Restraint in pediatric dentistry in the Norwegian Public Dental Service

An exploratory and descriptive study using qualitative and quantitative methods

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To explore the use of restraint in pediatric dentistry has been a major interest for me, especially after working as a TOO-dentist at the Centre for Odontophobia (TkVestland), but it has also been challenging. This thesis contributes with a small, but hopefully important, piece of research to the dental health service. I hope that the knowledge from this thesis can preposition for discussions about restraint in the dental environment, which I have experienced both in the specific data collection and during presentations that are desired among many dentists.

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Abstract

Background: Over the past decades, the use of restraint has been a topic of interest in a variety of health services. When restraint is set on the agenda, both the use of, the experiences of, and possible consequences of restraint are illuminated. However, in pediatric dentistry, existing studies are predominantly concerned with the degree to which dentists accept or would use restraint. Therefore, research on the use of restraint during pediatric dental care and dentists' in-depth perspectives regarding this practice is scarce. Additionally, the patients' experiences of restraint and the possible consequences of being restrained have received little attention in the extant literature. At the onset of this project, to what extent and in what situations restraint is used and experienced in pediatric dentistry in Norway were unknown.

Aims: The overall aim of this thesis was to explore and develop knowledge on the use of restraint during pediatric dental treatment in the Norwegian Public Dental Service (PDS). This was investigated through two sub-studies. Specifically, sub-study I aimed to explore the perspectives of non-specialist dentists on the use of restraint when administering dental treatment to children and adolescents from 0 to 18 years of age in the Norwegian PDS. Sub-study IIa aimed to estimate the prevalence of self-reported history of restraint in children and adolescents when receiving dental care by non-specialist dentists. Additionally, Sub-study IIa assessed the differences in dental fear and anxiety (DFA), intra-oral injection fear, and trust in dentists between patients with and without a self-reported history of restraint. In sub-study IIb, the primary purposes were to examine dental records of Norwegian adolescents' with and without self-reported history of restraint for information about oral health, total scheduled time in the PDS (dental appointments, cancelled, and missed appointments), and reluctant behavior and/or DFA. Another purpose of sub-study IIb was to explore the dental records for information recorded by the dentist concerning the use of restraint.

Methods: This thesis has an exploratory and descriptive design using both qualitative and quantitative methods throughout the two sub-studies. In sub-study I (qualitative part), two focus groups were conducted with a total of nine public non-specialist dentists employed in the Norwegian PDS. The interviews were audio-taped and transcribed verbatim directly after the interviews and the analysis of the data from the focus group interviews was conducted through Thematic Analysis by Braun and Clarke. Sub-study IIa (quantitative part) was a cross-sectional questionnaire study of 17- and 9-year-olds in Hordaland, Norway. The data was collected electronically via text messages sent from the PDS and analyzed by employing

descriptive statistics and Mann-Whitney U tests. Sub-study IIb was a continuation of sub-study IIa and was a retrospective review of dental records of 17-year-old patients with and without a self-reported history of experiencing physical restraint during dental care. The data was analyzed by employing descriptive statistics, Mann-Whitney U tests, and chi-square tests.

Results: Sub-study I identified that some dentists use restraint to provide the necessary dental treatments, mainly in combination with conscious sedation. However, when restraint is used, dentists are concerned with difficult ethical considerations. In sub-study IIa, 2.9% of 17-year-olds and 4.2% of 9-year-olds had a self-reported history of physical restraint. In general, patients with this history had higher DFA and intra-oral injection fear, and lower trust in dentists, compared to participants without a history of self-reported restraint. In sub-study IIb, 17-year-olds with a self-reported history of a physical restraint (n=18) had poorer oral health, higher total scheduled time in the PDS, and more descriptions of reluctant behavior and/or DFA, compared to the self-reported non-restraint group (n=188). Finally, there was no significant association between patient-reported history of restraint and dentist-recorded use of restraint in the patients' dental records.

Conclusions: Each of the sub-studies contributes new knowledge to the limited literature on the use of restraint in the Norwegian PDS. Being in situations where the dentist finds it necessary to use restraint to complete dental treatment, seems to be a difficult clinical challenge that can place a strain on both dentists and patients. Considering the patients, the main results were that young patients with a self-reported history of restraint during dental treatments had higher DFA and more reports of reluctant behavior, higher total scheduled time in the PDS, and more unmet dental treatment needs compared to patients without a self-reported history of restraint. However, from the work in this thesis, it was not possible to determine if there is a causal relationship between the use or experience of restraint and either DFA or reluctant behavior, higher total scheduled time in the PDS, dental treatment avoidance, or poorer oral health. Future studies should explore the potential negative consequences of restraint during dental treatments and whether personal risk factors, such as early dental caries and cognitive vulnerability, increase one's susceptibility to report a history of restraint. Based on the present results, the use and experience of restraint should be examined and disclosed in more definitive terms in pediatric dental care.

Abstract in Norwegian

Bakgrunn: I løpet av de siste tiårene har det vært fokus på bruken av tvang i flere helsetjenester. Når tvang blir satt på agendaen vil både bruken av, opplevelsen av og mulige konsekvenser av tvang bli belyst. Ved barnetannbehandling er eksisterende studier likevel i hovedsak fokusert på i hvilken grad tannleger aksepterer eller bruker tvang. Derfor er forskning om bruken av tvang ved barnetannbehandling og tannlegers dybdeperspektiver på denne praksisen mangelfull. Videre har pasienters opplevelser av tvang og mulige konsekvenser av å bli tvunget fått lite oppmerksomhet i litteraturen. Når dette prosjektet ble etablert var det ukjent i hvilken grad og i hvilke situasjoner tvang er brukt og opplevd ved barnetannbehandling i Norge.

Hensikter: Den overordnede hensikten med denne avhandlingen var å utforske og utvikle kunnskap om bruken av tvang ved barnetannbehandling i Den offentlige tannhelsetjenesten (DOT) i Norge. Dette ble utforsket gjennom to delstudier. Spesifikt var hensikten i delstudie I å utforske ikke-spesialist-tannlegers perspektiver på bruk av tvang ved tannbehandling av barn og ungdom fra 0-18 år i DOT i Norge. I delstudie IIa var hensikten å estimere prevalensen av selv-rapportert historie om tvang ved tannbehandling for barn og ungdom. Videre ble det i delstudie IIa vurdert om det er forskjell i frykt og angst for tannbehandling, intra-oral injeksjonsfrykt, og tillit til tannleger for pasienter med og uten selv-rapportert historie om tvang. I delstudie IIb var de primære hensiktene å undersøke tannhelsejournalene til ungdommer med og uten selv-rapportert historie om fysisk tvang ved tannbehandling for informasjon om oral helse, total tidsbruk i DOT (oppmøtte timer, avbestilte og uteblitte timer), og motstandsatferd og/eller frykt og angst for tannbehandling. En annen hensikt i delstudie IIb var å utforske om tannhelsejournalene inneholdt informasjon om bruk av tvang journalført av tannlegen.

Metoder: Denne avhandlingen har et utforskende og deskriptivt design der det er brukt både kvalitative og kvantitative metoder utført i to delstudier. I delstudie I (kvalitativ del), ble det gjennomført to fokusgruppeintervjuer med totalt ni offentlige ansatte ikke-spesialist-tannleger i DOT i Norge. Det ble tatt lydopptak av intervjuene som deretter ble transkribert ordrett like etter intervjuene. Analysen av dataene fra fokusgruppeintervjuene ble utført med Tematisk analyse av Braun og Clarke. Delstudie IIa (kvantitativ del) var en tverrsnittsstudie blant 17-åringer og 9-åringer i Hordaland, Norge. Datamaterialet i denne studien ble samlet inn elektronisk via tekstmeldinger sendt fra DOT og de ble analysert med deskriptiv statistikk og

Mann Whitney U tester. Delstudie IIb var en fortsettelse av delstudie IIa og var en retrospektiv tannhelsejournalgjennomgang for 17-år gamle pasienter med og uten selv-rapportert historie om fysisk tvang ved tannbehandling. Datamaterialet ble analysert med deskriptiv statistikk, Mann-Whitney U tester og kji-kvadrat tester.

Resultater: I delstudie I ble det identifisert at noen tannleger bruker tvang for å kunne gjennomføre nødvendig tannbehandling, i hovedsak i kombinasjon med bevisst sedasjon. Samtidig var tannlegene opptatt av at det er knyttet vanskelige etiske vurderinger til bruken av tvang. I delstudie IIa ble det funnet at prevalensen for selv-rapportert historie om fysisk tvang var 2.9% for 17-åringene og 4.2% for 9-åringene. Generelt hadde pasienter med selv-rapportert historie om tvang høyere frykt for tannbehandling, høyere intraoral injeksjonsfrykt og lavere tillit til tannleger sammenlignet med dem uten selv-rapportert historie om tvang. I delstudie IIb ble det identifisert at tannhelsejournalene til 17-åringene med selv-rapportert historie om fysisk tvang (n=18) hadde dårligere tannhelse, høyere totalt tidsbruk i DOT, og flere beskrivelser av motstandsatferd og/eller frykt og angst for tannbehandling sammenlignet med den selv-rapporterte ikke-tvang gruppen (n=188). Det var ikke signifikant sammenheng mellom pasient-rapportert historie om fysisk tvang og tannlege-journalført bruk av tvang i pasientenes tannhelsejournaler.

Konklusjoner: Hver av delstudiene bidrar med ny kunnskap til den begrensede litteraturen om bruk av tvang ved barnetannbehandling i DOT i Norge. Tvangssituasjoner ser ut til å være vanskelige kliniske utfordringer som kan være krevende både for tannleger og pasienter. Hovedresultatene angående pasientene var at de med selv-rapportert historie om fysisk tvang ved tannbehandling hadde høyere frykt for tannbehandling og flere rapporteringer av motstandsatferd, høyere totalt tidsbruk i DOT og mer umøtt behandlingsbehov sammenlignet med pasienter uten slik historikk. Utfra arbeidet i denne avhandlingen er det likevel uvisst om det er kausal sammenheng mellom bruken av eller opplevelsen av tvang og frykt og angst for tannbehandling, motstandsatferd, høyere totalt tidsbruk, tannlegerelatert unngåelse eller dårligere oral helse. Fremtidige studier bør utforske mulige negative konsekvenser av tvang ved tannbehandling, og om personlige risikofaktorer som tidlig karies og kognitiv sårbarhet er predisponerende faktorer for selv-rapportert historie om tvang. Med kunnskap fra denne avhandlingen ser det ut til å være nødvendig at bruken av og opplevelsen av tvang tydeligere blir satt på agendaen når det gjelder tannbehandling for barn.

Abbreviations

AAPD: American Association of Pediatric Dentistry

BMT: Behavioral management technique

BMP: Behavioral management problems

BSPD: British Society of Pediatric Dentistry

CBT: Cognitive behavioral therapy

CFSS-DS: Children's Fear Survey Schedule–Dental Subscale

DBS: Dental Belief Survey

DFA: Dental fear and anxiety

DMFT: Decayed/Missing/Filled Teeth

DOT: Den offentlige tannhelsetjenesten [Public Dental Service]

IOIF-s: Intra-Oral Injection Fear-scale

PDS: Public Dental Service

UNCRC: The United Nations Convention on the Rights of the Child

TkVestland: Tannhelsetjenesten kompetansesenter Vestland [the Oral Health Centre of Expertise in Western Norway]

List of publications

This thesis is based upon three papers:

Paper I

Aarvik RS, Agdal ML, Svendsen EJ. Restraint in paediatric dentistry: a qualitative study to explore perspectives among public, non-specialist dentists in Norway. Acta Odontol Scand. 2021. DOI: 10.1080/00016357.2021.1881159

Paper II

Aarvik RS, Svendsen EJ, Agdal ML. Held still or pressured to receive dental treatment: self-reported histories of children and adolescents treated by non-specialist dentists in Hordaland, Norway. Re-submitted to Eur Arch Paediatr Dent.

Paper III

Aarvik RS, Svendsen EJ, Agdal ML. Patient-self-reported history of restraint among 17-year-olds: a retrospective study of records by non-specialist dentists in the public dental service in Hordaland, Norway. Eur Arch Paediatr Dent. 2022. DOI: 10.1007/s40368-022-00710-0

These papers will be referred to as **Paper I, II, and III**.

Scientific environment

This PhD-project was conducted from autumn 2019 to spring 2022 at:

[a] *The Oral Health Centre of Expertise in Western Norway, Bergen, Norway*

[b] *The Institute of Health and Society, Faculty of Medicine, University of Oslo, Oslo, Norway*

Main supervisor: PhD, Specialist in pediatric dentistry, Maren Lillehaug Agdal[a]

Co-supervisor: Associate professor, Pediatric nurse specialist, Edel Jannecke Svendsen[b]

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1 Introduction

Dental health services' main aim is to ensure lifelong good oral health for their patients [1]. In general, the health services in Norway follow the fundamental principle that all healthcare should be voluntary [2]. The Norwegian Public Dental Service (PDS) is responsible for providing free follow-ups and necessary dental treatments to all individuals aged zero–18 years [1]. Although the PDS caters to a very high amount of patients in this demographic [3], some children still face challenges when receiving dental care [4-6] and they may resist oral examinations or treatments for various reasons [6, 7]. In turn, resistance of medical treatment may sometimes result in dentists administering treatments against children's will.

Dental avoidance is common among patients with dental fear and anxiety (DFA) [8, 9]. With a focus on administering dental treatment to ensure lifelong good oral health, the fact that 11.7% of Norwegian 10- to 16-year-olds report high DFA is a considerable problem for dentistry [5]. In the past decades, substantial research has been performed to understand the etiology and maintenance of DFA [6-8, 10, 11]. DFA is shaped by a complex bundle of contributing factors and there is a consensus that these factors are divided into endogenous and exogenous components [12, 13]. A high proportion of patients report negative dental experiences in relation to their DFA and while this is not the only reason for DFA, it is an important factor. Negative dental experiences constitute a range of events, such as painful dental treatment, lack of control, and bad patient-dentist relationships [14-18]. To the best of our [a] knowledge, restraint has not explicitly been acknowledged as a negative dental experience. Considering that restraint experiences involve a procedure being performed against the individual's will, they may include both painful procedures and feeling a lack of control. However, if and how a history of restraint plays a role in DFA is unknown.

DFA and many other conditions may cause challenges for children receiving dental treatment [6, 7]. By implementing behavioral management techniques (BMTs), dentists working with children strive to provide them with the necessary dental treatments [19-22]. BMTs are important as they have a direct impact on the administration of pediatric dental treatments [23]. The different BMTs, especially the degree to which dentists or parents accept the different BMTs, have received attention in the literature [24-26]. Among both dentists [24] and parents [25], the

[a] "I" will be used to refer to the author of this thesis. "We/our" is used to refer to the research team.

acceptance of the use of restraint has decreased considerably since the late 20th century. Nonetheless, the literature does not describe what lies behind these assessments.

Furthermore, the use of restraint may conflict with the United Nations Convention on the Rights of the Child (UNCRC) [27]. In Norway, as in many other countries, there are unclear laws and guidelines regarding the use of restraint in pediatric healthcare [28], leaving the decision to perform BMTs up to the individual healthcare professional. The dental literature mostly involves medical knowledge about the consequences of non-completed dental treatments, rather than the consequences of administering dental treatments against children's will. Therefore, it is likely that the treatment choice is based on concrete medical treatment needs and not the possible long-term consequences of administering treatments with the use of restraint. The dental literature also lacks knowledge on children's experiences of restraint. By filling this knowledge gap on children's experiences, individual factors, and the possible consequences of restraint use, dentists can make even more knowledge-based decisions, weighing the pros and cons for each individual situation.

Overall, the use of restraint has received little attention in pediatric dental research and in dental health services. In fact, the topic seems to be taboo and sensitive for many. In the Norwegian PDS, it is unknown to what degree and for which situations restraint is used during pediatric dental care. In general, it is also unclear if the use of restraint during dental care has consequences for the child who experiences it. One perspective can be that it is a good technique to get the dental treatment "over with," and a quick and adequate solution that saves time and resources. Another perspective, as research on restraint in other fields of healthcare indicates, is that it might lead to both social, developmental, and psychological challenges for the child [29, 30]. As such, the knowledge gap regarding restraint use and possible consequences suggests many under-explored questions.

Therefore, exploratory and descriptive research is necessary to gain more knowledge about the use of restraint in pediatric dental care and to inform future prospective studies that can provide information about possible related consequences. Thus, the overall aim of this thesis was to explore and develop knowledge on the use of restraint during pediatric dental treatment in the Norwegian PDS.

1.1 Outline of the thesis

This thesis comprises eight chapters, including the reference list. Each sub-study is presented as an original paper (Papers I–III) and attached after the references. Chapter 1 introduces the topic and Chapter 2 outlines the project background. Chapter 3 presents the overall aim and the specific aims of each sub-study. Chapter 4 describes the materials and methods. Chapter 5 presents a summary of the main results of the sub-studies, divided according to the three respective papers. Chapter 6 discusses the main results, followed by a methodological discussion. Chapter 7 presents the conclusions, including clinical and research implications. Finally, Chapter 8 provides the reference list, followed by the Original papers and Appendices.

2 Background

In the pediatric dental literature, evidence-based knowledge on restraint and its possible repercussions is sparse, but the research stemming from health services at large indicates that children's experiences of restraint can lead to physical, psychological, and developmental challenges [29, 30]. Unless otherwise stated, the background chapter presents the basis of available knowledge from when the project was developed and during its initial phase (2019).

2.1 Restraint

Because research on treatments against the patient's will in pediatric dentistry is sparse, it is difficult to find fitting concepts to cover the phenomenon and simultaneously adjust to the Norwegian context. The different concepts used in the literature vary slightly between cultures, borders, societies, and individuals. Therefore, it is important to discuss the core concept and describe how it is understood within the context of this research.

2.1.1 The definition of restraint in this thesis

In the medical context, the *Norwegian Medical Encyclopaedia* defines "restraint" [tvang] as administering medical actions that the patient (or the user) resists, or actions that are so comprehensive that the person normally would have resisted. It is additionally specified that common requests and by hand guidance are not considered restraint. Thus, the concept of "restraint" involves different means of administering a treatment against a person's will [31]. In this study, it is described as the administration of dental treatments against a child's will.

2.1.2 The variation in concepts describing the restraint phenomenon

As noted, the topic of restraint lacks conceptual clarification in many healthcare fields. Physical/active immobilization, passive immobilization, physical restraint, protective stabilization (against the patient's will), temporary restrictive behavior management, physical interventions, and (clinical) holding are all concepts in the literature that can fit the above description [21, 28, 32-34]. These different and often value-laded concepts highlight the necessity of discussing and making a conscious decision regarding which concept this thesis should use.

In dentistry, there have been discussions and dividing opinions regarding how to conceptualize the phenomenon of administering a treatment against someone's will and without one's acceptance [21, 33]. The American Academy of Pediatric Dentistry (AAPD) recently chose to use the concept "protective stabilization," instead of physical restraint and medical immobilization [33]. This decision was made because the concept of restraint "has limitations when applied to dentistry as it does not accurately or comprehensively reflect the indications or utilization of restraint in dentistry" [33, p. 326]. Specifically, the AAPD defines protective stabilization as "any manual method, physical or mechanical device, material, or equipment that immobilizes or reduces the ability of a patient to move his arms, legs, body, or head freely" [33, p. 325-326]. Protective stabilization is divided into active and passive immobilization: *active* refers to an immobilization executed by parents/caregivers or dental health personnel, while *passive* refers to the utilization of mechanical restraining devices. Conversely, in Australia, Armfield and Heaton opted for the concept of restraint and declared that BMTs involving the forced restriction of a child's movements are "somewhat euphemistically called protective stabilization" by others [21, p. 402]. In a policy document from the British Society of Pediatric Dentistry (BSPD), "clinical holding in dentistry" is used to indicate administering a dental treatment against someone's will [34].

In Norway, the Norwegian concept "tvang" is frequently used to describe an action being taken against an individual's will and acceptance. It can be translated as "restraint," "coercion," or "force" in English. In the *Oxford Dictionary of English*, restraint is described as "a measure or condition that keeps someone or something under control." An alternative concept, "coercion," is defined in the *Oxford Dictionary of English* as "the action or practice of persuading someone to do something by using force or threats." However, coercion has traditionally not been used in healthcare services outside of psychiatry and therefore, does not seem relevant in the pediatric dental context. Finally, force is defined as "strength or energy as an attribute of physical action or movement," which in this setting seems limiting, because it only includes the physical aspect of the phenomenon under study.

To adjust the concept to the Norwegian context, where this study was performed, we opted to use the concept of "restraint" [b]. There are several reasons for this choice. The protective intention, which "protective stabilization" can give impression of, is important and valuable in

[b] As described above, the cited references sometimes use concepts other than restraint, but for consistency, "restraint" will be used in this thesis for all situations fitting the aforementioned definition.

clinical practice. However, the action of being held down when one is frightened or resisting treatment is likely not compatible with feeling protected. As this thesis emphasizes the child's perspective as well as that of the dentist, we deliberately chose the broader concept of "restraint." The intention is to contribute to shifting the attention to how children experience treatments that are administered against their will and not only the specific technique. Further, "protective stabilization" only involves a physical method. This choice is supported by existing literature, such as research in the nursing field [28, 31, 35-38], and "restraint" has also been applied in research on pediatric dentistry, both internationally [21] and in Norway [39, 40].

2.1.3 Different dimensions of restraint

There are different dimensions that cover different aspects of the restraint phenomenon. These are known in mental and pediatric healthcare in hospitals, but can also be useful as a theoretical framework for the use of restraint in the dental health service.

In medical literature, restraint is typically defined through three subgroups: physical, psychological, and pharmacological/chemical [28, 31, 41, 42]. Physical restraint refers to the use of physical force to prevent the patient from moving [28, 31, 42]. Psychological restraint is the process of limiting intentions by talking about it and reasoning, or by changing circumstances to ensure that the individual is forced to accept the limitations [31]. In other words, psychological restraint involves verbally or non-verbally forcing a child to accept the treatment without the option of resisting, and it has been suggested that psychological restraint can lead to a physical action/physical restraint [31]. Finally, pharmacological/chemical restraint involves the use of sedatives or other medications to calm the patient and control his/her behavior [31, 41]. Within different healthcare fields, there has been some disagreements regarding whether this should be termed pharmacological or chemical restraint.

Moreover, the restraint phenomenon is also commonly divided into formal, informal, and experienced restraint [28, 43]. The formal use of restraint is regulated by law. In Norway, the use of restraint is regulated for individuals without competence to consent aged 16 years and older in the Patient and User Rights Act (§ 4A) [2]. Informal restraint is not regulated by law, often not recognized by health personnel, and commonly seen in pediatric healthcare [28, 36]. This means that with parental informed consent for the treatment, health personnel can administer health treatments against a child's will and this is not considered formal restraint. Experienced

restraint is assessed by the patients and refers to experiencing an action being done against the patient's will, regardless of the restraint's informal or formal nature [43].

2.1.4 Possible consequences of restraint

Research on the consequences of restraint in pediatric health care is ethically challenging and there is a scarcity of studies on the matter. However, the use of restraint has received more attention in other fields of healthcare compared to dentistry. The related findings indicate, as earlier noted, that experiencing restraint can have negative psychological, social, and developmental effects on the child [29, 30]. For instance, one qualitative observational study found that children who experience physical restraint during hospitalized health care can show anger, resistance, and discomfort [35]. Diseth et al. revealed that the most severe consequence of using restraint on chronically ill children is the onset of dissociative disorders [30]. This specifically occurs if a child experiences not being "good enough" on a basic level, when their thoughts and feelings are not integrated, or the child does not feel safe and "coherent" as a person [30]. Being subjected to restraint can create an immense sense of having a "lack of control," which is known to contribute to anxiety [44]. The overload of stress and possibility of a breach of trust may result in an impaired ability to form trustful clinical relationships [30], which has possible consequences related to the provision of health care [45].

2.1.5 Existing recommendations on the use of restraint in pediatric dentistry

The AAPD (updated 2020) [33] and BSPD [34] provide guidelines on the use of restraint. In most European countries, it is likely that the BSPD guidelines reflect the current or similar statuses concerning restraint in relation to pediatric dentistry. For dentists in Norway, in February 2020, there were signs that the use of restraint will be included in the new national guidelines for public dentists, specifically pertaining to the dental treatment of children (TannBarn 2) [46]. According to the AAPD and BSPD guidelines, the use of restraint is employed if immediate diagnosis or treatment is necessary and the patient is uncooperative, due to a lack of maturity or physical/mental disability [33, 34]. The BSPD guidelines underline that restraint should be a last resort, to be used only when strategies to promote cooperation have failed [34]. Further, an assessment should be performed when considering the use of restraint to determine if the treatment should be administered under conscious sedation [34]. Thus, restraint should only be

used after a risk assessment [34]. Additionally, restraint must be performed by trained personnel [34, 47] with the informed consent [33, 34], and the process must be documented [33, 34]. A debriefing with the child and family after treatment is recommended [33, 34].

To help dentists assess whether to use physical restraint, the BSPD provides a list of questions that should be considered in advance [34]:

1. Is what you are proposing really in the patient's best interest?
2. Is the patient happy to go ahead? If not, is there an alternative?
3. If there is no alternative, what will really be the outcome if you do not proceed with treatment?

Contrary to the field of pediatric dental care, the use of restraint has received considerable attention in several other health services, such as mental health, over the past decades. Even though there are great differences between mental and dental health services, it is possible that some mental health service knowledge can be transferable to dental healthcare. For instance, research from mental health services has shown that if the restrained treatments are administered with care and respect, in such a way that the patient understands that it is in his/her best interest, many patients experience it as less negative [43]. Further, if one is to succeed in the aim of decreasing the use of restraint, the aim must be well anchored and supported by the management [43]. To reduce the use of restraint, a follow-up debriefing among health personnel has been shown to be effective [48, 49]. Other positive effects of this debriefing are increased learning, interdisciplinary collaboration, and team cohesion for health personnel [49]. In hospitalized pediatric healthcare, physicians and nurses report that keeping parents safe and calm are important to avoid escalating situations in such a way that restraint becomes necessary [36].

2.2 Dental fear and anxiety

The overall intention of dentistry is to promote the dental health of the population and provide the necessary preventative measures and treatments for each individual. For dental health personnel, helping patients establish and prepare for lifelong good oral health may be dependent on good communication skills [19], in addition to many other competencies. When performing restraint, the patient-dental health personnel relationship may be at risk and it has

been suggested that restraint might influence the patient's DFA [50-54]. This chapter provides a short summary of evidence-based knowledge on dental fear, anxiety, and phobia.

Although fear, anxiety, and phobia are often used interchangeably, these terms are distinctly different [44]. Fear is the emotional and behavioral condition that arises for an individual in real danger, either directly or in terms of a non-imaginary threat [55]. Anxiety is when emotional, behavioral, and cognitive conditions or reactions are out of proportion to the actual threat [55]. Phobia is a clinical diagnosis that can only be made by a clinical psychologist or physician [56]. As this thesis considers a clinical perspective, it uses the term DFA to refer to "strong negative feelings associated with dental treatment among children and adolescents whether or not the criteria for a diagnosis of dental phobia are met" [6].

The prevalence of DFA among Norwegian adolescents has decreased from 1996 to 2016 [57] and it also usually decreases with age [6, 10]. The prevalence of dental phobia is difficult to measure in epidemiological research and only a few studies have reported on it [44]. However, it is generally expected that the prevalence of dental phobia is stable across populations at approximately 3% to 5% [44]. Currently, there are several treatment methods available for dentists to address fearful and anxious children and adults [21, 44, 58-60].

2.2.1 Etiology of dental fear and anxiety

The etiology of DFA is multifactorial and complex, and over the past four decades, comprehensive research has been performed in the field. Since the late 20th century, it has become common to divide the etiology of DFA into exogenous and endogenous sources or components [12, 13], as first suggested by Weiner and Sheehan [61].

Endogenous sources are connected to internal reasons, such as personal vulnerability, heritage, and personality [11, 12, 62]. Locker et al. described this as "constitutional vulnerability to (dental) anxiety disorders" [12]. Personal vulnerability factors, such as being generally fearful or having specific negative emotions, may explain why negative experiences have a lasting impact on some individuals, but not on others [11, 62, 63].

Exogenous sources are connected to outer influences, either indirectly or directly [12, 13, 61]. Indirect exogenous sources refer to the causes of DFA that are influenced by others in close relationships [17, 64], such as parents telling their child that they are afraid of going to the dentist.

This source of DFA is often referred to as a vicarious experience or vicarious learning [17, 64]. Earlier negative experiences are often referred to as conditional learning or conditioning experiences, and direct traumatic experiences are frequently reported as a cause of DFA [14-18].

2.2.2 Negative dental experiences

The literature has described negative experiences as dental situations involving pain, lack of control, or having inter-personal problems with the dentist [14-18]. Research shows that many positive experiences lower the risk of developing DFA, while one negative experience early in life, as well as multiple negative experiences, contribute to a higher risk of long-lasting DFA [14, 15, 18]. For the individual, what constitutes a negative (dental) experience is subjective and depends on individual factors, including the patient-therapist relationship. Additionally, if the onset of DFA occurs in the child's younger years the causes of DFA seems more likely to be exogenous, while for adolescents, endogenous causes are more likely [12]. To our knowledge, restraint experiences have not been explicitly included as negative experiences in research.

A recent review in the *Lancet*, addressing adverse childhood experience studies, underscored how multiple adverse childhood experiences are a risk factor for some health conditions [65]. In dentistry, multiple unpleasant dental care experiences are associated with poor oral health and reduced oral health-related quality of life [66]. Negative experiences are also associated with uncooperative behavior and low utilization of dental services [14-16, 67, 68]. However, it is suggested that different kinds of negative experiences play a lesser role in DFA compared to perceptions of uncontrollability, unpredictability, dangerousness, and disgustingness [69].

2.2.3 The vicious cycle of dental anxiety

In 1984, Berggren and Meynert presented what became the foundation for understandings of DFA's maintenance [9]. Their theory presents the relationship between DFA and dental avoidance, commonly referred to as "the vicious cycle of dental anxiety." This cycle indicates that DFA may lead to dental avoidance and in turn, the deterioration of oral health, which may cause feelings of guilt, shame, and inferiority that can again reinforce or maintain DFA [9]. Since then, this theory has been tested and further developed by several researchers [8, 70-72]. However, the ways in which experiencing restraint may play a role in this cycle is unclear.

2.3 Dental behavioral management problems

Dental behavioral management problems (BMP) is described as "a collective term for uncooperative and disruptive behaviors, which result in delay of treatment or render treatment impossible, regardless of the type of behavior or its underlying mechanism(s)" [6]. Dental BMP is based on the dentist or dental health personnel's assessment and description of the child during the dental visit [6]. In 1987, Holst and Crossner found that 8% of children (aged three to 16 years) in Sweden showed signs of BMP [73]. Similarly, in 1994, Klingberg et al. found a 10.5% prevalence of BMP among young children (aged four to six and nine to 11 years) in Göteborg, Sweden [74]. Wogelius et al. identified a much higher prevalence (37.2%) in a population of Danish children (aged six to eight years) [75]. Moreover, Arnrup et al. found that Swedish children (aged four to 12 years) with BMP are more impulsive than other patients [76], while Blomqvist et al. specified that Finnish children with attention-deficit/hyperactivity disorder had more BMP than those in the control group [77]. To the best of our knowledge, there have been no studies to date on the prevalence of BMP among children in Norway.

BMP is likely to have multifactorial origins with several potential etiological factors, such as general fear, temperament, and general behavior and attention [6]. The main cause of BMP is thought to be painful or otherwise negative dental treatment experiences [6]. Although BMP is associated with DFA, not all patients with BMP have DFA and vice versa [78]. In clinical settings, the distinction between BMP and DFA is difficult. Klingberg found that 27.3% of patients with recorded BMP had DFA (defined as a score of ≥ 38 on the Children's Fear Survey Schedule–Dental Subscale [CFSS-DS], proxy report), while 61.0% of patients with DFA had a history of BMP [78]. In general, individuals with BMP are more likely to miss dental appointments, have poorer oral health, and have previously experienced dental treatments without local anesthetic, compared to their counterparts [74].

2.4 Behavioral management techniques with focus on restraint

The field of pediatric dentistry has developed a wide range of BMTs [c] to accommodate the need for children, adolescents, and individuals with special healthcare needs to receive the necessary dental care [19-23, 33]. These techniques range from the tell-show-do method to the use of restraint. As Nelson noted, "by implementing the appropriate behavior guidance strategy, a healing relationship is maintained and the child is equipped to receive dental treatment throughout their lifetime" [47]. Because the topic of this thesis is restraint, the following sections will mainly focus on historical perspectives on restraint.

2.4.1 Historical perspectives on the use of restraint in pediatric dental care

Since the 1980s, the perspectives of dental health personnel and parents on the use of different BMTs have been examined in many countries.

Present knowledge on the use of restraint from dentists' perspectives

Existing knowledge regarding dentists' views on restraint in pediatric dentistry is sparse, as most studies only mention restraint as one of the several BMTs [24, 79-81]. However, in educational programs and among dentists, the use of restraint has been accepted for a long time, but the notion that it may lead to psychological challenges gained increased attention throughout the late 20th/early 21st century [50-52, 82-84].

In 1990, Allen et al. reported that among many pediatric dentists in the US, restraint was preferred over the tell-show-do technique, based on the perception that it is less time consuming and because not all dentists possess the specific behavioral skills needed to perform the tell-show-do technique [81]. In 1991, Australian dentists reported the occasional use of "gentle" restraint, performed by parents, to help patients with anxiety or behavioral problems, but physical restraint and hand-over-mouth techniques were generally not used [85]. At the beginning of the 21st century, Newton et al. found that dental students and dentists in the UK assessed the use of restraint as being most acceptable for children with learning disabilities, very young patients, and sedated patients [86]. Further, in 2004, Newton et al.

[c] In later years, the concept of "behavioral management" has been changed to "behavioral guidance," as it is more suggestive of successful coping and positive experiences. In this thesis, "behavioral management" is chosen, because it is used in most of the referred articles, which is understandable given that this thesis explores a BMT that does not support patient autonomy.

examined UK pediatric dentists' views on the hand over mouth technique and the use of physical restraint [87]. While very few accepted and used the former technique, 62.0% responded that the latter method could be appropriate for certain patients with disabilities [87]. Additionally, several practitioners reported the use of restraint as being appropriate for very young (39.0%), premedicated (20.0%), and physically resistive patients (14.0%) [87]. As the hand-over-mouth technique [50, 82, 83] has not been used in Norway, it is not further emphasized in this thesis.

In 2004, Adair et al. revealed from a survey of members of the AAPD that the restraint method was used by 73.0% of dentists, 88.0% of dental personnel, and 86.0% of parents in the US [79]. Further, in 2007, almost half of the surveyed American pediatric dentists considered restraint with premedication during dental treatments to be a successful treatment method [88]. In 2017, Rønneberg et al. found that approximately 10% of general (non-specialist) dentists in Norway would use physical restraint, if necessary, to complete a dental procedure on a five-year-old with pulpitis and pain due to severe caries [40]. In Brazil, a dental record review of zero- to 19-year-olds in a specialist clinic showed that the use of restraint was common, and patients with intellectual disabilities were seven times more likely to experience restraint during dental treatments than patients with medical conditions, such as chronic kidney disease, sickle cell anemia, and HIV [89].

Historically, there have been great variations in the degree to which restraint has been used and accepted by dentists in different parts of the world, and location, caries' prevalence, and educational backgrounds seem to influence the choice of BMT [84]. Further, in 2016, Davis et al. discovered that among the members of the American board of Pediatric Dentistry, a variety of characteristics, including practitioner sex, practice context, geography, and parental acceptance, influenced dentists' acceptance and use of restraint [90]. In summary, even across borders and cultures, there has been a relatively large shift in attitudes toward BMTs throughout the past decades and restraint is among the less accepted techniques [24].

A debate about the use of restraint among pediatric dentists

At the beginning of the 21st century, Casamassimo et al. noted a paradigm shift in the use of BMTs in the US [91]. American pediatric dentists reported that the changes in parenting style during their career had worsened children's behaviors and made them more assertive in the use of BMTs [91]. Almost simultaneously, an international debate regarding restraint among pediatric dentists was evoked in the field. In the literature, this debate appears to have begun

[92] with a case study on the use of restraint published in 2001 by Kunken et al. [93]. As a result, Kupietzky wrote an opinion-based position paper entitled "Strap him down or knock him out: Is restraint with conscious sedation an alternative to general anesthesia?" [94] Thereafter, several pediatric dentists with various perspectives participated in this debate and it is clear that cultural differences impact the views pediatric dentists have on the practice. In the UK perspective, Manley noted the following regarding restraint use: "Situations of conflict arise when it is considered in the interest of the child's health that action is taken against the will of the child" [95]. On one side of the debate, the central viewpoint was that restraint can be used if there is a safety concern or when no other alternatives exist. In contrast, there was the opinion that restraint cannot be used unless the situation is potentially life-threatening, suggesting that the process is entirely unacceptable [95, 96]. Furthermore, in a letter to the editor, Kupietzky opined that the use of general anesthesia should be considered chemical/pharmacological restraint [92]. Brunt and Wright indicated that based on their experience, many patients referred for treatment for high dental anxiety or phobia recalled an experience of restraint [51]. However, the debate was mostly based on personal experiences and not underpinned by evidence-based knowledge.

Parents' perspectives on the use and experience of restraint in pediatric dentistry

The research in this thesis does not examine parents' perspectives on restraint. However, their perspectives on BMTs are important for understanding pediatric healthcare. Therefore, a brief outline of current knowledge regarding parental [d] perspectives on this topic is provided below.

Over the last few decades, there appears to have been a big change in parental participation in pediatric treatment [97] and parents today are more active in decision-making regarding treatment choices [25]. Parental presence during dental treatment is also recognized and considered to be positive [98]. A similar change has been seen in the acceptance of BMTs. In 1999, Perez et al. reported that one-fourth of parents in Israel accepted physical restraint [99]. Contrary, in 2013, Peretz et al. performed a similar study among Israeli parents and found that only 1.1% of parents accepted physical restraint [100]. They found that in situations where the child did not cooperate with or accept the treatment, 76.0% of the parents stated that they would ask the dentist to stop and calm the child before further treatment was provided, while 13.0% would help the dentist complete the treatment even if it involved the use of physical

[d] In this context, parental/parents is also used for other adults/caregivers that have parental responsibility for the child.

restraint [100]. Similarly, Venkataraghavan et al. summarized studies on parental acceptance of BMTs in pediatric dentistry until 2016 and showed a reduced acceptance of restraint [25]. Further, Boka et al. found that anxious parents in Greece are more likely to prefer that their child receive dental treatment under general anesthesia than with the use of restraint [101]. Parents in Germany have reported to be more willing to accept different types of BMTs in emergency situations, but restraint is still the less accepted technique [102]. However, parents' ethnic background, language, and country of residence appear to play a large role in how BMTs are evaluated [103, 104].

Lately, parental acceptance of pharmacological methods has increased, while the acceptance of physical methods has decreased [105]. Among others, in 2005, Eaton et al. found that compared to earlier studies, parents accepted oral premedication to a higher degree [26]. This trend has continued, as White et al. identified in 2016 that four-fifths of the surveyed parents in the US/Tennessee thought sedation was safe and acceptable in the context of pediatric treatment [106]. These parents reported that the use of restraint is unnecessary if a child is sedated [106]. To the best of our knowledge, there are no published studies on the parental acceptance of restraint during pediatric dental treatment in Norway or Scandinavia.

Scarcity of research on children's perspectives on restraint

In general, research on children's perspectives on BMTs is limited, but several researchers have indicated that it is the patient's perception of the treatment, and not the actual dental treatment, that influences the development of DFA [16, 62, 69]. In 2013, Davies and Buchanan performed a mixed-method study to assess children's (nine- to 11-year-olds) acceptability and perceptions of dental communication and BMTs [107]. They found that the children generally accepted dentists' general communication, voice control, positive reinforcement, tell-show-do technique, sensation information, stop signals, distraction, and inhalation sedation [107]. As an important conclusion for further studies and clinical practice, they noted that nine- to 11-year-olds generally have a good capability to provide their own viewpoints, which is an advantage when dentists strive to tailor their practice toward individual preferences [107]. In another recent study that assessed adolescent perspectives, Fägerstad et al. explored the reasons for missed appointments in public dental clinics in Sweden [108]. Overall, they highlighted the importance of predictable dental visits where patients feel safe [108].

Despite that the patient's perspective is acknowledged in the research, there is, to the best of our knowledge, a lack of research on children's experiences of restraint during dental

treatments. Children's experiences are important for many reasons. Among others, the UNCRC underscores that children have the right to have an opinion and be listened to [27]. Thus, the fact that children's perspectives regarding restraint in dentistry have not been addressed in research is concerning.

2.5 Trust

Warren [109, p.1], a political scientists, described trust as "a judgement, however implicit, to accept vulnerability to the potential ill will of others by granting them discretionary power over some good. When one trusts, one accepts some amount of risk for potential harm in exchange for the benefits of cooperation." A trustful patient-health personnel relationship is essential in healthcare, because patients who use healthcare services rely on the assistance of healthcare professionals [45]. Accordingly, Grimen declared that to trust someone is to transfer power over to them [45]. As a result, trusting someone entails taking a chance that they will not abuse their power [45]. This means that the individual who gives trust becomes vulnerable. However, in situations where one cannot be optimistic about others and if one is suspicious of or assumes the worst in others, then trust is inhibited, resulting in distrust [109]. This may lead patients to not receive the necessary healthcare [45]. According to Grimen, because every consultation with a health professional represents the health service in question, each consultation has an impact on future consultations [45].

Evidently, the importance of trust has been valued in dental care [19, 110]. There is a known correlation between DFA and distrust in dentists [57, 111], and Norwegian dentists seem interested in a trustful dentist-patient relationship as they report utilizing many different BMTs in the treatment of fearful patients [112]. Recently, Strøm et al. identified a reduction in distrust in dentists from 15% to 6% ($p < .001$) among Norwegian 18-year-olds from 1996 to 2016 [57].

2.6 The Norwegian Public Dental Service

Much of the presented literature is difficult to transfer to the Norwegian context, because of cultural differences, and differences in access to and utilization of healthcare services. As context is highly important for discussions and research on restraint, a good description of the context makes it easier to assess the external validity of the research results. Therefore, this

chapter provides an overview of the Norwegian PDS and this thesis is written in consideration of this context.

The PDS in Norway is a statutory and publicly funded health service and each county municipality is required to offer dental health care to children, individuals with congenital developmental disabilities, individuals in institutions, and others who need home nursing care on a weekly basis [1]. Most dentists in the Norwegian PDS are non-specialists and of all dentists in Norway, approximately 1% are specialists in pediatric dentistry [113]. During the past decades, there has been an increased focus on individualized follow-ups [114] and lifelong good oral health [115]. The Norwegian PDS is responsible for providing an outreaching oral health service in which children and adolescents (aged zero to 18 years) have the right to receive free oral healthcare at a public dental clinic where they live or stay [1]. All children and adolescents aged three to 18 years shall have oral examinations at least every other year, and the PDS utilization among children and adolescents in Norway is very high [3]. In 2019, 96.0% and 93.3% of all 12- and 18-year-olds, respectively, had been examined or treated at least once during the last three years [3]. Before the age of three, parents and health (or other) services can contact the PDS for dental care whenever necessary, but the first routine examination is administered at the age of approximately three.

In general, the oral health of children and adolescents in Norway is good. In 2019, 81.1% of all five-year-olds, 63.5% of all 12-year-olds, and 29.4% of all 18-year-olds had no history of caries [3]. Still, some have a high burden of oral pathology in childhood and they often bring this issue into adulthood [116]. Additionally, several children and adolescents struggle with DFA [5, 57] and these individuals often avoid dental visits [8, 9]. Recent studies from Norway have shown that 11.7% of 10- to 16-year-olds [5], 11.6% of 15- to 18-year-olds [117], and 8.0% of 18-year-olds [57] report high DFA. Although there are no available studies on the prevalence of BMP in Norway, it is likely present to some degree, owning to the overlap between DFA and BMP [78].

2.7 Laws, legislation, conventions, and guidelines regulating Norwegian pediatric dental care

To understand the use of restraint in dental care in the frame of Norwegian professional practice and society, it is necessary to understand the consequences of the laws, legislation,

conventions, and guidelines that are relevant to restraint during healthcare. First of all, children's rights are underscored both in Norwegian constitutional law (§ 104) [118] and in the UNCRC [27]. In the UNCRC, Article 3 declares that adults shall act in the best interest of the child, Article 12 notes that the child has the right to be listened to, and Article 24 indicates that the child has the right to receive the best possible healthcare [27].

In Norway, restraint in pediatric healthcare is not explicitly regulated by either the Norwegian Patient and User Rights Act or the Health Personnel Act, except for its formal use for individuals above 16 years of age [2]. However, these laws include considerations that are transferable to restraint situations in pediatric health care. The Patient and Users Rights Act §4 declares that healthcare in general shall be voluntarily and include informed consent that is given after a thorough sharing of the information related to the patient's state of health and the content of the provided healthcare [2]. Consent can be given either explicitly or tacitly [2]. Tacit consent is considered valid if based on the patient's conduct and other circumstances, it is likely that the patient accepts the healthcare. For children aged younger than 16 years, it is their parents who can formally consent to treatment [2]. However, it is also specified that when children reach the age of seven and when younger children can form their own opinions, they must be provided with information and the opportunity to express their opinions before a decision is made [2]. Emphasis should be placed on the child's opinion, in accordance with the child's age and maturity [2]. If the child is aged 12 years or older, his/her opinion must be emphasized to a greater extent than if they are younger [2]. Consent given by children is called assent, because assent is the agreement of someone who is unable to provide legal consent to participate in an activity.

The purpose of the Norwegian Health Personnel Act is to contribute to patient safety and quality in healthcare, as well as trust in health personnel and services [119]. Regarding health emergencies, the law proclaims that health personnel must immediately provide healthcare when it is assumed that the help is urgently needed [119]. With the restrictions outlined in the Patient and User Rights Act § 4-9, necessary healthcare should be administered even if the patient cannot consent or is opposed to the treatment. The person administering healthcare shall write a medical record for the individual patient, containing relevant and necessary information about the patient and the administered healthcare [119]. This is further elaborated on in the Regulation on Patient Records § 8, in which documentation of the use of restraint is

required, with its actual and legal basis, as well as the decisions made by the control commission or county governor [120].

In 2019, a new law restricting the use of restraint in health services was drafted in Norway [121]. This draft underlined that children's rights have a stronger foundation compared to in the past, and concluded that new legislation must ensure that children's interests and rights are protected. The draft further highlighted that children in vulnerable situations should be listened to and their opinions emphasized [121].

In February 2020, new guidelines for the provision of oral health services in Norway for children and young adults (Tannbarn 2) were available for comment [46]. This draft indicated that if restraint is necessary to complete a dental treatment, the child should be under conscious sedation or referred for general anesthesia [46].

During the autumn of 2021, the second draft of the law restricting the use of restraint in health services in Norway was available for commentary [122]. This draft suggested that restraint should be defined as a mastery of resistance. Resistance is present when a person expresses a negative attitude toward healthcare that cannot be overcome without restraint [122]. When in doubt, one should consider it as resistance and if the person does not resist it, it should not be considered as restraint. It was suggested that these definitions also apply to individuals aged 12−16 years and for those aged younger than 12 years if they show particular maturity in the situation [122]. However, for young children, the concept of restraint should only be applicable for actions that are particularly comprehensive, such as holding the child still or other actions that prevent the child from moving freely [122]. In contrast to the current law [2], it is suggested that for the use of restraint, there should no longer be a need for parental consent, rather this should be up to the institution/health personnel to decide [122]. For children aged younger than 12 years, when the actions are not particularly comprehensive, it is suggested that the parents should decide [122].

2.8 Medical-ethical principles

The use of restraint is often related to ethical challenges [34, 37, 123]. In the BSPD guidelines on the use of restraint, it is underlined that most pediatric dental care can be postponed with no adverse consequences and it is often possible to proceed with treatment at a later time [34]. Still, patients can experience pain or their dental condition may deteriorate if dental procedures are

not administered [34]. Beauchamp and Childress' four medical-ethical principles, namely beneficence (ethics of doing good), non-maleficence (do no harm), autonomy (respecting patients as independent individuals and providing healthcare with informed consent), and justice (fairness and equality among individuals) [124], seem relevant to include in a study on the use of restraint.

2.9 Rationale for this study

Dental health services have undergone great changes over the past decades and patients' experiences in dental practice and psychological well-being are on the agenda for dental care [16, 62, 69, 125]. While patients still tell stories about dental treatments performed against their will [51], reflections on the use of restraint among dental practitioners have not received much attention in dentistry. When this study was designed, it was unclear if restraint exists to a measurable extent in the Norwegian PDS or if the stories represent exceptions. Despite research calls for evidence-based knowledge about restraint in pediatric dentistry [39, 84], the existing studies on restraint use in pediatric dental care are sparse, especially regarding dentists' in-depth perspectives on the use of restraint and children's experiences of restraint. Further, if and how the use of restraint is documented in pediatric patients' dental records is unknown.

3 Aims of the study

The overall aim of this thesis was to explore and develop knowledge on the use of restraint during pediatric dental treatment in the Norwegian PDS. Table 1 presents the titles and specific aims of the sub-studies (three papers) that comprise this thesis.

Table 1. The titles and aims of the three papers.

	Sub-study I (Paper I)	**Sub-study IIa (Paper II)**	**Sub-study IIb (Paper III)**
Titles	Restraint in paediatric dentistry: a qualitative study to explore perspectives among public, non-specialist dentists in Norway	Held still or pressured to receive dental treatment: self-reported histories of children and adolescents treated by non-specialist dentists in Hordaland, Norway	Patient-self-reported history of restraint among 17-year-olds: a retrospective study of records by non-specialist dentists in the public dental service in Hordaland, Norway
Aims	To explore the perspectives of non-specialist dentists on the use of restraint when administering dental treatment on children and adolescents from 0 to 18 years of age in the Norwegian PDS.	To estimate the prevalence of a self-reported history of restraint in children and adolescents when receiving dental care by non-specialist dentists and to assess differences in DFA, intra-oral injection fear, and trust in dentists between patients with and without a self-reported history of restraint.	To examine dental records of Norwegian adolescents' with and without self-reported history of restraint for information about oral health (DMFT), total scheduled time in the PDS (dental appointments, cancelled and missed appointments), and reluctant behavior and/or DFA. Another purpose was to explore their dental records for information recorded by the dentist concerning the use of restraint.

The following chapter describes how these studies were conducted.

4 Materials and methods

The employed methods for the sub-studies in this thesis are described below. For a more detailed description, readers can refer to the respective papers attatched after the References.

The study setting of this thesis was the county of Hordaland, Norway. Hordaland [e] also includes Bergen, Norway's second largest city, and represents the third most populated county in Norway in 2019 [126]. The county is mostly rural and sparsely populated outside of the Bergen metropolitan area, which reflects the country. The median household income is similar to the median national household income [127]. Thus, Hordaland can be considered representative for epidemiological research in Norway.

4.1 Design

The overall design of this thesis is exploratory and descriptive, providing an in-depth exploration and description of a phenomenon when there is little prior knowledge [128, 129]. The intention in this approach is to explore, observe, describe, and document aspects of a situation or process, thereby potentially forming a basis for the theoretical foundation of further research [128, 129]. In this thesis, the research method is qualitative in sub-study I, and quantitative in sub-studies IIa and b. Employing several methods in research is useful when studying complex topics, especially when the existing knowledge is sparse [130, 131]. Several methods were used to expand the exploration breadth of our main aim and corroborate the findings of one approach with those of another. The interrelationships between the sub-studies are outlined in Figure 1 and documented later on in Chapter 6.1. An overview of the methods, samples, and data collection for each sub-study is also presented in Table 2.

[e] Vestland county after county merging on January 1, 2020.

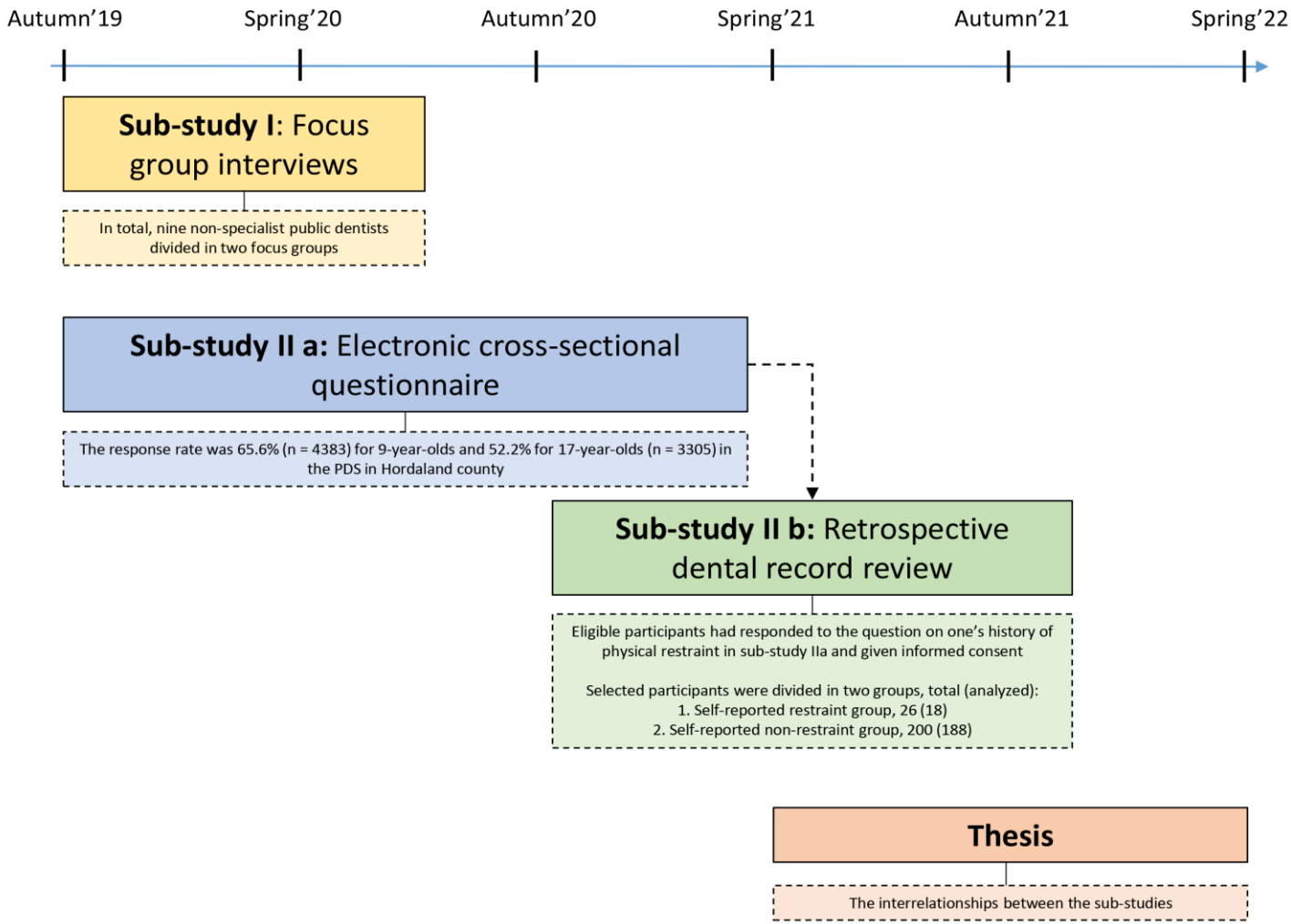

Figure 1. Timeline of the work that comprises this thesis.

Table 2. Overview of the study types, samples, data collection, and data analysis for each sub-study.

	Sub-study I (Paper I)	**Sub-study IIa (Paper II)**	**Sub-study IIb (Paper III)**
Type of study	Focus group interview	Cross-sectional questionnaire	Retrospective dental record review
Samples	Public non-specialist dentists (*n* = 9)	Adolescents/17-year-olds (*n* = 3305) and children/9-year-olds (*n* = 4383) in the PDS, Hordaland county, Norway	A sample of 17-year-olds from sub-study IIa: The self-reported restraint group (*n* = 18) and non-restraint group (*n* = 188)
Data collection methods	Semi-structured focus group interviews	Electronic survey	Electronic survey and dental record review
Data analysis	Qualitative: Thematic analysis	Quantitative: Statistical analysis	Quantitative: Statistical analysis

4.2 Sample and recruitment

The samples in this thesis include public non-specialist dentists, pediatric dental patients, and the pediatric dental patients' dental records. For sub-study I, we chose dentists that had permanent positions in the PDS to ensure that all participants had experience with pediatric dental treatment. In sub-study IIa, the sample consisted of all 17- and 9-year-olds in the PDS in Hordaland who answered to the survey research request. In sub-study IIb, all 17-year-olds from sub-study IIa were invited to participate and a selection of those who consented were included. A more detailed presentation of the samples is offered below.

Sub-study I

The qualitative component of this thesis comprises two focus group interviews, with five and four public non-specialist dentists, respectively. In Paper I, we included a table with information regarding the participants' sex, clinical experience, and demographic distribution. In one focus group, the work experience (as dentists) range was 0.5−33 (mean 12.6) years, while the other focus group range was four−29 years (mean 12.0).

In focus groups, the participants should be as heterogenic as possible to ensure that the collected data can show different sides of the concept under study [132]. We used a purposive sampling strategy based on criterion sampling [133] to collect information from dentists with different backgrounds and experience. Inclusion and exclusion criteria are presented in Table

3. We aimed to have half of the sample represent dentists who worked more than 10 years to ensure varying lengths of clinical experience. Specialist dentists were not included, because the Norwegian PDS is organized in such a way that most patients only meet with non-specialist dentists and dental hygienists. Children are only referred to specialist dentists in special cases. Therefore, these specialists do not have (at least recent) experience with the ordinary follow-up and treatment for pediatric patients in the PDS.

Table 3. Exclusion and inclusion criteria for sub-study I.

Inclusion	**Exclusion**
Permanent position as a public non-specialist dentist	Specialist education
Dentists with diverse lengths of clinical experience	Leader
Female and male dentists	Dentists employed at the same clinic

The recruitment of dentists was performed by the PhD candidate. The dentists were initially asked to participate in a phone conversation that provided information about the project and research method. Written information about the project was subsequently provided in an e-mail (Appendices I and II). Participation was voluntary and potential rejection was confidential. Ten dentists accepted to participate. On the day of the second interview, one dentist did not show up, resulting in a total sample of nine dentists.

Sub-study IIa

In total, 13,013 adolescents (17-year-olds, *n* = 6,327) and children (9-year-olds, *n* = 6,686) were invited to participate via text-message sent from the dental record system in the Hordaland PDS. They all received one invitation and three reminders that included complete information about the study (Appendix III). Among the 17-year-olds and 9-year-olds, 52.2% and 65.6%, respectively, responded to the survey (Appendix IV). The response rate for both groups ranged from 43.5% to 59.9% for different questions in the survey. All individuals who responded to the survey were included in the analysis. Of the respondents, 50.0% identified as "boys" (*n* = 3844), 49.8% as "girls" (*n* = 3832), and 0.2% as "they" (*n* = 12).

Sub-study IIb

All 17-year-old participants in the cross-sectional study (n = 3,305, 52.2 %) were invited to participate sub-study IIb. Those who provided informed consent for access to their dental records (n = 1045) were eligible for participation. Informed consent was provided

electronically with a statement declaring that we could review their dental records including the individual's full name and date of birth.

The adolescents were divided into two groups based on the cross-sectional data collection: those with a self-reported history of physical restraint (self-reported restraint group) and those without a self-reported history of restraint (self-reported non-restraint group). These groups were chosen based on the adolescents' responses to the question: "Have you experienced being held still against your will during dental treatment?" This study included all eligible participants in the self-reported restraint group ($N_1 = 26$). A statistician calculated the sample size (Figure 2) for the self-reported non-restraint group ($N_2 = 200$, power 0.80, effect size: 0.55). Finally, the "random organization" function in the statistical program SPSS (SPSS; IBM, Armonk, NY, USA version 27.0) was used to choose 200 participants for the self-reported non-restraint group.

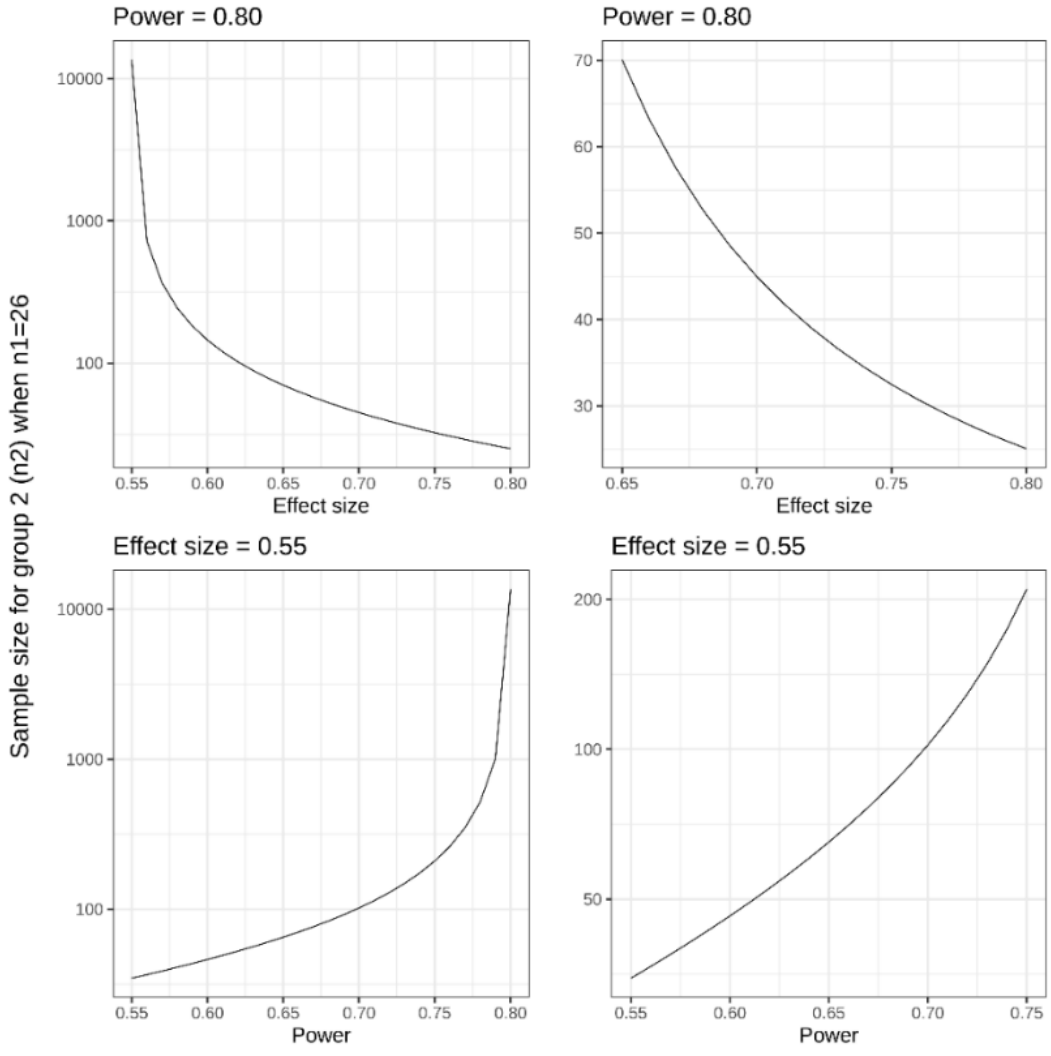

Figure 2. Estimation of the necessary sample size in the self-reported non-restraint group.

The participants' written dental records from 2002 to 2019 were reviewed for the 226 participants included in this study. The dental records that lacked information for parts of the study period (e.g., in cases when the participants moved to a different county or country) were excluded from the analyses, resulting in a total sample of 206: 18 individuals (55.6% female) in the self-reported restraint group and 188 individuals (47.9% female) in the self-reported non-restraint group.

4.3 Interview guide, instruments, and data collection

4.3.1 Interview guide and measurement instruments

Sub-study I

We developed an interview guide for the focus groups, which is provided in Paper I. During the development process, the questions were discussed with psychologists, pediatric dentists, and other researchers. The questions were grounded in existing knowledge (Chapter 2) and related to the specific research aim (Chapter 3). Prior to data collection, the interview guide was tested in a pilot interview with non-specialist dentists and a few adjustments were made as a result. These were related to question formulations and answers from the interviewer (moderator), where we focused specifically on open-ended questions and avoided providing normative answers to the participants.

Sub-study IIa

The items from the electronic survey included in Paper II were seven questions about aspects of restraint, two psychometric measurement instruments regarding DFA (CFSS-DS) and intra-oral injection fear (Intra-Oral Injection Fear Scale [IOIF-s]), a single item measuring DFA, and eight items from the Getz Dental Belief Survey (DBS). All variables are presented in Paper II.

<u>Restraint</u>

We could not identify any instruments that could be used to measure self-reported experiences of restraint during dental treatments for children and adolescents. Therefore, it was necessary to develop questions to measure if restraint was experienced during dental treatment and other dimensions of the experience. Those questions were thoroughly discussed in the research group, with psychologists and specialists in pediatric dentistry, before they were tested on the respective age groups. The electronic survey test included 56 participants,

with half from each age group. All participants were asked to share their experiences and thoughts regarding the survey and were specifically asked if any questions were unclear or otherwise difficult to understand. All respondents provided feedback that the questions about restraint were easy to understand and answer.

- Physical restraint was measured by the question: "Have you experienced being held still against your will during dental treatment?" (*yes, no,* or *do not know*)

- Psychological restraint was measured by the question: "Have you felt pressured to receive dental treatment in such a way that you could not say no?" (*no degree, low degree, neither high nor low, high degree,* or *very high degree*)

DFA

We used the CFSS-DS to measure DFA in children and adolescents. This instrument is validated and has been used in several studies in Nordic countries [5, 134]. We used the self-report version with a suggested cutoff score of > 38 to indicate high DFA [134]. Additionally, the question "Are you afraid of dental treatment?" (*not at all, low degree, neither high nor low, high degree*, or *very high degree*) was used to separate "no fear" (including *neither high nor low*) from all other levels of DFA.

Intra-oral injection fear

The IOIF-s measures fear of intra-oral injections and was validated by Berge et al. in 2016 in a similar population in Hordaland, Norway [135]. A cutoff score of > 38 was used to indicate high fear of intra-oral injections [135].

Trust in dentists

We used eight items from the DBS (included in Paper II) as the basis for the section of the survey intended to measure participants' trust in dentists [136]. The questions cover different situations, feelings, and thoughts that may occur during dental treatments and are rated on a five-point Likert scale (*never, one or two times, a few times*, *often,* or *almost always*). To our knowledge, this instrument has not been validated in child populations.

Sub-study IIb

Sub-study IIb included five items from the cross-sectional study and 19 items from the participants' dental records. The five from the cross-sectional study were:

1. Patient-self-reported physical restraint
2. Patient-self-reported age when physical restraint occurred
3. Patient-self-reported situation of physical restraint
4. DFA measured by CFSS-DS
5. DFA measured by the single question on dental fear

The variables from the dental records were related to written information on the total scheduled time in the PDS, oral health and treatment, descriptions of reluctant behaviors or DFA, and the use of restraint. All items are presented in Paper III.

4.3.2 Data collection

The data included in this thesis consist of interview transcripts, survey responses, and dental records. The data in sub-studies I and IIa were collected almost concurrently during fall 2019, and that of sub-study IIb were collected during fall/winter 2020 (postponed due to the COVID-19 pandemic).

Sub-study I

To ensure that interviews remain within the scope of the selected topic, it is recommended that focus groups be led by a moderator and assistant moderator [132]. As such, in September 2019, the PhD candidate/dentist, serving as the moderator, and the research assistant/dentist, taking the role of assistant moderator, collected the data for sub-study I. The interviews were held in a quiet and separate meeting room in the administration building of TkVestland. They were audio-recorded (with consent) and each lasted for approximately 90 minutes. Directly following each interview, the PhD candidate transcribed the interviews verbatim, and the assistant moderator reviewed and verified the transcripts. Both focus groups were characterized by open conversations and an atmosphere in which all participants were encouraged to share their thoughts, experiences, and reflections. This was underscored in both focus groups by the fact that the conversation continued even after the interviews had ended.

Sub-study IIa

Data collection was performed from October to December 2019, and the electronic survey was distributed using the PDS' text message function in the dental record system. Therefore, the sender of the text messages was "the dentist." SurveyXact by Ramboll (Surveyxact.com) was the tool used to create the questionnaire. Owning to the study's anonymous design, one invitation and three reminders (at two, six, and eight weeks) were sent to the entire sample. In

the text messages, there was a link to the questionnaire, including the informed consent form. The questionnaire was written in Norwegian, the national language in Norway.

Sub-study IIb

Sub-study IIb is a continuation of the prior cross-sectional study (sub-study IIa). The PhD candidate and a research assistant (former dentist) performed the data collection from November to December 2020. All records were reviewed according to a preset protocol, as presented in Paper III. No clinical examinations or interventions were performed. To increase validity, the variables were comprehensively discussed and operationalized in advance, and all written descriptions were reviewed in the research group after data collection. Ten random records were chosen with the "random organization" function in SPSS and reexamined independently by both data collectors. No differences were detected between the two data collectors or the original data.

4.4 Analyses

Although the data in this thesis stems from three different data sources, it can be divided into one text transcript and two different and primarily numerical datasets. The analyses in all three studies are presented in Table 4 and were performed in collaboration with the co-authors (supervisors of this thesis) in Papers I−III. The main supervisor and co-supervisor focused primarily on quantitative and qualitative research, respectively. During the research process, we continuously held seminars in the research group to discuss and evaluate the analyses and results. In this process, a statistician at the University of Oslo recommended and controlled the statistical analysis in sub-study IIa, while a statistician from TkVestland recommended the analysis in sub-study IIb.

Table 4. Overview of the data analyses.

Sub-study I (Paper I), Qualitative	**Sub-study IIa (Paper II), Quantitative**	**Sub-study IIb (Paper III), Quantitative**
Thematic analysis informed by Braun and Clarke	Descriptive statistics Mann−Whitney U tests	Descriptive statistics Mann−Whitney U tests Chi-square tests of independence Power analysis and sample size Effect size statistics

4.4.1 Qualitative analysis: Sub-study I

The qualitative analysis was informed by Braun and Clarke's thematic analysis method [137], which is a foundational analysis method within qualitative research, and recommended for both novice and experienced researchers. In qualitative studies, the analytic process reflects not only the specific analysis steps of the research, but also the continuous process that occurs from when the interviews take place until the results are fully written and ready for presentation [138]. Therefore, it is advantageous for the researcher(s) to have a role in the interview setting as well [137, 138]. I took on this role of interview moderator in both focus groups.

As Braun and Clarke describe [137], "thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within data." This method comprises the following six steps, as described and illustrated in Paper I: (1) transcribing, reading, and rereading the data to ensure that you familiarize yourself with it; (2) generating codes for the entire dataset and collating data relevant to each potential theme, (3) searching for themes and collating codes into potential themes, (4) reviewing themes, (5) defining and naming themes derived from the data, and (6) producing a report [137]. These steps were performed in close collaboration with the supervisors. The qualitative data organizing software NVivo 12 (QSR International) was used to structure the analysis. For further elaboration on the qualitative analysis, including a schematic model of the analysis process and stepwise analysis examples for each theme, see Paper I.

4.4.2 Statistical analyses: Sub-studies IIa and b

The statistical programs SPSS (SPSS; IBM, Armonk, NY, USA version 26.0 and 27.0) and R (packages: pwr to determine power and sample size; and ggplot2, grid, and gridExtra to make plots) were used for the statistical analyses. The p-values of <0.05 were considered statistically significant (see Table 4 above for specific methods used in Paper II and III). Descriptive statistics were conducted using "frequencies" in SPSS. Mann−Whitney U tests were used to compare group differences. Chi-square tests of independence were employed to indicate associations. When the lowest expected frequency in any cell was < 5, the p-value for Fisher's exact probability test was reported.

4.5 Ethical considerations

The studies that comprise this thesis were conducted according to the ethical principles of the Helsinki Declaration. The Regional Committees for Medical and Health Research Ethics Southeast (2019/570) considered this project to be health service research, and therefore outside their mandate. The Norwegian Center for Research Data (783349) evaluated and recommended the project. The study was additionally approved by the County Dental Officer and Data Protection Official in Hordaland County Municipality.

Informed consent was obtained from all participants (from parents/caregivers for the children) prior to the study's commencement. It was underlined for all participants that they were under no obligation to participate in any study. Their participation could be withdrawn if they were identifiable in the data set. Before anonymization (Paper I and II) and pseudonymization (Paper III), the data were saved in a secure zone of the PDS' data system (the same place as where the dental records are saved).

Sub-study I

In the focus group interviews, experiences about specific patient cases were expected. All participants were employed in the PDS and had signed a declaration of confidentiality. The written informed consent for participation in the study additionally underlined the mutual duty of confidentiality between the study participants and researchers. The information obtained in the interviews could not be used against the participants and they were all informed when Paper I was published. Additionally, I paid specific attention to performing the research in such a way that the dentists would be willing to participate in future research as well.

Sub-studies IIa and b

Exploring child and adolescent experiences was the main intention in these sub-studies. According to the UNCRC, children are defined as individuals aged younger than 18 years [27], which represents the age groups in both sub-study IIa and b. In research projects involving children, one should ensure that it would be impossible to collect the same information from adults [139]. Specifically, the following four key elements should be considered: risk-benefit analysis, informed consent, secure confidentiality, and compensation/payment/incentive [140].

In the risk-benefit analysis, the youngest children's participation was weighed against the benefit of new knowledge in a sparsely explored research area. In our discussions with psychologists at the Centre for Odontophobia, we thoroughly examined if participation could

lead to long-lasting consequences for the children. We especially focused on the possibility that memories from negative experiences could lead to children feeling aversion. The fact that the children were not in a dental treatment situation when the questions were asked was considered a mitigating circumstance. The adolescents were aged older than 16 years, which is the age of majority regarding health decisions [2], and participation for this group was considered low risk.

Informed consent in sub-study IIa was obtained when the participant accessed the survey after reviewing the page containing full information about the study. Participation in sub-study IIb involved an additional informed consent form at the end of the cross-sectional survey. The minimal time demand for the survey (10 minutes) did not require financial compensation. To achieve a higher response rate, all participants had the option to participate in a contest in which one iPad was provided for each age group based on a random draw. The compensation shall not place any pressure on or have any other negative consequences for the participants [140], and the incentive in this study was in line with ethical research guidelines.

5 Summary of results

The overall aim of this thesis was to explore and develop knowledge on the use of restraint during pediatric dental treatment in the Norwegian PDS. The following sections present a summary of the results for each study. Table 5 provides an overview of the papers, aims, and knowledge contributions generated for the sub-studies.

Table 5. Overview of studies and knowledge contributions.

Sub-study	Original paper (title)	Aims	Knowledge contributions
I	I: Restraint in paediatric dentistry: a qualitative study to explore the perspectives of public non-specialist dentists	To explore the perspectives of non-specialist dentists on the use of restraint when administering dental treatment on children and adolescents from 0 to 18 years of age in the Norwegian PDS	• Some dentists justify the use of restraint in pediatric dentistry and physical restraint is often legitimized by the fact that the child is sedated. • The use of restraint evokes difficult ethical considerations for dentists.
IIa	II: Held still or pressured to receive dental treatment: self-reported histories of children and adolescents treated by non-specialist dentists in Hordaland, Norway	To estimate the prevalence of a self-reported history of restraint in children and adolescents when receiving dental care by non-specialist dentists and to assess differences in DFA, intra-oral injection fear, and trust in dentists between patients with and without a self-reported history of restraint.	• The prevalence of a self-reported history of physical restraint during dental treatment was 2.9% and 4.2% for 17- and 9-year-olds, respectively. • In general, participants with a self-reported history of restraint had higher DFA and lower trust in dentists compared to those with no such reports.
IIb	III: Patient-self-reported history of restraint among 17-year-olds: a retrospective study of records by non-specialist dentists in the public dental service in Hordaland, Norway	To examine dental records of Norwegian adolescents' with and without self-reported history of restraint for information about oral health (DMFT), total scheduled time in the PDS (dental appointments, cancelled and missed appointments), and reluctant behavior and/or DFA. Another purpose was to explore their dental records for information recorded by the dentist concerning the use of restraint.	• In general, the self-reported restraint group had poorer oral health, higher total scheduled time in the PDS, and more descriptions of fearful and reluctant behaviors compared to the non-restraint group. • Self-reported history of restraint was not concurrent with documented restraint use in the patients' written dental records.

5.1 Sub-study I (Paper I)

The qualitative analysis resulted in three themes, labeled as follows: (1) some dentists justify the use of restraint in pediatric dentistry, (2) physical restraint is often legitimized by the fact that the child is sedated, and (3) the use of restraint evokes difficult ethical evaluations.

In the focus group interviews, some non-specialist dentists justified the use of physical restraint in combination with conscious sedation, particularly in clinical situations where it was necessary to administer an immediate dental treatment, such as for dental traumas and deep caries. Further, the interviews also revealed that physical restraint is sometimes used instead of other techniques (e.g., tell-show-do), because restraint is considered less time-consuming and they have a lack of resources/pressure form the management. The way the dentists communicated about pediatric dental treatment in combination with conscious sedation gave the impression that conscious sedation was sometimes synonymous with the use of restraint. As a final but dominant theme, it was clear that the use of restraint involved difficult ethical considerations for the dentists and they were uncertain to which degree restraint experiences could cause harm for the children. The non-specialist dentists' overarching aim was to act in the best interest of the child, but in cases concerning restraint, they reported occasionally struggling with finding a justifiable way.

5.2 Sub-study IIa (Paper II)

Prevalence of a self-reported history of restraint

In 2019, the prevalence of self-reported history of physical restraint in the PDS in Hordaland county was 2.9% and 4.2% for 17- and 9-year-olds, respectively. The most typical reported instances of physical restraint were when the dentist stated that the treatment was necessary and when the participants tried to escape from the dental chair. In the same population, a history of psychological restraint was reported by 6.0% and 4.3% of 17- and 9-year-olds, respectively.

DFA and intra-oral injection fear

Overall, the 17- and 9-year-olds with a self-reported history of physical restraint had significantly higher DFA ($p < 0.001$) and intra-oral injection fear ($p = 0.003$), compared to patients without this self-reported history. The specified results for each age group and for psychological restraint are presented in Paper II.

Trust in dentists

Patients with a self-reported history of physical restraint had significantly higher scores on all items from the DBS ($p < 0.001$), compared to their counterparts, indicating that patients with this history might have lower trust in dentists. Paper II contains the specific results for each age group.

5.3 Sub-study IIb (Paper III)

In the 206 analyzed dental records of the 17-year-olds, there were statistically significant differences for several variables in the self-reported restraint group, compared to the non-restraint group (Figure 3). These differences included significantly poorer oral health (DMFT, untreated caries >D_2), and a higher number of cancelled/moved and missed dental appointments in the PDS.

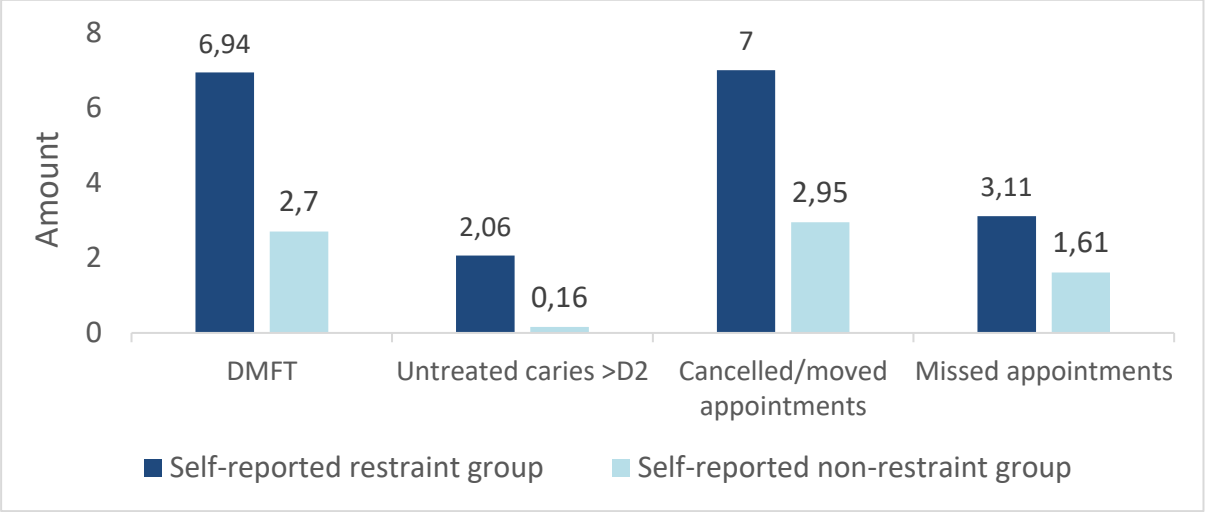

Figure 3. Scores on DMFT, untreated caries, cancelled/moved appointments, and missed appointments for the self-reported restraint and non-restraint groups.

Additionally, the self-reported restraint group had considerably more descriptions of reluctant behaviors or showing signs of DFA. Three dental records had written information on the use of restraint during dental care: one from the self-reported restraint group and two from the non-restraint group. There was no statistical association between the self-reported history of restraint and dentist-reported restraint in the patients' written dental records ($p = 0.241$).

6 Discussion

This chapter provides a discussion of the main results in Papers I−III and the methodological considerations.

6.1 General discussion of the main results

Overall, the results of this thesis indicate that public non-specialist dentists sometimes use restraint when they find it necessary during dental treatments in the Norwegian PDS (Paper I). Accordingly, some children and adolescents report a history of restraint during pediatric dental treatments (Paper II). The results also reveal differences in oral health and total scheduled time in the PDS, as well as more descriptions of DFA and reluctant behavior in dental records for patients with a self-reported history of restraint, compared to their counterparts. The dental records included limited information regarding behavioral objectives, and there was no statistical association between patient- and dentist-reported restraint (Paper III).

6.1.1 The use and experience of restraint according to some non-specialist dentists and a child population in one county in Norway

The background for this thesis was a lack of systematic knowledge regarding restraint use in the Norwegian PDS. In clinical practice, patients often tell stories about being held still or in other ways forced to receive dental treatments against their will. Despite this, no national or international studies had examined the prevalence of a self-reported history of restraint.

Physical restraint

In Paper II, 2.9% of 17-year-olds and 4.2% of 9-year-olds in the PDS in Hordaland county reported a history of physical restraint during dental treatments. In the focus group interviews (Paper I), all dentists had either used restraint or witnessed it during dental treatments, but in the reviewed dental records (Paper III), only one dental record from the restraint group had a description of restraint use. Additionally, two dental records from the self-reported non-restraint group had descriptions of restraint use. At the onset of this project, Rønneberg et al. had recently published a study from the Norwegian pediatric dental context assessing non-specialist and pediatric dentists' treatment-related decisions for severe caries in young children [40]. They found that approximately 10% of non-specialist dentists would use physical

restraint, if necessary, to complete a dental procedure on a five-year-old with pulpitis and pain, due to severe caries. Those who would use restraint if necessary were mainly non-specialist dentists educated outside the Nordic region, while specialists in pediatric dentistry deem this practice as inappropriate [40]. Overall, it appears that physical restraint is both used by public non-specialist dentists and experienced by some patients during pediatric dental treatments in Norway.

Pharmacological/chemical restraint

According to the public non-specialist dentists in Paper I, most restraint use during pediatric dental treatments is combined with conscious sedation when absolutely necessary. Similarly, most patients in Paper II responded that they had experienced physical restraint when the dentist said that the treatment was necessary, 29.0% in combination with sedative medications. The percentage of restraint situations combining sedative medications is likely somewhat higher, considering that many patients experience the amnestic effect of conscious sedation [141]. In Paper III, only three dental records had descriptions of restraint use, two of which also employed conscious sedation. However, the associated patients did not report a history of restraint in the survey. There is a lack of knowledge regarding the amnestic effect of conscious sedation when the treatment involves restraint, and it is possible that restraint experiences might evoke more emotions in the child, which then might reduce the amnestic effect. As identified in Paper I and in line with the guidelines for dentists treating children and adolescents, dentists often use conscious sedation to avoid the development or maintenance of dental fear. This use of conscious sedation may be an effective supplement to reduce the patient's fear and increase cooperation during dental treatments. However, in Paper I, the dentists sometimes used sedation as a synonym for restraint. Therefore, discussions on restraint should include reflections about when the use of sedatives is or could involve pharmacological/chemical restraint. As Kangasniemi et al. highlighted, administering a medical procedure when the patient is sedated, per its definition, involves a physical action [31]. In future studies, it would be interesting to examine and discuss when conscious sedation/nitrous oxide can be considered restraint and when it cannot.

Psychological restraint

In general, 6.0% and 4.3% of 17- and 9-year-olds, respectively, reported having felt pressured to receive dental treatments against their will. In Paper II, we suggested that the related item on feeling pressured to dental treatment corresponds to psychological restraint. Psychological

restraint involves different approaches, such as persuasion, to make the patient do what you want [31]. A common method of psychological restraint in pediatric healthcare is giving unfavorable options, leaving the patient with no other real choice than to receive the procedure [31]. In Paper I, one dentist described this item which we interpreted as psychological restraint as follows: "The restraint is often indirect in terms of us saying that 'this must be done,' and the child doesn't want to." The patients' dental records had limited descriptions of behavioral objectives and no descriptions explicitly involving psychological restraint. Regardless, the restraint group had significantly more descriptions of reluctant and fearful behaviors that had often interrupted the dentist's administration of the treatment. This might indicate that patients in the restraint group frequently felt pressured to receive dental treatments, even though the situations did not necessarily involve the use of physical force.

To the best of our knowledge, the concept of psychological restraint has not yet been used in dental healthcare literature. Thus, we were obliged to adopt it from hospitalized pediatric healthcare [31], as there are similarities between dentist consultations and clinical procedures in hospitals. In both situations, children are involved, parents are usually present, and a professional healthcare provider needs to administer a procedure that involves pain/discomfort for the child and is against the child's will. Therefore, we included the concept of restraint not involving physical force, but still entailing pressure to receive a treatment. As discussed in Paper II, the items are not validated and it is possible that the questions can be understood in different ways. Thus, future research should develop and validate instruments to measure children and adolescents' experiences of restraint during dental care.

6.1.2 Situations of restraint the Norwegian PDS

In this thesis, public non-specialist dentists considered the use of physical restraint to be required under special circumstances during pediatric dental treatments (Paper I). The specific treatment needs in those situations ranged from acute dental traumas to deep cavities or infections. Most dentists underlined that the use of restraint during pediatric dental care only occurs in emergency treatments, when no other treatment options seem available, while others reported pressure from parents and management (limited time/resources) as the reason justifying the use of restraint in more non-acute situations. Most patients with a history of restraint in Paper II responded that they had experienced physical restraint when the dentist

said that the treatment was necessary. In the three dental records with written descriptions of physical restraint, restraint was used in specific dental procedures or when conscious sedation was administered, but the dental records contained no information about the degree of emergency.

During the research period of this work, Marty et al. also described similar perspectives from French pediatric dentists (degree in pediatric dentistry, validated or in progress) on the use of restraint [142]. Emergency situations were described as an infection that might develop into cellulitis, toothache, or dental trauma [142]. These results overlap with those in Rønneberg et al.'s Norwegian study, in which general dentists considered restraint as "adequate if necessary" [40]. From the parental perspective, Al Zoubi et al recently identified among German and Jordanian parents that the acceptance of different advanced BMTs increases for emergency treatment [143]. In Brazil, however, restraint use during pediatric dental treatment seems to be more common and accepted in regular dental care situations [144, 145], which may be rooted in cultural differences. In this regard, da Silva et al. are planning a non-randomized clinical trial in Brazil to examine the effectiveness of moderate sedation compared to protective stabilization for patients with BMP [144]. They hypothesize that sedated children will "behave better" than those experiencing restraint [144]. The use of restraint in "necessary medical situations" is also supported in the literature from other healthcare fields [31, 36].

Norwegian law declares that when healthcare is urgently needed, healthcare professionals should immediately provide it even if the patient is unable to consent or opposes healthcare [119]. On the premise that a dental treatment can be considered urgently needed healthcare, restraint can be used. Considering that it is in the patient's best interest to receive treatment, it is in line with the principle of beneficence [124], as well as Articles 3 and 24 of the UNCRC, declaring that one shall always act in accordance with the child's best interest and that the child has the right to enjoy the highest standard of health [27]. The principle of non-maleficence dictates that health personnel shall avoid causing harm and that harmful procedures require justifications [124]. One could argue that the use of restraint is not in the best interest of the patient if it causes harm (e.g., psychological trauma). In this regard, it is a well-known challenge that the four medical-ethical principles often conflict with each other [124]. Conversely, the administration of healthcare against an individual's will may result in doing harm to the patient, but in the long-term, it can treat oral pathology. Therefore, several interviewed dentists highlighted that the use of restraint can be justified (Paper I).

Another perspective poses the question who shall decide if and when dental healthcare is urgently needed? The interviewed dentists expressed insecurity regarding the restraint-decision being based on individual assessments without clear guidelines and they did not reach a consensus on when to use restraint (Paper I). During the COVID-19 pandemic, what counts as a necessary/emergency dental treatment has received increased attention and a number of guidelines have been published, which can be useful in restraint decision-making. Nonetheless, the use of restraint conflicts with the principle of autonomy [124], as the patient's will is not considered. Article 12 of the UNCRC declares the right of children to express their own opinions in all matters affecting them and for those opinions to be given due weight in decisions regarding the child, according to each child's age and maturity [27]. As underlined in the guidelines of the BSPD regarding the use of restraint [34], compared to other health services and especially in hospitals, few dental conditions could be considered life-threatening and most treatments will have no immediate adverse outcomes if postponed by the patient. However, some dental situations do involve cases in which the patient will suffer undue pain and distress if a treatment is not administered [34].

6.1.3 Restraint and the age of the patient

Both the dentist interviews (Paper I) and the survey of children and adolescents (Paper II) indicate that most physical restraint situations occur with children between the ages of five and 10. The three dental records with descriptions of physical restraint involved children aged between four and six. As most children in the Norwegian PDS have not received much dental care [3], the treatment situation is often new. Thus, being afraid and resisting treatment is a completely normal and expected reaction [146]. As underlined in legislation, guidelines, and legal drafts, children and adolescents are still developing and cannot be considered adults having the full capacity to make decisions for themselves. A child's capability to understand a causal relationship (inductive reasoning) normally begins around six years of age [147]. Thus, for young children, it may be difficult to fully understand the necessity of a dental treatment, because the ability to think of and process abstract phenomena (deductive reasoning) is not developed until the age of 12 [147]. This means that young children who need immediate dental care may not understand the complexity of the situation. Furthermore, psychological restraint was more commonly reported by 17-year-olds (Paper II) and this result might involve several factors. Although the exact age when psychological restraint was experienced was not examined in the present study, it is reasonable to believe that the experience often occurs for

slightly older individuals, compared to physical restraint. Between the ages of six to 12 is often considered a calm period in which many children have a desire to behave well. As a result, adults often overestimate a child's ability to cope with treatment [146, 147], which can end in situations where the patient feels pressured to receive a dental treatment. Overall, it is likely that the older the child is, the less physical force is used by health personnel [36].

6.1.4 Restraint, DFA, and BMP

Several of the interviewed dentists reported experiencing patients becoming anxious after restraint was used at the dental clinic, although some doubted this relationship (Paper I). In Paper II, the 17- and 9-year-olds with a self-reported history of physical restraint generally scored significantly higher on DFA, compared to patients without this history. Accordingly, pediatric dentists in the UK have assessed fear of dental treatment as the main consequence of physical restraint [87] and in Zhou et al.'s 2011 review, assessing how the behavior of health personnel influences pediatric patients, it was suggested that restraint during pediatric dental treatments might be associated with the development of DFA [52]. However, whether or not restraint causes DFA is unknown. Armfield et al. reported strong bivariate associations between dental fear and perceptions of uncontrollability, unpredictability, and dangerousness when going to the dentist [62]. As a restraint situation involves a procedure being conducted against the individual's will, it is likely that restraint may lead patients to feel dental fear, due to feelings of uncontrollability, unpredictability, and probably also dangerousness.

Several children and adolescents with a self-reported history of physical restraint noted that it had happened when trying to escape from the situation (Paper II). Many of these patients also reported feeling pressured to receive a dental treatment without the possibility to refuse (Paper II). On that note, fear and anxiety are emotions that include physiological, behavioral, and cognitive responses [44]. The most common behavioral response is avoidance, that is, the person either avoids going into the situation or flees when faced with the threat [44]. In Paper III, the self-reported restraint group had considerably more descriptions compatible with DFA, compared to the non-restraint group. This is in accordance with Sturmey, who noted that anxious patients are at a higher risk of experiencing restraint [148]. Further, Marty et al. recently found that pediatric dentists consider restraint as inappropriate for fearful children and that it should be avoided to not aggravate their fear [142].

Because dental anxiety has a multifactorial etiology, high effect sizes for single variables are unexpected. As the role that the restraint variables play in DFA is unsure, the development of DFA must be viewed as part of a larger picture. According to developmental psychology, there are many factors that influence individuals' responses to traumas [149]. Traumatic events are stressful experiences that overwhelm a person's normal ability and capacity to cope, and are viewed as immediate, negative, and frightening, leaving people feeling a lack of control [149]. For instance, while some children are born more resilient, others are more vulnerable, and while some have a safe childhood, others experience neglect. These and other factors are known to play a role in individuals' responses to a trauma and the consequences depend on how the factors weigh for the individual [65, 149]. The time in the life cycle when the trauma occurs also plays an important role [12, 149]. Therefore, it is likely that the developmental curve will derail in a different direction for a five-year-old who experiences restraint during dental treatment than for a teenager. Nevertheless, in general, the possible difficulties cannot be explained solely in terms of traumas [149]. Possible difficulties, such as anxiety, can just as much be a result of what has been missing in the child's development. The dental literature has paid attention to the fact that subjective perceptions of a dental visit may be more important for determining fear than the actual dental procedure [16, 62, 69]. Considering that dental health personnel rarely know much about the child's other life experiences, dentists should be careful about violating the child's boundaries and focus on how they affect the child.

In Paper I, the dentists discussed how younger (five- to 10-year-olds) patients were immature and therefore did not cooperate during treatment, which suggests that the dentists experienced patients with reluctant behaviors. In Paper III, reluctant behavior was suggested to fit under the term BMP, because it is assessed by dentists and indicates a behavior that interrupts treatment, independent of the sort of behavior or the mechanism that underpins it [74]. The self-reported restraint group in Paper III had more descriptions of reluctant and fearful behaviors, compared to the non-restraint group. Further, many physical restraint experiences in Paper II were reported in situations where the patients tried to escape. This can be compatible with the dentist experiencing the patient as having BMP, because their behavior interrupts the treatment. In Paper III, we suggested that patients with BMP and DFA seem to experience restraint more often. However, in clinical situations, distinguishing between DFA and BMP is difficult, and children who exhibit uncooperative behaviors do not form a homogeneous group of patients [7, 76]. As this thesis has not examined which pediatric dental patients who

experience restraint, future studies on restraint should include systematic data on personal (e.g., somatic and mental health, temperament, demographic data, etc.) and parental characteristics. We chose not to do this in the present study due to the risk of more dropouts and a lower response rate if the survey was too demanding or time-consuming [150].

The methods used in this thesis make it impossible to draw causal conclusions between experiences of restraint and other variables. Thus, the results from the retrospective studies should be interpreted with caution [151]. For instance, it is uncertain if those with a self-reported history of restraint were already afraid before the experience of restraint or if they became afraid afterward. Additionally, it is unknown if the patients had experienced severe caries early in life, had molar incisor hypomineralization, or other conditions that can involve painful dental treatments, which are associated with both DFA [18] and BMP [74]. In any event, the results can indicate that forcing a child to undergo a dental treatment does not help the child overcome DFA, as evidenced by the restraint group, who had considerably higher DFA and more reports compatible with BMP. Therefore, restraint should be recognized as a possible negative experience in future studies on DFA and BMP. Finally, considering that performing prospective studies on restraint is ethically challenging, costly, and time-consuming, it was necessary to begin exploring this understudied phenomenon by establishing prevalence and group differences.

6.1.5 Distrust in dentists

The results (Papers I, II, and III) suggest that restraint experiences can have consequences on the relationship between the dentist and patient, as previous research from other health services has indicated [30, 152]. Health service providers depend on their patients trusting them [45]. Trusting usually involves leaving something in someone else's care and expecting safety in return [45]. In Norway, trust is highly maintained and valued in the population. For example, in recent years, population censuses have shown that Norwegian patients highly trust the dental health services and even among patients with high DFA, there is relatively low distrust in dentists [57]. When patients seek healthcare, they either willingly or reluctantly trust the health personnel and/or healthcare service. In restraint situations, the patient might have given their trust to the therapist and then felt betrayed or was forced into the situation by someone else. As a result, broken trust may then cause distrust [45]. In Paper II, the participants with a self-reported history of physical restraint scored significantly lower on all eight DBS items,

indicating that they might have less trust in dentists, compared to patients without such a history. This should be considered concerning for both regular follow-ups and potential treatments of DFA in the PDS [21].

An evidence based method for treating DFA is cognitive behavioral therapy (CBT) [44, 110]. To succeed in CBT, the relationship between the therapist and patient is important, and dependent on trust as well as feelings of safety [44, 110]. Considering that patients with DFA have a higher risk of experiencing restraint during dental treatment [148], those who would benefit the most from developing trust in the PDS often do not. Even though there is no evidence that the restraint experiences caused the significantly lower trust scores in dentists in the self-reported restraint group, restraint probably does not improve the relationship. A bad patient-dentist relationship may interfere with future dental treatments, potential treatments for DFA, and the main goal of dental health services (lifelong good oral health).

6.1.6 Oral health and total scheduled time in the PDS

The self-reported restraint group had significantly poorer oral health and higher total scheduled times in the PDS, compared to the non-restraint group (Paper III). Regarding the vicious cycle of dental anxiety, Berggren and Meynert focused on the relationship between dental anxiety, dental avoidance, and oral health deterioration [9]. Since then, many studies have supported that patients with DFA in general have poorer oral health and higher total scheduled times with dental health providers, including missed and cancelled appointments [8, 70-72]. Similarly, by 1994, Klingberg et al. identified that patients with BMP had poorer oral health and more missed appointments compared patients without BMP [74]. As underlined earlier, if and how a history of restraint may play a role in DFA and BPM remains unclear. As such, we cannot conclude on causality between restraint and poorer oral health/higher total scheduled times in the PDS. Nonetheless, the results of Papers I, II, and III indicate that patients with a dentist-reported or self-reported history of restraint are not necessarily counted in the group for which the PDS has successfully accomplished the aim of lifelong good oral health [1].

6.1.7 Documentation of restraint in dental records

Very few dental records included descriptions of the use of restraint and there was no significant association between the self-reported history and the written dental records with

related descriptions (Paper III). The possible reasons for this result are discussed in Paper III and may range from dentists either not using or not experiencing the use of restraint, to dentists avoiding the documentation of restraint. In 2009, § 4A was added to the Norwegian Patient and User Rights Act, which concerns giving necessary healthcare to individuals above 16 years of age without the competence to consent and who resist healthcare [2]. Currently, this is the only place in Norwegian law where it is explicitly mentioned that the use of restraint can be legal (formal restraint). In this regard, health personnel in nursing homes were interviewed about the different aspects of using restraint [153]. They considered these aspects unclear, and had differing definitions of restraint and necessary health care [153]. This is in line with the dentists' perspectives in Paper I and a paper by Kaptad et al. about the use of restraint in geriatric oral health care in Norway [154]. Therefore, it is possible that the documentation of the use of restraint is sometimes avoided, because health personnel are unsure if they are administering illegal healthcare [153]. Pediatric nurses in the UK have similarly reported rarely documenting the use of restraint in medical records [31].

Medical records that lack information about how a treatment is administered and how the patient responded to restraint may be a serious problem. Future treatments may benefit from more comprehensive dental records, especially because patients in the PDS often have many different dentists/therapists (Paper III). Moreover, Chapter 2.7 presented the draft of the new national guidelines for dentists treating children and adolescents in Norway (out for comment in February 2020) (TannBarn 2). On March 31st, 2022, these guidelines were published and they include for the first time recommendations on the use of restraint in Norwegian pediatric dentistry [155]. Specifically, these guidelines note that restraint should only be used as a last resort after a comprehensive assessment and if necessary, a consultation with a specialist in pediatric dentistry [155]. The use of restraint must be documented in the patient's dental records, including justifications, procedures, and cooperation with the child/parents; and the child must be followed up within a week to safeguard the patient and his/her oral health [155]. This might facilitate the documentation of restraint in dental records.

6.1.8 The best interest of the child: Is restraint actually care?

The dominating perspective of all interviewed dentists was that they strive to act in the best interest of the child (Paper I). This perspective is in accordance with Norwegian law [2, 118] and the UNCRC [27], and has received much attention in pediatric healthcare over the past decade.

In Paper I, the dentists continuously underlined how the use of restraint involved difficult ethical dilemmas. They experienced being forced to choose the lesser of two evils, despite being unsure which is the "lesser." As with other health personnel, dentists must often choose between non-ideal solutions in which values and considerations must be weighed against each other. This is commonly reported by health personnel both in dentistry and in other healthcare fields in relation to the use of restraint [34, 36, 37, 123, 142, 152, 156].

The dentists in Paper I related negative feelings and insecurity to decision-making regarding the use of restraint. Similarly, in a qualitative study, French pediatric dentists discussed different ways to psychologically protect themselves when restraint is used [142]. Some suggested dehumanizing or depersonifying the patient, meaning that the child was seen as an object of care [142]. Others had good experiences with discussing the situations within the dental team [142]. Sometimes, if the parents had not looked after their child's oral health in a satisfactory way, it helped to hold the parents responsible for the restraint situation [142], which was also indicated among the non-specialist dentists in Paper I. In Brazil, the use of restraint is well accepted and preferred over passive restraint, general anesthesia, and sedation by mothers, psychologists, and pediatric dentists, but they acknowledge the situations as challenging, due to resulting stress [145]. Thus, to which degree restraint is accepted and used in pediatric dentistry differs considerably and appears to be influenced by, among others, the context, healthcare availability, and culture [84, 90, 103, 104].

The dentists in Paper I reported many competing thoughts. For instance, they experienced situations in which pressure from parents, limited resources, and communication from the management lead to the decision to use restraint. A well-known challenge in healthcare is that the supply of resources is not infinite and when administering a treatment to one patient, it means that another patient gets less [43]. In this regard, a treatment with a documented effect is prioritized over treatments with non-documented or less significant effects [43], in line with the principle of justice: treating people fairly in terms of rights, benefits, risks, and costs [124]. However, this is not always easy. As the interviewed dentists expressed, they were unsure of the consequences of different alternatives and they highlighted the present knowledge gap regarding the possible consequences of restraint in pediatric dentistry (Paper I). Therefore, future research should examine if restraint use has consequences for the child and the PDS, and if some children are at a higher risk of experiencing possible consequences.

A common dilemma in discussions about reducing restraint use is if one can consider a treatment successful when the medical treatment is completed, but the patient has no trust in their capability to receive medical treatments later in life [43]. Simultaneously, dentists are educated to prevent and treat oral pathology, and do their best to act in the best interest of the child [40] (Paper I). To reduce the use of restraint, research from other health services has shown that health personnel must acknowledge the use of restraint [43, 48, 49]. After this acknowledgement, they can consider the potential consequences and assess if restraint is used in planned, well-considered situations or as a spontaneous last resort method that challenges one's professional integrity. Based on the dentist interviews in Paper I, restraint in pediatric dentistry appears to sometimes occur spontaneously, in specific situations, and when no other options seem available. The use of restraint as a last resort treatment method, when other trust-building measures have been performed, is in line with pediatric dental guidelines [34, 155]. However, the BSPD guideline additionally underline that restraint should only be administered by trained health personnel and that the patient must receive a follow-up shortly after [34]. According to educational institutions for both non-specialist and pediatric dentists in Norway (personal communication), dentists educated in Norway are not trained in administering restraint. Additionally, considering this study's small sample size, it is unclear if the patients received follow-up after the treatments involving restraint (Paper III).

In the development of the new law restricting the use of restraint in Norwegian health services (Chapter 2.7), it was newly suggested that providing a health treatment against the will of the child shall be considered as formal restraint in many situations. Further, the recent inclusion of the use of restraint in the national guidelines for dentists [155] may be a good start for further developments and awareness in pediatric healthcare regarding restraint. Discussions and research on restraint are challenging and in other fields of healthcare, it is commonly discussed whether administering a treatment against an individual's will is restraint or care [156, 157]. A nuanced discussion demands the inclusion of both the potential harm of using restraint and its necessity for administering good healthcare in some situations, as at times, it actually can be the right care for the patient. Nonetheless, the ways in which health personnel perform and justify the practice does not free them from paying attention to the child's experiences. Overall, children's experiences of restraint should receive increased attention both in clinical practice and in the dental literature.

6.2 Methodological considerations

This section addresses a selection of methodological considerations for the present research, emphasizing the samples, data materials, analyses, and results.

Quality assessments in qualitative and quantitative research

This thesis has a pragmatic epistemological approach, inspired by mixed method research, which allowed for the use of several research methods [158]. As qualitative and quantitative methods differ substantially [129], the concepts for each are discussed separately. In qualitative research, the most common way to assess quality is based on Lincoln and Guba's trustworthiness framework, which consists of credibility, transferability, dependability, and confirmability [159]. Table 6 shows how these concepts are related to quantitative factors for assessing quality [129].

Table 6. Quality assessments in qualitative and quantitative research.

Qualitative	Quantitative
Credibility - confidence in the 'truth' of the findings	*Internal validity* - a study's ability to measure what it intends to measure in the population under study
Transferability – the extent to which the findings have applicability in other contexts	*Generalizability* – the interference that the findings can be generalized from the sample to the population
Dependability - showing that the findings are consistent and could be repeated	*Reliability* – the degree of consistency or dependability with which an instrument measures the attribute it is designed to measure
Confirmability - a degree of neutrality or the extent to which the findings of a study are shaped by the respondents and not researcher bias, motivation, or interest	*Objectivity* – the extent to which two independent researchers would arrive at similar judgments or conclusions

6.2.1 Design

The intentions of qualitative and quantitative methods differ, as the former aims to obtain in-depth knowledge and the latter aims to generalize the sample results to a population [158]. In recent decades, mixed-method or multi-method studies have increased [158]. This thesis does not fall under a mixed-method research design in itself, owing to the strict methodological guidelines [158, 160]. However, the design is close to a convergent mixed-method design [158], because the data collection of the qualitative and quantitative studies was performed almost simultaneously.

The overall aim of this thesis was to explore and develop knowledge on the use of restraint during pediatric dental treatment in the Norwegian PDS, which was an under-explored research area. The use of both qualitative and quantitative methods has provided in-depth knowledge that would not be obtainable using only quantitative methods [158]. However, a common criticism of mixed-method research is that it is impossible to merge the results of qualitative and quantitative studies [158]. In this thesis, sub-study IIb works as an aligner, in which the different studies with different types of results can still be discussed together, but evidently with an awareness of these differences. Specifically, sub-study IIb compares the patients' self-reports and dental records that can be understood even further when considering the interviews. This type of merging is described as a side-by-side comparison [158]. On the one hand, the good degree of convergence between the quantitative and qualitative results has increased the validity of the research [158]. On the other hand, the use of three different methods has probably decreased my in-depth methodological knowledge compared to if I had specified in one method. Still, an advantage of learning different research methods is that the researcher can increase their ability to view the different perspectives of what they are studying [158].

6.2.2 Sample and recruitment

Sub-study I

One aspect of credibility is to include participants who have experienced the phenomenon under study [159]. Therefore, one strength in the sample of public non-specialist dentists was that they all worked with children (one of their main tasks during an average work day) and had either used or witnessed restraint in pediatric dental care. Further, the sample included both dentists with extensive experience and those who were newly educated. Our goal was to recruit dentists with different demographics (length of clinical experience, location of clinic – rural/central, sex), using the criterion sampling strategy, to reflect possible different views [133]. A comprehensive description of participants was conducted to establish transferability, ensuring that others can evaluate whether or not the results can be transferable to other contexts.

In total, nine dentists participated in two focus group interviews. While this could be considered a small sample, a smaller number of participants can cover great variations within a topic, making it possible to perform more in-depth interviews and analyses [161]. There are various recommendations for the number of participants in focus groups (commonly five to

12). A higher number of participants may preposition more nuanced discussions, but they also run the risk of grouping [132]. Specifically, smaller groups are preferable for sensitive topics, allowing for more in-depth discussions in which participants can be more open with one another [132]. However, there is a consensus for interview studies that researchers should interview as many individuals as necessary to answer the research question/aim [132, 138, 162]. Therefore, the number of participants is secondary to how information-rich the included participants are [133, 161]. Nonetheless, the richness of the collected information should be assessed [163]. The participants contributed generously to the conversations, providing rich information that can compensate for the relatively small number of participants. In this study, we relied on the understanding of informational power to assess the sample [161], which is further elaborated on in Paper I.

Sub-study IIa

Selection bias is an important threat to this study's internal validity [151]. The target population in sub-study IIa was considered representative for epidemiological research in Norway. However, although the response rate (43.5% to 59.9%) was assessed as adequate for electronic surveys, quite a big proportion of individuals did not respond. The population-based design in which all individuals in a target population are invited to participate is suitable for prevalence studies [164], such as sub-study IIa, but our moderate response rate is indeed a limitation. In retrospect, collecting data in school classes with a representative sample, as seen in Berge et al. [5] , might have been a better choice. To increase the sample size, the invited adolescents and children/parents received three reminders and we offered two iPad draws as the incentive for participation. Owing to the anonymous design, an analysis of non-responders was impossible, reflecting another limitation, as it is possible that they could have provided similar or more important data. Nevertheless, a low response rate does not necessarily represent a bias if the actual respondents reflect the target population [151]. Both the CFSS-DS and IOIF-s were previously used in a similar Norwegian population (response rate 98.7%) with similar results [5], supporting the representativeness of the present sample. However, some uncertainty remains regarding this representativeness, as it is unclear if the sample e.g. only represents individuals with high reading and writing skills or with interest in the subject [164]. Therefore, the results should be interpreted with caution.

Sub-study IIb

The possibility of selection bias is also present in sub-study IIb. The limited sample size might have contributed to findings that are the result of chance or led to too few participants being included to be able observe possible differences. When the sample size is too small, there is a risk of Type II errors (false negative conclusions) and the design of sub-study IIb made it impossible to increase the sample size in the self-reported restraint group ($N_1 = 26$). The non-restraint group consisted of $N_2 = 200$ to improve the statistical power, accordingly the power calculation. A power of 80% will reduce the possibility of a Type II error, meaning that the study has an 80% chance of ending up with a p-value of less than 5% in a statistical test if there really are important between-group differences. As shown in Figure 2 (Chapter 4.2), we were only able to reach a power close to 80%, due to convenience, as the graph for the estimated *N* in relation to power increased dramatically (from 200 to 10,000) just before 80%. Further, it is a limitation that a high percentage of individuals in the self-reported restraint group had to be excluded, due to incomplete dental records, which further reduced the samples to $n_1 = 18$ and $n_2 = 188$. The best solution for this issue of a low *N* is to increase the sample [151], which was impossible in this study owning to the principle of informed consent. One may also reduce the effect of outliers by dichotomizing continuous variables [151], which we did in the analysis of DFA. However, one must be aware of dichotomization's disadvantages, such as the loss of a substantial amount of information [151]. Additionally, the small sample size prevented us from performing subgroup analyses and more advanced statistical analyses, such as regression models, because the correlations are very vulnerable to outliers in small samples [151].

6.2.3 Interview guide, instruments, and data collection

Study I

The research team developed the interview guide based on prior research grounded in the research aim. As recommended [132], this guide consisted of open-ended questions and was tested in a pilot focus group with public non-specialist dentists before the formal study. To ensure the study's dependability, the semi-structured focus group interviews followed the questions in the interview guide, which is published in Paper I. When studying a sensitive topic, such as restraint, it was beneficial to have the dentists speak together in groups, as this facilitated their ability to build on each other's stories, compared to individual interviews [132].

Different dentists with other backgrounds, histories, and perspectives would most likely have added different inputs. Focus groups are sensitive to group dynamics and as commonly found in methodological literature [132], each focus group had a participant who took a dominant position in the interview. Thus, the moderator and assistant moderator ensured that all participants were included in the conversation and established an open atmosphere. Others might have withheld information to avoid being judged, which is common when discussing sensitive topics [132]. Nevertheless, the participating dentists willingly contributed to the discussion with specific stories from their dental practice and additionally contributed their reflections, thoughts, and feelings from various situations.

Sub-studies IIa and b

Sub-studies IIa and b were based on patient-self-reports, using both validated psychometric measurement instruments and newly developed items/variables.

Content validity concerns whether the concepts under study are precisely operationalized [129]. To secure content validity in the development of new instruments, the concepts should be conceptualized with an extensive literature review and rich first-hand knowledge in the field [129]. Therefore, it was an advantage that the research group included a member who had a PhD on the use of restraint on hospitalized children. Additionally, thorough literature searches in collaboration with a librarian were performed. The operationalization of the "restraint" concepts was discussed with pediatric dentists and psychologists. To assess stability, it is desirable to measure the test-retest reliability of the developed questions [129]. As this was not achievable within the framework of this project, we tested the questions on the respective age groups, which can be considered as face validity [129]. Newly developed non-validated items are generally not recommended in quantitative research and have many weaknesses [129]. For instance, the question on psychological restraint can be interpreted in different ways. This was underscored in the discussion in Paper II, together with a statement that future studies should develop and validate questions to measure pediatric dental patients' experiences of restraint. Nonetheless, our findings indicate that some patients do experience restraint during dental treatments, which is new (evidence-based) knowledge in the Norwegian dental context.

As the CFSS-DS and IOIF-s have been validated in similar populations [134, 135] as in this study, they were considered eligible for use. The validated ages, however, differed slightly from those in this study, but this should only cause minor discrepancies in terms of cognitive development. A limited number of parents from the 9-year-old group provided feedback,

indicating that some questions were difficult to answer. For instance, they mentioned issues with item eight in the CFSS-DS, which involved placing oneself in the following situation: "How afraid are you when the dentist drills into your teeth?" To our knowledge, this has not been reported in previous studies that used this instrument. However, as a person's ability to engage in episodic future thinking increases with age [165], children's difficulties imagining a possible future scenario might have caused difficulties and led to survey dropouts. The CFSS-DS has received criticism, because of the unsatisfactory validation of the cutoff score [6] and we have problematized the use of cutoff scores in Paper II. We additionally used a single dental fear item to separate *no-fear* participants from all other levels of dental fear. This was done with the knowledge that it would provide a picture of all participants and not only those with *high-fear*. Another criticism is that the CFSS-DS only considers the specific dental situation and no other aspects of DFA (cognitive, behavioral, or emotional) [166].

Regarding the measure of trust in dentists, it is a limitation that the DBS has only been validated in adult populations [18] and that we only used eight of the 15 items. The full version of the DBS assesses patients' attitudes toward dentists and measures patients' feelings regarding a lack of security and trust in dentists [136]. Only eight items were used to reduce the survey's length. Therefore, it was impossible to estimate the prevalence of distrust or make comparisons with other studies. However, we hypothesized that individuals who had experienced restraint could have a higher distrust in dentists and therefore determined that it was better to use predefined questions to avoid too many newly developed items. With the benefit of hindsight, it would have been better to use the entire DBS and validate the instrument for use with children in advance.

Except for oral health (DMFT-scores and caries) and scheduled time in the PDS, the variables in sub-study IIb were developed after performing a comprehensive assessment of the protocol within the research group. In the 10 double-controlled dental records, there were no differences in the reports between data collectors, indicating high reliability. Two researchers combined with a "third-party evaluation" could have produced an even more reliable data collection. However, for the sake of maintaining dental record privacy, this was not done.

6.2.4 Analyses and results

Sub-study I

In qualitative research, the researcher's role is decisive as he/she is the main instrument for obtaining knowledge [138]. Showing reflexivity (described as "the knower's mirror") is considered important [162] and a way of establishing confirmability. The background and position of the researcher(s) influence the topic of study, which methods are used, and which results are considered most appropriate [162]. Thus, the results presented in Paper I, which were interpreted by a set of researchers, could possibly be understood in a different way by others who stem from a different environment.

In Paper I, we underlined how preunderstanding may be a further challenge when studying your own field. Specifically, preunderstanding in research refers to a person's knowledge, insight, and experiences prior to the research project [138, 162]. This can cause certain elements or perspectives to remain unexplored, because it is often more difficult to access new information and criticize findings from your own field [138]. My background as a dentist treating dental patients in the TOO-project (Tortur [Torture], Overgrep [Abuse], and/or Odontofobi [dental phobia]) using CBT has affected my perceptions regarding the use of restraint. Many of my referred patients at the Centre for Odontophobia did express that they had been physically restrained during dental treatments, which increased my interest in exploring the topic. Therefore, I came into this project with an understanding that the use of restraint should be minimized, which probably affected the interpretations. However, preunderstanding in qualitative research is not necessarily synonymous with research bias, but instead requires the researcher(s) to be open and reflexive about these issues throughout the research process [137, 162]. In Paper I, we were clear about the authors' education and that the first author (PhD candidate) had the same employer as the interviewed dentists. In retrospect, we should have been clearer regarding the first and second authors' affiliations to the Center for Odontophobia. However, in the interviews, the research team's background was described in detail.

Interview transcripts will always involve multiple readings [138, 167]. In this regard, a thematic analysis is a highly flexible analytic method [137] and this flexibility allows for various interpretations of the research topic [137], such as when the dentists disagreed regarding the children's behaviors following an experience of restraint (Theme 3, Paper I). Confirmability demonstrates that the data in a study accurately represents the participant's views and were

not invented by the researchers [129]. Therefore, we strived to be transparent about our methodological choices, by describing the study settings, recruitment procedures, data collection, analysis, and interpretations of the results. For example, we used NVivo to organize the coding and exemplified each theme with one example from the transcripts up to the final theme in Paper I. To illustrate how our interpretations led to the results and thereby increase trustworthiness, we additionally presented a few quotes under each theme. Continuous collaboration within the research team most likely reduced individual biases, thereby strengthening the credibility of the presented results. To reduce the effects of our preunderstanding, it was advantageous to use a qualitative approach with open-ended questions, rather than a structured questionnaire [138, 167]. Another advantage was that one of the co-supervisors (third author, Paper I) of this project has a background in pediatric nursing and not in dentistry.

Finally, as the qualitative study in this thesis only presented a few perspectives from a small group of public non-specialist dentists, the results should be interpreted with caution. Future research should examine the extent to which the findings of Paper I are transferable to other public non-specialist dentists in Norway.

Sub-studies IIa and b

A main limitation of retrospective studies is uncertainty regarding data reliability, which in this case, represents survey and dental record data. Different factors may have affected the reliability of sub-studies IIa and b.

The main reliability threat in the two sub-studies was recall bias [164], because the participants' memories may not be in line with what occurred in the past. However, it is expected that recall bias will be stronger for subjective assessments, such as family well-being, than for actual events [168]. Furthermore, at least in a clinical perspective, what one remembers should be prioritized over what one does not recall. Further, it is common in cross-sectional studies that participants provide the answers that they believe are most desirable [151]. This might not be as relevant in this study, because the survey was anonymous and the participants answered alone or with their parents present. It should also be noted that the participants might have, consciously or unconsciously, provided incorrect answers, and there is a possibility of proxy-reports for the 9-year-olds, which creates a potential for information bias in sub-study IIa. Parents have been shown to commonly overestimate their child's fear [134, 169], making it possible that the DFA scores in this study are overestimated.

The reliability of the dental record data material is dependent on how precisely the different variables are operationalized. The dental records were sparsely written regarding behavioral objectives and it is also reasonable to assume that they only provided a small part of the dental situation. Furthermore, there is uncertainty between what the dentist perceived and what was recorded, which will always be a limitation in this type of research. The results regarding total scheduled time in the PDS, DMFT, and treatment methods are however likely more reliable compared to the behavior descriptions. This is because the PDS reports on the specific required treatment measures and the use of time, therefore, the dentists probably focus more on those reports than on behavioral aspects.

The statistical analyses in this thesis (Papers II and III) were performed by the PhD candidate and controlled by a statistician at the University of Oslo (Paper II). Considering that almost all the continuous variables were left skewed, we used the non-parametric Mann Whitney U test to test for differences between two independent groups on a continuous measure [170]. This test compares medians and converts the scores on a continuous variable to rank across the two groups to evaluate if the groups differ significantly [170]. The main advantage of this test is that the actual distribution of scores does not matter, because the scores are converted into ranks, while the main disadvantage is reduced power compared to parametric tests [170]. For information, parametric tests (independent sample t-test) were also performed with the same results. In sub-study IIb, we considered and discussed with the statistician at TkVestland whether we should match individuals in the self-reported non-restraint group based on gender or other variables in the self-reported restraint group. This was dissuaded, as the design of sub-study IIa only included the participants who answered the electronic survey, which is considered random.

Finally, external validity refers to the generalizability of the results to other settings or samples and depends on the degree to which the sample is representative of a broader population [129]. In observational research, such as in sub-studies IIa and b, generalizability to other settings is limited [129]. We have described the samples in sub-studies IIa and b to the best of our capability, and limitations are discussed, so that others can assess if the results are applicable for other contexts. A replication of sub-study IIa and b performed in other Norwegian counties, such as a county in the northern part of the country, would provide an opportunity to compare our results and possibly increase external validity. This was not possible in this study as we had to compromise time, cost, and work load.

7 Conclusions

The use of restraint seems to be a difficult clinical challenge that can place a strain on both non-specialist dentists and patients. Considering the limitations of the present study, the following conclusion can be made:

- Some non-specialist dentists in Norway report that the use of restraint in pediatric dentistry is more legitimized when the treatment is considered necessary and the child is under conscious sedation. However, the assessment of whether restraint should be used involves difficult ethical evaluations.

- The prevalence of a self-reported history of physical restraint during dental treatment was 2.9% for the 17-year-olds and 4.2% for the 9-year-olds in the PDS in Hordaland county, Norway, as of 2019. In general, these individuals reported higher DFA and lower trust in dentists compared to patients without this self-reported history.

- Patients with a self-reported history of restraint had more documented DFA-related and reluctant behaviors in their dental records, a higher total scheduled time in the PDS, and poorer oral health, compared to patients who had not reported a history of physical restraint.

The knowledge acquired in this thesis contributes a small piece of understanding pertaining to the use of restraint during pediatric dental treatment in the Norwegian PDS. While the present study has provided some answers, it has also introduced several new questions. Hopefully, this thesis can open further discussions regarding the use of restraint in pediatric dental care and create avenues for future research.

7.1 Implications for practice

Non-specialist dentists, as well as children and adolescents in Norway, report that restraint can occur during pediatric dental treatments, but dentists report that the use of restraint involves difficult ethical evaluations. The results of this thesis indicate that “necessary dental treatment needs” combined with a lack of time/resources, pressure from management/parents, or lack of alternatives sometimes leads to dental treatments being administered with restraint. Dental health personnel rarely know much about their pediatric patients’ other life experiences and life situations, and will, therefore, not know how the child might be affected

by the use of restraint. Prior to applying restraint, other methods for establishing good cooperation should be attempted. The use of restraint should be a last resort method, and followed by a debriefing conversation and habituation to dental treatment [34, 155]. Rather than restraint being something that "simply happens," there seems to be a need in clinical practice for increased awareness, openness, and debate in order to establish effective measures to evaluate and possibly reduce the use of restraint.

7.2 Implications for future research

The exploratory and descriptive results provide novel opportunities and suggest directions for future research. The two sub-studies in the current thesis were designed to explore and develop knowledge on the use of restraint during pediatric dental treatment in the Norwegian PDS, a topic that had received limited attention beforehand. The current research has provided some of the first pieces of this puzzle, but future studies are needed to increase our understanding of the use of restraint in the pediatric dental context.

Although non-exhaustive, suggestions for future research are as follows:

- Future studies should explore if there is a causal relationship between the experience of restraint and DFA, distrust in dentists, total scheduled time in the PDS, and poorer oral health. This should be done using a prospective study design.

- One finding of this study was that dentists often use restraint in combination with conscious sedation and that the amnestic effect of the latter can serve as a justification for dental treatments involving restraint, despite dentists being unsure of the possible consequences. Therefore, how children experience the amnestic effect of conscious sedation when being restrained should be explored.

- Gaining qualitative knowledge on individual perspectives would be valuable, because it would enable a more in-depth understanding of experienced restraint. Therefore, interview and observational studies of patients, parents, and dental health personnel (including dental health secretaries) on restraint during pediatric dental treatments should be prioritized in the future.

8 References

1. Tannhelsetjenesteloven. 1984. Lov om tannhelsetjenesten [The Dental Health Services Act] m.v. av 1983-06-03 nr 54. [Internet] [Cited 2020 Oct 28]. Available from: https://lovdata.no/dokument/NL/lov/1983-06-03-54 .

2. Pasient- og brukerrettighetsloven. Lov om pasient- og brukerrettigheter [Patient and User Rights Act] m.v. av 1999-07-02 nr 63. [Internet][Cited 2020 Oct 28]. Available from: https://lovdata.no/dokument/NL/lov/1999-07-02-63 .

3. Statistics Norway. Tannhelsetilstand og kariesforekomst blant utvalgte aldersgrupper, etter alder 2015–2020. [Dental health condition and incidence of caries among selected age groups, by age 2015–2020]. [Internet] [Cited 2021 Jun 8]. Available from: https://www.ssb.no/statbank/table/13033/tableViewLayout1/ .

4. Fägerstad A, Lundgren J, Windahl J, Arnrup K. Dental avoidance among adolescents - a retrospective case - control study based on dental records in the public dental service in a Swedish county. Acta Odontol Scand. 2019;77(1):1-8.

5. Berge KG, Agdal ML, Vika M, Skeie MS. High fear of intra-oral injections: prevalence and relationship to dental fear and dental avoidance among 10- to 16-yr-old children. Eur J Oral Sci. 2016;124(6):572-9.

6. Klingberg G, Broberg A. Dental fear/anxiety and dental behaviour management problems in children and adolescents: a review of prevalence and concomitant psychological factors. Int J Paediatr Dent. 2007;17(6):391-406.

7. Klingberg G. Dental anxiety and behaviour management problems in paediatric dentistry - a review of background factors and diagnostics. Eur Arch Paediatr Dent. 2008;9(1):11-5.

8. Armfield JM, Stewart J, Spencer AJ. The vicious cycle of dental fear: exploring the interplay between oral health, service utilization and dental fear. BMC Oral Health. 2007;7(1):1.

9. Berggren U, Meynert G. Dental fear and avoidance: causes, symptoms, and consequences. J Am Dent Assoc. 1984;109(2):247-51.

10. Cianetti S, Lombardo G, Lupatelli E, Pagano S, Abraha I, Montedori A, et al. Dental fear/anxiety among children and adolescents. A systematic review. Eur J Paediatr Dent. 2017;18(2):121-30.

11. Seligman LD, Hovey JD, Chacon K, Ollendick TH. Dental anxiety: An understudied problem in youth. Clin Psychol Rev. 2017;55:25-40.

12. Locker D, Liddell A, Dempster L, Shapiro D. Age of onset of dental anxiety. J Dent Res. 1999;78(3):790-6.

13. Berggren U, Carlsson SG, Hakeberg M, Hägglin C, Samsonowitz V. Assessment of patients with phobic dental anxiety. Acta Odontol Scand. 1997;55(4):217-22.

14. Locker D, Thomson WM, Poulton R. Psychological disorder, conditioning experiences, and the onset of dental anxiety in early adulthood. J Dent Res. 2001;80(6):1588-92.

15. Ost LG, Hugdahl K. Acquisition of blood and dental phobia and anxiety response patterns in clinical patients. Behav Res Ther. 1985;23(1):27-34.

16. Ten Berge M, Veerkamp JS, Hoogstraten J. The etiology of childhood dental fear: the role of dental and conditioning experiences. J Anxiety Disord. 2002;16(3):321-9.

17. Milgrom P, Mancl L, King B, Weinstein P. Origins of childhood dental fear. Behav Res Ther. 1995;33(3):313-9.

18. Skaret E, Raadal M, Berg E, Kvale G. Dental anxiety and dental avoidance among 12- to 18-year-olds in Norway. Eur J Oral Sci. 1999;107(6):422-8.

19. Milgrom P, Weinstein P, Getz T. Treating fearful dental patients: a patient management handbook. 2nd ed., rev. ed. Seattle (WA): University of Washington, Continuing Dental Education; 1995.

20. American Academy of Pediatric Dentistry. Behavior guidance for the pediatric dental patient. The Reference Manual of Pediatric Dentistry. Chicago (Ill): American Academy of Pediatric Dentistry; 2021:306-24.

21. Armfield JM, Heaton L. Management of fear and anxiety in the dental clinic: a review. Aust Dent J. 2013;58(4):390-407.

22. Wright GZ, Kupietzky A. Behavior management in dentistry for children. Ames (IA): John Wiley & Sons; 2014.

23. Arnrup K, Berggren U, Broberg AG, Bodin L. A short-term follow-up of treatment outcome in groups of uncooperative child dental patients. Eur J Paediatr Dent. 2004;5(4):216-24.

24. Roberts JF, Curzon MEJ, Koch G, Martens LC. Behaviour Management Techniques in Paediatric Dentistry. Eur Arch of Paediatr Dent. 2010;11(4):166-74.

25. Venkataraghavan K, Shah J, Kaur M, Trivedi K, Shah S, Virda M. Pro-Activeness of Parents in Accepting Behavior Management Techniques: A Cross-Sectional Evaluative Study. J Clin Diagn Res. 2016;10(7):ZC46-ZC9.

26. Eaton JJ, McTigue DJ, Fields HW, Beck FM. Attitudes of contemporary parents toward behavior management techniques used in pediatric dentistry. Pediatr dent. 2005;27(2):107-13.

27. United Nations. Convention on the Rights of the Child, 20 November 1989. 1989;16:95-501.

28. Svendsen EJ. Restraint during medical procedures in hospitalized preschool children. An exploratory study [doctoral dissertation]. Oslo (NO): University of Oslo; 2018.

29. Amos PA. New considerations in the prevention of aversives, restraint, and seclusion: Incorporating the role of relationships into an ecological perspective. Res Pract Pers Sev Disabl. 2004;29(4):263-72.

30. Diseth TH. Dissociation following traumatic medical treatment procedures in childhood: A longitudinal follow-up. Dev Psychopathol. 2006;18(1):233-51.

31. Kangasniemi M, Papinaho O, Korhonen A. Nurses' perceptions of the use of restraint in pediatric somatic care. Nurs Ethics. 2014;21(5):608-20.

32. Townsend JA. Protective Stabilization in the Dental Setting. In: Nelson TM, Webb JR, editors. Dental Care for Children with Special Needs: A Clinical Guide. Cham (CH): Springer International Publishing; 2019. p. 247-67.

33. American Academy of Pediatric Dentistry. Use of protective stabilization for pediatric dental patients. The Reference Manual of Pediatric Dentistry. Chicago (Ill): American Academy of Pediatric Dentistry; 2021:325-31.

34. Nunn J, Foster M, Master S, Greening S. British Society of Paediatric Dentistry: a policy document on the use of Clinical Holding in the dental care of children. Int J Paediatr Dent. 2016;18(1):39-46.

35. Svendsen EJ, Moen A, Pedersen R, Bjørk IT. Resistive expressions in preschool children during peripheral vein cannulation in hospitals: a qualitative explorative observational study. BMC Pediatr. 2015;15(1):190.

36. Svendsen EJ, Pedersen R, Moen A, Bjørk IT. Exploring perspectives on restraint during medical procedures in paediatric care: a qualitative interview study with nurses and physicians. Int J Qual Stud Health Well-being. 2017;12(1):1363623-.

37. Bray L, Snodin J, Carter B. Holding and restraining children for clinical procedures within an acute care setting: an ethical consideration of the evidence. Nursing Inq. 2015;22(2):157-67.

38. Lewis R. Restraining, holding still and containing children and young people. London (UK): Royal College of Nursing; 2003.

39. Rønneberg A. Barriers and facilitators safeguarding children in dental care: clinical practice, attitudes and cooperation with social welfare services [doctoral dissertation]. Oslo (NO): University of Oslo; 2020.

40. Rønneberg A, Skaare AB, Hofmann B, Espelid I. Variation in caries treatment proposals among dentists in Norway: the best interest of the child. Eur Arch Paediatr Dent. 2017;18(5):345-53.

41. Dorfman DH, Kastner B. The use of restraint for pediatric psychiatric patients in emergency departments. Pediatr Emerg Care. 2004;20(3):151-6.

42. Demir A. The use of physical restraints on children: practices and attitudes of paediatric nurses in Turkey. Int Nurs Rev. 2007;54(4):367-74.

43. Pedersen R, Nortvedt P, Ribe E, Keeping D. Etikk i psykiske helsetjenester. Oslo (NO): Gyldendal akademisk; 2017.

44. Ost L-G, Skaret E. Cognitive Behavioral Therapy for Dental Phobia and Anxiety. Somerset (UK): Wiley-Blackwell; 2013.

45. Grimen H. Hva er tillit. Oslo (NO): Universitetsforl.; 2009.

46. Norwegian Directorate of Health. Høringsutkast: Tannbarn - Kapittel 2 Barn og unge med tannbehandlingsangst (odontofobi) [Draft for consultation: Pediatric dentistry - Chapter 2 Children and adolescents with dental anxiety]; 2020 [Internet] [Cited 2020 Mar 30]. Available from: https://www.helsedirektoratet.no/retningslinjer/tannhelsetjenester-til-barn-og-unge-020-ar/tannbehandlingsangst-blant-barn-og-unge/tannhelsepersonell-skal-benytte-en-skansom-tilnaerming-nar-motsetter-seg-tannbehandling?tidligere-versjoner#6054 .

47. Nelson T. The continuum of behavior guidance. Dent Clin North Am. 2013;57(1):129-43.

48. Scanlan JN. Interventions to reduce the use of seclusion and restraint in inpatient psychiatric settings: what we know so far, a review of the literature. Int J Soc Psychiatry. 2010;56(4):412-23.

49. Boumans CE, Walvoort SJ, Egger JI, Hutschemaekers GJ. The methodical work approach and the reduction in the use of seclusion: how did it work? Psychiatr Q. 2015;86(1):1-17.

50. Barton DH, Hatcher E, Potter R, Henderson HZ. Dental attitudes and memories: a study of the effects of hand over mouth/restraint. Pediatr Dent. 1993;15(1):13-9.

51. Brunt L, Wright B. Restrain or refer? Br Dent J. 2006;200(1):2-3.

52. Zhou Y, Cameron E, Forbes G, Humphris G. Systematic review of the effect of dental staff behaviour on child dental patient anxiety and behaviour. Patient Educ Couns. 2011;85(1):4-13.

53. Weinstein P, Getz T, Ratener P, Domoto P. The effect of dentists' behaviors on fear-related behaviors in children. J Am Dent Assoc. 1982;104(1):32-8.

54. Weinstein P, Getz T, Ratener P, Domoto P. Behavior of dental assistants managing young children in the operatory. Pediatr Dent. 1983;5(2):115-20.

55. McNeil DW, Arias MC, Randall CL. Anxiety versus fear. Encyclopedia of abnormal and clinical psychology. Sage: Thousand Oaks (CA); 2017. p. 279-80.

56. Diagnostic and statistical manual of mental disorders: DSM-5®. 5th ed., American Psychiatric Association; 2013.

57. Strøm K, Skaare AB, Willumsen T. Dental anxiety in 18-year-old Norwegians in 1996 and 2016. Acta Odontol Scand. 2020;78(1):13-9.

58. Gomes HS, Viana KA, Batista AC, Costa LR, Hosey MT, Newton T. Cognitive behaviour therapy for anxious paediatric dental patients: a systematic review. Int J Paediatr Dent. 2018. [Cited 2021 Aug 24] https://doi:10.1111/ipd.12405.

59. Goettems ML, Zborowski EJ, Costa FD, Costa VP, Torriani DD. Nonpharmacologic intervention on the prevention of pain and anxiety during pediatric dental care: a systematic review. Acad Pediatr. 2017;17(2):110-9.

60. Mejàre IA, Klingberg G, Mowafi FK, Stecksén-Blicks C, Twetman SH, Tranæus SH. A systematic map of systematic reviews in pediatric dentistry - what do we really know? PLoS One. 2015;10(2):e0117537.

61. Weiner AA, Sheehan DV. Etiology of dental anxiety: psychological trauma or CNS chemical imbalance? Gen Dent. 1990;38(1):39-43.

62. Armfield JM, Slade GD, Spencer AJ. Cognitive vulnerability and dental fear. BMC Oral Health. 2008;8(1):2.

63. Barlow DH. Unraveling the mysteries of anxiety and its disorders from the perspective of emotion theory. Am Psychol. 2000;55(11):1247-63.

64. Themessl-Huber M, Freeman R, Humphris G, MacGillivray S, Terzi N. Empirical evidence of the relationship between parental and child dental fear: a structured review and meta-analysis. Int J Paediatr Dent. 2010;20(2):83-101.

65. Hughes K, Bellis MA, Hardcastle KA, Sethi D, Butchart A, Mikton C, et al. The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. Lancet Public Health. 2017;2(8):e356-e66.

66. Åstrøm AN, Smith ORF, Sulo G. Early-life course factors and oral health among young Norwegian adults. Community Dent Oral Epidemiol. 2021;49(1):55-62.

67. Mitchual S, da Fonseca MA, Raja S, Weatherspoon D, Koerber A. Association between childhood traumatic stress and behavior in the pediatric dental clinic. Pediatr Dent. 2017;39(3):203-8.

68. Locker D, Shapiro D, Liddell A. Negative dental experiences and their relationship to dental anxiety. Community Dent Health. 1996;13(2):86-92.

69. Armfield JM. Towards a better understanding of dental anxiety and fear: cognitions vs. experiences. Eur J of Oral Sci. 2010;118(3):259-64.

70. De Jongh A, Schutjes M, Aartman IH. A test of Berggren's model of dental fear and anxiety. Eur J Oral Sci. 2011;119(5):361-5.

71. Thomson WM, Stewart JF, Carter KD, Spencer AJ. Dental anxiety among Australians. Int Dent J. 1996;46(4):320-4.

72. Moore R, Brødsgaard I, Rosenberg N. The contribution of embarrassment to phobic dental anxiety: a qualitative research study. BMC Psychiatry. 2004;4:10. [Cited 2021 Sept 5] https://doi.org/10.1186/1471-244X-4-10 .

73. Holst A, Crossner CG. Direct ratings of acceptance of dental treatment in Swedish children. Community Dent Oral Epidemiol. 1987;15(5):258-63.

74. Klingberg G, Vannas Löfqvist L, Bjarnason S, Norén JG. Dental behavior management problems in Swedish children. Community Dent Oral Epidemiol. 1994;22(3):201-5.

75. Wogelius P, Poulsen S, Toft Sørensen H. Prevalence of dental anxiety and behavior management problems among six to eight years old Danish children. Acta Odontol Scand. 2003;61(3):178-83.

76. Arnrup K, Broberg AG, Berggren U, Bodin L. Lack of cooperation in pediatric dentistry - the role of child personality characteristics. Pediatr Dent. 2002;24(2):119-28.

77. Blomqvist M, Holmberg K, Fernell E, Ek U, Dahllöf G. Oral health, dental anxiety, and behavior management problems in children with attention deficit hyperactivity disorder. Eur J Oral Sci. 2006;114(5):385-90.

78. Klingberg G, Berggren U, Carlsson SG, Noren JG. Child dental fear: cause-related factors and clinical effects. Eur J Oral Sci. 1995;103(6):405-12.

79. Adair S, Waller J, Schafer T, Rockman R. A survey of members of the American Academy of Pediatric Dentistry on their use of behavior management techniques. Pediatr dent. 2004;26:159-66.

80. Law C, Blain S. Approaching the pediatric dental patient: a review of nonpharmacologic behavior management strategies. Journal of the California Dental Association. 2003;31:703-13.

81. Allen KD, Stanley R, McPherson K. Evaluation of behavior management technology dissemination in pediatric dentistry. Pediatr Dent. 1990;12(2):79-82.

82. Acs G, Hersch G, Testen RD, Ng MW. A 20-year perspective on the changing use of hand over mouth (HOM) and restraint in postdoctoral pediatric dental education. Pediatr dent. 2001;23(4):301-6.

83. Acs G, Burke MJ, Musson CM. An updated survey on the utilization of hand over mouth (HOM) and restraint in postdoctoral pediatric dental education. Pediatr Dent. 1990;12(5):298-302.

84. Peretz B, Gluck GM. The use of restraint in the treatment of paediatric dental patients: old and new insights. Int J Paediatr Dent. 2002;12(6):392-7.

85. Wright FA, Giebartowski JE, McMurray NE. A national survey of dentists' management of children with anxiety or behaviour problems. Aust Dent J. 1991;36(5):378-83.

86. Newton JT, Sturmey P. Students' perceptions of the acceptability of behaviour management techniques. Eur J Dent Ed. 2003;7(3):97-102.

87. Newton J, Patel H, Shah S, Sturmey P. Attitudes towards the use of hand over mouth (HOM) and physical restraint amongst paediatric specialist practitioners in the UK. Int J Paediatr Dent. 2004;14(2):111-7.

88. Vargas KG, Nathan JE, Qian F, Kupietzky A. Use of restraint and management style as parameters for defining sedation success: a survey of pediatric dentists. Pediatr Dent. 2007;29(3):220-7.

89. Salles PS, Tannure PN, Oliveira CA, Souza IP, Portela MB, Castro GF. Dental needs and management of children with special health care needs according to type of disability. J Dent Child (Chic). 2012;79(3):165-9.

90. Davis DM, Fadavi S, Kaste LM, Vergotine R, Rada R. Acceptance and Use of Protective Stabilization Devices by Pediatric Dentistry Diplomates in the United States. J Dent Child (Chic). 2016;83(2):60-6.

91. Casamassimo PS, Wilson S, Gross L. Effects of changing U.S. parenting styles on dental practice: perceptions of diplomates of the American Board of Pediatric Dentistry presented to the College of Diplomates of the American Board of Pediatric Dentistry 16th Annual Session, Atlanta, Ga, Saturday, May 26, 2001. Pediatr Dent. 2002;24(1):18-22.

92. Kupietzky A. General anesthesia or chemical restraint? Pediatr Dent. 2006;28(1):7-8.

93. Kunken FR, McGee EM, Stell LK. Case Study: Strap Him down. Hastings Cent Rep. 2001;31(1):24-6.

94. Kupietzky A. Strap him down or knock him out: Is conscious sedation with restraint an alternative to general anaesthesia? Br Dent J. 2004;196(3):133-8.

95. Manley MCG. A UK perspective. Br Dent J. 2004;196(3):138-9.

96. Weaver JM. Why is physical restraint still acceptable for dentistry? Anesth Prog. 2010;57(2):43-4.

97. Freeman R. The case for mother in the surgery. Br dent J. 1999;186(12):610.

98. Shroff S, Hughes C, Mobley C. Attitudes and preferences of parents about being present in the dental operatory. Pediatr Dent. 2015;37(1):51-5.

99. Peretz B, Zadik D. Parents' attitudes toward behavior management techniques during dental treatment. Pediatr Dent. 1999;21:201-4.

100. Peretz B, Kharouba J, Blumer S. Pattern of parental acceptance of management techniques used in pediatric dentistry. J Clin Pediatr Dent. 2013;38(1):27-30.

101. Boka V, Arapostathis K, Vretos N, Kotsanos N. Parental acceptance of behaviour-management techniques used in paediatric dentistry and its relation to parental dental anxiety and experience. Eur Arch Paediatr Dent. 2014;15(5):333-9.

102. Al Zoubi L, Schmoeckel J, Mustafa Ali M, Alkilzy M, Splieth CH. Parental acceptance of advanced behaviour management techniques in normal treatment and in emergency situations used in paediatric dentistry. Eur Arch Paediatr Dent. 2019;20(4):319-23.

103. Martinez Mier EA, Walsh CR, Farah CC, Vinson LA, Soto-Rojas AE, Jones JE. Acceptance of behavior guidance techniques used in pediatric dentistry by parents from diverse backgrounds. Clin Pediatr. 2019;58(9):977-84.

104. Theriot AL, Gomez L, Chang CT, Badger GR, Herbert AK, Cardenas Vasquez JM, et al. Ethnic and language influence on parents' perception of paediatric behaviour management techniques. Int J Paediatr Dent. 2019;29(3):301-9.

105. Patel M, McTigue DJ, Thikkurissy S, Fields HW. Parental attitudes toward advanced behavior guidance techniques used in pediatric dentistry. Pediatr Dent. 2016;38(1):30-6.

106. White J, Wells M, Arheart KL, Donaldson M, Woods MA. A questionnaire of parental perceptions of conscious sedation in pediatric dentistry. Pediatr Dent. 2016;38(2):116-21.

107. Davies EB, Buchanan H. An exploratory study investigating children's perceptions of dental behavioural management techniques. Int J Paediatr Dent. 2013;23(4):297-309.

108. Fägerstad A, Lundgren J, Arnrup K, Carlson E. Barriers and facilitators for adolescent girls to take on adult responsibility for dental care – a qualitative study. Int J Qual Stud Health Well-being. 2019;14(1).

109. Warren M. Democracy and trust. Cambridge (UK): Cambridge University Press; 1999.

110. Haukebø K, Skaret E, Öst L-G, Raadal M, Berg E, Sundberg H, et al. One- vs. five-session treatment of dental phobia: A randomized controlled study. J Behav Ther Exp Psychiatry. 2007;39(3):381-90.

111. Skaret E, Raadal M, Berg E, Kvale G. Dental anxiety among 18-yr-olds in Norway. Prevalence and related factors. Eur J Oral Sci. 1998;106(4):835-43.

112. Strøm K, Rønneberg A, Skaare AB, Espelid I, Willumsen T. Dentists' use of behavioural management techniques and their attitudes towards treating paediatric patients with dental anxiety. Eur Arch Paediatr Dent. 2015;16(4):349-55.

113. Statistics Norway. Spesialistutdanning. 4.kvartal, etter spesialitet, alder, statistikkvariabel, år og kjønn [Specialist education: speciality, age, statistical variable, year and sex]. 2019. [Internet][Cited 2021 Dec 12]. Available from: https://www.ssb.no/statbank/table/07935/tableViewLayout1/ .

114. Wang NJ, Petersen PE, Sveinsdóttir EG, Arnadóttir IB, Källestål C. Recall intervals and time used for examination and prevention by dentists in child dental care in Denmark, Iceland, Norway and Sweden in 1996 and 2014. Community Dent Health. 2018;35(1):52-7.

115. Norwegian Directorate of Health. Tenner for livet. Helsefremmende og forebyggende arbeid [Teeth for life. Health promoting and preventive work]. Oslo; 1999.

116. Oscarson N, Espelid I, Jönsson B. Is caries equally distributed in adults? A population-based cross-sectional study in Norway - the TOHNN-study. Acta Odontol Scand. 2017;75(8):557-63.

117. Nermo H, Willumsen T, Johnsen JK. Prevalence of dental anxiety and associations with oral health, psychological distress, avoidance and anticipated pain in adolescence: a cross-sectional study based on the Tromsø study, Fit Futures. Acta Odontol Scand. 2019;77(2):126-34.

118. Kongeriket Norges Grunnlov [Constitution of the Kingdom of Norway] as amended in 2018, 17 May 1814. [Internet] [Cited 2021 Aug 25]. Available from: https://lovdata.no/dokument/NL/lov/1814-05-17 .

119. Helsepersonelloven. 1999. Lov om helsepersonell [The Health Personnel Act] m.v. av 1999-07-02 nr 64. [Internet] [Cited 2020 Mar 30]. Available from: https://lovdata.no/dokument/NL/lov/1999-07-02-64 .

120. Norwegian Government, Department of Health and Care Services. Forskrift om pasientjournal [Regulations on Patient Records] [Internet] [Cited 2021 Jun 21]. Available from: https://lovdata.no/dokument/SF/forskrift/2019-03-01-168 .

121. Norwegian Government, Department of Health and Care Services. NOU 2019: 14. Tvangsbegrensningsloven - Forslag til felles regler om tvang og inngrep uten samtykke i helse- og omsorgstjenesten [Proposal for common rules on restraint and interventions without

consent in the healthcare service] [Internet] [Cited 2019 Nov 20]. Available from: https://www.regjeringen.no/no/dokumenter/nou-2019-14/id2654803/.

122. Norwegian Government, Department of Health and Care Services. Høringsnotat om oppfølging av forslagene fra Tvangslovutvalget [Consultation note on follow-up of the proposals from the Restraint Law Committee] [Internet] (2021). [Cited 2021 Oct 14] Available from: https://www.regjeringen.no/contentassets/0ea7eeab31a4475cb0ac7e63b72e7784/horingsnotat-oppfolging-av-forslagene-fra-tvangslovutvalget.pdf .

123. Machado GdCM, Mundim AP, Prado MMd, Campos CdC, Costa LRdRSd. Does protective stabilization of children during dental treatment break ethical boundaries? A narrative literature review. OHDM. 2015;14(14):188-93.

124. Beauchamp TL, Childress JF. Principles of biomedical ethics. New York (NY): Oxford University Press; 2013.

125. Torper J, Ansteinsson V, Lundeby T. Moving the four habits model into dentistry. Development of a dental consultation model: Do dentists need an additional habit? Eur J Dent Ed. 2019;23(2):220-9.

126. Statistics Norway. Areal og befolkning i tettsteder, etter region, statistikkvariabel og år [Area and population in densely populated area, by region, statistical variable and year]. [Internet][Cited 2021 Dec 12]. Available from: https://www.ssb.no/statbank/table/04860/tableViewLayout1/.

127. Statistics Norway. Income and wealth statistics for households. 2019. [Internet][Cited 2021 Dec 12]. Available from: https://www.ssb.no/en/statbank/table/06944/tableViewLayout1/ .

128. Brink PJ, Wood MJ. Advanced design in nursing research. 2nd ed. Thousand Oaks (CA): Sage Publications; 1998.

129. Polit DF, Beck CT. Nursing research: generating and assessing evidence for nurcing practice. 10th ed. Philadelphia: Wolters Kluwer; 2017.

130. Risjord MW. Nursing knowledge: science, practice, and philosophy. Chichester: Wiley-Blackwell; 2010.

131. Teddlie C, Tashakkori A. Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences. Los Angeles (CA): Sage; 2009.

132. Malterud K. Fokusgrupper som forskningsmetode for medisin og helsefag 2nd ed. Oslo (NO): Universitetsforlaget; 2018.

133. Patton MQ. Qualitative research & evaluation methods: integrating theory and practice. 4th ed. Los Angeles (CA): Sage; 2015.

134. Gustafsson A, Arnrup K, Broberg A, Bodin L, Berggren U. Child dental fear as measured with the Dental Subscale of the Children's Fear Survey Schedule: the impact of referral status and type of informant (child versus parent). Community Dent Oral Epidemiol. 2010;38(3):256-66.

135. Berge KG, Vika M, Agdal ML, Lie SA, Skeie MS. Reliability, validity and cutoff score of the Intra-Oral Injection Fear scale. Int J Paediatr Dent. 2017;27(2):98-107.

136. Kvale G, Berg E, Nilsen CM, Raadal M, Nielsen GH, Johnsen TB, et al. Validation of the dental fear scale and the dental belief survey in a Norwegian sample. Community Dent Oral epidemiol. 1997;25(2):160-4.

137. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77-101.

138. Kvale S, Brinkmann S. Interviews: learning the craft of qualitative research interviewing. 2nd ed. Los Angeles (CA): Sage; 2009.

139. Graham A, Powell M, Taylor N, Anderson D, Fitzgerald R. Ethical Research Involving Children Florence: UNICEF Office of Research Innocenti; 2013 [Cited 2020 Mar 10]. Available from: https://childethics.com/wp-content/uploads/2013/10/ERIC-compendium-approved-digital-web.pdf .

140. Powell MA, Fitzgerald RM, Taylor N, Graham A. International literature review: Ethical issues in undertaking research with children and young people. Lismore (NZ): Southern Cross University, Dunedin (NZ): University of Otago; 2012.

141. Jensen B, Schröder U. Acceptance of dental care following early extractions under rectal sedation with diazepam in preschool children. Acta Odontol Scand. 1998;56(4):229-32.

142. Marty M, Marquet A, Valéra MC. Perception of Protective Stabilization by Pediatric Dentists: A Qualitative Study. JDR Clin Trans Res. 2020:2380084420963933.

143. Al Zoubi L, Schmoeckel J, Mustafa Ali M, Splieth CH. Parental acceptance of advanced behaviour management techniques in paediatric dentistry in families with different cultural background. Eur Arch Paediatr Dent. 2021;22(4):707-13.

144. da Silva GS, Anabuki AA, Viana KA, Corrêa-Faria P, Moterane MM, Tedesco TK, et al. Sedation versus protective stabilization for dental treatment of children with caries and challenging behavior at the dentist (CHOOSE): a study protocol for a non-randomized clinical trial. BMC Oral Health. 2021;21(1):256.

145. Ilha MC, Feldens CA, Razera J, Vivian AG, de Rosa Barros Coelho EM, Kramer PF. Protective stabilization in pediatric dentistry: A qualitative study on the perceptions of mothers, psychologists, and pediatric dentists. Int J Paediatr Dent. 2021;31(5):647-656.

146. Klingberg G, Raadal M, Arnrup K. Dental fear and behavior management problems. In Koch G, Poulsen S, Espelid I, Haubek D (eds). Pediatric dentistry: A Clinical approach. 3rd ed. Oxford (UK) Wiley-Blackwell; 2009.

147. Bee H, Boyd D. The developing child. 11th ed. Boston (MA): Pearson/Allyn & Bacon; 2007.

148. Sturmey P. Reducing Restraint and Restrictive Behavior Management Practices. Cham (CH): Springer International Publishing: Imprint: Springer; 2015.

149. Carlson EB, Dalenberg CJ. A conceptual framework for the impact of traumatic experiences. Trauma Violence Abuse. 2000;1(1):4-28.

150. Sahlqvist S, Song Y, Bull F, Adams E, Preston J, Ogilvie D, et al. Effect of questionnaire length, personalisation and reminder type on response rate to a complex postal survey: randomised controlled trial. BMC Med Res Methodol. 2011;11(1):62.

151. Rothman KJ. Epidemiology: an introduction. 2nd ed. Oxford: Oxford University Press; 2012.

152. Svendsen EJ, Bjørk IT. Experienced Nurses' Use of Non-Pharmacological Approaches Comprise More Than Relief From Pain. J Pediatr Nurs. 2014;29(4):e19-e28.

153. Pedersen R, Hem MH, Gjerberg E, Førde R. Bruk av tvang i sykehjem etter ny lovgivning [The use of restraint after new legislation]. Tidsskr Nor Legeforen. 2013;133:1935-9.

154. Kapstad J, Storesund T, Strand GV. Bruk av tvang ved tannbehandling - lov eller ikke? [The use of restraint in dentistry - legal or not?]. Nor Tannlegeforen Tid. 2015;4:7.

155. Norwegian Directorate of Health. Nasjonal faglig retningslinje: TannBarn - Kapittel 7 Tannbehandlingsangst blant barn og unge [National guideline: Pediatric dentistry - Chapter 7 Dental anxiety among children and adolescents]; 2022 [Internet] [Cited 31 March 2022]. Available from: https://www.helsedirektoratet.no/retningslinjer/tannhelsetjenester-til-barn-og-unge-020-ar/tannbehandlingsangst-blant-barn-og-unge .

156. Hem M, Gjerberg E, Pedersen R, Førde R. Pleie og omsorg i grenselandet mellom frivillighet og tvang [Nursing and care in the borderline between voluntariness and restraint]. Sykepleien forskning. 2010;5(4):294-301.

157. Fixdal T, Aulie H. Tvang kan være god omsorg [Restraint can be good care]. Tidsskr Nor Legeforen. 2021. https://doi: 10.4045/tidsskr.21.0774

158. Creswell JW, Creswell JD. Research design: qualitative, quantitative & mixed methods approaches. 5th ed. Los Angeles (CA): Sage; 2018.

159. Lincoln YS, Guba EG. Naturalistic inquiry. Los Angeles (CA): Sage; 1985.

160. Creswell JW, Plano Clark VL. Designing and conducting mixed methods research. 2nd ed. Los Angeles (CA): Sage; 2011.

161. Malterud K, Siersma VD, Guassora AD. Sample Size in Qualitative Interview Studies: Guided by Information Power. Qual Health Res. 2016;26(13):1753-60.

162. Malterud K. Qualitative research: standards, challenges, and guidelines. Lancet. 2001;358(9280):483-8.

163. Sandelowski M. Sample size in qualitative research. Research Nurs Health. 1995;18(2):179-83.

164. Bowling A. Research methods in health: investigating health and health services. 4th ed. Maidenhead (UK): Open University Press, McGraw-Hill; 2014.

165. Gott C, Lah S. Episodic future thinking in children compared to adolescents. Child Neuropsychol. 2014;20(5):625-40.

166. Grisolia BM, dos Santos APP, Dhyppolito IM, Buchanan H, Hill K, Oliveira BH. Prevalence of dental anxiety in children and adolescents globally: A systematic review with meta-analyses. Int J Paediatr Dent. 2021;31(2):168-83.

167. Malterud K. Kvalitative forskningsmetoder for medisin og helsefag. 4th ed. Oslo (NO): Universitetsforlaget; 2017.

168. Sheikh MA, Abelsen B, Olsen JA. Differential Recall Bias, Intermediate Confounding, and Mediation Analysis in Life Course Epidemiology: An Analytic Framework with Empirical Example. Front Psychol. 2016;7:1828-.

169. Tollili C, Katsouda M, Coolidge T, Kotsanos N, Karagiannis V, Arapostathis KN. Child dental fear and past dental experience: comparison of parents' and children's ratings. Eur Arch Paediatr Dent. 2020;21(5):597-608.

170. Aalen OO, Frigessi A, Moger TA, Scheel I, Skovlund E, Veierød MB. Statistiske metoder i medisin og helsefag. 2nd ed. Oslo (NO): Gyldendal akademisk; 2018.

Original papers

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II. Aarvik RS, Svendsen EJ, Agdal ML. Held still or pressured to receive dental treatment: self-reported histories of children and adolescents treated by non-specialist dentists in Hordaland, Norway. Re-submitted to Eur Arch Paediatr Dent.

III. Aarvik RS, Svendsen EJ, Agdal ML. Patient-self-reported history of restraint among 17-year-olds: a retrospective study of records by non-specialist dentists in the public dental service in Hordaland, Norway. Eur Arch Paediatr Dent. 2022. DOI: 10.1007/s40368-022-00710-0

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ORIGINAL ARTICLE

Restraint in paediatric dentistry: a qualitative study to explore perspectives among public, non-specialist dentists in Norway

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ABSTRACT

Objective: The aim of this study was to explore the perspectives of non-specialist dentists on the use of restraint in paediatric dentistry in the Public Dental Service in Norway.

Materials and Method: Two focus group interviews involving four and five dentists, respectively, were conducted in one of the most populated counties in Norway in September 2019. The thematic analysis by Braun and Clarke informed the qualitative analysis.

Results: According to the dentists, physical restraint in paediatric dentistry is usually used when dental treatment is absolutely necessary. The qualitative analysis revealed the following three main themes: (1) some dentists justify the use of restraint in paediatric dentistry; (2) physical restraint is often legitimised by the fact that the child is sedated; (3) the use of restraint evokes difficult ethical evaluations. Additionally, the dentists had an overarching perspective of acting in the child's best interest, but they sometimes struggled to find a justifiable path in situations involving restraint.

Conclusions: Dentists seem to consider the use of restraint combined with sedation as legitimate for absolute necessary dental treatment. Furthermore, the use of restraint involves difficult ethical evaluations.

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Restraint; coercion; paediatric dental treatment; children; paediatric dentistry

Introduction

The UN Convention on the Rights of the Child (UNCRC) [1] underscores the importance of the participation of children in healthcare decision-making but reviews show that their participation is still sometimes suboptimal [2,3]. This may occasionally result in situations involving restraint. Physically forced treatment can cause anger, resistance and discomfort in children [4]. Little is known about the use of restraint in paediatric health services at large and paediatric dentistry specifically. However, research from other medical health services shows that restraint can cause psychological, social and developmental burdens for children [5,6]. Some children are vulnerable to developing dental anxiety, and a trustful clinical relationship can be necessary for them to successfully undergo dental treatment [7]. This relationship is at risk when using restraint, and children with anxiety are at higher risk of experiencing restraint than others [5]. The vicious circle of dental anxiety may [8], therefore, start at an early age when they experience restraint.

In this study, the term 'restraint' was initially understood as the administration of dental treatment despite the resistance of a child. Restraint thus involves the different means of administering a treatment against a person's will, and it may be classified as: psychological, pharmacological and physical [9,10]. Psychological restraint involves verbally or non-verbally forcing a child to accept the treatment without the option of resisting. Pharmacological restraint involves the use of sedatives/medication to calm a child down, such as conscious sedation [9]. Physical restraint involves physical force where the child is prevented from moving [9]. In the Norwegian context, physical restraint, physical immobilisation, passive immobilisation, protective stabilisation (against one's will) and holding are all concepts in the literature that can be considered to cover the restraint phenomenon [5,11,12]. However, there is no consensus within dentistry on how to define or what to consider as restraint [13].

Child resistance to necessary treatment is a well-known clinical challenge among dentists working in paediatric dentistry [7]. To accommodate children, different behaviour management techniques (BMTs) have been used to help them receive the required dental treatment [14]. The generic term, BMTs, refers to techniques for providing dental care, such as tell–show–do (TSD), positive reinforcement, distraction, conscious sedation and physical restraint. While most BMTs facilitates and enables participation in decision-making, physical restraint does not [5]. Both internationally and in Norway, restraint is among the less accepted techniques [14,15]. Although the acceptance of restraint is decreasing, its use has not been problematised in dentistry in the same way as it has been in other paediatric health services. Being possibly harmful and violating of child autonomy, the use of restraint

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Table 1. Gender, clinical experience and demographic distribution of the participants.

Category	Variables	*n*
Gender	Female	6
	Male	3
Clinical experience	<10 years	5
	≥10 years	4
Location	Rural	4
	Central	5

raises important medico-ethical questions regarding the principles of non-maleficence.

To our knowledge, no published studies have reported on the prevalence of restraint in paediatric dentistry, but restraint seems to occur frequently in dentistry [13,15]. Rønneberg et al. [15] found that restraint in the Norwegian Public Dental Service (PDS) was most often used by dentists educated outside the Nordic region. Due to the fact that restraint is an underexplored topic in paediatric dentistry, we wanted to qualitatively gain a better understanding of the topic.

The aim of this study was to explore the perspectives of non-specialist dentists on the use of restraint when administering dental treatment on children and adolescents from 0 to 18 years of age in the Norwegian PDS.

Materials and method

An exploratory qualitative design was used [16], and the data of this study were collected during two focus group interviews in September 2019.

The use of restraint involves a complex interaction between the caregiver and the patient associated with taboo and sensitive practice, which makes the topic difficult to explore quantitatively. A focus group approach was found suitable for stimulating reflection and thoughts about dentists' understanding of their practice [17]. Focus group interviews are suitable when the participants are unconscious or less aware of their views on an taken for granted practice, to capture the meaning that lies behind a topic that little is known about beforehand [17]. Compared with individual interviews, the interaction between the participants allowed us to explore the participants' expressions, elaborations and exchanges of experiences, views and attitudes during interactions including valuable reactions to the other participants' statements [17]. This was especially helpful in this study because of the differing definitions of restraint among dentists.

Participants and recruitment

This study took place in the PDS in one of Norway's most populated counties. In the PDS, all children aged from 0 to 18 years receive free dental care except orthodontic treatment, which involve individually adapted recalls at least every 2 years [18]. A purposive sampling strategy based on criterion sampling was used to ensure information-rich participants [19]. The following criteria were set for the dentists' participation: a permanent position in the PDS, no management position, no specialists, and a maximum of one participant from each clinic. Of the 132 listed in the county, 98 dentists fulfilled the abovementioned criteria. Since the accessible sample included more dentists than necessary, a random sampling strategy was used to identify whom to invite (performed in Excel) [19]. When 10 dentists accepted to participate, they were allocated to two groups. Each group was preconceived to consist of five participants, including both genders, dentists with ≥10 and <10 years of clinical experience and dentists working in both central and rural parts of the county. These criteria were set to avoid groups with established roles and ensure multiple interactions between the participants. The interviewer (first author) and the participants had the same county employer. However, the included participants were not close acquaintances.

In total, nine dentists participated, and they were allocated to two focus groups to allow enough time for sharing their different experiences and thoughts. The first contact was made by phone by the first author, and written information was sent by e-mail to those willing to participate in the study. Of the 15 invited dentists, 10 chose to participate. The reasons for rejection were the long journey ($n = 2$), inappropriate timing ($n = 2$) and a lack of interest in the subject ($n = 1$). On the day of the second interview, one person did not show up due to illness. The mean work experience was 9.9 years, with a range from 0.5 to 33 years, and they all worked with children and adolescents aged between 0 and 18 years. A brief overview of the participants is shown in Table 1. Before the interview started, the participants gave written informed consent to participate in the study. After the preliminary analysis of the two interviews, the need for further recruitment was discussed. We concluded that the research question was fully answered using the data from the two interviews.

Data collection

A researcher moderated (the first author/dentist) and a research assistant assisted both interviews. Both groups were informed about the researcher's background. The interviews took place in a quiet meeting room, and they were audiotaped with consent. They lasted for 90 min during normal work hours, and the participants' costs were covered. The semi-structured interview guide was developed by the research team, and it has been presented in Table 2. In addition, a vignette made by the research team about a boy with toothache who experienced restraint was presented to the participants for discussion at the end of both interviews. To present, a vignette in interviews is a good way of getting honest answers about sensitive topics [20]. We tested the interview guide and the vignette in a pilot focus group with public dentists in advance of the data collection, and a few adjustments were implemented.

Table 2. The interview guide used for both focus groups.

Interview guide
Can you tell about one time a child did not want to have dental treatment? What happened and how did you handle it?
What type of dental treatment is, in your opinion, absolutely necessary to perform the same day?
Can you tell me about a situation where you felt that there was no other option than to go through with the treatment even though the child resisted?
Have you experienced thinking 'we have to do this today' and then quit before the treatment was completed? What made you quit?
Can you tell me about a method you use that normally means that the treatment succeeds without resulting in a feeling that the treatment was performed against the child's will?
Can you tell me about a typical situation where you choose to offer sedative agents? How do you explain it to the parents?
Can you tell me about an experience where you sedated a child who still resisted receiving dental treatment?
How does it feel when the child resists dental treatment? Does the feeling differ when the child is sedated and when he/she is not?
Do you know if there are routines about how to follow up on children when a dentist feels that the dental treatment was traumatic?
Can you give an example of how you would record a situation where a child expressed discomfort and opposition during the dental treatment?
What experiences do you have of dealing with children after treatments they have opposed? Some of you have worked in dentistry for a long time and others for a shorter. Can you share your experiences about the oral health of children who opposed dental treatment earlier on but still had it performed? And have you seen any behavioural changes in those children?
Is there something you think we should add to cover the topic even better?

Thematic analysis

The interviews were transcribed verbatim by the first author and validated by the research assistant shortly after the interviews. This resulted in an information-rich data material that consisted of 63 computer-written pages. For example, several of the questions were not necessary because the participants answered them in their conversations. The analysis, which included the answers to all questions, was informed by Braun and Clark's thematic analysis (TA) [21]. This process has been illustrated in the schematic model in Figure 1. TA is a method used to identify and analyse themes within a dataset, and it consists of six steps [21]: (1) transcribing, reading and re-reading the data so that you familiarise yourself with it; (2) generating codes for the entire dataset and collating data relevant to each potential theme; (3) searching for themes and collating codes into potential themes; (4) reviewing themes; (5) defining and naming themes derived from the data; (6) producing a report [21]. To organise the analysis, the first author used NVivo 12, which is qualitative data organising software. Excluding the transcription part in step 1, all authors conducted all the steps of a systematic process of discussion and reflection. The analytical process for each main theme has been exemplified in Table 3. In the results, the quotes are presented with the corresponding number of participants (ID1–9). The Norwegian quotes were translated into English by the research team and crosschecked by one native English- and Norwegian-speaking translator and one native English-speaking dental health employee.

Results

The participants reported that the use of restraint is a part of paediatric dentistry when 'necessary dental treatment' must be completed. They mainly used the term restraint when describing physical restraint. In both interviews, the dentists were fundamentally concerned about acting in the child's best interest, but they struggled in different ways to find a justifiable path. These overarching perspectives were reflected in the following three main themes: (1) some dentists justify the use of restraint in paediatric dentistry; (2) physical restraint is often legitimised by the fact that the child is sedated; (3) the use of restraint evokes difficult ethical evaluations.

Theme 1: some dentists justify the use of restraint in paediatric dentistry

All the participants recollected situations where they, or their colleagues, had used physical restraint to complete what was termed as 'necessary dental treatment.' It was established that it is sometimes imperative to practice restraint when administering dental treatment and that they in these situations had no alternatives. They faced an ethical dilemma of not causing harm, where restraint seemed less harmful, then not administering dental treatment when the child had dental pain. Even though the dentists mainly used the word 'restraint' as a synonym for physical restraint during the interviews, one dentist drew attention to how verbal restraint may occur, as shown in the following quote:

> The restraint is often indirect in terms of us saying that "this must be done," and the child doesn't want to. ID 1

This was the only time psychological restraint was mentioned, and in the rest of this manuscript, restraint refers to physical restraint.

There was a consensus that toothache that disrupts a child's sleep and causes difficulty with eating is the foremost reason for considering dental treatment to be necessary, even if the treatment involves the use of restraint. This is illustrated in the following quote:

> She had an abscess and it was really painful! ID 6

During the interviews, personal experiences related to the consequences of not administering dental treatment were shared. The participants' assessment of future pain and the possible need for emergency treatment were used as justifications for performing dental treatment despite the resistance of the child. The approach of habituating the child to dental treatment was considered too time-consuming when deep caries and dental pain were diagnosed, as illustrated in the following quote:

> The child doesn't sleep or eat. Takes analgesics. Toothache can be very painful. If you have a 04 [molar tooth] with a short path to the pulp and you use several hours on behavior guidance,

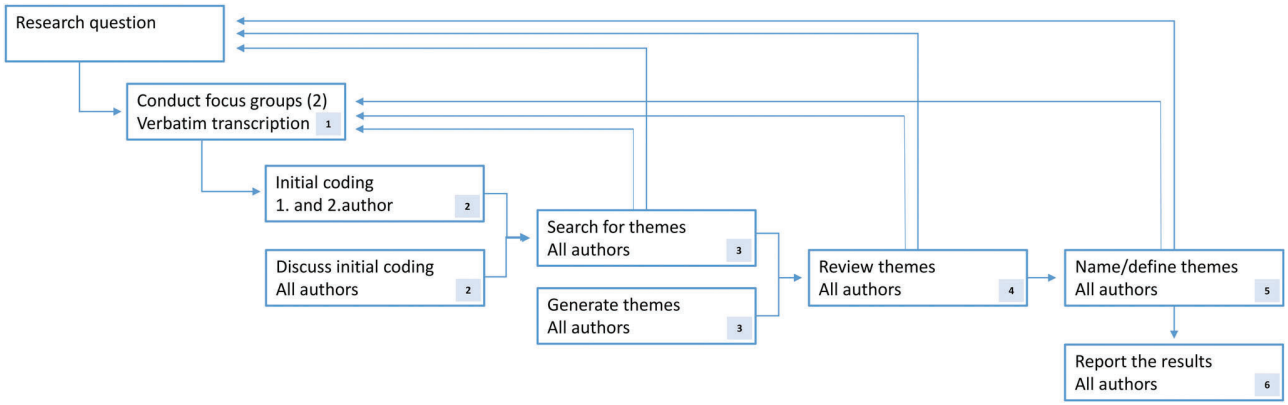

Figure 1. Schematic representation of the thematic analysis performed in this study. The arrows from steps 3–5 show that the steps are based on the research question and the data material.

Table 3. An extract from the thematic analysis showing how the main themes were established.

An excerpt of the transcribed text Step 1	NVivo code Step 2	Temporary theme Steps 3–4	Final theme Steps 5–6
'The child doesn't sleep or eat. Takes analgesics. Toothache can be very painful. If you have a 04 [molar tooth] with a short path to the pulp and you use several hours on behaviour guidance, then you have pulpitis. I have experienced it several times, and I'm sure others have as well (several agree saying 'mmm'/nodding). Then you don't have time.'	Children with toothache are forced to receive dental treatment as a result of dentists' desire to remedy pain and suffering	Dental pain and pathologies are reasons for the use of restraint	Some dentists justify the use of restraint in paediatric dentistry
'When the child is sedated, my point of view is that the treatment should be done.'	Doing whatever is necessary to complete dental treatment when the child is sedated	Physical restraint often occurs when the child is sedated	Physical restraint is often legitimised by the fact that the child is sedated
'You don't want to be a dentist anymore. Those days – you get a headache and feel that your legs fall asleep. You are completely exhausted.'	Negative emotions after the use of physical restraint during paediatric treatment	Demanding clinical situations lead to negative personal emotions	The use of restraint evoked difficult ethical evaluations

> then you have pulpitis. I have experienced it several times, and I'm sure others have as well (several agree saying 'mmm'/nodding). Then you don't have time. ID 8

It was emphasised that after caries is treated, there is more time to perform actions to increase the child's ability to receive dental treatment. Furthermore, a consensus was reached that it is necessary to perform some dental trauma treatments immediately, independent of the resistance of the child.

Situations of dental treatment on the point of no return were described, where the use of restraint was demanded to complete the treatment. For example, one dentist described a treatment situation where a good relationship with the child was achieved. Everything went well during the dental treatment until the child suddenly resisted putting on the matrix system. The dentist explained how the mother had to hold the child firmly to keep the child still to enable the completion of the treatment.

In contrast to the situations described above, it was expressed that the need for treatment should always be considered carefully in advance, and 'necessary dental treatment' was nuanced with the following quote:

> It's rarely so urgent that you have to do something the same day. ID 4

The dentists shared doubts about judgments of the necessity of dental treatments.

Theme 2: physical restraint is often legitimised by the fact that the child is sedated

Following the assessments of the necessity of treatments, the dentists expressed how physical restraint mainly occurred when the child was sedated. It was agreed that sedation allowed dentists to perform extra-dental treatment and it lowered the threshold for restraint for completing the process. When the participants talked about restraint during dental treatment, the term 'sedation' was often used as a synonym for the term 'restraint.' A dentist expressed it like this:

> When the child is sedated, my point of view is that the treatment should be done. ID 3

Another dentist described the following situation where restraint in combination with conscious sedation was the chosen alternative:

> The child I'm thinking of was very special and had many big cavities. Then, I think one should give Dormicum (Midazolam)

> right away to treat the deep cavities, before they turn painful. ID 8

There was a general agreement that children aged from 5 to 10 years are more often subjected to sedation and restraint than those in other age groups. Children in this age group were considered by the participants to be too immature to understand their treatment needs and, consequently, less cooperative. This was also the case for younger children, but they were reported to rarely need dental treatment. The dentists agreed that a child should not experience restraint without being sedated, and used it to minimise the negative effects of the restrain, such as dental anxiety. This is illustrated in the following quote describing common preoperative information to parents before conscious sedation:

> The way I view your child now, I think that if we fix this cavity when he is awake and totally alert, it could have a negative impact on future follow-ups in the dental health service. ID 6

There was disagreement on the amnestic effect of sedation.

> … Then, I usually inform them that there will most likely be some crying and screaming and that it will probably be worse for them [the parents]. They will find this the toughest. Their child will remember coming and going, but won't remember what happened in between. ID 6

Some dentists supported the statement above and concluded that the children would not return to their offices for further treatment otherwise. Other participants shared experiences of patients becoming anxious after treatment with sedation and physical restraint. One discussion concerning the amnestic effect ended with the following quote:

> It's safe to say that there is a good chance they don't remember. To say that they won't remember anything is a very explicit statement. ID 1

The discussion on the amnestic effect of sedation culminated with participants expressing doubt related to the use of restraint when treating children, which led to a reconsideration of its legitimacy.

Theme 3: the use of restraint evoked difficult ethical evaluations

Based on the participants' accounts, restraint in paediatric dentistry seems to be an unclear topic entwined with challenging professional decisions and difficult feelings. The use of restraint was in conflict with their professional assessments. Notwithstanding, they occasionally used restraint, and they explained how spontaneous decision-making regarding restraint was often influenced by external factors, such as parents and the lack of time and resources. Their future decisions attached to the use of restraint were thus underpinned by difficult ethical evaluations.

The lack of time and its associated pressure evoked difficult ethical evaluations for the dentists. It was described as a dilemma when parents wanted the dentist to complete the treatment, while the dentists preferred to take their time to habituate the child to prevent dental anxiety and future avoidant behaviour. This is illustrated in the quote below:

> … The parents are very thankful for it having been done. However, when they come back, my experience is that they [the children] are terrified. ID 2

The participants also had experienced a demanding workload and time-related pressure in their daily practice. They explained how the management encouraged them to focus on prophylactic treatment, helping the children to have a positive experience of dental treatment, and working more efficiently to decrease the lag in patient recalls. To save time, the use of restraint sometimes seemed unavoidable. A participant preferred to use restraint instead of sedation and TSD technique due to time-related pressure, even though restraint was undesired, as demonstrated in the following quote.

> I wanted to sacrifice as little treatment and as few examination sessions as possible. ID 1

It was reasoned that if children were sedated, it would be at the expense of other patients as sedated treatment is time-consuming.

General anaesthesia was considered as an alternative to restraint, but often involved difficult ethical evaluations. Some considered general anaesthesia as the last option, only to be used when TSD and sedation were not successful, whereas one pointed out that dental treatment with general anaesthesia should be the treatment of choice for patients with substantial treatment needs. Another dentist questioned whether general anaesthesia was a viable option because the dentist was uncertain about the harm it could cause. Nevertheless, the long waiting list and rejections of references to dental treatment with general anaesthesia because of capacity limitations made them question it as a good alternative to restraint.

The dentists reported being in situations dominated by having to choose the lesser of two evils. They described situations without optimal treatment solutions when weighing their options in terms of the parents, the child, the necessity of the treatment and their access to resources. At times, this resulted in decisions they were uncomfortable about. In descriptions of restraint, negative feelings such as insecurity, sadness and helplessness were described. The use of restraint is one of the worst parts of their work, and they intimated personal desires to adjust treatments to avoid the use of restraint. Some dentists expressed adaptability in terms of overcoming negative feelings in situations of physical restraint by focussing on how they removed the child's dental pain. Others pointed out the negative impact they suffered from these situations, both psychologically and physically, as shown in the following quote:

> You don't want to be a dentist anymore. Those days – you get a headache and feel that your legs fall asleep. You are completely exhausted. ID 9

The participants described the outcomes they observed in the children when using restraint:

> I don't find it comfortable either way, but I think to myself that at least they don't remember it clearly afterwards. ID 3

> There were things we had to do. And the father cooperated very well in performing these. He completely agreed. But the boy was

> furious … But now, he has become so compliant and he is not the only one. I have just remembered another one who is in the same situation. In the end, they can actually turn out to be the most compliant patients. ID 8

How the dentists perceived the reactions of the children after restraint differed. Some supported the quote above, where those children are the ones who turn out to be the most compliant patients, whereas others described anxious children. The following quote is an answer to the interviewer's question about why these children became the most compliant patients.

> He is confident with one dentist [me]. I don't think things would go well if he was forced to change to another dentist. It is because he and I have developed a relationship.

The discussions about the use of restraint bore imprint of challenging ethical evaluations.

Discussion

This study aimed to qualitatively explore dentists' perspectives on the use of restraint in paediatric dentistry in Norway, which is a sparsely researched topic. An important and new result in this study is that physical or psychological restraint, in combination with or without conscious sedation, in some occasions is considered unavoidable when dentists administer what they term 'necessary dental treatment.' What to consider as necessary dental treatment seems to be subjective. We further identified that the use of restraint was a familiar but last-resort method in use. In paediatric health services, the use of restraint is found to be comprehensive, even though it is mostly used in acute or clinically important situations, such as when the child has to be administered medications [9].

The dentists treated children in the age group of 0–18 years, but restraint was reportedly used most often in the age group of 5–10 years. This finding is consistent with the use of restraint in health services at large [12,22]. Legally, the use of restraint in health care is regulated in most countries and patient groups [1]. The UNCRC is implemented in many countries' legislation, including Norway. Especially article 3, 12 and 24 are important for the discussion about the use of restraint in paediatric dentistry. Following Article 3, one shall always act in the best interest of the child, and Article 12 states the right of children to be listened to. Article 24 highlight the right of the child to enjoy the highest attainable standard of health [1]. Further, the Patients' Rights Act in Norway [23] declares that from the age of seven, the child has the right to contribute during decision-making concerning their health, whereas from the age of 12 the child's opinion shall be largely emphasised. Notwithstanding, parents still have the formal competence to consent until the child is 16 years old.

The dentists in this study indicated parental influence as one of the main reasons for using restraint, which in turn can mean that these dentists may be sensitive to parents' views on restraint. Jackson et al. [24] reviewed several studies on the factors that influence parents' decision-making regarding their children's health and concluded that parents rarely challenged the authority of health personnel, such as doctors. Venkataraghavan et al. [25] summarised studies on parental acceptance of the BMTs in dentistry up until 2016 and identified a distinct trend of reduced acceptance of restraint, which is in contrast to the dentists' experience presented in this study. Therefore, establishing a good parent-dentist relationship and communication may nuance possible misunderstandings between dentists and parents and potentially reduce the use of restraint.

The results showed that physical restraint is often combined with and legitimised by conscious sedation when the dental treatment is considered necessary and the child opposes treatment. Strøm et al. [26] reported in 2015 that 18% of the asked dentists in the PDS in Norway use conscious sedation at the local clinic to provide dental care to anxious children. In this study, the dentists disagreed on the amnestic effects of sedatives and debated their contributions to the development of dental anxiety. Although the study was published in 1998, Jensen et al.'s findings have been referenced in several discussions on conscious sedation. They identified that 85% of pre-school children experienced the amnestic effect of rectal sedation when extracting a tooth [27]. The children that remembered the extraction when sedated showed less acceptance of future treatment compared with the ones that did not [27]. Because several children do not remember, dentists may conclude that the conscious sedation and restraint combined do not result in anxious children. Additionally, the large number of successful treatments, based on the amnestic effect, may influence and ease the justification of the use of restraint in combination with sedation by dentists.

This study indicates that the use of restraint is inflicted with difficult ethical evaluations when the dentists make individual assessments. At the beginning of 2020, The Norwegian Directorate of Health published a draft for new guidelines for dentists treating children and adolescents aged from 0 to 20 years [28]. To date, the draft for the new guidelines stipulates that if restraint is necessary to complete dental treatment, the child should be sedated at the local clinic or undergo general anaesthesia. In other words, the draft for the new guidelines seems to accept restraint when the child is sedated and leaves the final decision to each dentist. The descriptions of the dentist of the combined use of restraint and conscious sedation were consistent with the upcoming guidelines. Available documentation indicates that dental treatment is better accepted by children when sedation is used [27]. However, the referenced literature does not question whether the dental treatment involved the use of restraint. There is a lack of research addressing the possible psychological trauma associated with the use of restraint. If there is no clear indication of preferable evidence-based practices, it will be easier to justify the use of restraint when the child is in urgent need of dental treatment.

From what the participants in this study reported, there are negative feelings and personal stress related to the use of restraint. This is consistent with research from other health services as well, such as nurses reporting restraint in

paediatric treatment as emotionally challenging [29]. The self-perceived stress of dentists performing restorative treatments in children decreases with increasing age of the children from 3 to 18 years [30], and high levels of stress affect the ability of dentists to make good decisions [31]. To explore treatment goals and BMTs supporting the child to participate in decision-making before the consultation, can for some dentists help reduce the emotional strain.

In this study, the concern related to acting in the best interest of a child was underscored, and yet, they sometimes chose to act against the child's will. Restraint challenges the ethical principles of nonmaleficence, autonomy, and justice when it is used based on the principle of beneficence [32]. The perspectives of a dentist on consequence ethics, emphasising the consequence of the act, and virtue ethics, emphasising moral excellence, seem to play major roles in the dentists' approaches. Knowledge about possible consequences is important when weighing the pros and cons. The values of dentists may influence their choice of action. A major issue is the availability of treatment. As discussed by Rønneberg et al., the dentists interviewed also described the ethical assessment of whether patients had to wait to receive a GA appointment and endure dental pain for a long duration or get over with the procedure using restraint [15]. In several cases, the last option seemed to be the choice informed by the child's best interest. However, Bray *et al.* expressed concerns in 2015 regarding whether children were frequently being physically restrained for procedures that were not urgent or necessary, as a result of marginalising their voice during situations of restraint [12]. Snyder concludes that the use of restraint has to be accepted on some occasions, and health personnel should be aware that they thereby compromise the child's right to participate [33]. Nevertheless, the possibility of completely safeguarding the rights of children to participate in decision-making [1] is questionable when the right to receive [23] and provide [34] health care is legally established.

Methodological considerations

The explorative qualitative design facilitated the understanding of how restraint in paediatric dentistry can be described, discussed and used by non-specialist dentists. This study aimed to explore the use of restraint in the Norwegian PDS in general, and did not focus on specific patient groups. Overall, the dentists in the present study had relative long work experience with children in the PDS. However, they were not specialists in paediatric dentistry. In a future study, it would be interesting to explore how knowledge and training in BMT influence the use of restraint during paediatric dental treatment.

We acknowledge that the small number of participants can be a limitation. However, the informational power was considered sufficient [35]. In line with Malterud et al., informational power is reached when the participants generously share their experience in such a way that the aim of the study is obtained. The informational power of this study was further strengthened through the in-depth analysis that resulted in new and nuanced patterns relevant for the study's exploratory aim [35]. Tabooed and sensitive topics can best be explored using qualitative methods obtained in a safe environment. However, further research is necessary to identify how the perspectives of this study represent the general population of dentists [16].

A criterion sampling strategy was used to pre-process the sample to consist of participants with different backgrounds to ensure a wide range of viewpoints on the use of restraint [19]. For example, we considered groups of participants with both short and long clinical experiences as an advantage. However, it may have affected what the participants chose to tell us, such as the case of one newly educated dentist that spoke less and may have found it difficult to speak in front of the more experienced dentists. Still, another group composition would have given rise to other issues related to the interactions. The sample of more female than male dentists was representative for the Norwegian PDS.

There are several challenges when studying one-peers [36,37]. Because two of the authors were dentists (the first and second authors), we may have unconsciously influenced the results [37]. For example, the participants may have excluded descriptive information when articulating due to the expectation that we would understand the context of their descriptions. The pilot interview with dentists lead to a greater inclination for the interviewer to ask the participants to clarify terms taken for granted by dentists. Still, we acknowledge that our personal experiences and values influenced the interpretation of the data material [36]. Therefore, we kept asking critical questions about the interpretation of the data material throughout the entire research process. The research group also consisted of a paediatric nurse (third author), who contributed by maintaining an outsider perspective during the research process.

Conclusion

This study presented selected patterns about the perspectives of non-specialist dentists on the use of restraint in paediatric dentistry. The dentists interviewed in this study reported that restraint is most often used in combination with conscious sedation, and they expressed that the use of restraint with its possible repercussions constitutes an ethical dilemma. Future research should explore the possible consequences of restraint in paediatric dentistry.

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Ethics approval and consent to participate

The Regional Committee of Medical Ethics (REK) assessed the study and concluded that it was health service research, and it was outside its mandate (2019/570/REK Sør-Øst). However, the study adhered to the ethical principles of the Helsinki Declaration. The Norwegian Centre for Research Data approved the study (# 783349/2019). In advance of the

data collection, the participants provided written consent after receiving written and oral information about the study.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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References

[1] UNCRC. United Nations Convention on the Rights of the Child. Office of the United Nations High Commissioner for Human Rights. 1989. [cited 2020 Mar 30]. Available from: https://www.ohchr.org/en/professionalinterest/pages/crc.aspx.
[2] Mårtenson EK, Fägerskiöld AM. A review of children's decision-making competence in health care. J Clin Nurs. 2008;17(23):3131–3141.
[3] Coyne I. Children's participation in consultations and decision-making at health service level: a review of the literature. Int J Nurs Stud. 2008;45(11):1682–1689.
[4] Svendsen EJ, Moen A, Pedersen R, et al. Resistive expressions in preschool children during peripheral vein cannulation in hospitals: a qualitative explorative observational study. BMC Pediatr. 2015;15(1):190.
[5] Sturmey P. Reducing restraint and restrictive behavior management practices. Cham: Springer International Publishing; 2015.
[6] Diseth TH. Dissociation following traumatic medical treatment procedures in childhood: a longitudinal follow-up. Dev Psychopathol. 2006;18(1):233–251.
[7] Klingberg G, Arnrup K. Dental fear and behavior management problems. Pediatric dentistry: a Clinical approach. Iowa: Wiley-Blackwell; 2017.
[8] Berggren U, Meynert G. Dental fear and avoidance: causes, symptoms, and consequences. J Am Dent Assoc. 1984;109(2):247–251.
[9] Kangasniemi M, Papinaho O, Korhonen A. Nurses' perceptions of the use of restraint in pediatric somatic care. Nurs Ethics. 2014;21(5):608–620.
[10] de Bruijn W, Daams JG, van Hunnik FJG, et al. Physical and pharmacological restraints in hospital care: protocol for a systematic review. Front Psychiatry. 2019;10:921–921.
[11] Townsend JA. Protective stabilization in the dental setting. In: Nelson TM, Webb JR, editors. Dental care for children with special needs: a clinical guide. Cham: Springer International Publishing; 2019. p. 247–267.
[12] Bray L, Snodin J, Carter B. Holding and restraining children for clinical procedures within an acute care setting: an ethical consideration of the evidence. Nurs Inq. 2015;22(2):157–167.
[13] Kapstad J, Storesund T, Strand GV. Bruk av tvang ved tannbehandling - lov eller ikke? [The use of restraint in dentistry - legal or not?] [The use of restraint in dentistry - legal or not?]. Nor Tannlegeforen Tid. 2015;125:328–334.
[14] Roberts JF, Curzon MEJ, Koch G, et al. Review: behaviour management techniques in paediatric dentistry. Eur Arch Paediatr Dent. 2010;11(4):166–174.
[15] Rønneberg A, Skaare AB, Hofmann B, et al. Variation in caries treatment proposals among dentists in Norway: the best interest of the child. Eur Arch Paediatr Dent. 2017;18(5):345–353.
[16] Malterud K. Qualitative research: standards, challenges, and guidelines. Lancet. 2001;358(9280):483–488.
[17] Malterud K. Fokusgrupper som forskningsmetode for medisin og helsefag [Focus groups as research method in medicine and health sciences]. 2nd ed. Oslo: Universitetsforlaget; 2018. Norwegian.
[18] Lovdata. Lov om tannhelsetjenesten [The Dental Health Services Act] Norway, 1983. Norwegian. [cited 2020 Mar 30]. Available from: https://lovdata.no/dokument/NL/lov/1983-06-03-54.
[19] Patton MQ. Qualitative research & evaluation methods: integrating theory and practice. 4th ed. Los Angeles: Sage; 2015.
[20] Brondani MA, MacEntee MI, Bryant SR, et al. Using written vignettes in focus groups among older adults to discuss oral health as a sensitive topic. Qual Health Res. 2008;18(8):1145–1153.
[21] Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101.
[22] Lewis I, Burke C, Voepel-Lewis T, et al. Children who refuse anesthesia or sedation: a survey of anesthesiologists. Pediatr Anesth. 2007;17(12):1134–1142.
[23] Lovdata. Lov om pasient- og brukerrettigheter [Patients' Rights Act] Norway, 1999. Norwegian. [cited 2020 Mar 30]. Available from: https://lovdata.no/dokument/NL/lov/1999-07-02-63.
[24] Jackson C, Cheater FM, Reid I. A systematic review of decision support needs of parents making child health decisions. Health Expect. 2008;11(3):232–251.
[25] Venkataraghavan K, Shah J, Kaur M, et al. Pro-activeness of parents in accepting behavior management techniques: a cross-sectional evaluative study. J Clin Diagn Res. 2016;10(7):ZC46–ZC49.
[26] Strøm K, Rønneberg A, Skaare AB, et al. Dentists' use of behavioural management techniques and their attitudes towards treating paediatric patients with dental anxiety. Eur Arch Paediatr Dent. 2015;16(4):349–355.
[27] Jensen B, Schröder U. Acceptance of dental care following early extractions under rectal sedation with diazepam in preschool children. Acta Odontol Scand. 1998;56(4):229–232.
[28] The Norwegian Directorate for Health. Høringsutkast: Tannbarn - Kapittel 2 Barn og unge med tannbehandlingsangst (odontofobi) [Draft for consultation: Pediatric dentistry - Chapter 2 Children and adolescents with dental anxiety] [cited 2020 Mar 30]. Norwegian. Available from: https://www.helsedirektoratet.no/retningslinjer/tannhelsetjenester-til-barn-og-unge-0-20-ar-del-2-horingsutkast/barn-og-unge-med-tannbehandlingsangst-odontofobi#tannlege-eller-tannpleier-skal-benytte-det-minst-inngripende-tiltaket-nar-barn-eller-ungdommer-motsetter-seg-nodvendig-tannbehandling-begrunnelse.
[29] Lloyd M, Urquhart G, Heard A, et al. When a child says 'no': experiences of nurses working with children having invasive procedures. Paediatr Nurs. 2008;20(4):29–34.
[30] Rønneberg A, Strøm K, Skaare AB, et al. Dentists' self-perceived stress and difficulties when performing restorative treatment in children . Eur Arch Paediatr Dent. 2015;16(4):341–347.
[31] Chipchase SY, Chapman HR, Bretherton R. A study to explore if dentists' anxiety affects their clinical decision-making. Br Dent J. 2017;222(4):277–290.
[32] Beauchamp TL, Childress JF. Principles of biomedical ethics. Aufl New York: Oxford; 2013.
[33] Slowther A-M. The concept of autonomy and its interpretation in health care. Clin Ethics. 2007;2(4):173–175.
[34] Lovdata. Lov om helsepersonell [The Health Personnel Act] Norway, 1999. Norwegian. [cited 2020 Mar 30]. Available from: https://lovdata.no/dokument/NL/lov/1999-07-02-64.
[35] Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: guided by information power. Qual Health Res. 2016;26(13):1753–1760.
[36] Kvale S, Brinkmann S. Interviews: learning the craft of qualitative research interviewing. 2nd ed. Los Angeles, CA: Sage; 2009.
[37] Coar L, Sim J. Interviewing one's peers: methodological issues in a study of health professionals. Scand J Prim Health Care. 2006;24(4):251–256.

Paper II

Held still or pressured to receive dental treatment: self-reported histories of children and adolescents treated by non-specialist dentists in Hordaland, Norway

Re-submitted to Eur Arch Paediatr Dent.

Abstract

Aim: This study aimed to estimate the prevalence of a self-reported history of restraint in children and adolescents when receiving dental care by non-specialist dentists and to assess differences in dental fear and anxiety (DFA), intra-oral injection fear, and trust in dentists between patients with and without a self-reported history of restraint.

Methods: An electronic cross-sectional survey was distributed to all 9-year-olds (n = 6,686) and 17-year-olds (n = 6,327) in the Public Dental Service in Hordaland County, Norway, in 2019. For statistical evaluation, we generated descriptive statistics and Mann-Whitney U tests.

Results: The response rate ranged between 43.5% and 59.9% for the different questions. The prevalence of a self-reported history of being held still against one's will during dental treatment and pressured to undergo dental treatment against one's will was 3.6% and 5.1%, respectively. In general, these patients reported higher DFA, and higher intra-oral injection fear compared with those without such histories of restraint. Patients who had reported being held still against their will during dental treatment had significantly higher distrust in dentists than those who did not report restraint ($p < 0.001$).

Conclusion: To feel pressured to receive dental treatment and to be held still against one's will overlap with the concepts of psychological and physical restraint. Patients with a self-reported history of restraint recorded significant differences in DFA, intra-oral injection fear, and trust in dentists compared to those who did not report restraint. Future studies should explore the role that restraint may play in relation to a patient's DFA, intra-oral injection fear, and trust in dentists.

Keywords: Dental treatment, Children and adolescents, Public Dental Service, Non-specialist dentists, Restraint, Dental fear and anxiety, Trust in dentists

Introduction

In the past four decades, extensive research has contributed to the understanding of how dental fear and anxiety (DFA) have implications for both adult and paediatric patients' ability to receive dental care (Armfield et al. 2007; Berggren and Meynert 1984; Seligman et al. 2017). The use of different behavioural approaches to ameliorate the dental situation and help patients overcome dental anxiety has been found to be effective (Berge et al. 2017; Roberts et al. 2010; Seligman et al. 2017). In Norway, approximately 10% of non-specialist dentists educated in the Nordic region reported that they would use restraint if necessary in paediatric dental care of young patients with severe caries (Rønneberg et al. 2017). The use of restraints occurs in situations where the child resists recommended or necessary dental treatment (Aarvik et al. 2021; da Silva et al. 2021; Ilha et al. 2021) and/or perhaps does not fully understand the necessity of dental treatment. In a recent qualitative study, nine Norwegian non-specialist dentists reported the occasional use of restraints to complete necessary dental treatment, despite being uncertain of possible harmful consequences for the child (Aarvik et al. 2021).

The use of restraint can be considered a necessary approach when other behavioural and/or pharmacological techniques are not available and dental treatment needs are both extensive and urgent (Aarvik et al. 2021; Ilha et al. 2021; da Silva et al. 2021; Marty et al. 2020; Rønneberg et al. 2017). Dental health services are required to provide treatment while respecting the integrity of each individual and obtain informed consent (Lovdata 1999). In dental literature, terms that are used to describe treatment without the patient's will and acceptance are 'restraint', 'protective stabilisation (against ones will)', 'active immobilisation', 'passive immobilisation', and 'clinical holding' (Aarvik et al. 2021; American Academy of Pediatric Dentistry, 2021; Armfield and Heaton

2013; British Society of Paediatric Dentistry 2016; da Silva et al. 2021; Ilha et al. 2021; Vargas et al. 2007). Being held down while being fearful or resisting the treatment is probably not compatible with a feeling of control in the situation. In our study, we therefore opted to use the broader term ‘restraint’ to encompass the different techniques that may be used by dental health personnel or parents/caregivers to proceed with dental treatment against a child’s will.

A systematic review by Zhou et al. indicate that dental staff behaviour such as coercion, coaxing, putdowns, stopping treatment, and holding and restraining are associated with fear-related behaviours in children (Zhou et al. 2011). These findings relate to studies by Weinstein et al. (1982 and 1983) observing 3- to 5-year-old children during dental treatment visits that included local anaesthetic administration, and follow-up observations were not undertaken. Dental fear and dental anxiety are distinctly different. Fear is an adaptive reaction to fearful stimuli, whereas anxiety is not. Klingberg and Broberg (2007) defined DFA as ‘strong negative feelings associated with dental treatment among children and adolescents’. We adopted the term ‘DFA’ to describe all levels of dental fear and anxiety given that the terms ‘fear’ and ‘anxiety’ are often used interchangeably by clinicians. Approximately 5%–20% of children and adolescents experience high DFA or high fear of intra-oral injections, with the variation attributed to differences in study populations and study design (Berge et al. 2016; Klingberg and Broberg 2007; Stenebrand et al. 2013). In the adult population, DFA is associated with reduced oral health (Hakeberg et al. 1993) and quality of life (Berggren 1993). For many, DFA and intra-oral injection fear can result in dental avoidance (Armfield et al. 2007; Berge et al. 2016; Berggren and Meynert 1984; Seligman et al. 2017).

The aetiology of DFA is considered to consist of a complex interplay of cognitive, behavioural, and contextual factors and it has been proposed that a common factor in the development of DFA is a direct conditioning experience - most frequently a painful or traumatic dental experience (Seligman et al. 2017; Skaret et al. 1999). Knowledge concerning children's perception of restraint has seldom been assessed but may be valuable and important in informing best clinical practice. To the best of our knowledge, no study has investigated the self-reported histories of the use of restraints during dental treatment in children and adolescents. Since this study is novel in its focus on restraint, it was necessary to have an explorative approach to gain knowledge that might guide to the development of prospective studies in the future. Therefore, this study aimed to estimate the prevalence of a self-reported history of restraint in children and adolescents when receiving dental care by non-specialist dentists and to assess differences in dental fear and anxiety (DFA), intra-oral injection fear, and trust in dentists between patients with and without a self-reported history of restraint.

Material and method

We distributed an electronic cross-sectional questionnaire directly to all 17-year-old adolescents and addressed to all 9-year-old children via their parents' phone number in the Public Dental Service (PDS) in the county of Hordaland, Norway. The age group "9-year-olds" were considered old enough to have experience with dental treatment and to be able to report on their subjective experiences. An age close to the potential self-reported restraint was assumed to lower the risk of recall bias. The PDS in Norway is responsible for individually adapted, free-of-charge follow-up of oral health of children and adolescents aged up to 18 years (Lovdata 1983). The age group "17-year-olds" were addressed to include persons who still were patients in the PDS and could report

on their accumulated experiences in the PDS. Hordaland County, which includes Norway's second largest city (Bergen), was in 2019 the third most populated county in Norway (Statistics Norway). The county is mostly rural and sparsely populated outside of the Bergen metropolitan area, which reflects the country. The median household income is similar to the median national household income (Statistics Norway). Thus, Hordaland can be regarded representative for epidemiological research in Norway. Most dentists in the Norwegian PDS are general dentists, and of all dentists approximately 1% (47) are specialists in paediatric dentistry (Statistics Norway).

Data collection

Data were collected from October to December 2019, and the survey was distributed using the PDS text message function in the journal system. The 17-year-olds received the invitation as a text message on their own phones, whereas the 9-year-olds received it on their parents' phones specified with the name of the child. By legislation, all patients below the age of 16 years are to be contacted through their parents in the Norwegian healthcare system. The parents were informed to assist the child, and the message specified that the study sought to examine the child's subjective experiences. Given the anonymous design of the study, we sent one invitation and three reminders (at two, six, and eight weeks) to all individuals. The text messages provided a link to the survey (estimated to take 10 minutes), which also obtained informed consent to participate in the study. The survey was written in Norwegian. One iPad in each age group was raffled as an incentive for participation.

Survey

This paper examined the following elements obtained in the cross-sectional survey: demographic details (sex and age), self-reported history of restraint at the dental clinic, potential fear of dental treatment and intra-oral injections, and trust in dentists.

To our knowledge, no psychometric instruments about self-reported histories of restraint for this group of patients have been developed. As such, we developed seven items based on earlier research and the definition of restraint (Bray, Snodin, and Carter 2015; Svendsen et al. 2015; Kangasniemi, Papinaho, and Korhonen 2014). These items were thoroughly discussed in the research group, with psychologists and specialists in paediatric dentistry, and thereafter tested on the respective age groups. Comments from the test group showed that the developed questions were easy to understand and answer. Research on restraint is context dependent, and passive immobilisation, such as via a papoose board or Pedi wrap, is not used in the Norwegian PDS. Therefore, passive immobilisation was not addressed in the survey. Being held still against one's will (physical restraint) was measured by the item, 'Have you experienced being held still against your will during dental treatment?' (*yes*, *no*, or *do not know*). Respondents who answered *yes* were asked the following questions: 'Have you experienced being physically held still against your will during dental treatment several times?' (*yes*, *no*, and *do not know*), 'Approximately how old were you when/the first time you experienced being physically held still against your will during dental treatment?', 'Approximately, how old were you the last time you experienced being physically held still against your will during dental treatment?' (age), and 'In what/which situation(s) were you being physically held still during dental treatment?'. Situational descriptions of when physical restraint was experienced are presented in Table 2 under 'Results'.

Then, the question ‘Have you felt pressured to receive dental treatment in such a way that you could not say no?’ (*no degree*, *low degree*, *neither high nor low*, *high degree*, or *very high degree*) followed. The item ‘Have you wanted to escape from the dental treatment situation?’ served as follow-up question.

To measure DFA, we used the psychometric instrument Children’s Fear Survey Schedule–Dental subscale (CFSS-DS) (Cuthbert and Melamed 1982), which consists of 15 questions related to different aspects of dental treatment. Each item is scored from 1 (*not afraid at all*) to 5 (*very afraid*) with a sum score ranging from 15 to 75. The CFSS-DS is a widely used instrument for measuring DFA, among others in Norwegian and Swedish children and adolescents (Berge et al. 2016; Gustafsson et al. 2010). This study used the self-report version with a suggested cut-off score >38 to indicate high DFA (Gustafsson et al. 2010). To measure intra-oral injection fear, the Intra-Oral Injection Fear-scale (IOIF-s) (Berge et al. 2017) was used. This 12-item questionnaire has been validated in Norway for children aged from 10 to 16 years, with items scored from 1 (*not afraid at all*) to 5 (*very afraid*); sum scores range from 12 to 60. A cut-off score of >38 indicates high fear of intra-oral injections (Berge et al. 2017).

We used eight single items (presented in Table 4) based on the Getz Dental Beliefs Survey (DBS) (Kvale et al. 1997) to measure patients’ trust in dentists. The questions cover different situations, feelings, and thoughts that may occur during dental treatment and are rated on a Likert scale from 1 to 5 (*never*, *one or two times*, *a few times*, *often*, or *almost always*). Only parts of the instrument were used to shorten the survey’s length and thereby reduce the risk of dropouts, with the knowledge that only some aspects of trust in dentists were measured. Therefore, no sum score is presented. Since the DBS is

not validated in children, and 17-year-olds can be considered adults, the items are analysed and presented separately for the different age groups.

Data and statistical analysis

All participants who answered the survey were included in the analysis. The dichotomised variables followed this pattern: items with the response alternatives *yes*/*no*/*do not know* were coded 0 for *no*/*do not know* and 1 for *yes*, and the five-point items were coded 0 for *not at all*/*low degree*/*neither high nor low* and 1 for *high degree*/*very high degree*.

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 26.0 (Armonk, NY, USA). Descriptive statistics were generated using 'Frequencies'. We used Mann–Whitney U tests to compare group differences. The level of statistical significance was set at $p < 0.05$. The option 'exclude cases pairwise' was chosen in all analyses with missing data, indicating that the respective cases were excluded only if they had missing data required for the specific analysis.

Ethical approvals

The Norwegian Centre for Research Data (#783349/2019) and County Dental Officer in Hordaland approved this study. Additionally, the content, the recruitment procedure, and length of the survey were discussed with psychologists at the Centre for **o**dontophobia (Oral Health Centre of Expertise in Western Norway) in Bergen. The survey was considered unlikely to have negative consequences for the respondents.

Results

In total, 13,013 adolescents (aged 17 years, n = 6,327) and children (aged 9 years, n = 6,686), assisted by their parent(s), were invited to participate in this study. The total response rate ranged from 43.8% to 59.9% for the different questions in the survey. Among the participants, 50.0% identified as *boys* (n = 3,844), 49.8% as *girls* (n = 3,832), and 0.2% as *they* (n = 12). Table 1 presents the descriptive statistics for the age groups.

[Insert Table 1 about here]

Prevalence of a reported history of restraint

The prevalence of a self-reported history of being held still against one's will (physical restraint) during dental treatment was 2.9% (n=75) for 17-year-olds and 4.2% (n=130) for 9-year-olds. In total, 3.6% (n=205) of patients reported a history of physical restraint. Of them 43.6% (n=89) had reported the use of physical restraint several times, and 29.0% (n=58) reported the use of physical restraint under conscious sedation. Physical restraint was reported by both age groups to have occurred most often when the child was 5-9 years old. Table 2 shows the distribution of the different dental situations where the respondents reported physical restraint. In total, the reported prevalence of having felt pressured to receive dental treatment in such a way that one could not say no, was 5.1% (n=296).

[Insert Table 2 about here]

Dentistry-related fear and restraint

Mann Whitney U tests indicated that participants who reported the use of physical restraint, regardless of age, had significantly higher DFA (CFSS-DS) and intra-oral injection fear (IOIF-s) compared with participants who did not report the use of physical restraint (Table 3). Table 3 gives the results for self-reports of physical restraint and for being pressured to receive dental treatment in such a way that one could not say no.

[Insert Table 3 about here]

Figure 1 presents a Venn diagram that demonstrates the overlap between a history of being held still (physical restraint), having felt pressured to receive dental treatment in such a way that one could not say no, and having wanted to escape from dental treatment.

[Insert Figure 1 about here]

Trust in dentists and restraint

Mann-Whitney *U* tests indicated that the group that reported physical restraint had significantly higher scores for all items measuring distrust in dentists compared with the group that did not report a history of physical restraint during treatment (Table 4).

[Insert Table 4 about here]

Discussion

The study identified some 17-year-old adolescents and 9-year-old children who reported the use of physical restraint while undergoing dental treatment. These participants had significantly higher dentistry-related fear and tended to trust dentists significantly less compared with those without a history of restraint during dental treatment. To estimate a prevalence on restraint will vary depending on who is being asked (patient, parent, dental health personnel) and how and what type of instruments are used in the data collection. To the best of our knowledge, the prevalence of a self-reported history of restraint during dental treatment of a child or adolescent in a public dental service has never been examined, and our study provides new knowledge on young patients' reports of restraint in this setting. Although there are methodological challenges in including children in research, to involve the child's voice is considered valuable by the United Nation on the Rights of the Child chapter 12 (UN General Assembly 1989), and can provide a unique perspective on what concerns children (James 2007).

One central finding was that some children and adolescents have felt pressured to accept dental treatment. This phenomenon is not identified or conceptualised in guidelines in the field of pediatric dentistry. Interestingly, even though there is no clear consensus, other health care fields have suggested concepts such as physical, psychological, and pharmacological restraint (also called chemical), such as paediatric nurses' perceptions of the use of restraint in somatic paediatric care (Kangasniemi et al. 2014), emergency paediatric psychiatric evaluation (Dorfman and Kastner 2004) and adult psychiatry (Negroni 2017). Physical restraint involves the use of physical techniques to prevent the child from moving, such as parents and dental health personnel holding the child's arms, head, and/or legs still when the child resists by moving and/or verbally giving

signs of disapproval. Psychological restraint involves verbally or non-verbally pressuring a child to undergo treatment against their will, giving the child the feeling that refusal is not an option. When a medication is administered to sedate an agitated patient to prevent harmful behaviour to the patient or to others, it can be considered as pharmacological or chemical restraint. Although the terminology and concept of restraint is mostly used in other fields of health care, highlighting aspects of less child-friendly practices is of value also in paediatric dentistry and research. Since the question "Have you felt pressured to receive dental treatment in such a way that you could not say no?" overlaps the concept psychological restraint, we have adopted that concept in this study.

The prevalence of self-reported physical restraint was higher in the 9-year-old age group, although the 17-year-old age group, who reported from a longer period of life, probably had more need for urgent dental treatment. The retrospective design of the study implies a risk of recall bias (Bowling 2014). Older participants may have habituated to the dental situation over time, and memories of events may have faded, or they have displaced prior events. Given that the child's right to participate in decision-making has been on the agenda of society and healthcare services for some time (Coyne 2008), a reduction in the self-reported history of physical restraint between the two groups was expected. In a recent qualitative study, Norwegian public dentists reported that the use of physical restraint is the most common in the age group 5–9 years and when the child is sedated (Aarvik et al. 2021).

Self-reports of psychological restraint were more prevalent in the 17-year-old-group. With increased maturity, 17-year-old adolescents may to a larger degree better

understand the need for dental treatment than 9-year-old children (Bee and Boyd 2007), and psychological restraint involves verbally or non-verbally pressuring a child to accept treatment against their will. For some participants, the answer to the question on psychological restraint can be rooted in an accurate understanding of the need for dental treatment, whereas the experience of others can be rooted in a situation where they felt pressured by the dental health personnel and/or their parents/caregivers to undergo dental treatment. In this study, almost 75% of the patients who reported a history of psychological restraint had an urge to escape from dental treatment (Fig. 1). One of the diagnostic criteria for a specific phobia, such as dental phobia, is described in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, (American Psychiatric Association, 2013) as "the phobic object or situation is actively avoided or endured with intense fear or anxiety." Armfield (2010) argued that questionnaires on DFA should incorporate elements of the diagnostic criteria of specific phobia. Therefore, we included the question about escaping treatment. Since children are commonly accompanied by their parents or caregivers, they rarely avoid dental visits, unlike the case among adolescents and adults.

In the present study, the three most common reasons for experiencing physical restraint were when the dentist stated that dental treatment was necessary and when the patient tried to escape or could not sit still. The use of restraint when treatments are considered necessary has been identified in both dental (Aarvik et al. 2021) and health service literature (Kangasniemi et al. 2014). Since many children and adolescents reported that they had experienced physical restraint when they somehow physically resisted, it is likely that the dentist might describe them as having behavioural management problems (BMP) (Klingberg et al. 1994).

Many of the participants with a self-reported history of restraint reported the use of restraint several times. Owing to the retrospective design of our study, we could not obtain information on the participants' degree of DFA before the use of restraint. We can hypothesise that multiple instances of restraint might explain some of the difference in DFA between those who reported a history of restraint and those without a history of restraint; multiple negative events tend to increase the risk of developing DFA (Skaret et al. 1999). Skaret et al. (1999) noted that eighteen-year-old students who reported more than one previous episode of pain during attendances at the PDS in Norway were ten times more likely to report high dental anxiety than the rest of the group. On the other hand, DFA may interfere with a patient's perception of restraint and self-reports of restraint may be over-reported in patients with DFA. In this study, 29.0% of children and adolescents who reported physical restraint had their dental treatment provided under conscious sedation. One would expect many of those children to have DFA preoperatively as DFA/BMP would be the likely reason for scheduling treatment under sedation. The development of DFA or dental phobia is a complex interaction of multiple factors, such as general and psychological health, poor oral health, painful dental treatment and Molar Incisor Hypomineralisation or other oral conditions that might involve painful dental treatment, and environment (Seligman et al. 2017, Skaret et al. 1999). A limitation of our study is its cross-sectional design which means that causality cannot be inferred from its results. Therefore, it is impossible from our study to determine if DFA caused the need to use restraint or if the use of restraint caused DFA. It is acknowledged that DFA has a multifactorial aetiology, and the authors of this paper recommend that the role of restraint as a factor in the development of DFA should be explored in future prospective studies.

In the UK, the use of restraint (clinical holding) when providing dental care for children is limited to specialists in paediatric dentistry or in special care dentistry who have had formal training in such advanced behaviour guidance procedures (British Society of Paediatric Dentistry 2016). Contrary, in the US, the use of restraint (protective stabilisation) during dental care is "considered within an overall behavior guidance plan that promotes a positive dental attitude and quality of care (American Academy of Pediatric Dentistry, 2021). In Norway, new national guidelines for dentists treating patients from 0-20 years were published on the 31st of March 2022 (Norwegian Directorate of Health, 2022). The guideline on the use of restraint recommends that restraint shall be a last-resort treatment method only for dental treatment that cannot be postponed, after consultation with a specialist in paediatric dentistry if necessary. Dentists and paediatric dentists educated in Norway are not trained in administering restraint.

The response rate to the survey was lower in the 17-year-old age group than in the 9-year-old age group. It is known that avoidance behaviour to dental triggers is prevalent among individuals with high DFA. However, in a national epidemiological survey of oral health in Australia (Armfield et al. 2009), the response rate of individuals with dental fear and phobia was not appreciably lower than that of other individuals in the survey. Nonetheless, in our study, those 17-year-olds with severe DFA who avoid dental situations, such as hearing and speaking about dentists, may not have opened the text message from 'the dentist'. Given that DFA in general was higher for those with a self-reported history of restraint, our study design may have resulted in us missing some of the most anxious patients who might have a history of restraint.

Patients with a self-reported history of restraint had significantly less trust in dentists than patients with no history of restraint. Strøm et al. identified that 6% of a strategic sample of 18-year-olds in Norway have a high distrust of dentists (Strøm et al. 2020). They found that the majority of individuals with distrust also have a high DFA (Strøm et al. 2020). In adults, key elements for successful management of DFA using cognitive behavioural therapy (CBT) is to emphasize the patients' experience of control in the dental situation and to establish a trustful patient–dentist relationship (Haukebø et al. 2007). CBT has been shown as an effective treatment method for fearful paediatric dental patients, such as for children with intra-oral injection phobia (Berge et al. 2017). Providing the patient with a sense of control and predictability in the situation is difficult when the patient is restrained. When patients experience that both trust and control are put aside to pursue necessary dental treatments, their terms for the future achievement of good oral health may be challenged.

Limitations

The survey was carried out in Hordaland County which is considered representative for Norway. The response rate is considered adequate for electronic surveys (McLeod et al. 2013), but the number of non-responders must be considered when interpreting the results. The survey design had a theoretical possibility of being taken multiple times. For ethical considerations, the non-responders were unknown to the authors. Therefore, we could not obtain information on the reasons for non-participation. However, the results on the prevalence of DFA (CFSS-DS) and intra-oral injection fear (IOIF-s) did not differ substantially from a representative study in a similar population with a high response rate (Berge et al. 2016). One weakness of our study is the application of seven

non-validated items regarding restraint. Nevertheless, in our opinion, these questions contributed to this underexplored area of research. In future, validated questionnaires regarding restraints should be developed.

The intention of this study was to gain knowledge on children's and adolescents' experiences, but it should be acknowledged that the retrospective measure of restraint might include recall bias. Owing to the electronic design of the survey, we could not determine if the children's answers were entirely self-reports or the degree to which they were mixtures of self-and proxy-reports. Parents may in some cases remember situations where restraint has been used that the child has no memory of. In other situations, the child's subjective experience of restraint may not be apparent for the parents. How proxy reports affect the results of the experiences of restraint is unknown. Regarding DFA, proxy reports have discrepancies with self-reports where parents rate their child's fear higher than the child would (Gustafsson et al. 2010; Klingberg and Broberg 2007). Thus, whether other cut-off scores on the CFSS-DS and IOIF-s should have been used for the 9-year-old patients can be discussed.

In the Norwegian PDS, paediatric patients are mainly followed up by non-specialist dentists and dental hygienists, and only referred to specialists in paediatric dentistry in special cases. Therefore, we cannot know for sure that the participants' reports do not include specialist treatment, but have chosen to write non-specialist dentists as that represents most paediatric dental care in Norway.

This study did not include questions about nationality, and as such, we could not confirm the degree to which we obtained responses from participants with a native

language other than Norwegian. In the Scandinavian setting, immigrants often have poorer oral health than the general population (Stecksén-Blicks et al. 2014). Therefore, they undergo more dental treatment with possible restraint situations. Further, we do not know to which degree the sample include participants with special health care needs. Other possible reasons for non-participation may be survey fatigue, poor timing, and the assumption that the survey was spam.

Conclusion

This is the first study to report on the prevalence of self-reported history of restraint during dental treatment among children and adolescents. A small proportion of 17- and 9-year-old patients in Hordaland, Norway, self-report history of restraint during paediatric dental treatment. In general, patients with self-reported history of restraint during dental treatment have higher dentistry-related fear and higher distrust in dentists compared without such history. As thoughts and feelings are activated during dental treatment, scholars studying clinical practice should acknowledge patients' experience. How restraint may play a role in patients' DFA, intra-oral injection fear, and trust in dentists should be explored in future studies.

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Consent to participate: Informed consent was obtained from all individual participants included in the study.

Availability of data and material: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Authors' contributions: All authors have made substantial contributions to the manuscript. RSA has been in charge of the research process. RSA administered the data collection and statistical analysis in collaboration with EJS and MLA. All authors have been involved in writing, reviewing, and commenting on the subsequent drafts.

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References

Aarvik RS, Agdal ML, Svendsen EJ. Restraint in paediatric dentistry: a qualitative study to explore perspectives among public, non-specialist dentists in Norway. Acta Odontol Scand. 2021;1–8. https://doi.org/10.1080/00016357.2021.1881159

American Academy of Pediatric Dentistry. Use of protective stabilization for pediatric dental patients. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2021:325-31. https://www.aapd.org/media/Policies_Guidelines/BP_Protective.pdf . Accessed 11 Mar 2022.

American Psychiatric Association. Anxiety Disorders. Diagnostic and Statistical Manual of Mental Disorders (DSM-5®). American Psychiatric Association; 2013.

Armfield JM. Development and psychometric evaluation of the Index of Dental Anxiety and Fear (IDAF-4C+). Psychol Asses. 2010;22:279–287. https://doi.org/10.1037/a0018678

Armfield JM, Slade GD, Spencer AJ. Are people with dental fear under-represented in oral epidemiological surveys? Soc Psychiatry Psychiatr Epidemiol. 2009;44:495–500. https://doi.org/10.1007/s00127-008-0454-6

Armfield JM, Stewart JF, Spencer AJ. The vicious cycle of dental fear: exploring the interplay between oral health, service utilization and dental fear. BMC Oral Health 2007;7(1):1. https://doi.org/10.1186/1472-6831-7-1

Armfield JM, Heaton LJ. Management of fear and anxiety in the dental clinic: a review. Aust Dent J. 2013;58 (4): 390-407. https://doi.org/10.1111/adj.12118

Bee H, Boyd D. The developing child. 11th ed. Boston: Pearson/Allyn & Bacon; 2007.

Berge KG, Agdal ML, Vika M, Skeie MS. High fear of intra-oral injections: prevalence and relationship to dental fear and dental avoidance among 10- to 16-yr-old children. Eur J Oral Sci. 2016;124:572–579. https://doi.org/10.1111/eos.12305

Berge KG, Vika M, Agdal ML, Lie SA, Skeie MS. Reliability, validity and cutoff score of the Intra-Oral Injection Fear scale. Int J Paediatr Dent. 2017;27:98–107. https://doi.org/10.1111/ipd.12237
Berge KG, Agdal ML, Vika M, Skeie MS. Treatment of intra-oral injection phobia: a randomized delayed intervention controlled trial among Norwegian 10- to 16-year-olds, Acta Odontol Scand, 2017;75:4, 294-301, https://doi.org/10.1080/00016357.2017.1297849
Berggren U. Psychosocial effects associated with dental fear in adult dental patients with avoidance behaviours. Psychol Health. 1993;8:185–196. https://doi.org/10.1080/08870449308403178
Berggren U, Meynert G. Dental fear and avoidance: causes, symptoms, and consequences. J Am Dent Assoc. 1984 Aug;109(2):247–51. https://doi.org/10.14219/jada.archive.1984.0328
Bowling A. Research methods in health: investigating health and health services. 4th ed. Maidenhead: Open University Press, McGraw-Hill; 2014.
Bray L, Snodin J, Carter B. Holding and restraining children for clinical procedures within an acute care setting: an ethical consideration of the evidence. Nurs Inq 2015;22(2):157–167. https://doi.org/10.1111/nin.12074
British Society of Paediatric Dentistry. British Society of Paediatric Dentistry: a policy document on the use of Clinical Holding in the dental care of children. 2016. https://www.bspd.co.uk/Portals/0/BSPD%20clinical%20holding%20guidelines%20final%20with%20flow%20chart%20250416.pdf .Accessed 11 Feb 2022.
Coyne I. Children's participation in consultations and decision-making at health service level: a review of the literature. Int J Nurs Stud. 2008;45:1682–1689. https://doi.org/10.1016/j.ijnurstu.2008.05.002
Cuthbert MI, Melamed BG. A screening device: children at risk for dental fears and management problems. ASDC J Dent Child. 1982;49:432–436.
Dorfman DH, Kastner B. The use of restraint for pediatric psychiatric patients in emergency departments. Pediatr Emerg Care. 2004;20(3):151-6. https://doi.org/10.1097/01.pec.0000117921.65522.fd
da Silva GS, Anabuki AA, Viana KA, Corrêa-Faria P, Moterane MM, Tedesco TK, Costa PS, Hosey MT, Raggio DP, Costa LR. Sedation versus protective stabilization for dental treatment of children with caries and challenging behavior at the dentist (CHOOSE): a study protocol for a non-randomized clinical trial. BMC Oral Health. 2021 May 12;21(1):256. https://doi.org/10.1186/s12903-021-01594-0
Gustafsson A, Arnrup K, Broberg A, Bodin L, Berggren U. Child dental fear as measured with the Dental Subscale of the Children's Fear Survey Schedule: the impact of referral status and type of informant (child versus parent). Community Dent Oral Epidemiol. 2010;38(3):256–66. https://doi.org/10.1111/j.1600-0528.2009.00521.x
Hakeberg M, Berggren U, Gröndahl H-G. A radiographic study of dental health in adult patients with dental anxiety. Community Dent Oral Epidemiol. 1993;21:27–30. https://doi.org/10.1111/j.1600-0528.1993.tb00714.x
Haukebø K, Skaret E, Öst LG, Raadal M, Berg E, Sundberg H, Kvale G. One- vs. five-session treatment of dental phobia: a randomized controlled study. J Behav Ther Exp Psychiatry 2007;39:381–390. https://doi.org/10.1016/j.jbtep.2007.09.006
Ilha MC, Feldens CA, Razera J, Vivian AG, de Rosa Barros Coelho EM, Kramer PF. Protective stabilization in pediatric dentistry: a qualitative study on the

perceptions of mothers, psychologists, and pediatric dentists. Int J Paediatr Dent. 2021 Sep;31(5):647–656. https://doi.org/10.1111/ipd.12751
James, A. Giving Voice to Children's Voices: Practices and Problems, Pitfalls and Potentials. Am Anthropol 2007;109 (2): 261-272. https://doi.org/10.1525/aa.2007.109.2.261
Kangasniemi M, Papinaho O, Korhonen A. Nurses' perceptions of the use of restraint in pediatric somatic care. Nurs Ethics 2014 Aug;21(5):608–620. https://doi.org/10.1177/0969733013513214
Klingberg G, Broberg AG. Dental fear/anxiety and dental behaviour management problems in children and adolescents: a review of prevalence and concomitant psychological factors. Int J Paediatr Dent. 2007;17:391–406. https://doi.org/10.1111/j.1365-263X.2007.00872.x
Klingberg GL, Löfqvist V, Bjarnason S, Norén JG. Dental behavior management problems in Swedish children. Community Dent Oral Epidemiol. 1994;22 (3): 201-5. https://doi.org/10.1111/j.1600-0528.1994.tb01841.x
Kvale G, Berg E, Nilsen CM Kvale, Raadal M, Nielsen GH, Johnsen TB, and Wormnes B. Validation of the dental fear scale and the dental belief survey in a Norwegian sample. Community Dent Oral Epidemiol. 1997;25:160–164. https://doi.org/10.1111/j.1600-0528.1997.tb00915.x
Lovdata. Lov om tannhelsetjenesten [The Dental Health Services Act] Norway. 1983. https://lovdata.no/dokument/NL/lov/1983-06-03-54 . Accessed 28 Oct 2020.
Lovdata. Lov om helsepersonell [The Health Personnel Act] Norway. 1999. https://lovdata.no/dokument/NL/lov/1999-07-02-64 . Accessed 30 Mar 2020.
Marty M, Marquet A, Valéra MC. Perception of Protective Stabilization by Pediatric Dentists: A Qualitative Study. JDR Clin Trans Res: 2020;2380084420963933. https://doi.org/10.1177/2380084420963933
McLeod CC, Klabunde CN, Willis GB, Stark D. Health care provider surveys in the United States, 2000–2010: a review. Eval Health Prof. 2013;36:106–126. https://doi.org/10.1177/0163278712474001
Negroni AA. On the concept of restraint in psychiatry. Eur J Psychiatry 2017;31 (3): 99-104. https://doi.org/10.1016/j.ejpsy.2017.05.001
Norwegian Directorate of Health. Nasjonal faglig retningslinje: TannBarn - Kapittel 7 Tannbehandlingsangst blant barn og unge [National guideline: Pediatric dentistry - Chapter 7 Dental anxiety among children and adolescents]. https://www.helsedirektoratet.no/retningslinjer/tannhelsetjenester-til-barn-og-unge-020-ar/tannbehandlingsangst-blant-barn-og-unge . Accessed 31 March 2022.
Roberts JF, Curzon MEJ, Koch G, Martens LC. Behaviour Management Techniques in Paediatric Dentistry. Eur Arch Paediatr Dent. 2010;11, 166–174. https://doi.org/10.1007/BF03262738
Rønneberg A, Skaare AB, Hofmann B, Espelid I. Variation in caries treatment proposals among dentists in Norway: the best interest of the child. Eur Arch Paediatr Dent. 2017;18:345–353. https://doi.org/10.1007/s40368-017-0298-4
Seligman LD, Hovey JD, Chacon K, Ollendick TH. Dental anxiety: An understudied problem in youth. Clin Psychol Rev 2017;55: 25-40. https://doi.org/10.1016/j.cpr.2017.04.004
Skaret E, Raadal M, Berg E, Kvale G. Dental anxiety and dental avoidance among 12 to 18 year olds in Norway. Eur J Oral Sci. 1999;107(6):422–8. https://doi.org/10.1046/j.0909-8836.1999.eos107602.x

Statistics Norway. 2019a. Areal og befolkning i tettsteder, etter region, statistikkvariabel og år [Area and population in densely populated area, by region, statistical variable and year]. https://www.ssb.no/statbank/table/04860/tableViewLayout1/. Accessed 12 Dec 2021.

Statistics Norway. 2019b. Income and wealth statistics for households. https://www.ssb.no/en/statbank/table/06944/tableViewLayout1/. Accessed 12 Dec 2021.

Statistics Norway. 2019c. Spesialistutdanning. 4.kvartal, etter spesialitet, alder, statistikkvariabel, år og kjønn [Specialist education, speciality, age, statistical variable, year and sex]. https://www.ssb.no/statbank/table/07935/tableViewLayout1/. Accessed 12 Dec 2021.

Stecksén-Blicks C, Hasslöf P, Kieri C, Widman K. Caries and background factors in Swedish 4-year-old children with special reference to immigrant status. Acta Odontol Scand. 2014;72:852–858. https://doi.org/10.3109/00016357.2014.914569

Stenebrand A, Wide Boman U, Hakeberg M. Dental anxiety and temperament in 15-year olds. Acta Odontol Scand. 2013;71:15–21. https://doi.org/10.3109/00016357.2011.645068

Strøm K, Skaare AB, Willumsen T. Dental anxiety in 18-year-old Norwegians in 1996 and 2016. Acta Odontol Scand. 2020;78:13–19. https://doi.org/10.1080/00016357.2019.1637933

Svendsen EJ, Moen A, Pedersen R, Bjørk IT. Resistive expressions in preschool children during peripheral vein cannulation in hospitals: a qualitative explorative observational study. BMC Pediatr 2015;15(1):190. https://doi.org/10.1186/s12887-015-0508-3

UN General Assembly. Convention on the Rights of the Child, 20 November 1989, United Nations, Treaty Series, vol. 1577, p. 3. https://www.refworld.org/docid/3ae6b38f0.html. Accessed 12 Dec 2021.

Vargas KG, Nathan JE, Qian F, Kupietzky A. Use of restraint and management style as parameters for defining sedation success: a survey of pediatric dentists. Pediatr Dent. 2007 May-Jun;29(3):220–227.

Weinstein P, Getz T, Ratener P, Domoto P. The Effect of Dentists' Behaviors on Fear-Related Behaviors in Children. J Am Dent Assoc. 1982;104(1):32-8.

Weinstein P, Getz T, Ratener P, Domoto P. Behavior of dental assistants managing young children in the operatory. Pediatr Dent. 1983;5(2):115-20.

Zhou Y, Cameron E, Forbes G, Humphris G. Systematic review of the effect of dental staff behaviour on child dental patient anxiety and behaviour. Patient Educ Couns. 2011;85:4–13. https://doi.org/10.1016/j.pec.2010.08.002

Table 1. Descriptive statistics for individuals aged 17 (born 2002) and 9 years (born 2010).

Item	n (%)
Year of birth	
2002	3305 (52.2)
2010	4383 (65.6)
Self-reported physical restraint	
17-year-olds	75 (2.9)
9-year-olds	130 (4.2)
Self-reported being pressured to accept dental treatment	
17-year-olds	159 (6.0)
9-year-olds	137 (4.3)
High DFA (CFSS-DS >38)	
17-year-olds	162 (5.5)
9-year-olds	277 (8.1)
High intra-oral injection fear (IOIF-s >38)	
17-year-olds	339 (13.2)
9-year-olds	493 (15.9)

Table 2. In descending order, these are the situational descriptions of when physical restraint was reported. The column ‘n (%)’ represents the *yes* responses for each item.

Situational descriptions of when physical restraint was reported	n (%)
The dentist said I needed dental treatment	135 (67.2)
When I tried to escape from the dental chair	101 (50.1)
When I could not sit still in the dental chair	86 (43.2)
I had toothache and contacted the dental clinic for help	72 (35.6)
Other situation not specified	66 (33.2)
When I had been administered sedative medication	58 (29.0)
I hit one tooth/several teeth and needed dental treatment	47 (23.5)

Table 3. Mann-Whitney *U* tests comparing CFSS-DS and IOIF-s scores between patients who reported physical restraint and being pressured against one's will with patients who reported no physical restraint and not being pressured against one's will.

			Held still against one's will during dental treatment		**Not held still against one's will during dental treatment**	**Statistics**
		n	Median, Mean (SD)	n	Median, Mean (SD)	Mann-Whitney *U* test
CFSS-DS	17-year-olds	75	28.0, 29.0 (10.3)	2485	20.0, 22.6 (7.9)	*U* = 129097, z = 5.71, **p <0.001**
	9-year-olds	130	34.0, 35.3 (13.1)	2971	24.0, 25.3 (7.7)	*U* = 284437, z = 9.15, **p <0.001**
	Total	205	31.0, 33.0 (12.5)	5456	22.0, 24.10 (7.9)	*U* = 806999, z =10.78 , **p <0.001**
IOIF-s	17-year-olds	75	32.0, 31.6 (9.8)	2485	29.0, 29.2 (8.8)	*U* = 109836, z = 2.65, **p =0.008**
	9-year-olds	130	29.0, 30.1 (11.5)	2972	29.0, 26.8 (12.6)	*U* = 214736, z = 2.16, **p =0.031**
	Total	205	31.0, 30.7 (10.9)	5457	29.0, 27.9 (SD 11.1)	*U* = 628060, z = 2.99, **p =0.003**

			Pressured against one's will during dental treatment		**Not pressured against one's will during dental treatment**	**Statistics**
		n	Median, Mean (SD)	n	Median, Mean (SD)	Mann-Whitney *U* test
CFSS-DS	17-year-olds	159	25.0, 28.6 (12.7)	2478	20.0, 22.5 (7.5)	*U* = 246211, z = 5.30, **p <0.001**
	9-year-olds	137	34.0, 34.9 (12.8)	3035	24.0, 25.4 (7.8)	*U* = 3052222, z = 9.29, **p <0.001**
	Total	296	29.0, 31.5 (13.1)	5513	22.0, 24.1 (7.8)	*U* = 1081223, z = 9.45, **p <0.001**
IOIF-s	17-year-olds	149	27.0, 27.8 (10.9)	2414	29.0, 29.3 (8.7)	*U* = 165233, z = -1.67, p <0.095
	9-year-olds	131	29.0, 29.5 (11.7)	2974	29.0, 26.8 (12.6)	*U* = 211268, z = 1.64, p <0.101
	Total	280	28.0, 28.6 (11.3)	5388	29.0, 27.9 (11.1)	*U* = 758095, z = 0.14, p <0.887

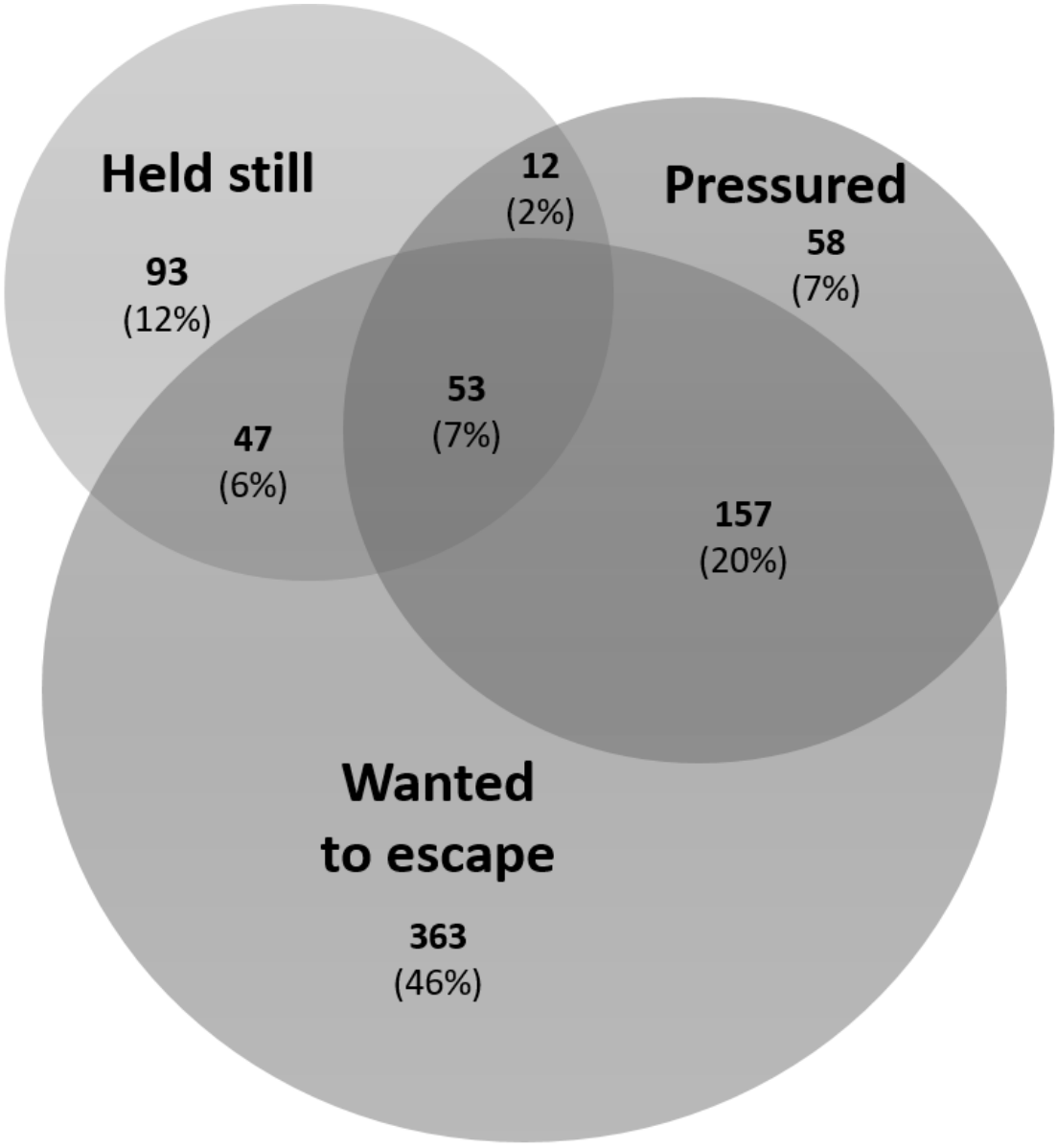
Table 4. Comparison of the frequency of dentist distrust measured by eight items of the Getz Dental Belief Survey among patients with and without a self-reported history of physical restraint during dental treatment. A low score indicates high trust.

Items from Dental Belief Survey		**Held still against one's will during dental treatment**		**Not held still against one's will during dental treatment**		**Statistics**
		n	Median, Mean (SD)	n	Median, Mean (SD)	Mann-Whitney *U* test
1	17-year-olds	75	2.00, 2.35 (1.30)	2485	1.00, 1.72 (1.27)	*U* = 122217, z = 5.58, **p <0.001**
	9-year-olds	130	2.00, 2.28 (1.38)	2972	1.00, 1.60 (1.18)	*U* = 253192, z = 7.65, **p <0.001**
	Total	205	2.00, 2.31 (1.35)	5457	1.00, 1.66 (1.22)	*U* = 730955, z = 9.29, **p <0.001**
2	17-year-olds	75	2.00, 2.65 (1.40)	2485	1.00, 1.60 (1.02)	*U* = 133897, z = 7.61, **p <0.001**
	9-year-olds	130	2.00, 2.34 (1.37)	2972	1.00, 1.33 (0.82)	*U* = 280165, z = 12.58, **p <0.001**
	Total	205	2.00, 2.45 (1.39)	5457	1.00, 1.45 (0.93)	*U* = 800255, z = 13.52, **p <0.001**
3	17-year-olds	75	2.00, 2.31 (1.43)	2485	1.00, 1.55 (1.13)	*U* = 123402, z = 6.32, **p <0.001**
	9-year-olds	130	2.00, 2.36 (1.48)	2972	1.00, 1.48 (1.20)	*U* = 264204, z = 9.80, **p <0.001**
	Total	205	2.00, 2.34 (1.46)	5457	1.00, 1.51 (1.11)	*U* = 754575, z = 11.48, **p <0.001**
4	17-year-olds	75	1.00, 1.85 (1.12)	2485	1.00, 1.20 (0.67)	*U* = 126732, z = 9.53, **p <0.001**
	9-year-olds	130	1.00, 1.78 (1.23)	2972	1.00, 1.17 (0.59)	*U* = 248197, z = 10.22, **p <0.001**
	Total	205	1.00, 1.80 (1.19)	5457	1.00, 1.18 (0.63)	*U* = 733522, z = 13.84, **p <0.001**
5	17-year-olds	75	3.00, 2.75 (1.46)	2485	1.00, 1.61 (1.06)	*U* = 135861, z = 8.05, **p <0.001**
	9-year-olds	130	3.00, 2.81 (1.46)	2972	1.00, 1.48 (0.91)	*U* = 294521, z = 12.55, **p <0.001**
	Total	205	3.00, 2.79 (1.46)	5457	1.00, 1.54 (0.98)	*U* = 836574, z = 14.65, **p <0.001**
6	17-year-olds	75	2.00, 2.27 (1.31)	2485	1.00, 1.58 (1.18)	*U* = 123920, z = 6.35, **p <0.001**
	9-year-olds	130	2.00, 2.32 (1.43)	2972	1.00, 1.59 (1.24)	*U* = 258117, z = 8.61, **p <0.001**
	Total	205	2.00, 2.30 (1.38)	5457	1.00, 1.58 (1.21)	*U* = 745690, z = 10.66, **p <0.001**
7	17-year-olds	75	2.00, 2.17 (1.17)	2485	1.00, 1.24 (0.69)	*U* = 139786, z = 11.89, **p <0.001**
	9-year-olds	130	1.00, 1.90 (1.16)	2972	1.00, 1.17 (0.62)	*U* = 269391, z = 13.68, **p <0.001**

	Total	205	2.00, 2.00 (1.17)	5457	1.00, 1.20 (0.65)	*U* = 799668, z = 17.80, **p <0.001**
	17-year-olds	75	2.00, 2.28 (1.24)	2485	1.00, 1.30 (0.78)	*U* = 138526, z = 10.70, **p <0.001**
8	9-year-olds	130	1.00, 2.03 (1.32)	2972	1.00, 1.25 (0.73)	*U* = 264109, z = 11.52, **p <0.001**
	Total	205	2.00, 2.12 (1.29)	5457	1.00, 1.27 (0.76)	*U* = 787339, z = 15.44, **p <0.001**

Items from Dental Beliefs Survey accordingly numbers in table: 1. Dentists don't seem to care that patients sometimes need a rest, 2. Dentists focus too much on getting the job done and not enough on the patient's comfort, 3. I am concerned that dentists will not take my worries (fears) about dentistry seriously, 4. I am concerned that dentists will put me down (make light of my fears), 5. Once I am in the chair I feel helpless (that things are out of my control), 6. If I were to indicate that it hurts, I think that the dentist would be reluctant to stop and try to correct the problem, 7. I have had dentists not believe me when I said I felt pain, 8. I am concerned that the dentist will do what he want and not really listen to me while I'm in the chair

Fig. 1 Venn diagram showing the overlap between a self-reported history of physical restraint, having felt pressured to receive dental treatment in such a way that one could not say no, and having wanted to escape from the dental situation. This figure represents respondents who answered all three questions (n=783).



Paper III

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ORIGINAL SCIENTIFIC ARTICLE

Patient-self-reported history of restraint among 17-year-olds: a retrospective study of records by non-specialist dentists in the public dental service in Hordaland, Norway

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Abstract

Purpose The primary purposes were to examine dental records of Norwegian adolescents' with and without self-reported history of restraint for information about oral health (DMFT), total scheduled time in the Public Dental Service (PDS) (dental appointments, cancelled and missed appointments), and reluctant behaviour and/or dental fear and anxiety (DFA). Another purpose was to explore their dental records for information recorded by the dentist concerning the use of restraint.

Methods Data on patient-self-reported history of restraint and DFA were collected in a population-based cross-sectional survey of 17-year-olds in the PDS in Hordaland, Norway, 2019. Patients were divided into two groups: self-reported restraint group ($N_1 = 26$) and self-reported non-restraint group ($N_2 = 200$). Data on oral health and dental treatment, total scheduled time of the PDS, reluctant behaviour or DFA, and information on the use of restraint were extracted from the dental records written by non-specialist dentists using a pre-set protocol covering the period from 2002 to 2019.

Results A total of 206 dental records were analysed. Adolescents with self-reported history of restraint ($n_1 = 18$) had higher DMFT and greater descriptions of reluctant behaviour and/or DFA, and total scheduled time compared with the self-reported non-restraint group ($n_2 = 188$). The use of restraint was recorded in the dental records of one patient from the self-reported restraint group and in two patients from the self-reported non-restraint group.

Conclusions The adolescents with self-reported history of restraint had higher DMFT, higher scheduled time attending the PDS, and had more descriptions of reluctant behaviour and/or signs of DFA compared with the self-reported non-restraint group. The patient records contained limited information concerning restraint, and there were significant discrepancies between patient-self-reported history of restraint and the recording of restraint by the dentist in the patients' records.

Keywords Dental records · Behavioural science · Paediatric dentistry · Adolescents · Restraint · Dental fear and anxiety

Introduction

Occasionally children resist dental treatment (Klingberg and Broberg 2007), and their resistance may lead dentists to use restraint during the procedure (Aarvik et al. 2021; Marty et al. 2020). The use of restraint may constitute ethical dilemmas, such as choosing between dental treatments involving the use of restraint or postponing the treatment itself (Aarvik et al. 2021; Marty et al. 2020). Habituating children to dental treatment can be time consuming and patients may experience pain or deterioration of their dental condition if dental procedures are postponed (Aarvik et al. 2021; Romer 2009). The British Society of Paediatric Dentistry provides guidelines on the use of restraint/clinical holding and physical intervention, which likely reflects the current or similar status concerning restraint in relation

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to children's dentistry in most European countries (British Society of Paediatric Dentistry 2016). The use of restraint in the dental care of children is restricted to dentists who have undertaken special training concerning the use of restraint in children (British Society of Paediatric Dentistry 2016). In the Norwegian paediatric dental context, physical restraint has been described when a child is held still by a dental health personnel or parents despite the child's verbal and/or physical resistance, and public non-specialist dentists report that it often occurs in combination with conscious sedation (Aarvik et al. 2021).

The use of restraint during dental treatment may result in fearful behaviour in children (Zhou et al. 2011). In the Public Dental Service (PDS) in Hordaland, Norway, 17- and 9-year-old patients with self-reported history of restraint have significantly higher dental fear and anxiety (DFA) compared with patients without self-reported history of restraint (Aarvik et al. 2022). The strong association between DFA and dental avoidance is well known (Armfield et al. 2007; Fägerstad et al. 2019; Skaret et al. 1999), and the latter has negative consequences for oral health and higher total time use in the PDS (Skaret et al. 1998, 2000; Wang and Aspelund 2009; Åstrøm et al. 2021). In 2009, Wang et al. suggested that children who do not attend their scheduled dental appointments should be considered as risk patients and be offered customised dental care (Wang and Aspelund 2009). Negative dental experiences (range from painful dental treatment to lack of control) in childhood are established as risk factors for developing DFA, and especially painful dental treatment is a frequently mentioned cause of DFA (Klingberg and Broberg 2007; Klingberg et al. 1995; Milsom et al. 2003; Åstrøm et al. 2021). However, the specific experience of restraint and its relation to DFA, dental avoidance, and oral health have received less attention in research.

The Norwegian PDS is required to keep dental records that comprise information that is relevant and necessary to the delivery of healthcare (Health Personnel Act, § 40 1999). Health records are important communication tools for health personnel involved in the patient's treatment, and are used to promote safety and quality of care, and to reduce the chance of malpractice (Health Personnel Act, § 40 1999). According to Norwegian law, the use of restraint in adults should be documented in health records with its actual and legal reasons (Regulations on Patient Records, § 8 2019). Information about holding the child still during dental treatment or subjecting the child to other means of restraint can be considered relevant information in dental records for communication between dental health personnel. However, for patients under 16 years of age, parents or caregivers have the legal right to consent on their behalf (Patients and User Rights Act, § 4-4 1999). Thus, the use of restraint can be administered with parental consent and without the child's assent, meaning that children's rights (United Nations 1989) are less explicit in law and legal guidelines. Since restraint use is ambiguous in paediatric care, there is a lack of knowledge on how the use of restraint is documented in dental records.

The primary purposes of this study were to examine dental records of Norwegian adolescents' with and without self-reported history of restraint for information about oral health (DMFT), total scheduled time in the PDS (dental appointments, cancelled and missed appointments), and reluctant behaviour or dental fear and anxiety (DFA). Another purpose was to explore their dental records for information recorded by the dentist concerning the use of restraint.

Methods

This retrospective study used data from both a cross-sectional study about self-reported history of restraint during dental treatment and the participants written dental records. The data from the cross-sectional study were collected from October to December 2019 and compared with data collected from the dental records from November to December 2020.

The electronic cross-sectional survey was distributed via text message to all 17-year-old adolescents in the PDS in Hordaland, Norway. The PDS in Norway is responsible for individually adapted, free-of-charge follow-up of oral health of children and adolescents aged up to 18 years (Dental Health Service Act, § 1–3 1983). By law, the Norwegian PDS is required to promote the oral health in the population and ensure necessary prevention and treatment (Dental Health Service Act, § 1–2 1983). Most dentists in the Norwegian PDS are non-specialists, and of all dentists, approximately 1% (47) are specialists in paediatric dentistry (Statistics Norway). General dentists and paediatric dentists educated in Norway are not trained in administering restraint. The age group '17-year-olds' were addressed to include people who were still patients in the PDS and could report on their accumulated experiences in the PDS. Although the adolescents were 18-year-olds at the year of the dental record data collection, they were 17-year-olds at the time of the cross-sectional study; therefore, referred to as 17-year-olds. Hordaland County, which includes Bergen, Norway's second largest city, was in 2019 the third most populated county in Norway (Statistics Norway). The county is mostly rural and sparsely populated outside of the Bergen metropolitan area, which reflects the country. The median household income (711,000 NOK) is quite similar to the median national household income (686,000 NOK) (Statistics Norway). Thus, Hordaland can be regarded representative for epidemiological research in Norway.

Sample

All 17-year-old participants who participated in the cross-sectional study ($n = 3305$, 52.2%) were invited to participate in this study. Those who provided written informed consent for access to their dental records were eligible for the present study ($n = 1045$).

Based on the cross-sectional data collection, the adolescents were assigned into two groups: one with self-reported history of physical restraints (restraint group) and one group without self-reported history of restraint (non-restraint group). These groups were selected based on the question 'Have you experienced being held still against your will during dental treatment?', which was answered by 2560 17-year-olds. All eligible participants in the restraint group were included ($n_1 = 26$) in this study. The sample size of the self-reported non-restraint group ($n_2 = 200$, power 0.80 with an effect size of 0.55) was calculated by a statistician. The function 'random organisation' in SPSS was used to select 200 participants for the self-reported non-restraint group.

Data collection and variables

Five elements obtained from the cross-sectional study were used in this study. The first question identified the history of physical restraint (1). The answer *do not know* was counted as *no*. Self-reported history of physical restraint (answer *yes*) was labelled 'patient-self-reported restraint'. The self-reported age (2) and situation (3) of when physical restraint occurred was measured by 'Approximately how old were you when/the first time you experienced being physically held still against your will during dental treatment?', and 'In what/which situation(s) were you being physically held still during dental treatment?'. Dental fear was assessed using the Children's Fear Survey Schedule–Dental subscale (CFSS-DS) (4) and a single-item question (5). The self-report version of the CFSS-DS (Cuthbert and Melamed 1982; Gustafsson et al. 2010)) addresses different aspects of dental treatment and is intended to categorise the degree of DFA in children. Each item is scored from 1 (*not afraid at all*) to 5 (*very afraid*), with a total score ranging from 15 to 75. A sum score of > 38 indicates a high DFA (Gustafsson et al. 2010). The single-item question to separate 'no fear' from all other levels of dental fear was 'Are you afraid of dental treatment? (*not at all*, *low degree*, *neither high nor low*, *high degree*, or *very high degree*).

For the 226 participants included in this study, the patients written dental records for the period 2002–2019 were reviewed. All data extractions from the dental records were performed by the first author and a research assistant according to a pre-set protocol. Ten random dental records were double checked to retrieve consistency and no differences were found. Data about oral health and dental treatment, total scheduled time in the PDS, reluctant behaviour and DFA, and recorded use of restraint were collected from the dental records. Table 1 presents an overview of the variables extracted from the cross-sectional study and dental records. The data collected from the dental records had been written by public non-specialist dentists and to a small degree dental hygienists.

To strengthen validity in the dental record data collection, the words and phrases that could be compatible with reluctant behaviour and/or DFA and the use of restraint were noted and discussed. After assessment in the research group, descriptions of 'reluctant behaviour and/or DFA' and 'restraint' were operationalised. Restraint was registered when it was explicitly written that the child, for example, had been held still by parents or dental health personnel during dental treatment.

Statistical analyses

Dental records that missed information from parts of the study period (for instance because of moving to another county or country) were excluded from the analysis. The variables were dichotomized as follows: records with descriptions of the use of restraint were coded 1 and records without restraint descriptions were coded 0. The CFSS-DS was coded 0 for sum scores ≤ 38 and 1 for > 38. The five-point item on DFA was coded 0 for *not at all/neither high nor low* and 1 for *low degree/high degree/very high degree*. Variables coded 2 (unclear) in the data collection were counted as 0 (no) in the analysis.

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 27.0 (IBM, Armonk, NY, USA). Descriptive statistics were conducted using 'Frequencies'. Mann–Whitney *U* tests were used to compare group differences and Chi-squared tests for independence to indicate variable associations. When the lowest expected frequency in any cell was < 5, the *p* value for Fisher's exact probability test was reported. The level of statistical significance was set at $p < 0.05$.

Ethical approval

The study was conducted in accordance with the guidelines of the Helsinki Declaration. The Norwegian Centre for Research Data (#783349/2019) and the County Dental Officer in Hordaland County Municipality (now Vestland) approved this study. Written informed consent was obtained from all individual participants included in the study.

Results

In total, 69.2% ($n_1 = 18$) of the self-reported restraint group and 94.0% ($n_2 = 188$) of the self-reported non-restraint group had complete dental records for the entire period

Table 1 Overview of the variables included in this study

Topic	Variables from the cross-sectional study	Registration (code)
	Patient-self-reported history of physical restraint	No (0), yes (1)
	Age of when restraint had happened (only answered by the yes-responders on the question about physical restraint)	Age 0–17, do not know
	Situational description of the restraint situation (only answered by the yes-responders on the question about physical restraint)	Copied written text
	Patient-self-reported dental fear (CFSS-DS sum score)	≤ 38 (0), > 38 (1)
	Patient-self-reported dental fear (single item)	Not at all/neither high nor low (0), low degree/high degree/very high degree (1)
Topic	Variables from the dental records	Registration (code)
Oral health and treatment	Decayed missing filled teeth (DMFT)	Count (0–28)
	Untreated caries > D_2	Count
	Dental treatment under conscious sedation	Count
	Dental treatment under general anaesthesia	Count
	Total cancelled/moved appointments (patients' desire)	Count
Total scheduled time in the PDS	Total missed appointments	Count
	Planned treatment not completed	Count
	Number of therapists (dentists and dental hygienists)	Count
	Habituating the child to dental treatment post-recorded use of restraint	No (0), yes (1), unclear (2)
	Habituating the child to dental treatment	Count
	Reluctant behaviour in child aged 0–5 years	No (0), yes (1), unclear (2)
Reluctant behaviour and/or DFA	Reluctant behaviour during oral examination	No (0), yes (1), unclear (2)
	Reluctant behaviour during dental treatment	No (0), yes (1), unclear (2)
	Description of reluctant behaviour and/or signs of dental fear and anxiety	Copied written text
Restraint	Patient fearful/anxious, written in dental record	No (0), yes (1), unclear (2)
	Restraint registered in dental record	No (0), yes (1)
	Restraint registered in dental record	Count
	Conscious sedation and restraint registered in dental record	No (0), yes (1)

(0–17 years) and were included in the analyses. Figure 1 shows a flow chart of the inclusion and exclusion of participants, including sex distribution in both groups and analysis of participants with and without consent. The self-reported restraint group had more participants with high DFA (22% scored > 38 on the CFSS-DS) than the self-reported non-restraint group (3.7% scored > 38 on the CFSS-DS).

Oral health and treatment

At the time of data collection, the mean caries experience (DMFT) for the total sample was 3.07. The self-reported restraint group had higher DMFT and more untreated caries (> D_2) compared with the self-reported non-restraint group (Table 2). Twenty-one (10.2%) patients had experienced treatment(s) with conscious sedation. The distribution of participants was 38.9% ($n = 7$) in the self-reported restraint group and 7.5% ($n = 14$) in the self-reported non-restraint group. There was a significant association between patient-self-reported restraint and history of dental treatment under general anaesthesia ($p = 0.002$).

Total scheduled time in the PDS

The total scheduled time in the PDS was significantly higher in the self-reported restraint group compared with the self-reported non-restraint group. The self-reported restraint group had more dental appointments, missed appointments, and cancelled appointments. The number of appointments where planned dental treatment was not completed also differed significantly between the two groups. In addition, the total number of therapists involved in the child's dental healthcare was higher in the self-reported restraint group than in the self-reported non-restraint group. The results are listed in Table 2.

One of the 11 situations of recorded use of restraint was followed up with a new appointment with the intention to habituate the child to the dental situation. Overall, more appointments for habituation to dental treatment were

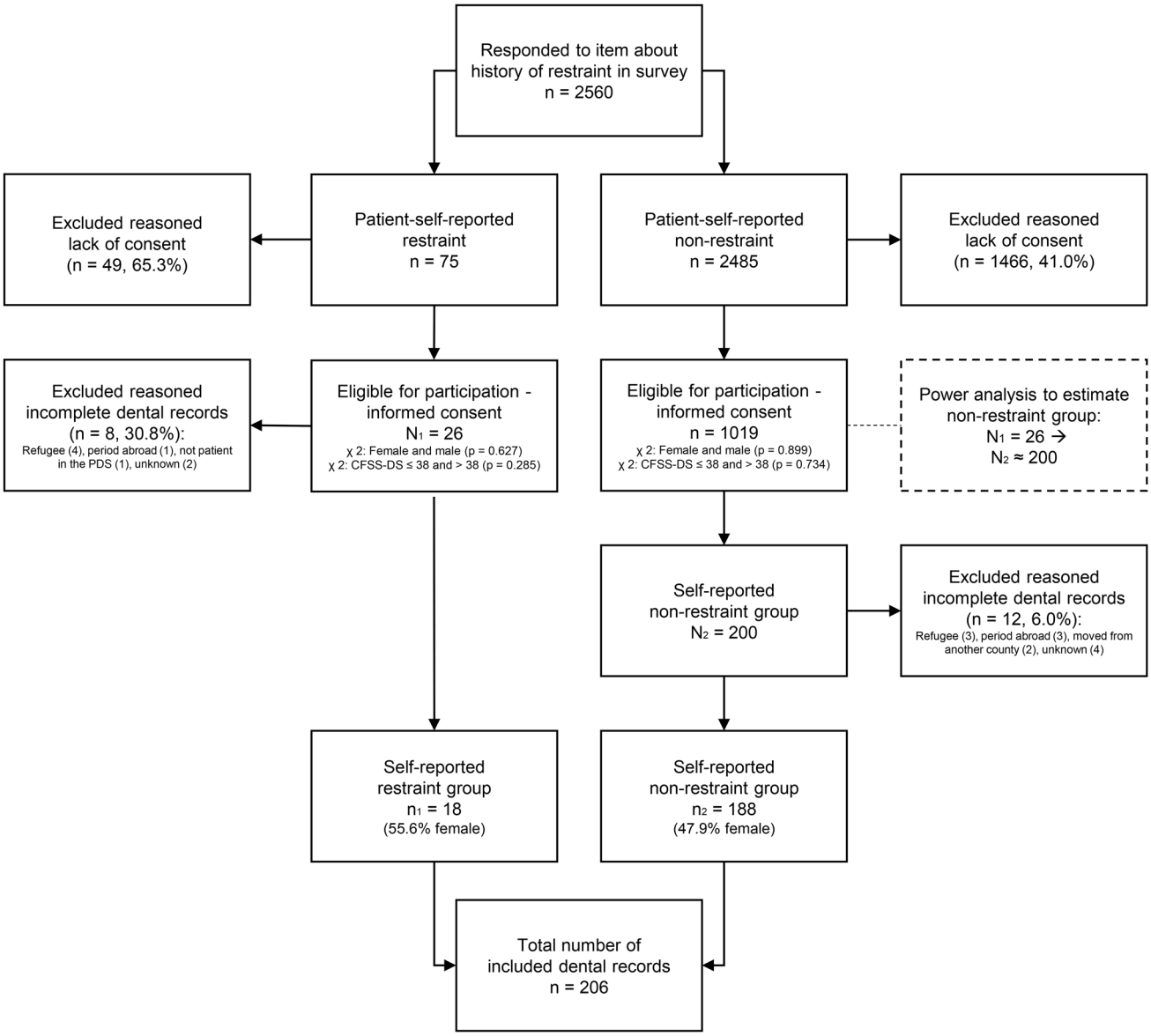

Fig. 1 Flow chart of the inclusion and exclusion of participants in the patient-self-reported restraint group (N_1) and patient-self-reported non-restraint (N_2) group. All included participants had answered a question concerning history of physical restraint in a cross-sectional survey on restraint in the Public Dental Service (PDS) in Hordaland, Norway (2019) and given informed consent to participate in this study

registered in the self-reported restraint group than in the self-reported non-restraint group (Table 2).

Reluctant behaviour and DFA

There was a significant association between patient-reported dental fear at any level above 'no fear' and descriptions of dental fear in the dental records ($p = 0.007$), but there was no association between patient-reported *high* dental fear (CFSS-DS sum score > 38) and records of dental fear ($p = 0.235$).

Reluctant behaviour was registered when the dental record included descriptions such as: refused, protested, unwilling to receive treatment, uncooperative, and reluctant. DFA was registered when the dental record included descriptions such as: anxious, injection/dental fear, dental phobia, terrified, and scared. In the self-reported restraint group, 72.2% had descriptions of reluctant behaviour and 50.0% had DFA descriptions, while in the self-reported non-restraint group, 30.9% had descriptions of reluctant behaviour and 17.2% had DFA descriptions.

There was a significant association between patient-self-reported physical restraint and records of reluctant behaviour in the following situations: children aged 0–5 years ($p = 0.003$), during oral examination at any age ($p = 0.001$),

Table 2 Mann–Whitney *U* test results for the differences in the patient-self-reported restraint and non-restraint groups regarding oral health and treatment and total scheduled time in PDS

	Variable collected from dental record	Patient-self-reported restraint group		Patient-self-reported non-restraint group		Statistics (Mann–Whitney *U* Test)
		Median	Mean (SD)	Median	Mean (SD)	
Oral health and treatment	DMFT	4.5	6.94 (6.91)	2.00	2.70 (3.37)	$U=2237$, $z=4.12$, $p<0.001$, $r=0.29$
	Untreated caries > D_2	0.00	2.06 (3.65)	0.00	0.16 (0.61)	$U=2477$, $z=3.31$, $p=0.001$, $r=0.23$
Total scheduled time in the PDS	Dental appointments (in total)	24.00	26.28 (16.12)	14.00	16.47 (9.01)	$U=2284$, $z=2.46$, $p=0.014$, $r=0.17$
	Cancelled/moved appointments	5.00	7.00 (7.97)	2.00	2.95 (2.60)	$U=2344$, $z=2.73$, $p=0.006$, $r=0.19$
	Missed appointments	2.50	3.11 (2.74)	1.00	1.61 (2.24)	$U=2387$, $z=2.99$, $p=0.003$, $r=0.21$
	Planned treatment not completed	0.5	1.44 (2.12)	0.00	0.13 (0.47)	$U=2414.5$, $z=5.10$, $p<0.001$, $r=0.36$
	Number of therapists	8.50	11.72 (7.36)	7.00	7.55 (3.93)	$U=2287.5$, $z=2.48$, $p=0.013$, $r=0.17$
	Habituating the child to dental treatment	0.00	3.50 (6.05)	0.00	0.21 (0.78)	$U=2326.5$, $z=4.41$, $p<0.001$, $r=0.31$

SD standard deviation, *U* Mann–Whitney *U* value, *z* *z* score (standardised test statistics), *p* *p* value, *r* effect size

Table 3 Distribution of dental records of reluctant behaviour recorded at oral examination and during dental treatment

	Reluctant behaviour during dental treatment		Total
	Yes	No	
Reluctant behaviour during oral examination			
Yes	24 (53.3%)	21 (46.7%)	45
No	25 (15.5%)	136 (84.5%)	161
Total	49	157	206

and during dental treatment at any age ($p=0.001$). For all patients, dentist-recorded reluctant behaviour during examination was significantly associated ($p<0.001$) with reluctant behaviour during treatment (Table 3).

Description of restraint use in dental records

Three of the 206 dental records had descriptions of restraint use. The remaining dental records had no descriptions of restraint. In the self-reported restraint group ($n_1=18$), one patient had dentist-recorded descriptions of restraint. In the self-reported non-restraint group ($n_2=188$), two patients had dentist-recorded descriptions of restraint. Two of the three dental records with restraint descriptions involved conscious sedated. No significant association between patient-self-reported restraint and the dentist-recorded use of restraint was found ($p=0.241$).

Descriptions of restraint included the following information—Patient 1. Mother holds the patient during oral examination at age 5 years. Father holds the girl during oral examination at age 6 years. This patient reported in the survey that physical restraint occurred when she was 6 years old, where she had a toothache and contacted the dental clinic for help. Patient 2. The patient was held still by guardian to receive rectal Midazolam (conscious sedation) and during dental treatment under conscious sedation at age 4 years. The patient had not reported the restraint experience in the survey and had, therefore, not answered at what age and the situation during which restraint had occurred. Patient 3. Mother holds the patient (conscious sedated) during caries excavation and filling at the age 6 years. The patient had not reported the restraint experience in the survey and had, therefore, not answered at what age and the situation during which restraint had occurred.

Discussion

The main results of this study were that the adolescents with self-reported history of restraint have poorer oral health, higher total PDS use, and a higher number of descriptions of reluctant behaviour and/or signs of DFA compared with the self-reported non-restraint group. Dental records contained limited information on the use of restraint and did not match the adolescents' self-reported history of physical restraint.

The intention of this study was to gain knowledge on adolescents' self-reported experiences and to examine whether variables in their written dental records were different for adolescents with history of restraint during dental treatment compared to adolescents without self-reports of such an experience. The retrospective design prevents from drawing conclusions due to confounders and recall bias. However, results from a prospective cohort study (the Tromsø study) regarding mental health, general health, and well-being indicate that recall is stronger for actual events than for subjective assessments, such as family well-being (Sheikh et al. 2016). In general, the self-reported restraint group had higher DFA compared to the self-reported non-restraint group. Anxious patients may have interest in finding

reasons for their anxiety. As such, it is possible that patients with higher DFA scores (CFSS-DS) will ruminate about past experiences during dental treatment, and therefore, report more such experiences than non-anxious peers. It should also be noted, the participants might have, consciously or unconsciously, provided incorrect answers. Still, patients' own personal experience is valuable information (Beaton et al. 2014).

The results of the present study indicate that the self-reported restraint group had higher DMFT, more untreated caries, more appointments in total, and more missed and cancelled appointments, and more dentists involved compared with the self-reported non-restraint group. These findings are in line with previous studies examining DFA in dental records (Klingberg et al. 1995; Skaret et al. 1999, 2000) and were expected since the self-reported restraint group had a higher percentage with high DFA (> 38 CFSS-DS). Reasons for missed dental appointments might range from forgetfulness to dental phobia. Patients who miss dental appointments should receive customised care (Wang and Aspelund 2009), and as the results of the present study indicate, this should particularly be if they report high DFA and restraint experience. There may be an association between self-reported histories of restraint as a young child and poor oral health at 17 years of age, but this does not mean that the use of restraint was the cause of subsequent poorer oral health and more use of PDS in the future. There are many other variables that could be associated with poor dental health, DFA, and use of dental services, which have complex and multifactorial reasons. For example, dental caries is a multifactorial disease with multiple and complex interactions between environmental, behavioural, and genetic factors. The best predictor of developing caries in the future is the history of past caries experience (Mejàre et al. 2014). Therefore, this study would have been improved if it had included the severity of dental caries in the adolescents when young. Even though no causal conclusions can be made, the treatment and follow-up for the restraint group have been more expensive for the PDS and this should receive attention. The significantly higher number of untreated caries in the self-reported restraint group may indicate that persons with history of restraint also face challenges in receiving dental care. When restraint is used, psychosocial challenges in the dental situation should be addressed during follow-up appointments to help the patient overcome possible negative feelings.

Most descriptions of reluctant or fearful patients were found in the dental records of the self-reported restraint group. This supports the results of a cross-sectional study that showed that patients with self-reported history of restraint have significantly higher dental fear compared with those who had no such experience (Aarvik et al. 2022). Further, Sturmey reported that fearful patients have a higher risk of being restrained (Sturmey 2015). Many patients were described in their dental records as uncooperative, reluctant, or unwilling to receive treatment. These descriptions mirror dental behaviour management problem(s) (BMP) in young patients (Klingberg and Broberg 2007). Klingberg and Broberg defined BMP as 'a collective term for *uncooperative* and disruptive behaviours, which result in delay of treatment or render treatment impossible, regardless of the type of behaviour or its underlying mechanism(s)' (Klingberg and Broberg 2007). This present study indicates that the self-reported restraint group are described as more reluctant and/or fearful.

Although we could not determine whether the patients were fearful or had BMP even before the restraint situation, negative experiences are a well-known aetiological cause for the development of DFA (Klingberg and Broberg 2007; Klingberg 2008; Locker et al. 2001; Milsom et al. 2003; Ost and Hugdahl 1985; Seligman et al. 2017; Ten Berge et al. 2002; Åstrøm et al. 2021), and there is reason to hypothesise that experiencing restraint during dental treatment is a negative experience which can influence DFA. Painful dental treatment is one of the most frequently mentioned causes of DFA and BMP, especially in combination with a feeling of lack of control (Seligman et al. 2017). The dental records of restraint had no information about painful treatment or inabilities to achieve profound analgesia, but this does not mean that it was not present. In this study, the only oral pathology measured was caries. Conditions such as Molar Incisor Hypomineralisation with problems concerning pain/sensitivity could also be one of the possible factors associated with the development of DFA (Jälevik et al. 2021). Further, medical and psychological conditions such as autism, general fear, and child temperament have been reported to be associated with occurrence of DFA and BMP (Blomqvist et al. 2014; Klingberg 2008; Seligman et al. 2017). These conditions can be anticipated to influence such a child's emotional response to restraint.

In the analysis of participants who provided consent and those who did not, we found no associations for sex and high DFA (> 38 CFSS-DS) (Fig. 1). The reasons for why the noticeably lower percentage of the self-reported restraint group consented to participate in the present study are unknown. If a child has had negative feelings and received verbal appraisals from their dentist for reluctant or uncooperative behaviour, feelings of shame may be prominent (Nathanson 1994). Other potential reasons not to consent can include no interest in the topic, scepticism, or unwillingness to give identifiable information. The self-reported restraint group also had the highest percentage share of adolescents with incomplete dental records (excluded from analyses), and the majority of incomplete records belonged to refugees or persons who had lived abroad. This might imply that some of the self-reported restraint situations during

dental treatment have occurred outside the Norwegian PDS. Rønneberg et al. discussed how dentists' educational backgrounds might influence the prevalence and acceptance of the use of restraint (Rønneberg et al. 2017). Thus, this finding might indicate that dentists should be especially aware of patients with unknown dental history regarding behavioural objectives.

The identified discrepancy between patient-self-reports and dental records can be problematic because being subjected to restraint can cause psychological, social, and developmental burdens for a child (Amos 2004; Diseth 2006; Sturmey 2015). Sparsely written dental records regarding behavioural objectives may be the reason for this discrepancy. A one-sided focus on oral diagnosis and operative treatment in the dental records may not benefit the child and may not be in accordance with the legal regulation of medical records: health personnel are required to record sufficient information to treat the patient (Health Personnel Act, § 40 1999). Given that the parent or caregiver consents to the treatment in which a child can experience restraint, then legally, the practise is, by Norwegian law, not considered as formal restraint (Patients and User Rights Act, § 4-4 1999). Hence, it can be considered unnecessary to document restraint in the dental record, which may explain several discrepancies in documentation. The difference between patient-self-reports and the dentist's written reports of the treatment might be explained by DFA, since patients with DFA might be better aware of restraint, while a non-DFA patient would rather perceive restraint as support or guidance. In general, notes from dental records seldom give a complete picture of the treatment situation (Klingberg et al. 1995). Since both public and paediatric dentists relate to the practice of restraint with feelings of negativity and professional failure (Aarvik et al. 2021; Marty et al. 2020), dentists may simply fail to document the use of restraint despite knowing that they have used restraint. Without well-defined guidelines on the use of restraint, a dentist must individually assess whether restraint is the method of choice (Aarvik et al. 2021; Marty et al. 2020). On the 31st of March 2022, new national guidelines for dentists treating children and adolescents in Norway were published and the use of restraint was included (Norwegian Directorate of Health 2022). Dentists are recommended to only use restraint as a last resort method after a thorough assessment, consulting a paediatric dentist if necessary. The use of restraint shall be documented in the patients' dental record (including justification, procedure, and cooperation with the child/parents) and have a follow-up with the child within a week to ensure that the child receives good follow-up in the future (Norwegian Directorate of Health 2022). In this study, the fact that the self-reported restraint group had significantly more therapists than the self-reported non-restraint group underscores the importance of comprehensive recording so that dentists involved in the patient's dental care are informed and can customise the care provided.

Most recorded descriptions of restraint were related to treatments where the young patients were conscious sedated. Similarly, a qualitative study of Norwegian non-specialist dentists indicated that the use of restraint often is legitimised when applied in combination with conscious sedation (Aarvik et al. 2021). In 2017, Rønneberg et al. reported that 12% of dentists in the Norwegian PDS used restraint to administer acute dental treatment to young children (Rønneberg et al. 2017). Furthermore, 50% would give a new appointment with conscious sedation. The study did not mention if the sedated treatment could include restraint. How restraint occurs during dental treatments in combination with conscious sedation in the Norwegian PDS should be explored in prospective studies.

Limitations

The results of retrospective designs must be interpreted with caution. The small sample size with the possibility of selection bias is a weakness of this study. Of the 17-year-olds in the target population, 52.2% participated in the cross-sectional study, and of those, only 31.6% (1045/3305) gave informed consent for participation in this present study. Further, several dental records were excluded from the analyses due to incomplete dental records. This limitation must be considered when the results are interpreted. However, the mean DMFT score in this study (3.07) is similar to the mean DMFT scores for 18-year-olds in Vestland county municipality (former Hordaland) and Norway in general (3.00) (Statistics Norway) which supports the representativeness of the current sample. The small sample in the self-reported restraint group made it necessary to include a higher number of participants in the self-reported non-restraint group. Therefore, subgroup analysis of for example sex differences was not possible.

The study gives no information about the patients' oral health and self-assessed DFA at the time before their self-reported history of restraint during dental treatment and cannot conclude on causal relationships. Including the parents' DFA would be valuable since DFA may be learned by modelling, listening to others, or be a result of heredity and personality traits (Beaton et al. 2014). In addition, the parent's evaluation of their child's experiences in the PDS and considerations on the aetiology of the child's DFA would be valuable. Another limitation is that the patients' somatic and psychological health was not assessed. Nevertheless, this study is the first to examine patient-self-reported history of restraint compared with dentist-recorded restraint and provides new knowledge in the field of paediatric dentistry.

Conclusion

Considering the limitations of the present study, it has been shown that the adolescents with self-reported history of restraint had higher DMFT, higher scheduled time attending the PDS and had more descriptions of reluctant behaviour and/or signs of DFA compared with the self-reported non-restraint group. The dental records written by non-specialist dentists had sparsely written descriptions regarding restraint, and the comparisons showed that patient-self-reported restraint was not consistent with dentist-recorded restraint. Dentists should strive to, in addition to the administered dental treatment, address behavioural objectives in the dental records. Due to the small numbers included in the study, conclusions cannot be drawn, and negative consequences of restraint should be addressed in future prospective studies.

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Author contributions All the authors have made substantial contributions to the manuscript. RSA has been in charge of the research process. RSA administered the data collection and statistical analysis in collaboration with EJS and MLA. All the authors have been involved in writing, reviewing, and commenting on the subsequent drafts.

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Data availability The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Conflict of interest The authors have no competing interests to declare that are relevant to the content of this article.

Consent to participate Written informed consent was obtained from all individual participants included in the study.

References

Aarvik RS, Agdal ML, Svendsen EJ. Restraint in paediatric dentistry: a qualitative study to explore perspectives among public, non-specialist dentists in Norway. Acta Odontol Scand. 2021;79(6):443–50. https://doi.org/10.1080/00016357.2021.1881159.

Aarvik RS, Svendsen EJ, Agdal ML. Held still or pressured to receive dental treatment: self-reported histories of children and adolescents treated by non-specialist dentists in Hordaland, Norway. Eur Arch Paediatr Dent. 2022 **(submitted)**.

Amos PA. New considerations in the prevention of aversives, restraint, and seclusion: incorporating the role of relationships into an ecological perspective. Res Pract Persons Severe Disabl. 2004;29(4):263–72. https://doi.org/10.2511/rpsd.29.4.263.

Armfield JM, Stewart JF, Spencer AJ. The vicious cycle of dental fear: exploring the interplay between oral health, service utilization and dental fear. BMC Oral Health 2007;7(1):1. https://doi.org/10.1186/1472-6831-7-1

Åstrøm AN, Smith ORF, Sulo G. Early-life course factors and oral health among young Norwegian adults. Community Dent Oral Epidemiol. 2021;49(1):55–62. https://doi.org/10.1111/cdoe.12576.

Beaton L, Freeman R, Humphris G. Why are people afraid of the dentist? Observations and explanations. Med Princ Pract. 2014;23(4):295–301. https://doi.org/10.1159/000357223.

Blomqvist M, Dahllöf G, Bejerot S. Experiences of dental care and dental anxiety in adults with autism spectrum disorder. Autism Res Treat. 2014;2014: 238764. https://doi.org/10.1155/2014/238764.

British Society of Paediatric Dentistry. British Society of Paediatric Dentistry: a policy document on the use of Clinical Holding in the dental care of children; 2016. https://www.bspd.co.uk/Portals/0/BSPD%20clinical%20holding%20guidelines%20final%20with%20flow%20chart%20250416.pdf Accessed 11 Feb 2022.

Cuthbert MI, Melamed BG. A screening device: children at risk for dental fears and management problems. ASDC J Dent Child. 1982;49(6):432–6.

Diseth TH. Dissociation following traumatic medical treatment procedures in childhood: a longitudinal follow-up. Dev Psychopathol. 2006;18(1):233–51. https://doi.org/10.1017/S0954579406060135.

Fägerstad A, Lundgren J, Windahl J, Arnrup K. Dental avoidance among adolescents—a retrospective case–control study based on dental records in the public dental service in a Swedish county. Acta Odontol Scand. 2019;77(1):1–8. https://doi.org/10.1080/00016357.2018.1489978.

Forskrift om pasientjournal [Regulations on Patient Records] Norway, 2019. https://lovdata.no/dokument/SF/forskrift/2019-03-01-168. Accessed 21 June 2021.

Gustafsson A, Arnrup K, Broberg AG, Bodin L, Berggren U. Child dental fear as measured with the Dental Subscale of the Children's Fear Survey Schedule: the impact of referral status and type of informant (child versus parent). Community Dent Oral Epidemiol. 2010;38(3):256–266. https://doi.org/10.1111/j.1600-0528.2009.00521.x.

Jälevik B, Sabel N, Robertson A. Can molar incisor hypomineralization cause dental fear and anxiety or influence the oral health-related quality of life in children and adolescents?—a systematic review. Eur Arch Paediatr Dent. 2021. https://doi.org/10.1007/s40368-021-00631-4.

Klingberg G. Dental anxiety and behaviour management problems in paediatric dentistry—a review of background factors and diagnostics. Eur Arch Paediatr Dent. 2008;9:11–5. https://doi.org/10.1007/BF03262650.

Klingberg G, Berggren U, Carlsson SG, Noren JG. Child dental fear: cause-related factors and clinical effects. Eur J Oral Sci.

1995;103(6):405–12. https://doi.org/10.1111/j.1600-0722.1995.tb01865.x.
Klingberg G, Broberg AG. Dental fear/anxiety and dental behaviour management problems in children and adolescents: a review of prevalence and concomitant psychological factors. Int J Paediatr Dent. 2007;17(6):391–406. https://doi.org/10.1111/j.1365-263X.2007.00872.x.
Locker D, Thomson WM, Poulton R. Psychological disorder, conditioning experiences, and the onset of dental anxiety in early adulthood. J Dent Res. 2001;80(6):1588–92. https://doi.org/10.1177/00220345010800062201.
Lov om helsepersonell [Health Personnel Act] Norway; 1999. https://lovdata.no/dokument/NL/lov/1999-07-02-64. Accessed 30 Mar 2020.
Lov om pasient- og brukerrettigheter [Patients and User Rights Act] Norway. Norway; 1999. https://lovdata.no/dokument/NL/lov/1999-07-02-63. Accessed 30 Mar 2020.
Lov om tannhelsetjenesten [Dental Health Service Act] Norway; 1983. https://lovdata.no/dokument/NL/lov/1983-06-03-54. Accessed 28 Oct 2020.
Marty M, Marquet A, Valéra MC. Perception of protective stabilization by pediatric dentists: a qualitative study. JDR Clin Trans Res. 2020. https://doi.org/10.1177/2380084420963933.
Mejàre I, Axelsson S, Dahlén G, Espelid I, Norlund A, Tranæus S, Twetman S. Caries risk assessment. A systematic review. Acta Odont Scand. 2014;72(2):81–91. https://doi.org/10.3109/00016357.2013.822548.
Milsom KM, Tickle M, Humphris GM, Blinkhorn AS. The relationship between anxiety and dental treatment experience in 5-year-old children. Br Dent J. 2003;194(9):503–6. https://doi.org/10.1038/sj.bdj.4810070.
Nathanson DL. Shame and pride: affect, sex, and the birth of the self. New York: WW Norton & Company; 1994.
Norwegian Directorate of Health. Nasjonal faglig retningslinje: TannBarn—Kapittel 7 Tannbehandlingsangst blant barn og unge [National guideline: Pediatric dentistry—Chapter 7 Dental anxiety among children and adolescents]. https://www.helsedirektoratet.no/retningslinjer/tannhelsetjenester-til-barn-og-unge-020-ar/tannbehandlingsangst-blant-barn-og-unge. Accessed 31 Mar 2022.
Ost LG, Hugdahl K. Acquisition of blood and dental phobia and anxiety response patterns in clinical patients. Behav Res Ther. 1985;23(1):27–34. https://doi.org/10.1016/0005-7967(85)90139-1.
Romer M. Consent, restraint, and people with special needs: a review. Spec Care Dentist. 2009;29(1):58–66. https://doi.org/10.1111/j.1754-4505.2008.00063.x.
Rønneberg A, Skaare AB, Hofmann B, Espelid I. Variation in caries treatment proposals among dentists in Norway: the best interest of the child. Eur Arch Paediatr Dent. 2017;18(5):345–53. https://doi.org/10.1007/s40368-017-0298-4.
Seligman LD, Hovey JD, Chacon K, Ollendick TH. Dental anxiety: an understudied problem in youth. Clin Psychol Rev. 2017;55:25–40. https://doi.org/10.1016/j.cpr.2017.04.004.
Sheikh MA, Abelsen B, Olsen JA. Differential recall bias, intermediate confounding, and mediation analysis in life course epidemiology: an analytic framework with empirical example. Front Psychol. 2016;7:1828–1828. https://doi.org/10.3389/fpsyg.2016.01828.
Skaret E, Raadal M, Kvale G, Berg E. Missed and cancelled appointments among 12–18-year-olds in the Norwegian Public Dental Service. Eur J Oral Sci. 1998;106(6):1006–12. https://doi.org/10.1046/j.0909-8836.1998.eos106605.x.
Skaret E, Raadal M, Berg E, Kvale G. Dental anxiety and dental avoidance among 12 to 18 year olds in Norway. Eur J Oral Sci. 1999;107(6):422–8. https://doi.org/10.1046/j.0909-8836.1999.eos107602.x.
Skaret E, Raadal M, Kvale G, Berg E. Factors related to missed and cancelled dental appointments among adolescents in Norway. Eur J Oral Sci. 2000;108(3):175–83. https://doi.org/10.1034/j.1600-0722.2000.108003175.x.
Statistics Norway. Tannhelsetilstand og kariesforekomst blant utvalgte aldersgrupper, etter alder 2015–2020. [Dental health condition and incidence of caries among selected age groups, by age 2015–2020]. https://www.ssb.no/statbank/table/13033/tableViewLayout1/. Accessed 8 June 2021.
Statistics Norway. Areal og befolkning i tettsteder, etter region, statistikkvariabel og år [Area and population in densely populated area, by region, statistical variable and year]. https://www.ssb.no/statbank/table/04860/tableViewLayout1/. Accessed 12 Dec 2021.
Statistics Norway. Income and wealth statistics for households. https://www.ssb.no/en/statbank/table/06944/tableViewLayout1/. Accessed 12 Dec 2021.
Statistics Norway. Spesialistutdanning. 4.kvartal, etter spesialitet, alder, statistikkvariabel, år og kjønn [Specialist education: speciality, age, statistical variable, year and sex]. https://www.ssb.no/statbank/table/07935/tableViewLayout1/. Accessed 12 Dec 2021.
Sturmey P. Reducing restraint and restrictive behavior management practices. Cham: Springer International Publishing; 2015.
Ten Berge M, Veerkamp JS, Hoogstraten J. The etiology of childhood dental fear: the role of dental and conditioning experiences. J Anxiety Disord. 2002;16(3):321–9. https://doi.org/10.1016/S0887-6185(02)00103-2.
United Nations. Convention on the Rights of the Child, 20 November 1989. 1989;16:95–501.
Wang NJ, Aspelund GØ. Children who break dental appointments. Eur Arch Paediatr Dent. 2009;10(1):11–4. https://doi.org/10.1007/BF03262660.
Zhou Y, Cameron E, Forbes G, Humphris G. Systematic review of the effect of dental staff behaviour on child dental patient anxiety and behaviour. Patient Educ Couns. 2011;85(1):4–13. https://doi.org/10.1016/j.pec.2010.08.002.

Appendices

I. Invitation for participation in sub-study I (e-mail)

II. Participant information sub-study I

III. Participant information sub-study IIa and b

IV. Survey sub-study IIa

Appendices

Appendix I

[Participants (dentists) who accepted to participate in sub-study I during the phone conversation (initial invite) received the following e-mail:]

Hei --,

Takk for en fin telefonsamtale og for at du ønsker å delta i forskningsprosjektet «Bruk av tvang ved tannbehandling av barn». Som avtalt sender jeg deg utfyllende informasjon her.

Om intervjuet
Tid: Oppmøte ….
Varighet: Ca 90 minutter
Sted: Grupperom … på TkVest – Årstadveien 21, 3.etg.
Servering: Lunsj, kaffe/te (gi beskjed snarlig dersom diettrestriksjoner eller allergier)

Vedlagt PDF (Forespørsel om deltakelse i forskningsprosjekt: Fokusgruppeintervju «Bruk av tvang ved tannbehandling av barn») viser mer utfyllende informasjon om prosjektet. Etter at intervjuet er ferdig, er din deltakelse i prosjektet også avsluttet. Dersom du ønsker kan du få tilsendt publiserte resultater av studien når det er klart. Gi meg en tilbakemelding dersom det er noe du ønsker.

Reiseregning
Reiseregningen skal dekkes av prosjektets midler, og koden som må legges inn i reiseregningen er … Send også en mail til ledende tannhelsesekretær i ditt distrikt om at reiseregningen skal faktureres prosjektkoden på TkV når du sender inn reiseregningen. Dette er h-n samt ledende tannhelsesekretær på TkVest informert om. Det er fortrinnsvis reise med offentlig kommunikasjon som blir dekket. Dersom det er særskilte årsaker til at du benytter bil til intervjuet og ønsker det refundert, må det avtales på forhånd. Jeg undersøker pr nå om vi har mulighet til å tilby parkeringsplass, men jeg kan ikke garantere det. Det finnes også parkeringsplasser i området, blant annet ved Statsarkivet og på Haraldsplass sykehus som evt kan benyttes mot avgift.

Bekreftelse på deltakelse
Det er fint om du svarer på denne mailen med bekreftelse på deltakelse i prosjektet (ikke fyll ut samtykkeskjema, det gjør vi på intervjudagen). Etter at du har samtykket pr mail til å delta må jeg informere overtannlegen og klinikksjef om at du skal delta slik at de vet at årsaken til ditt fravær er deltakelse i forskning, som er godkjent som lønnet arbeid. Dersom du har ombestemt deg, så er det også helt i orden. Da hadde det vært bra for forskningsdataene om du oppga årsak, men det er frivillig.

Anonymitet
Din deltakelse i prosjektet er anonym, og du trenger ikke å fortelle noen hva du skal denne dagen. Det kan eksempelvis preblokkeres som «TkVest» i timeboken. Etter intervjuet skal du ikke fortelle noen om hvem som har vært tilstede eller hva som har vært snakket om.

Jeg ser frem til intervjuet og er glad for at du ønsker å delta!
Ta gjerne kontakt pr telefon eller epost dersom du har noen spørsmål.

Vennlig hilsen

Regina Skavhellen Aarvik
Stipendiat/Tannlege
+47 922 15 692

Appendix II

Forespørsel om deltakelse i forskningsprosjekt:

Fokusgruppeintervju

«Bruk av tvang ved tannbehandling av barn»

Bakgrunn og hensikt
Denne henvendelsen går til deg som ansatt som tannlege i Den offentlige tannhelsetjenesten i Hordaland fylkeskommune.

Daglig i klinisk praksis møter dere barn i ulike situasjoner. Hvert enkelt barn er unikt og må behandles individuelt. For å klare å gi helsetjenester har tvang i lengre tid vært på dagsorden i flere helseinstanser. Innen tannhelse er det svært få tilgjengelige studier som forteller noe om bruk av tvang under tannbehandling. Det behøves mer kunnskap om tannlegers erfaringer knyttet til bruk av tvang. Hva mener tannleger at er tvang? I hvilke situasjoner er det eventuelt nødvendig å utøve tvang under tannbehandling? Og kan det ha noen konsekvenser for barna? Lik samfunnet for øvrig, er det viktig at også tannhelsetjenesten kartlegger sin egen praksis.

Vi ber derfor om deltakelse i et fokusgruppeintervju hvor temaet vil være «Tannbehandling og eventuell bruk av tvang i Den offentlige tannhelsetjenesten i Hordaland fylkeskommune».

Hva innebærer studien?
Deltakelse i studien innebærer å være med på et fokusgruppeintervju med varighet på 90 minutter. Intervjuet vil innebære spørsmål innen temaet «Bruk av tvang ved tannbehandling av barn». Fokusgruppen skal bestå av ca 5 tannleger og intervjuet vil bli ledet av en moderator og assisteres av en assisterende moderator. Som en del av intervjuet vil du også bli tilbudt lunsjpakke med drikke. Intervjuet vil bli tatt opp på lydbånd slik at innholdet kan analyseres i ettertid. Alle deltagere vil beholde sin anonymitet med unntak av for dem som deltar på samme fokusgruppeintervju.
Intervjuet vil gjennomføres innenfor normal arbeidstid. Reisekostnader vil bli refundert. Dersom du på grunn av avstand blir nødt til å reise utenfor normal arbeidstid, skal det føres som plusstid og kunne tas ut som avspasering.

Hvorfor blir du spurt om å være med?
Du er tilfeldig valgt fra ditt distrikt til å delta i denne studien. Som tannlege i DOT har du en unik kunnskap om hverdagen på en tannklinikk. Du vet hvilke utfordringer tannleger står overfor og du har førstehåndskunnskap om hvordan utfordringer håndteres. Tilbakemeldinger fra tannleger i form av et fokusgruppeintervju, vil gi oss ny kunnskap tannlegers handlinger og holdninger til et tema som er på dagsorden, men som aldri tidligere er diskutert på en vitenskapelig måte. Kunnskap som du har er nødvendig for å kunne videreutvikle tannhelsetjenesten.

Mulige fordeler og ulemper
Ved å sette tvang i helsetjenester i fokus og ved å belyse problemstillingen ved hjelp av arbeidstakernes erfaringer, får vi kunnskap som kan føre til endringer i klinisk praksis. Det anses som en fordel å kunne være med å bidra til slik utvikling.

Deltakerne vil bruke av sin tid på å delta i prosjektet. Det skal derfor tilstrebes i aller høyeste grad at avsatt tid holdes. Reiseutgifter og lunsj vil bli dekket. Intervjuet vil foregå innenfor normal arbeidstid og deltakerne skal ikke belastes ytterligere for å delta.

Personlige erfaringer vil trolig komme frem som en del av fokusgruppeintervjuet. For å ivareta de etiske forholdene rundt det, skal det foreligge informert samtykke for deltakelsen i prosjektet. Mellom alle deltakere og prosjektansvarlige skal det være gjensidig taushetsplikt. Dette innebærer også at deltakerne ikke skal kunne personifiseres i artikler eller andre deler knyttet til prosjektet.

Informasjonen som fremkommer i intervjuet skal ikke under noen omstendigheter kunne brukes mot deltakerne og ved publiseringer skal deltakerne bli informert.

Frivillig deltakelse
Det er frivillig å delta i studien. Dersom du ønsker å delta i prosjektet, undertegner du samtykkeerklæringen på

siste side. Du kan når som helst og uten å oppgi grunn trekke ditt samtykke til deltakelse i prosjektet. Så lenge du kan identifiseres i materialet vi besitter vil opplysninger da anonymiseres.

Hva skjer med informasjonen som kommer frem i intervjuet?
Det vil ikke være mulig å identifisere deg i publikasjoner av studien. Forsvarlig lagring, kryptering og sikkerhetskopiering av lydfilene vil gjøres like etter at intervjuet er gjennomført. Lydfilene vil bli gjennomgått og ordrett nedskrevet og deretter vil informasjon som kommer frem i intervjuet bli analysert. Doktorgradsstipendiaten har ansvar for den daglige driften av forskningsprosjektet og at opplysninger blir behandlet på en sikker måte.

Lydfilene av intervjuet vil bli slettet så snart som mulig og senest innen prosjektslutt 04.08.22.
Det vil ikke bli stilt spørsmål om taushetsbelagte tema. I intervjuet er det tenkelig at det kan komme opp erfaringer om spesifikke pasientkasus. For ivaretagelse av pasientautonomi er det en viktig opplysning at alle som skal delta i intervjuet er ansatt i Den offentlige tannhelsetjenesten og har signert taushetserklæring.

På oppdrag fra Tannhelsetjenestens kompetansesenter Vest/ Hordaland har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:
- Vårt personvernombud: Marianne Seim
- NSD – Norsk senter for forskningsdata AS, på epost (personverntjenester@nsd.no) eller telefon: 55 58 21 17.

Dine rettigheter
Du har følgende rettigheter:
- innsyn i hvilke personopplysninger som er registrert om deg
- få rettet personopplysninger om deg
- få slettet personopplysninger om deg
- få utlevert en kopi av dine personopplysninger (dataportabilitet)
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger

Dersom du etter intervjuet ønsker innsyn i innsamlet data eller analyseprosessen kan du kontakte:
Regina Skavhellen Aarvik – PhD stipendiat
Epost: Regina.Skavhellen.Aarvik@hfk.no Telefon: 922 15 692

Ellen Berggren - Forskningsleder ved Tannhelsetjenestens kompetansesenter Vest/Hordaland Epost: Ellen.Berggreen@hfk.no Telefon: +4798907225

Behandlingsansvarlige institusjon for studien er Tannhelsetjenestens kompetansesenter Vest/ Hordaland, Hordaland Fylkeskommune.
Marianne Seim – Personvernombud i Hordaland fylkeskommune, Epost: Marianne.Seim@hfk.no , Telefon: +4748181652

Hva vil skje dersom du deltar?
Dersom du velger å delta i prosjektet vil du delta på fokusgruppeintervjuet slik som skissert overfor. Du vil få informasjon om tidspunktet og sted for intervjuet og du vil bli møtt av moderator og de andre deltagerne. Det vil bli felles bespisning. Når intervjuet er ferdig er også din deltagelse i studien ferdig.

Tema og problemstillinger som blir diskutert under intervjuet vil benyttes til forskning og vitenskapelige publikasjoner.

Hva vil skje dersom du ikke deltar?
Du velger helt selv om du ønsker å være med på denne studien. Det vil ikke få noen konsekvenser for deg å ikke delta i studien og det vil kun være kjent for prosjektgruppen at du var forespurt om deltagelse i studien.

SAMTYKKE TIL DELTAKELSE I FORSKNINGSPROSJEKT

Fokusgruppeintervju

Ved å signere dette skjemaet samtykker jeg til at informasjonen som kommer frem i fokusgruppeintervjuet kan benyttes i forskning om Tvang ved barnetannbehandling i Den offentligetannhelsetjenesten.

JEG ER VILLIG TIL Å DELTA I PROSJEKTET

Med dette samtykker jeg,_____(fullt navn), til å delta i prosjektet.

Sted og dato

Signatur

_____

Undertegnedes navn med blokkbokstaver

Ta gjerne kontakt dersom du har spørsmål knyttet til studien:

Regina Skavhellen Aarvik
Tannlege, stipendiat
Regina.Skavhellen.Aarvik@hfk.no Tlf: 92 21 56 92

Veiledere:

Maren Lillehaug Agdal
Pedodontist, PhD
maragda@hfk.no
Tlf: 550337600

Edel Jannecke Svendsen
Pediatrisk sykepleier, PhD

Appendix III

INVITASJON TIL Å DELTA I FORSKNINGSPROSJEKT:
Bruk av tvang ved tannbehandling av barn

I tannhelsetjenesten gjennomføres det for tiden et forskningsprosjekt hvor vi ønsker informasjon om temaet "Bruk av tvang ved tannbehandling av barn". Du som er f.2002 eller foresatte og barn f.2010 er derfor invitert til å svare på denne spørreundersøkelsen. Den handler om dine besøk på tannklinikken og ditt forhold til tannhelsetjenesten. Det er svært nyttig for oss å få opplysninger om våre pasienters erfaringer. På denne måten kan du være med på å forbedre og videreutvikle tannhelsetjenesten.

Utfyllende informasjon om studien finner du på neste side. Spørreundersøkelsen anslås å ta ca 10 minutter.

Svar så godt du kan på spørsmålene vi stiller. Noen steder kan det være du ikke har opplevd det vi spør om, og da er det fint om du kan prøve å tenke deg til at du er i situasjonen.

Vi er svært takknemlig for ditt/ditt barns svar!

Deltakelse i undersøkelsen gir deg mulighet til å bli med i trekningen om å vinne en IPAD!

Med vennlig hilsen

Regina Skavhellen Aarvik
Tannlege og PhD-stipendiat
Tannhelsetjenestens kompetansesenter Vest avd. Hordaland/Universitetet i Oslo

Maren Lillehaug Agdal
Pedodontist, PhD
Tannhelsetjenestens kompetansesenter Vest avd. Hordaland

Edel Jannecke Svendsen
Pediatrisk sykepleier, PhD
Universitetet i Oslo

UTFYLLENDE INFORMASJON OM STUDIEN

BAKGRUNN OG HENSIKT

Denne henvendelsen går til deg som er født i 2002 eller som er foresatt til et barn født i 2010. Pasientmedvirkning er på dagsorden i helsetjenester. For å kunne tilby gode tjenester behøves kunnskap om pasientenes subjektive opplevelse av medvirkning og ivaretakelse under undersøkelse og tannbehandling. Vi vet at gode opplevelser gir mestringsfølelse, mens dårlige opplevelser kan være negativt for evnen til å mestre tannbehandling. For å utvikle tannhelsetjenesten behøves kunnskap om pasienters erfaringer i Den offentlige tannhelsetjenesten (DOT). Ved Senter for Odontofobi ved Tannhelsetjenestens kompetansesens kompetansesenter Vest jobber vi for at barn ikke skal være redde for å gå til tannlegen. Vi behandler barn som har utviklet høy frykt for tannbehandling og bedøvelse og vi underviser tannhelsepersonell slik at barn og ungdom blir møtt på en god måte i den offentlige tannhelsetjenesten. Ved denne undersøkelsen vil vi se om barnets erfaringer i tannhelsetjenesten har sammenheng med utvikling av frykt.

HVA INNEBÆRER STUDIEN?

Ungdom f.2002

Alle ungdommer født i 2002 i Hordaland vil bli spurt om å delta i studien. Studien vil bestå av 2 deler. Den første delen innebærer å svare på en spørreundersøkelse om dine erfaringer under undersøkelse og tannbehandling og om din subjektive opplevelse. Spørreundersøkelsen anslås å ta 10 minutter. Undersøkelsen i seg selv er anonym. Med dette menes at det ikke vil stilles spørsmål som vil kunne identifisere deltakerne som enkeltpersoner. Vi vil også ved bruk av SurveyXact (programvare for spørreundersøkelser) benytte en anonym løsning, hvilket tilsier at IP-adresser eller annen nettidentifikator ikke vil kunne knyttes til besvarelsen i undersøkelsen. På slutten av undersøkelsen vil vi imidlertid be om ditt samtykke til å få tilgang fra tannlegens og tannpleierens journalføring av behandlingen du har fått. Samtykke gir du ved å fylle ut navn og fødselsdato før du sender inn undersøkelsen. Dette vil være valgfritt. Dette innebærer at det kun er de deltakerne som ønsker å gi sitt samtykke til journalinnsyn som det vil innhentes personopplysninger om. Den andre delen innebærer gjennomgang av tannlegens og tannpleierens journalføring av behandlingen du har fått. Vi vil undersøke om tannlegen beskriver samarbeidet med deg under behandlingen, hvilken tannbehandling du har fått og hvor mange timer du har fått fra din tannklinikk. Informasjonen fra din journal vil være anonymisert slik at den aldri kan kobles til ditt navn. På slutten av studiens del 1 vil vi be om ditt samtykke til å få utføre studiens del 2.

Barn f.2010

Alle barn født i 2010 vil bli spurt om å delta i studien. For barn født i 2010 innebærer studien en spørreundersøkelse om barnets erfaringer og subjektive opplevelse under undersøkelse og tannbehandling. Denne bes foresatte fylle ut sammen med barnet. Spørreundersøkelsen anslås å ta 10 minutter. Undersøkelsen i seg selv er anonym. Med dette menes at det ikke vil stilles spørsmål som vil kunne identifisere deltakerne som enkeltpersoner. Vi vil også ved bruk av SurveyXact (programvare for spørreundersøkelser) benytte en anonym løsning, hvilket tilsier at IP-adresser eller annen nettidentifikator ikke vil kunne knyttes til besvarelsene i undersøkelsen.

INFORMASJON TIL ALLE

Rambøll er leverandør av det elektroniske spørreskjemaet. Den anonyme informasjonen som fremkommer i undersøkelsen, vil benyttes i forskningsprosjektet og til vitenskapelige publikasjoner. Etter undersøkelsen er innsendt kan du være med i trekningen av en IPAD. For at vi skal kunne kontakte vinneren må du skrive ditt telefonnummer i en egen link som blir tilgjengelig når spørreundersøkelsen er sendt inn. Telefonnummeret er personlig informasjon om deg som vil lagres på datasikkert område. Nummeret vil ikke kunne kobles til din besvarelse.

HVORFOR BLIR DU/DITT BARN SPURT OM Å DELTA?

Du/ditt barn har erfaringer fra undersøkelse og evt tannbehandling. Det er nyttig kunnskap for oss for å kunne vurdere kvaliteten av tjenestes som tilbys og for å kunne videreutvikle DOT. Bruk av tvang er på dagorden i samfunnet for øvrig og spesielt i en rekke helsetjenester. Til i dag har det ikke vært undersøkt brukernes erfaringer i tannhelsetjenesten. Tilbakemeldinger fra både redde og ikke redde barn vil gi oss mer kunnskap om hvordan tannhelsetjenestene leveres har konsekvenser for barnet. Slik kunnskap er nødvendig for å kunne utvikle tannhelsetjenesten. I denne studien ønsker vi å undersøke om tvang ved tannbehandling har konsekvenser for barnet. Barn født i 2010 og 2002 er inkludert i studien fordi vi ønsker å se om det er om samfunnsdebatten om tvang i helsetjenester har resultert i endret klinisk praksis.

MULIGE FORDELER OG ULEMPER

Ved å sette tvang i helsetjenester i fokus og ved å belyse problemstillingen ved hjelp av brukernes erfaringer, får vi kunnskap som kan føre til endringer i klinisk praksis. Det anses som en fordel å kunne være med å bidra til slik utvikling. Spørsmål om minner fra opplevelser som kan ha vært vanskelig for barnet, vil i noen tilfeller føles ubehagelig for barnet. At deltakerne ikke er i tannbehandlingssituasjonen når spørsmålene blir stilt vil trolig redusere et eventuelt ubehag.

FRIVILLIG DELTAKELSE

Det er frivillig å delta i studien og du kan når som helst og uten å oppgi noen grunn trekke ditt samtykke til at du eller barnet ditt deltar i studien. Dersom du velger å trekke ditt samtykke vil opplysninger om deg slettes så lenge opplysningene ikke allerede er anonymisert og derfor ikke kan identifiseres. Dette vil ikke ha noen konsekvenser for oppfølging i Den offentlige tannhelsetjenesten. Vi behandler opplysninger om deg basert på ditt samtykke. Med opplysninger om deg menes som nevnt tidligere opplysninger om ungdom f.2002 som ønsker å oppgi navn og fødselsdato. Vi vil ikke behandle opplysninger om øvrige deltakere.

HVA SKJER MED INFORMASJONEN OM BARNET?

Opplysninger som registreres om ungdom f.2002 skal kun brukes slik som beskrevet i hensikten med studien. Du har rett til innsyn i hvilke opplysninger som er registrert om barnet ditt og rett til å få korrigert eventuelle feil i opplysninger som er registrert. For ungdom f.2002 som i undersøkelsen skriver navn og fødselsdato og som dermed samtykke til tilgang på journalopplysninger vil det lagres en koblingsnøkkel. Listen vil bli lagret på bruksområdet til prosjektansvarlige i sikkert område i fylket sitt intranett. Det sikre området er området hvor journalsystemet er plassert. Kun autorisert personell knyttet til prosjektet (prosjektleder og PhD stipendiat) vil kunne koble deltagere til spørreundersøkelsen. Når informasjon fra journaler er innhentet vil koblingsnøkkelen makuleres slik at opplysninger vil være anonymisert. Det vil ikke være mulig å identifisere deltagere i publikasjoner av studien. Prosjektleder har ansvar for den daglige driften av forskningsprosjektet og at opplysninger blir behandlet på en sikker måte.

På oppdrag fra Tannhelsetjenestens kompetansesenter Vest/ Hordaland har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

DINE RETTIGHETER

For barn født i 2010 vil det ikke være mulig å koble barnets navn og innsamlet data. Derfor kan ikke innkomne opplysninger for et enkelt barn slettes. Dette gjelder tilsvarende for ungdom f.2002 som i undersøkelsen ikke skriver navn og fødselsdato, og som dermed ikke samtykker til tilgang til journalopplysninger. Ungdommer født i 2002 som oppgir navn og fødselsdato som samtykke for tilgang til journalopplysninger, kan få slettet eller utlevert kopi av innsamlet data i perioden det foreligger en koblingsnøkkel mellom navn og innsendt data fra spørreundersøkelsen. I denne perioden vil vedkommende også ha rett til innsyn og retting av sine opplysninger, samt rett til å klage til personvernombudet og datatilsynet om behandlingen av sine personopplysninger. Personopplysninger vil bli anonymisert fortløpende og seinest innen 04.08.2022.

Behandlingsansvarlig institusjon for studien er Tannhelsetjenestens kompetansesenter Vest/ Hordaland, Hordaland Fylkeskommune.

DERSOM DU SENERE HAR SPØRSMÅL OM STUDIEN KAN DU KONTAKTE

Ellen Berggren - Forskningsleder ved Tannhelsetjenestens kompetansesenter Vest/Hordaland, Epost: Ellen.Berggreen@hfk.no , Telefon: +4798907225
Maren Lillehaug Agdal – Prosjektansvarlige, Epost: maragda@hfk.no , Telefon: +4791703505
Marianne Seim – Personvernombud i Hordaland fylkeskommune, Epost: Marianne.Seim@hfk.no , Telefon: +4748181652

HVOR KAN JEG FINNE UT MER?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:
Vårt personvernombud: Marianne Seim eller NSD – Norsk senter for forskningsdata AS, på epost (personverntjenester@nsd.no) eller telefon (55 58 21 17)

Appendix IV

SPØRREUNDERSØKELSE

Hvilket kjønn er du?

- ❑ Jente
- ❑ Gutt
- ❑ Hen

Hvilket årstall er du født?

- ❑ 2002
- ❑ 2010

Hvor mange søsken har du?

- ❑ Ingen
- ❑ En
- ❑ To
- ❑ Tre
- ❑ Fire eller flere

Hvor redd er du (barnet/ungdom) i følgende situasjoner? Prøv å tenke deg at du er i situasjonene.

	Ikke redd i det hele tatt	Bare litt redd	Ganske redd	Svært redd	Livredd
Hvor redd er du for tannlegen?	❑	❑	❑	❑	❑
Hvor redd er du for doktoren?	❑	❑	❑	❑	❑
Hvor redd er du for å få sprøyte eller bedøvelse?	❑	❑	❑	❑	❑
Hvor redd er du når noen undersøker munnen og tennene dine?	❑	❑	❑	❑	❑
Hvor redd er du når du gaper hos tannlegen?	❑	❑	❑	❑	❑
Hvor redd er du når noen du ikke kjenner berører deg?	❑	❑	❑	❑	❑
Hvor redd er du når noen du ikke kjenner ser på deg?	❑	❑	❑	❑	❑
Hvor redd er du når tannlegen borer i tennene dine?	❑	❑	❑	❑	❑
Hvor redd er du når du ser tannlegen bore i tennene til en annen?	❑	❑	❑	❑	❑

	Ikke redd i det hele tatt	Bare litt redd	Ganske redd	Svært redd	Livredd
Hvor redd er du når du hører tannlegeboret?	❑	❑	❑	❑	❑
Hvor redd er du når noen holder et instrument inni munnen din?	❑	❑	❑	❑	❑
Hvor redd er du for å kveles eller sette noe i halsen?	❑	❑	❑	❑	❑
Hvor redd er du for å måtte innlegges på sykehus?	❑	❑	❑	❑	❑
Hvor redd er du for personer med hvite lege-eller tannlegeklær?	❑	❑	❑	❑	❑
Hvor redd er du når tannlege eller tannpleier pusser tennene dine?	❑	❑	❑	❑	❑

Prøv å krysse av for det du har følt eller opplevd. Hvis det ikke gjelder deg, kan du krysse "aldri".

	Aldri	En eller to ganger	Noen få ganger	Ofte	Nesten alltid
Tannleger bryr seg ikke om at jeg trenger en pause	❑	❑	❑	❑	❑
Tannleger er mer opptatt av å få jobben gjort enn hvordan jeg har det	❑	❑	❑	❑	❑
Tannleger tar ikke redselen min alvorlig	❑	❑	❑	❑	❑
Jeg er redd tannlegen vil gjøre narr av at jeg er redd	❑	❑	❑	❑	❑
Når jeg sitter i tannlegestolen føler jeg meg hjelpeløs (mangler kontroll)	❑	❑	❑	❑	❑
Hvis jeg sa til en tannlege at det gjør vondt, tror jeg ikke han/hun ville stoppet og gjort noe med det	❑	❑	❑	❑	❑
Jeg har opplevd at tannlegen ikke har trodd meg når jeg har sagt at det gjorde vondt	❑	❑	❑	❑	❑
Når jeg sitter i tannlegestolen, tror jeg tannlegen gjør det han/hun vil uten å lytte til meg	❑	❑	❑	❑	❑

Er du redd for tannbehandling?

- ❑ Ikke i det hele tatt
- ❑ Liten grad
- ❑ I verken stor eller liten grad
- ❑ I stor grad
- ❑ I veldig stor grad

Hva kan være årsaken(e) til at du er redd for tannbehandling? Kryss av for det som passer deg best. Tannbehandling kan være tannpuss, tannstensrens, boring, tannfjerning eller andre ting man kan gjøre på tannlegekontoret.

	Ja	Nei	Vet ikke
For meg har det har alltid vært greit å gå til tannlegen	❑	❑	❑
Jeg har alltid vært redd, er redd for andre ting også	❑	❑	❑
Jeg har hørt andre fortelle om at de er redde for tannlege	❑	❑	❑
Jeg har hørt andre fortelle om at de er redd for sprøyte	❑	❑	❑
Tannbehandling har gjort meg redd for å gjøre mer tannbehandling	❑	❑	❑
Følelsen jeg får når jeg er på tannklinikken har gjort meg redd for å gå til tannlegen	❑	❑	❑
Jeg har følt meg overtalt/presset på en måte som gjorde at jeg ikke klarte å si nei	❑	❑	❑
Jeg har blitt holdt fast mot min vilje under tannbehandling av en som fulgte meg	❑	❑	❑
Jeg har blitt holdt fast mot min vilje under tannbehandling av en som jobbet på tannklinikken	❑	❑	❑
Etter tannbehandling har jeg tenkt at tannlegen lurte meg	❑	❑	❑
Jeg har forsøkt å unngå tannbehandling ved å forsøke å dytte bort utstyr eller mennesker	❑	❑	❑

	Ja	Nei	Vet ikke
Jeg har gått ut fra tannklinikken før behandlingen var ferdig fordi jeg ikke klarte å få tannbehandling	❑	❑	❑

Svar det som passer deg best på spørsmålene.

	Ikke i det hele tatt	Liten grad	I verken stor eller liten grad	I stor grad	I veldig stor grad
Er du fornøyd med tannbehandlingen du har fått av tannklinikken?	❑	❑	❑	❑	❑
Føler du at tannlegen informerer deg om behandlingen som skal gjøres?	❑	❑	❑	❑	❑
Føler du at tannlegen stopper når du gir tegn til at tannlegen skal stoppe?	❑	❑	❑	❑	❑
Føler du at tannlegen hjelper deg til at du skal klare tannbehandlingen?	❑	❑	❑	❑	❑
Har du hatt lyst til å flykte fra tannbehandlingssituasjonen?	❑	❑	❑	❑	❑
Har du følt deg presset til tannbehandling på en slik måte hvor du ikke klarte å si nei?	❑	❑	❑	❑	❑
Er du fornøyd med måten tannklinikken (Den offentlige tannhelsetjenesten) møter deg på?	❑	❑	❑	❑	❑

Har du fått avslappende medisin før tannbehandling?

- ❑ Ja
- ❑ Nei
- ❑ Vet ikke

Ta stilling til følgende påstander og grader svaret

	Ikke i det hele tatt	Liten grad	I verken stor eller liten grad	I stor grad	I veldig stor grad
Opplever du at avslappende medisin har gjort det lettere for deg å få tannbehandling?	❑	❑	❑	❑	❑
Føler du at avslappende medisin har gjort det vanskelig for deg å si nei under tannbehandling?	❑	❑	❑	❑	❑
Husker du tannbehandlingen du fikk da du fikk avslappende medisin?	❑	❑	❑	❑	❑

Dette handler om bedøvelse hos tannlegen. Prøv å tenke deg at du er i disse situasjonene, også selv om du ikke har opplevd det. Svar det som passer deg best.

	Ikke redd i det hele tatt	Bare litt redd	Ganske redd	Veldig redd	Livredd	Vet ikke
Hvor redd er du når tannlegen sier du trenger en bedøvelsessprøyte?	❑	❑	❑	❑	❑	❑
Hvor redd er du når du kjenner stikket av bedøvelsessprøyten i munnen?	❑	❑	❑	❑	❑	❑
Hvor redd er du når tannlegen smører på bedøvelsessalve på tannkjøttet?	❑	❑	❑	❑	❑	❑
Hvor redd er du for selve bedøvelsesvæsken (bedøvelsesmiddelet)?	❑	❑	❑	❑	❑	❑
Hvor redd er du når du ser bilde av en person som får bedøvelse hos tannlegen?	❑	❑	❑	❑	❑	❑
Hvor redd er du når du hører noen fortelle at de har fått bedøvelse hos tannlegen?	❑	❑	❑	❑	❑	❑
Hvor redd er du for at stikket skal være veldig smertefullt?	❑	❑	❑	❑	❑	❑

	Ikke redd i det hele tatt	Bare litt redd	Ganske redd	Veldig redd	Livredd	Vet ikke
Hvor redd er du når du sitter i tannlegestolen og snart skal få en bedøvelsessprøyte?	❑	❑	❑	❑	❑	❑
Hvor redd er du når du kjenner at du blir nummen (bedøvet)?	❑	❑	❑	❑	❑	❑
Hvor redd er du for at bedøvelsen ikke skal virke?	❑	❑	❑	❑	❑	❑
Hvor redd er du når du ser nålen på en bedøvelsessprøyte?	❑	❑	❑	❑	❑	❑
Hvor redd er du når du ser bilde av en tannlegesprøyte?	❑	❑	❑	❑	❑	❑

Har du opplevd å bli holdt fast mot din vilje under tannbehandling?

- ❑ Ja
- ❑ Nei
- ❑ Vet ikke

Har du opplevd å bli holdt fast mot din vilje under tannbehandling flere ganger?

- ❑ Ja
- ❑ Nei
- ❑ Vet ikke

I hvilken situasjon har du blitt holdt fast mot din vilje under tannbehandling?

	Ja	Nei	Vet ikke
Jeg hadde vondt i en tann og kontaktet derfor tannklinikken for å få hjelp	❑	❑	❑
Jeg slo en tann/tenner og tannlegen måtte behandle det	❑	❑	❑
Tannlegen sa jeg trengte tannbehandling	❑	❑	❑
Når jeg forsøkte å komme meg bort fra tannlegestolen	❑	❑	❑
Når jeg ikke klarte å sitte i tannlegestolen	❑	❑	❑
Da jeg hadde fått medisin for å bli trøtt(avslappende medisin)	❑	❑	❑

	Ja	Nei	Vet ikke
Annen situasjon	❑	❑	❑

Vet du ca hvor gammel du var da/første gang du ble holdt fast og fikk tannbehandling mot din vilje?

- ❑ 0
- ❑ 1
- ❑ 2
- ❑ 3
- ❑ 4
- ❑ 5
- ❑ 6
- ❑ 7
- ❑ 8
- ❑ 9
- ❑ 10
- ❑ 11
- ❑ 12
- ❑ 13
- ❑ 14
- ❑ 15
- ❑ 16
- ❑ 17
- ❑ Vet ikke

Vet du ca hvor gammel du var siste gang du ble holdt fast og fikk tannbehandling mot din vilje?

- ❑ 0
- ❑ 1
- ❑ 2
- ❑ 3
- ❑ 4
- ❑ 5
- ❑ 6
- ❑ 7
- ❑ 8
- ❑ 9
- ❑ 10
- ❑ 11
- ❑ 12
- ❑ 13
- ❑ 14
- ❑ 15
- ❑ 16
- ❑ 17
- ❑ Vet ikke

[Til alle f.2002:]

Hva heter du (fullt navn) og når er du født (fødselsdato)? Ved å fylle inn den informasjonen så samtykker du (ref. info. side 2) til at vi kan gå inn i journalen din for å lese hva tannlegen(e) og tannpleier(ene) har skrevet om dine besøk på tannklinikken. Dersom du ikke samtykker til det kan du trykke "neste" uten å fylle inn noe.

Tusen takk for at du deltok i denne spørreundersøkelsen. Det er til stor hjelp for videre utvikling og forbedring av Den offentlige tannhelsetjenesten i Hordaland.

For å være med i trekningen av en iPad ber vi deg fylle inn mobilnummeret ditt via denne lenken: https://www.survey-xact.dk/LinkCollector?key=QH1PGPSKL5C5