

# Physiotherapy in patients with knee osteoarthritis

## Clinical practice compared to findings from systematic reviews

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## Foreword

I was introduced to evidence-based practice for the first time in the middle of the 1990s by Arild Bjørndal and Andy Oxman who were my mentors at The National Institute for Public Health in Oslo. My job at the institute at that time was to run a course in public health for physiotherapists. However, following the introduction of evidence-based practice and with the growing activity within our unit on systematic reviews and implementation research, the course turned its focus towards evidence-based practice and evidence-based policy. My own interests also changed, from public health to clinical epidemiology, methodology and teaching evidence-based practice. During the years that followed, I spent a lot of time promoting the uptake of research into practice by different activities. Through changing work settings and arenas, we discussed the concept and implications of evidence-based practice with students, clinicians, policy makers and teachers, and we were challenged by scepticism and discussion about the strengths and weaknesses of the concept. I learnt methodology and the value of summarising evidence by writing Cochrane reviews, and I was inspired by the culture of learning, support and sharing within our unit, and with colleagues internationally.

The driving force during these years was the underlying assumption that knowledge from research should be used by clinicians and health policy makers in decisions about the care of individual patients, and in the delivery of health services.

Sometimes, during this time clinicians asked me; “How do I know whether my practice for a specific condition is evidence-based?” I often found it hard to respond clearly because clinical practice, especially in primary care is complex. From a physiotherapist’s perspective it is also hard because physiotherapy often involves the use of several treatment modalities, combinations and doses, as well as treatments within different contexts and settings. I realised that measuring whether physiotherapy practice was evidence-based or not was challenging. Still, given all my effort in promoting evidence-based practice, I felt I ought to be able to answer such questions raised by clinicians. Also because measuring practice and performance are essential parts of quality improvement, these questions formed the background for this project.

## **Acknowledgements**

There are many people I would like to express my gratitude to for their help and encouragement.

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Kristin Thuve Dahm, the project coordinator, deserves a special thanks and recognition. Without her positive attitude, humour and help throughout this project it would never have been finalised. She helped develop and pilot the data-collection form, recruit and follow up participants and contributed to the analysis and interpretation of results. I thank her for many fruitful and fun discussions about physiotherapy practice.

I owe a special note of gratitude to my co-supervisor Inger Holm for her guidance and for keeping me on the track. Her experience and engagement in physiotherapy research and clinical work, as well as her interest in management of knee osteoarthritis, has been of great importance to fulfil the aims of the project.

A big and warm thanks goes to Kåre Birger Hagen, my close colleague for ten years and my best friend. The methodological discussions and his support to this work have been of great value. His capability to be totally present, focused and sometimes a bit slow has helped me take deep breaths, step back and try new angles.

I am also grateful to my other co-authors for important input and contributions. To Anne Christie, Rikke H. Moe and Espen Haavardsholm who developed our methods for overviews, to Sarah Rosenbaum for helping me realise that design can contribute to health service research and that it is important for knowledge translation and to Jan Odegaard-Jensen for his help with statistics.

Thanks to Arild Bjørndal, my mentor through these years, for introducing me to evidence-based practice and teaching. It has been fun and a privilege to work with him. I also would

like to thank Andy Oxman for inspiration, for helping me develop methodological skills in systematic reviews and for opening doors to international collaboration and friendship.

Many thanks to John-Arne Røttingen, director of the Norwegian Knowledge Centre for the Health Services, for his support and for understanding the need for sharing research with other work responsibilities. I also would like to thank Liv Merete Reinart for her support, as well as friends and colleagues at NOKC. Monica W. Nortvedt, head of Centre for Evidence-Based Practice at Bergen University College also deserves my gratitude for encouragement and valuable discussions both in Bergen and in Spain.

Thanks to Saga Høgheim for helping me enter the data and to Julia Tavridou for developing an appealing and user-friendly design of the data collection form.

The Norwegian Physiotherapists Association kindly allowed me to use their membership register and also helped to establish the group of clinicians that contributed through several steps of the project. Thanks to Irma Brandeggen Blaker, Ragnhild Carlsen, Bjørn Fossan, Hans Petter Faugli, Turid Høysveen, Per Indredavik, Solveig Melby, Aleksander Persen, Kjetil Sandsten, Karl-Fredrik Skjørshammere and Jon Vikne. Thanks to the Norwegian physiotherapists who actively participated in the study and to Margreth Grotle for feedback to the manuscripts.

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Finally, I would like to thank my friends and my family, particularly my sons Ola and Paal for their patience, smiles and love. Thank you for reminding me that life is more than research and evidence. And for helping me remember that things like climbing mountains, laughter, morning swims followed by coffee with my dear sister Anne, travelling and friendship are what make it rich.

## Sammendrag

Omfanget av klinisk forskning i fysioterapi øker, men det har vært lite fokus på prosjekter som beskriver praksis, og som vurderer praksis i forhold til eksisterende forskningsbasert kunnskap eller faglige retningslinjer.

Formålet med denne studien er å beskrive og vurdere fysioterapipraksis til pasienter med kneleddsartrose. Delmål er å oppsummere forskning fra systematiske oversikter om effekt av fysioterapitiltak til pasienter med kneleddsartrose, sammenligne praksis med funnene fra denne oversikten, samt å forsøke å forklare variasjon i praksis. Vi ønsket også å finne ut om et lite incitament ville øke svarprosenten i studien.

Undersøkelsen ble gjennomført i privat fysioterapipraksis. Klinikere deltok i utvikling av et skjema som ble benyttet til å rapportere praksisdata i studien. Hver fysioterapeut rapporterte funn, mål og 12 gangers behandling til en pasient med kneleddsartrose. Datainnsamlingen pågikk fra august 2006 til mai 2007.

Resultatene baserer seg på data fra 297 behandlingsforløp. Det viktigste målet med behandlingen var å redusere smerte og øke muskelstyrke. Øvelser ble brukt i nesten alle behandlingene, og dette understøttes av forskning av høy kvalitet som sier at øvelser reduserer smerte og bedrer funksjon hos pasientene med kneleddsartrose. Transcutaneous electrical nerve stimulation (TENS), laser eller akupunktur, som sannsynligvis kan redusere smerte (støttes av forskning av moderat kvalitet), ble benyttet av mindre enn 25% av terapeutene. Fysioterapeutene brukte i gjennomsnitt fire ulike tiltak for hver pasient. Halvparten av fysioterapeutene brukte massasje, traksjon/mobilisering og tøyning hvor det ikke foreligger forskning om effekt fra systematiske oversikter. Som konklusjon kan vi si at noen av tiltakene som fysioterapeutene benytter til pasienter med kneleddsartrose er i samsvar med det vi vet om effekt av tiltak fra systematiske oversikter, men de benytter også tiltak som har usikker effekt. Vi fant ingen sammenheng mellom pasientkarakteristika, slik som smerte eller alvorlighetsgrad og bruk av tiltak som massasje, råd om vektreduksjon eller bruk av TENS, laser eller akupunktur. En sjokoladeplate økte ikke svarprosenten.



## List of papers

- I. Jamtvedt G, Dahm KT, Christie A, Moe RH, Haavardsholm E, Holm I, Hagen KB. Physical Therapy Interventions for Patients With Osteoarthritis of the Knee: An Overview of Systematic Reviews. *Phys Ther* 2008;88:123–36.
- II. Jamtvedt G, Dahm KT, Holm I, Flottorp S. Measuring physiotherapy performance in patients with osteoarthritis of the knee: a prospective study. *BMC Health Services Research* 2008;8:145.
- III. Jamtvedt G, Dahm KT, Holm I, Odegaard-Jensen J, Flottorp S. Explaining variation in physiotherapy practice for patients with knee osteoarthritis. Submitted.
- IV. Jamtvedt G, Rosenbaum S, Dahm KT, Flottorp S. Chocolate bar as an incentive did not increase response rate among physiotherapists: a randomised controlled trial. *BMC Res Notes* 2008;1:34.



## Introduction

### ***Evidence-based physiotherapy***

Evidence-based physiotherapy is physiotherapy informed by relevant, high quality clinical research (1). The term clinical research is used to mean research on patients, conducted in clinical settings (1). This type of research differs from basic research as formulated in the report “Commitment to research” to the Norwegian Storting in 2004 (2): “Applied research is aimed at specific practical goals or applications, while basic research observes phenomena or facts without focusing on any particular use”. However, good physiotherapy practice should be based on more than clinical research alone. Into the decision making process, physiotherapists and patients bring a range of values, preferences, experiences and knowledge. The practice of evidence-based physiotherapy should also be based on patients` preferences and knowledge, and physiotherapists` clinical experience and practice knowledge (fig 1).

### Evidence-Based Practice

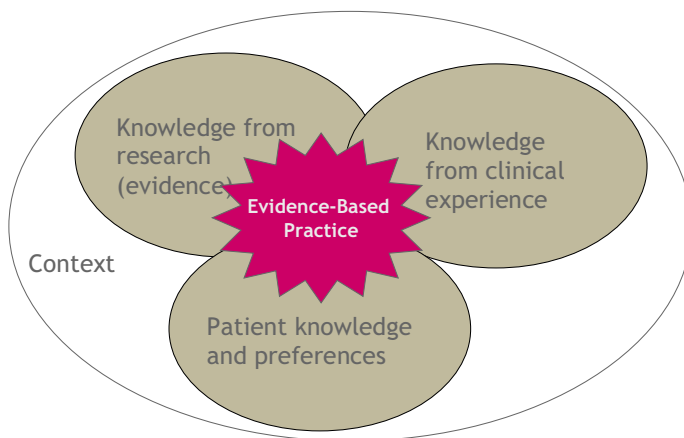


Fig 1. The model of evidence-based practice (3)

This definition of evidence-based physiotherapy implies that the term should be reserved only for physiotherapy practice that is supported by high quality clinical research. Some definitions have considered evidence-based practice as the use of “best available evidence” which could include high quality clinical research or, where such evidence is not available, lower quality clinical research, consensus views and clinical experience (4;5). However, in line with the

first definition above, the most frequently used definition of evidence-based medicine formulated by Dave Sackett (6) states that the best available evidence should be systematic research; “Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research”.

Knowledge from clinical research arises from clinical questions and includes both qualitative and quantitative studies. Such studies might cover questions regarding the interactions and experiences between therapists and patients, as well as studies of aetiology, diagnosis, outcome measures and effects of interventions. All types of study can contribute to evidence-based physiotherapy (1).

If “evidence is knowledge produced by research” (7), practice knowledge, clinical experience and clinical expertise are, usually, developed through clinical work. Gordon Guyatt suggests that “clinical expertise can be seen as the ability to integrate research evidence and patients` circumstances and preferences to help patients arrive at an optimal decision” (8). Practice is also influenced by contextual factors such as local health needs, service configurations and case mix (9), as well as clinical skills and cultural factors (1). Practice should never be interpreted out of context and without taking account of such variation.

Practising evidence-based physiotherapy involves the following steps: identify uncertainty, formulate questions, search for information, critically appraise evidence, apply evidence and evaluate performance (1). Practitioners will not always follow all the steps, but will use pre-appraised sources, such as guidelines, synopses and systematic reviews (8;10;11). A systematic review is a review based on a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review (12). Statistical methods (meta-analysis) may or may not be used to analyse and summarise the results (12). The use of explicit, systematic methods in reviews limits the risk of bias (systematic errors) and reduces chance effects, thus providing more reliable results upon which to draw conclusions and make decisions (13). With the increasing number of journal articles being published each year, systematic reviews are being used as a way to obtain an objective summary of a large amount of evidence. A suggested annual publication rate of systematic reviews in 2004 was about

2 500, including more than 33 700 separate studies and one-third of a million study participants (14). Meta-analysis can provide more precise estimates of the effects of healthcare than those derived from the individual studies included in a review (15). Various stakeholders, including clinicians, guideline developers and patients use systematic reviews and meta-analyses as the main sources of relevant high quality clinical research. In addition, meta-analyses are frequently the most cited reports in journal articles (16). According to the GRADE system (17) , the quality of evidence from systematic reviews can be graded as high, moderate, low or very low. High quality of the evidence indicates that further research is very unlikely to change our confidence in the estimate of effect (17). Guidelines are “Systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific circumstances” (18). Systematic reviews should be the core element of evidence-based clinical guidelines (19). The strength of a recommendation in a clinical guideline reflects the extent to which we can be confident that desirable effects of an intervention outweigh undesirable effects. The strength of recommendation is determined by the balance between desirable and undesirable consequences of alternative management strategies, quality of evidence, variability in values and preferences, and resource use (20).

The pyramid, as illustrated by the 4S model in figure 2 (11), reflects the classification, trustworthiness and the usefulness of information sources for clinicians and decision makers; the individual study, the systematic review of all the available studies on a given topic, a synopsis of both individual studies and summaries, and systems of information. By systems, we mean summaries that link a number of synopses related to the care of a particular patient (11).

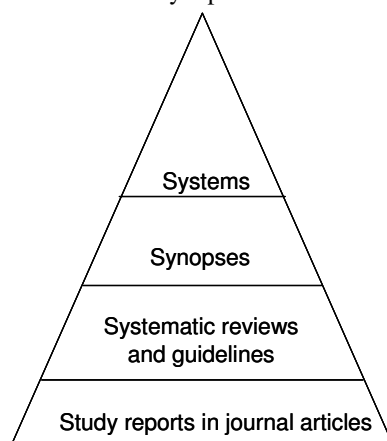


Fig 2. The 4S model of different information sources (11).

The definition of evidence-based physiotherapy implies that high quality clinical research is essential for evidence-based physiotherapy, but it is not enough for making well informed decisions. The model also implies that, even where high quality clinical research exists in a particular area, variation in practice might be justified because of patient preferences or clinical judgement. Because it can be challenging to apply evidence from systematic reviews and guidelines to individual patients, it is not always feasible, or even desirable, to adhere strictly to high quality clinical research or to guideline recommendations (21;22). The quality of evidence used in developing clinical guidelines is often far from perfect. Even if there is high quality evidence, it can still be difficult to assess whether the benefits of the treatment outweigh the harms and justify the costs, when considering all the outcomes that are relevant to individual patients.

The concept of evidence-informed patient choice underlines this approach. It “involves providing people with research-based information about the effectiveness of healthcare options and promoting their involvement in decisions about their treatment” (23). It brings together the two concepts of evidence-based healthcare and patient-centred medicine (24). Clinicians should understand and discuss the advantages and disadvantages of the treatment options with their patients, and be able to present evidence. It is important to discuss the different roles when advocating shared decision-making in physiotherapy because this might help to clarify the domains that are suitable for a shared decision-making approach (25). There are clearly several areas, such as in paediatric care (25), where the concept of shared decision-making is more complex.

Teachers of evidence-based practice have developed a new definition of evidence-based practice that takes into account informed decision making: “Evidence-based practice requires that decisions about health care are based on the best available, current, valid and relevant evidence. These decisions should be made by those receiving care, informed by the tacit and explicit knowledge of those providing care, within the context of available resources” (26). This new definition put a strong emphasis on consumer involvement. Some might argue that this definition goes too far, as it states that the decisions are made by those receiving care, and not as a shared decision between the patient and the practitioner. When providing evidence-based care, clinicians must balance knowledge from research with knowledge from other sources.

## ***Measuring performance and identifying determinants of practice***

Assessing whether practice is evidence-based, is closely linked to measuring performance. Measuring performance refers to the measurement of actual clinical practice and comparing it to desired clinical practice (27). The aim of measuring performance is to determine how well health care professionals are performing, and whether they need to improve their practice (28;29). Measurement can be used for learning and developing, quality improvement, making informed choices, accountability, contracting, and regulation (9). Often, a summary of clinical performance collected over a specified period of time is provided to individual professionals or to groups, and is called audit and feedback. Audit and feedback can improve professional practice although the improvements are generally small (30). Measuring performance is essential for assessing the quality of health care and, combined with identifying determinants of clinical practice, it can help policy makers and researchers to plan and evaluate quality improvement interventions (21;27).

A simple definition of quality in health care is: “Doing the right things right to the right people at the right time” (31). However, it has been estimated that only 55 percent of the population in US receives recommended care (32), and compliance with guidelines could be improved (33). Worldwide health authorities and health professionals have developed strategies for quality improvement to address concerns about health care quality (34;35). Many strategies focus on six dimensions of quality in healthcare first proposed by The Institute of Medicine in North America (36). These are safety, effectiveness, patient centeredness, timeliness, efficiency and equity. These have been widely accepted, including by the Norwegian and the Scottish quality improvement strategy (35;37). All dimensions are important for the quality of care, and it could be argued that all of them are, in some way, linked to evidence-based practice or policy.

The process of measuring, and ultimately, of improving the quality of care, can be evaluated on the basis of structure, process or outcome (29;38;39). Structural data refer to the characteristics of practices, health professionals or organisations (e.g. the care setting, equipment, age and number of therapists); process data are the components of the encounter between a health professional and a patient (e.g. the interventions); while outcome data refer to the patient’s subsequent health status and the consequences of care (e.g. pain, function or patients’ understanding) (38;39). Process data are usually the most sensitive measures of

quality, because they provides information about the content of the process, are easy to measure, and vary in accordance with the behaviour of the care provider (29;40). Clinical outcomes are less sensitive at detecting changes in practice (27), and measurement of clinical outcomes will usually provide insufficient information about when and how to improve (41).

The aim of performance measurement at the process level is to collect the minimum amount of information needed to determine how well health care professionals are performing and whether they need to improve (28;29). It is always important to measure baseline performance before planning a quality improvement project because this helps to:

- Justify a quality improvement intervention by demonstrating a gap between actual and desired clinical practice
- Estimate the magnitude of the problem. Low baseline performance indicates there is much room for improvement, whereas high baseline performance indicates there is little room for improvement (ceiling effect).
- Identify practice patterns and the factors that determine them; you can use these factors to tailor your intervention
- Use measurements as part of an intervention involving feedback
- Assess the impact of the intervention by comparing pre (baseline) and post-intervention performances (27).

Before measuring clinical performance the following questions should also be clarified:

- What is to be measured?
- Is the needed information available?
- How can an appropriate sample of patients be identified?
- How big should the sample be?
- How will the information be collected?
- How will the information be interpreted? (28).

Performance measurement depends on the availability of information, and it has been suggested that the key source is the medical record (28;29). One challenge to this, however, is that medical records are not always available or suitable for extracting the data needed. There are also pitfalls in measuring performance without accounting for patient preferences or clinical judgement. Applying evidence to individual patients implies involvement from those



patients and integration of professional clinical experience. Even in cases where high quality evidence is available, there will be variations in clinical practice because of differences in patients' values and preferences, and in clinical judgement between practitioners. On the other hand, where there is a lack of high quality clinical research, practice will be influenced by this uncertainty and we would expect more variation in practice (42). Different practice patterns and great variation in practice may exist because of uncertainty about the consequences. Such variation in practice might be justified (42). If we do not know whether a treatment is beneficial or harmful, because of lack of evidence from high quality clinical research, or if there is uncertainty about the balance between desirable and undesirable effects, there is little to be gained by undertaking a performance measurement (27;43). In line with this, GRADE recommends that management options associated with strong, but not with weak, recommendations are candidates for quality criteria, and performance measurement (20).

Practice variation can be appropriate or inappropriate, and the elimination of inappropriate variation is a fundamental principle behind quality improvement in health care. By measuring physiotherapy performance we can identify variations in practice, such as the way different physiotherapists treat patients with a similar condition, and we can estimate the amount of undesirable practice (29;41). Factors that affect practice patterns are often called "determinants of practice" (27). They are also sometimes categorised as "barriers and facilitators" or "moderators and mediators". Determinants of practice can help us understand practice variation, as well as helping us design improvement strategies (27;41). Some variation in practice can be expected because of the characteristics of individual patients and differences in preferences among patients and physiotherapists. However, much of the variation in healthcare delivery has been considered unwarranted because it cannot be explained by type or severity of illness or by patients' preferences (21;42). Other factors such as practicalities, incentives or social influence are clearly important determinants of practice, as well as for the adoption of evidence-based physiotherapy (44-46). Many of the existing explanations imply that variation is caused by differences in preferences among health professionals. An alternative explanation emphasizes the role of differences in opportunities, incentives and influences, rather than preferences (47). For example, payment incentives have been associated with the likelihood of receiving physiotherapy (48), and physiotherapy in nursing homes is more likely to be provided to male patients with good cognitive function (49). Two studies from the Netherlands have determined factors associated with variation in the number of physiotherapy treatment sessions for low back pain and ankle injuries (50;51).

Both studies suggested that the number of treatment sessions depended on patient characteristics, such as severity of pain and co-morbidity. The authors concluded that very little variation could be explained by characteristics of the physiotherapists.

Theories of change can be used to understand the behaviour of health professionals (1;21). Numerous theories from a variety of fields such as psychology, sociology, economics, marketing, education and organizational behaviour have been used to understand clinical behaviour and to develop improvement strategies (1;21).

One systematic review has summarised published studies measuring performance of clinical care in UK, Australia and New Zealand from 1995 to 1999 (52). The authors outlined the methodological challenges of measuring performance in general practice. They suggested that evaluations should focus on randomly selected samples of records drawn from populations rather than from self-selected practices in order to reduce potential participation bias. The review also highlighted the need to include non-technical aspects of care, particularly interpersonal care, which is a fundamental component of quality in general practice.

### **Previously published studies on physiotherapy performance**

In order to get an overview of physiotherapy performance studies and their methods, we have identified and assessed studies based on the methods used by Seddon et al (52). They reported studies by design, sampling strategy and size, clinical conditions studied, quality of care attained for each condition and country of origin for each study (52). Table 1 describes studies of physiotherapy performance published up to 2007 by author, country, setting, design, sampling strategy, response rate and sample size. The table also provides information about whether practice was assessed against a specific guideline or source, and whether explicit criteria or recommendations were used.

<b>Reference and country</b>	<b>Condition and setting</b>	<b>Study design</b>	<b>Data collection method and sampling strategy</b>	<b>Source of standard and criteria</b>	<b>Response rate</b>	<b>Numbers of physiotherapists/ patients</b>
Armstrong 2003 Ireland	Low back pain One teaching hospital	Retrospective	Case-notes from treated patients Each third note was selected	Guidelines for LBP (Waddell 1996) No explicit criteria	Not relevant	25/200
Foster 1999 Britain and Ireland	Low back pain Sample of chartered physiotherapists	Cross-sectional survey	Postal questionnaire Respondents were asked to rank how often they used specific treatment methods Four regional cluster samples	Current guidelines (no reference given) No explicit criteria	58%	1548/na
Hamm 2003 Denmark	Low back pain Primary health care	Prospective	Data on all patients treated consecutively over a 4 week period All practising physiotherapists National case-note audit	Health Technology Assessment Report No explicit criteria	14%	242/4725
Hammond 2005 UK	Stroke management All hospitals which managed stroke in UK	Retrospective	Each hospital submitted up to 40 cases admitted consecutively over a 2 month period	Audit tool based on physiotherapy elements of National Clinical Guidelines for Stroke (NCGS) Clear criteria for the applicability of each standard was developed a priori	95%	Unclear/8200

Gracy 2002	Low back pain	Prospective	Questionnaire with prospective self-report of treatments from all patients referred within the study period of 1 year Unclear	Current guidelines	Not reported	157/1062
Northern Ireland	Outpatient centres			No explicit criteria		
Li 2001	Low back pain	Cross-sectional survey	Postal questionnaire of practice behaviour on hypothetical patients from three case scenarios	AHCPR (Agency for Health Care Policy and Research) guidelines on management of low back pain	73%	468/na
Canada	Registered physiotherapists from Ontario					
Overmeer 2005	Back pain	Cross-sectional survey	Random sample Postal questionnaire of practice behaviour for (hypothetical?) patients with low back pain	No explicit criteria Health Technology Assessment Report	82%	82/na
Sweden	Primary health care			No explicit criteria		
Mikhail 2005	Acute low back pain	Cross-sectional survey	All practising physiotherapists in a county in Sweden Telephoned administrated interview of desired treatment for a hypothetical patient in a vignette	Each reported intervention was coded according to its level of evidence (strong, moderate, limited, none).	86%	100/na
Canada	Physical therapists working in public or private practice in Quebec		Random sample			

Swinkels 2005 The Netherlands	Low back pain Private practice	Retrospective	Data collected from a register  Physiotherapists self-selected to a national network	National guidelines for non-specific low back pain (Bekkering 2003)  Four criteria were developed from this guideline. Three of these were used for this study	Not relevant	90/1913
Strand 2004 Norway	Acute low back pain Private practice	Observation and semi-structured interviews	Data collected from observation and interviews  Convenience sample of physiotherapists	Various clinical guidelines  No explicit criteria	Not relevant	34/42
Leemrijse 2006 The Netherlands	Acute ankle sprain Extramural health care	Cross-sectional	Self-report about to what extent physiotherapists treated their patients according to the guidelines using a six point scale	National clinical guideline from The Royal Dutch Society for Physical Therapy	60%	240/na

Table 1. Characteristics of previously published studies on physiotherapy performance

### *Diagnosis and setting*

We identified 11 studies on physiotherapy performance up to 2007. Most studies measured performance for patients with low back pain in primary care settings. One study involved management of stroke patients (53), and one involved patients with acute ankle sprain (54). Studies from Canada, Ireland, Britain, the Netherlands, Denmark, Norway and Sweden assessed physiotherapy practice against guidelines for low back pain. The study on stroke management was part of a national audit that involved all hospitals in the UK. The number of physiotherapists involved in each study varied from 25 to 1548, and the number of patients from 42 to 8200.

### *Sampling strategy and data collection method*

The studies used different sampling strategies and data collection methods. Only two studies extracted data from electronic journal systems and most studies used different types of cross-sectional designs. The response rate varied from 14% to 86%. Two studies used hypothetical patient scenarios and asked a sample of physiotherapists what would be their preferred treatment options, using telephone interviews (55), or a questionnaire (56). Foster and Overmeer (57;58) conducted postal surveys and asked physiotherapists to rank how often they used different treatment options for back patients. Two studies used prospective registration of actual practice on low back patients (59;60). One Danish national audit project invited all practising physiotherapists to provide practice data over a four week period (59), and the other collected data on all back pain patients referred to a sample of physiotherapists within a study period of one year (60). A Norwegian study used a combination of observation and semi-structured interviews (61). This study described how 34 manual therapists treated their back pain patients and discussed practice according to the main points of the guidelines. Three studies extracted data retrospectively from records (50;53;62). In the Netherlands, data were collected from a national register involving a network of 90 physiotherapists (50). In the UK, a national retrospective case-note audit was carried out in all hospitals that managed stroke patients over a period of two months (53). Data from 8200 patients were recorded in this audit. In the last study, data were extracted from 200 case-notes involving 25 physiotherapists in a teaching hospital in Belfast (62).

### *Source of standard*

Seven studies measured practice against a specific national guideline (50;53;54;56;58;59;62), three referred to international guidelines (57;60;61). In four studies, guideline

recommendations were expressed as criteria or statements. In these studies, the authors presented the proportion of physiotherapists that adhered to each criterion (50;53;59). One study coded each intervention according to its level of evidence into strong, moderate, limited or none and reported the use of each intervention (55). In the remaining studies, practice behaviour was presented as the prevalence of different interventions and these were discussed against guidelines.

#### *Strengths and limitations of previous studies of physiotherapy performance*

The scientific rigour of the studies measuring physiotherapy performance varied. Firstly, the respondents in many of the studies were self-selected or, if random samples were used, samples were small, and response rates often low. This increases the likelihood of selection bias in the data presented. Secondly, in most of the studies the clinicians were reporting on their own practice. Social desirable bias can influence data collection when using self-reporting of practice behaviour. The third concern is the use of clinical vignettes and case scenarios. It is questionable whether the reported practice based on clinical vignettes and case scenarios reflects actual practice on real patients. Finally, summaries of high quality clinical research, graded for specific comparisons and outcomes should be used to compare against actual practice. Systematic reviews, overviews of reviews, or preferably recommendations from evidence-based clinical practice guidelines are useful tools. Not all performance studies in physiotherapy assess practice against such sources.

Information extracted from a data source that continuously collect valid information on actual practice behaviour, e.g. through a register or a clinical database, is the preferred method for measuring performance (29;63). A random sample of both physiotherapists and patients should be drawn from this register to avoid selection bias. However, few physiotherapists working in outpatient clinics or primary care routinely collect data that are available for audit, whereas this might be more likely in hospitals. Internationally, there are very few clinical databases in which physiotherapists record practice data on a routinely basis (63), and only two of the studies of physiotherapy performance reported in table 1 extracted retrospective data from registers, charts or records.

#### *Response rate in surveys of practice*

Low response rate is a problem in all types of surveys. Some interventions, such as monetary incentives, reminders and follow-up telephone contacts have shown to been successful in

increasing response rate in surveys (64). A systematic review on the effect of incentives to improve response rates to physician surveys shows that it is even harder to get a high response rate in surveys of clinical practice than in other types of survey (65). Van Geest and colleagues found that token nonmonetary incentives were less effective than even small financial incentives among physicians (65). To our knowledge, no studies have evaluated interventions to increase response rate in surveys among physiotherapists.

### ***Knee osteoarthritis***

Osteoarthritis is common, costly and disabling (66). The main symptoms associated with osteoarthritis are pain, discomfort, limitation of activity and reduced participation (67).

Osteoarthritis is not a simple disease entity and cannot be defined as such. The term "osteoarthritis" refers to two different but overlapping syndromes (67). Firstly it is a disease of the synovial joints in which cartilage is lost, subchondral bone alters and new bone is formed around the joint. Secondly it is the clinical syndrome of joint pain, stiffness and loss of function likely to be related to the presence of the joint pathology (67). The symptoms are not specific, and no clinical definition of osteoarthritis at any joint site has been properly validated (67).

Radiographic findings have traditionally been the reference standard for the diagnosis of knee osteoarthritis, identified by joint space narrowing, subchondral sclerosis and osteophyte formation. The presence of osteophytes is the radiographic feature that associates best with knee pain, whereas joint space is not (68). However, patients with the same radiographical score present variation in function, pain and power (66;69). A systematic review concluded that knee pain is an imprecise marker of radiographic knee osteoarthritis because only two thirds of older adults with knee pain have radiographical disease (70). Radiographic knee osteoarthritis is likewise an imprecise guide to the likelihood that knee pain or disability will be present. Both associations are affected by the definition of pain used and the nature of the study group (70). The results of X-rays of the knee should not therefore be used in isolation when assessing individual patients with knee pain. For these reasons the recommended definition of osteoarthritis is based on symptoms; "Osteoarthritis is a condition characterized by use-related joint pain experienced on most days in any given month, for which no other



cause is apparent. Staging in accordance with X-ray findings is commonly used. However, the value of this method has limitations because X-ray findings are not directly transferable to subjective symptoms or physical findings” (67). The guideline development group for the The National Institute for Health and Clinical Excellence (NICE) guideline on osteoarthritis considered the following to represent a clinician’s working diagnosis of peripheral joint osteoarthritis (71):

- persistent joint pain that is worse with use
- age 45 years old and over
- morning stiffness lasting no more than half an hour.

According to the NICE guideline, patients who meet the working diagnosis of osteoarthritis do not normally require radiological or laboratory investigations (71). This working diagnosis is quite similar to the American College of Rheumatologists’ clinical criteria for classification of osteoarthritis of the knee (72). The criteria are knee pain, and at least one of the following three criteria: age >50 years, stiffness < 30 minutes, crepitus and osteophytes (72). Because there are several definitions of knee osteoarthritis, the populations included in studies of knee pain and studies of knee osteoarthritis overlap.

It is estimated that 10% of the world’s population who are 60 years or older has significant clinical problems that can be attributed to osteoarthritis (67). Osteoarthritis of the knee is expected to be the fourth leading cause of disability by the year of 2020 (73). The estimated population prevalence varies, depending on age, gender and definition of the disease. Above the age of 55, radiologic knee osteoarthritis is an increasingly common cause of knee pain, and about 25% of individuals over 55 will report an episode of knee pain in the past year (66). Painful, severely disabling radiographic knee osteoarthritis affects about 1.5% of adults over the age of 55, whereas painful knee osteoarthritis associated with mild to moderate disability affects up to 10% (66). The prevalence of knee pain increases with age, though age is more closely correlated to knee pain in women than in men (66;74). Population studies have consistently reported a higher prevalence of radiographic knee osteoarthritis in women than in men from middle age onwards (67). In a Norwegian population between 24 to 76 years the overall self-reported prevalence of knee osteoarthritis was 7.1%, 7.9% in women and 6.2% in men respectively (74).

Osteoarthritis is a complex disorder with multiple risk factors. The risk factors can be divided into three major categories (71):

- genetic factors (heritability for knee osteoarthritis is high at 40-60%, though the responsible genes are largely unknown)
- constitutional factors (for example aging, female sex, obesity, high bone density)
- more local, largely biomechanical risk factors (for example joint injury, occupational/recreational usage, reduced muscle strength, joint laxity, joint malalignment)

In the Norwegian population knee osteoarthritis was significantly associated with several factors, such as fewer than 10 years` education and increased body mass index (75).

Prognostic factors for progression of knee osteoarthritis are hyaluronic acid serum levels and generalized osteoarthritis (76). Sex, knee pain, radiologic severity, knee injury, quadriceps strength and regular sport activities were not identified as significant prognostic factors for progression of knee osteoarthritis (76). Another systematic review concluded that greater muscle strength, better mental health and self-efficacy, social support and more aerobic exercise were significant predictors for better outcomes in knee osteoarthritis (77).

### **Use of primary health care among patients with knee osteoarthritis**

Pain and reduced function are the main problems associated with knee osteoarthritis and are the reason patients seek health care, including physiotherapy. The annual incidence of consultations with a general practitioner for knee pain in the UK and the Netherlands is estimated to be 0.5% among people over 55 years and 1% among those over 70 years (66). Among people with self-reported knee pain in the UK 33% consulted their general practitioner during the past year (78). A study carried out among primary care patients with knee osteoarthritis in Germany reported that 86% of women and 77% of men visited their general practitioner at least once during the previous half year, and 55% had visited a physiotherapist at least once (79). In Norway, in a population of persons with self-reported knee osteoarthritis, the mean number of physiotherapy visits was 6.0 during the previous year, and 5.6 for visits to a medical doctor (74). This might indicate variation in health service use between countries for patients with knee osteoarthritis.

Most patients with chronic knee pain are managed with medication, followed by physiotherapy and aids (80;81). Mitchell et al (80) reported that analgesics or non-steroidal anti-inflammatory drugs (NSAIDs) was received by 83% of patients with knee osteoarthritis, and that 21% of patients with knee pain who consulted their general practitioner were referred to physiotherapy. Another study, also from the UK, found that 13% of patients with knee osteoarthritis received physiotherapy (82). Physiotherapy was used more by patients from higher social classes in the UK (82), and by patients who have previously seen a hospital consultant for their knee osteoarthritis (82). Patients with osteoarthritis also commonly used complimentary medicine and therapies the most frequently reported complimentary therapy used was cod liver oil which was used by 38% (82).

A survey of individuals with chronic knee pain identified a mismatch between the kind of treatments the responders preferred, the treatment they had received and the treatments that were recommended in evidence-based guidelines (80). Among those who expressed a treatment preference, the most popular treatment option was physiotherapy. Many individuals had no preference for a particular treatment (40%) (80). It also appeared that many individuals with knee osteoarthritis do not discuss their pain and osteoarthritis during consultations with their general practitioner. Less than one-third of participants in this study reported that they received information on knee osteoarthritis when visiting their general practitioner (83).

Despite the considerable health problems reported to be associated with knee osteoarthritis, many people do not seek help from health care professionals (78;84). Over 50% of those with severely disabling knee pain did not consult for it (78;84). Neither the presence of self-reported co-morbidity nor the total number of co-morbid conditions was related to consultations for knee pain (66). A qualitative study found that the reasons for not consulting were that patients perceived that knee pain was a part of normal ageing, that little effective prevention and treatment is available and that the use of medication causes side effects and dependency (78). On the other hand, many patients with knee osteoarthritis might have unmet needs for information and management in primary care (66;81;85;86). The fact that many of the patients with knee osteoarthritis do not consult general practitioners or physiotherapists might indicate a mismatch between felt need (an individual's assessment of their need for health care) and expressed need (demand for health care) (78). It also suggests that physiotherapy is underused because guidelines recommend therapeutic exercises as a first-line management (87;88).

## ***Evidence-based physiotherapy for patients with knee osteoarthritis***

Evidence-based physiotherapy is practice informed by high quality clinical research and the integration of clinical experience, and patients` preferences (1). Studies of the effects of physiotherapy interventions are the most relevant source of information when we consider measurements of performance and comparisons between real practice and desired practice in physiotherapy. However other types of evidence such as qualitative studies and studies of diagnostic tests might also contribute to the assessment of practice.

Questions about the effects of physiotherapy interventions should be answered by randomised controlled trials (1), whereas systematic reviews of randomised trials constitute the best single source of information about the effects of particular interventions (1). There is a growing number of randomised controlled trials in physiotherapy, as well as systematic reviews of randomised controlled trials (89;90). Many systematic reviews address physiotherapy interventions for knee osteoarthritis, and many reviews suggest that physiotherapy leads to significant improvement in patient outcomes. Exercise can improve pain and function (91;92), transcutaneous electrical nerve stimulation (TENS) (93) and low level laser might reduce pain (94;95). There are also systematic reviews of ultrasound (96), braces and orthosis (97) and electromagnetic fields (98).

Systematic reviewers should use good methods to assess, summarise and grade the quality of evidence for relevant comparisons and important outcomes (22). Authors of systematic reviews should not make recommendations, whereas guideline developers should assess both the quality of evidence and the strengths of recommendations (22). This will help communicate the extent to which we can have confidence that an estimate of effect is correct, and that we will cause more good than harm by adhering to a recommendation. Systematic reviews and guidelines need to be updated regularly to include new primary studies. New studies might change the results, add to the quality of the evidence and might lead to changes in the recommendations.

In Norway, we have not yet developed clinical guidelines for the management of knee osteoarthritis, although an HTA report on physiotherapy for knee osteoarthritis was published in 2004 (99). Internationally, there are several clinical guidelines for knee osteoarthritis, both interdisciplinary (88;100;101), and physiotherapy or rehabilitation specific guidelines

(87;102). One guideline recommends strong evidence for the use of transcutaneous electrical nerve stimulation (TENS) and therapeutic exercises for patients with knee osteoarthritis (102). The other guideline recommended therapeutic exercise only (87).

During the last few years, implementation researchers have evaluated different strategies for closing the gap between clinical research and practice and changing provider behaviour (103-105). Clinical guidelines are seen as a strategy to improve practice although the improvements are generally small (33). To address this challenge and to help develop improvement strategies in physiotherapy, many have explored the barriers to evidence based physiotherapy, and the barriers and facilitators for adherence to guidelines (44;45;106). Using the existing literature as a basis, Richard Grol et al (107) propose that barriers and incentives for achieving evidence-based practice should be examined at six different levels: the innovation itself, the individual professional, the patient, the social context, the organisational context, and the economic and political context . Up to now, as outlined in table 1, few studies have measured physiotherapy performance in areas other than low back pain. Also, few studies have evaluated the effects of strategies to implement guidelines and evidence-based physiotherapy (108). We identified only three studies with robust evaluation design in a systematic review of studies implementing guidelines in physiotherapy (108).

We need to measure the quality of care for patients with osteoarthritis (109). Measuring baseline performance is important before planning a quality improvement project (27;110). It has also been suggested that chronic conditions with high prevalence rates, which are easy to diagnose and well defined, and with treatments that have demonstrated effect are suitable for measuring performance (29). All these criteria are met by knee osteoarthritis.

As far as we know, no study yet has measured physiotherapy performance among patients with a chronic rheumatic condition, including knee osteoarthritis.

## **Aims**

The main objective of this study was to measure physiotherapy performance in patients with knee osteoarthritis by comparing clinical practice to the findings from systematic reviews.

Additional aims were to

- summarise, in an overview, the evidence from systematic reviews about the effects of physiotherapy interventions for patients with knee osteoarthritis
- explain variation in the use of physiotherapy interventions for patients with knee osteoarthritis
- evaluate whether a small incentive could increase response rate in a prospective study of physiotherapy practice

## **Methods**

Three types of design have been used in this project (fig 3). Paper I is an overview of systematic reviews of the effects of physiotherapy interventions for patients with knee osteoarthritis. Papers II and III are based on data collection from a questionnaire.

Physiotherapists reported practice data on one patient with knee osteoarthritis prospectively at the end of each treatment session through 12 sessions. Paper IV is a randomised controlled trial on the effects of a chocolate bar as an incentive to increase the response rate among the physiotherapists invited to the study.

### ***Paper I***

We identified systematic reviews published between 2000 and 2007 in English or a Scandinavian language by searching the Cochrane Library (Cochrane Database of Systematic Reviews and Database of Abstracts of Reviews of Effects), Medline, Embase and PEDro. Two reviewers independently assessed the relevance of all references based on titles and abstracts, read relevant reviews in full text and assessed the methodological quality of included reviews using a modified version of a previously validated checklist (111). The overall scientific quality of each review was labelled as “Minor limitations” (at least seven of the criteria met), “Moderate limitations” (at least four of the criteria met) and “Major limitations” (fewer than four of the criteria met) on the basis of a summary of nine criteria. We excluded reviews with major limitations. One author extracted data from each included review and discussed the data with the other. Finally, we used principles from GRADE to assess the quality of evidence for each comparison and outcome across the reviews. GRADE is a system for grading the quality of evidence and strengths of recommendations (17). The

quality of evidence indicates the extent to which one can be confident that the estimate of effect is correct. High quality of the evidence indicates that further research is very unlikely to change our confidence in the estimate of effect (17). Based on judgements considering the design of the primary studies, the quality of the primary studies, consistency (similarity of estimates of effect across studies) and directness (the extent to which comparisons, people, interventions and outcome measures were similar to those of interest), the quality of evidence for each outcome in each comparison was classified as high, moderate or low, or as no evidence from systematic reviews. After grading the quality of evidence for each outcome and comparison in each systematic review, we considered the overall level of quality of the combined evidence. In the table of the overall level of quality, the following statements were used to indicate direction of effect; improves, reduces, no difference and unclear. Unclear also includes inconsistent evidence.

## ***Papers II and III***

This study was conducted among private physiotherapy practitioners in Norway, who are integrated into primary health care. The Regional Committees for Research Ethics in Norway approved the protocol for the study.

### *Data collection form and recruitment*

We developed a data-collection form in close collaboration with clinicians who were invited through The Norwegian Physiotherapy Association. The data collection form was extensively piloted, and we assessed the reliability of the form in 15 observations of treatment sessions. The observer and the physiotherapist recorded practice data independently and we calculated kappa scores. The final form was in three parts (see Appendix for variable list and the original data-collection form). Part one covered characteristics of the patients, the findings from the physiotherapy examination and the goals of the treatments. Part two was designed to report the treatment modalities used in each session during 12 sessions. This part contained a list of 35 different treatments, e.g. different types of exercise, massage, traction, hot packs, physical modalities, information and patient education. We also collected information about whether the patients were treated individually or in groups. We chose 12 treatment sessions because this is the number of sessions most often used when general practitioners refer patients to physiotherapy in Norway. Part three collected information on characteristics of the

physiotherapists, e.g. gender, age, years since qualification, work setting and postgraduate education. A designer contributed to the lay-out to create a user-friendly form.

We invited all private practitioners (n=2 798), identified by membership of The Norwegian Physiotherapy Association in February 2006, to participate in the study. In response to the invitation letter sent out in May 2006, 744 physiotherapists replied that they did not normally treat patients with osteoarthritis, or that they had other reasons for not being eligible. In August 2006, we distributed the anonymous data-collection form with a pre-paid return envelope to the remaining physiotherapists (n=2 054). We asked the physiotherapists to report the management of the first patient with knee osteoarthritis referred to their practice (one case), and to complete the form at every treatment session. We sent two reminder letters to all, and one e-mail postcard to those with an e-mail address. We contacted practices with more than five physiotherapists by telephone. The data collection period was nine months, from August 2006 to May 2007.

#### *Research evidence and performance*

We measured physiotherapy performance by comparing practice reported in the data-collection forms to the findings from the overview of systematic reviews (Paper I). If the physiotherapist used interventions that were supported by evidence of high or moderate quality for improving specific patient outcomes, we interpreted the practice as desirable. Even though there was a lack of evidence for the effects of giving advice, we considered giving advice and information about physical activity and weight reduction to be desirable practice.

#### *Explain variation*

On the basis of the findings from the results of the physiotherapy performance study (Paper II) we chose to explain practice variation in the use of interventions supported by high or moderate quality evidence, or in interventions frequently used but with lack of evidence from systematic reviews. Exercise was used by almost all therapists. However, variation was identified in the use of TENS, low level laser or acupuncture, massage and weight reduction advice. We invited the clinicians who took part in developing the data collection form to a one day meeting, and, through small group work and a plenary discussion, they listed factors that they thought might explain the variation in each of the interventions. Factors were related to characteristics of the patients and the therapists, as well as to culture and resources.



### *Analysis paper II*

We classified the use of each treatment modality into three categories, “not used”, “used in up to 80% of the sessions” and “used in more than 80% of the sessions”. Different types of exercise, e.g. exercises aimed to increase muscle strength, aerobic capacity, coordination or range of motion, were merged into one treatment modality.

### *Analysis paper III*

To explain variation in practice we classified treatment modalities either as 1) a dichotomous variable, “used” or “not used”, or 2) a continuous variable: the total number of times an intervention was used during the treatment period (12 sessions). We carried out the explanatory analysis in two steps. First, variables prespecified by the clinicians, and with data available, were examined in a univariate manner using the chi-square test (categorical independent variables), *t*-tests (continuous independent variables for dichotomous outcome) and univariate linear regression analysis (continuous independent variable for continuous outcome). Second, all variables identified in the first step with a p-value less than 0.3 were entered as independent variables in a multiple regression analysis or logistic regression analysis. Because there is moderate-quality evidence that TENS, low level laser and acupuncture reduce pain, and each of these was used by fewer than 20% of the physiotherapists, we merged these interventions into one variable in the analysis.

## ***Paper IV***

In order to evaluate whether a small incentive could increase response rate we randomised the physiotherapists (n=2 054) by a computer generated table to an intervention group (n=1 027) that received a bar of dark chocolate together with the data-collection form, and a control group (n=1027) that received the data-collection form only. We distributed the forms and chocolates by postal mail and included a pre-paid return envelope. The chocolate bar consisted of 36 grams 70% cocoa wrapped in a specially designed sticker bearing the survey logo and the text “Thank you for helping us to document physiotherapy practice”, fig 3. The outcome measure was the response rate and the number of completed data-collection forms.



Fig 3. The chocolate bar with sticker

## Results

### *Paper I*

We included 23 systematic reviews on physiotherapy interventions for patients with knee osteoarthritis in the overview. The reviews covered the following topics; exercise, psycho education, braces and orthoses, electromagnetic field, weight reduction, acupuncture, transcutaneous electrical nerve stimulation (TENS), low level laser, ultrasound, thermotherapy, electric muscle stimulation and balneotherapy. Sixteen of the reviews were high quality (minor limitations) and seven of moderate quality. The reviews show that there is high quality evidence that exercise reduces pain and improves physical function in patients with knee osteoarthritis, and that weight reduction improves function. There is moderate quality evidence that acupuncture, TENS and low level laser therapy reduce pain, and that psychoeducational interventions improve psychological outcomes. For other interventions the quality of evidence is low or there is no evidence from systematic reviews available.

### *Paper II*

In the study of physiotherapy performance we received a response from 527 therapists. Of these, 297 had treated one patient with knee osteoarthritis and had completed the data-collection form, see fig 4.

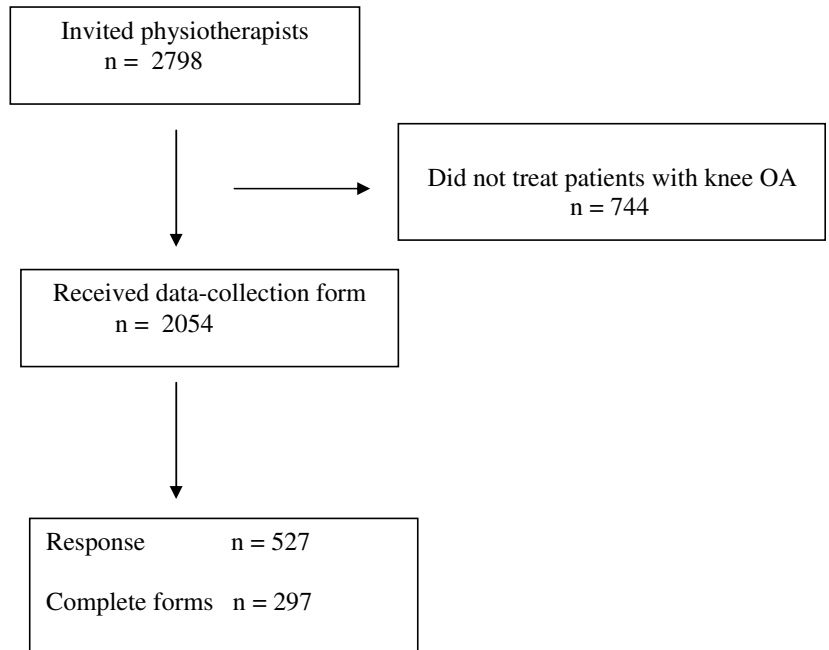


Fig 4. Flow diagram

The mean age of the physiotherapists was 47 years (SD=11). Almost half (47%) were women. Patients had a mean age of 65 years (SD=11), and 67% were women. Pain intensity during the previous week was 5.9 (SD=2.1) on a 10-point visual analogue scale (VAS). Almost half of the patients (46%) suffered from pain during the night, or when at rest. More than half had bilateral knee osteoarthritis, and 32% were diagnosed more than five years ago. Thirty three percent were considered overweight, and 31% had important co-morbidity, the most frequently reported being cardiovascular diseases or low back pain. Fifty percent of the patients were referred to physiotherapy for knee osteoarthritis for the first time. The most important aim of the treatment, as reported by the therapists, was to reduce pain (92%), followed by increasing muscle strength (85%).

Table 2 outlines the treatment modalities used according to quality of evidence. Exercise was used by all but six physiotherapists (2%), and 86% used exercise in almost all sessions. There is high quality evidence that exercise reduces pain and improves physical function in patients with knee osteoarthritis. Type of exercise, e.g., improving muscle strength, gait, range of motion and stability varied widely, both within and across sessions. Muscle strengthening exercises were the most commonly used (90%).

Type of intervention	Not used at all	Used in up to 80 % of the sessions	Used in more than 80 % of the sessions	Quality of evidence
Exercise	6 (2)	35 (12)	256 (86)	High for pain reduction and improved physical function  Moderate for no improvement in psychological outcomes
TENS (transcutaneous electrical nerve stimulation)	260 (88)	16 (5)	21 (7)	Moderate for pain reduction
Low level laser therapy	265 (89)	22 (7)	10 (4)	Moderate for pain reduction
Acupuncture (manual, electrical and trigger point)	237(80)	40 (14)	20 (7)	Moderate for pain reduction
Short wave therapy (and pulsed electromagnetic energy)	268 (90)	16 ( )	13 (4)	Moderate for no reduction in pain or improvement in physical function
Patient education, self-management and psychoeducation	53 (18)	214 (72)	29 (10)	Moderate for improving psychological outcomes  Moderate for no difference in pain or physical function
Ultrasound	249 (84)	21 (7)	27 (9)	Low for all outcomes
Thermotherapy (heat packs)	251 (85)	20 (7)	26 (8)	Low for all outcomes
Thermotherapy (cold packs)	278 (94)	12 (4)	7 (2)	Low for all outcomes
Braces and orthosis	273 (92)	21 (7)	3 (1)	Low for all outcomes
Tape	286 (96)	10 (4)	1 (0)	No evidence from SR
Massage	137 (46)	69 (24)	91 (30)	No evidence from SR
Traction	158 (53)	60 (20)	78 (26)	No evidence from SR
Stretching	158 (53)	57 (19)	81 (27)	No evidence from SR
Advice about physical activity	32 (11)	220 (74)	45 (15)	No evidence from SR
Advice about weight reduction among 102 patients considered overweight	43 (42)	55 (54)	4 (4)	No evidence from SR

Table 2. Number (%) of treatment modalities used in the management of patients with knee osteoarthritis according to quality of evidence from systematic reviews (SR)

There is evidence of moderate quality that transcutaneous electrical nerve stimulation (TENS), low-level laser therapy and acupuncture reduce pain. Each of these modalities was used by fewer than 25% of the therapists (table 2).

The physiotherapists applied a median number of four (range 1-10) different interventions for each patient throughout the sessions. Massage, traction/mobilisation and stretching were the next most common modalities after exercise, and were applied in approximately half of patients (table 2). There is no evidence from systematic reviews about the effect of these treatments.

There is evidence of moderate quality that psychoeducation, including patient education and self-management programmes improve psychological outcomes. Sixty eight percent of the physiotherapists used interventions that were classified as psychoeducation. Almost all physiotherapists (90%) provided information and guidance about physical activity, and 76% prescribed a home exercise programme.

The physiotherapists provided advice and information about weight reduction to 59 (58%) of the 102 patients that they considered overweight. By contrast, almost all patients who were assessed by their physiotherapist as needing more physical activity (n= 101), received advice and support for increasing activity levels (n=92).

### ***Paper III***

We explained variation in the use of TENS, low level laser or acupuncture, massage and giving advice about weight reduction. The explanatory variables suggested by the clinicians overlapped highly across the interventions. Univariate analysis showed that using TENS, low level laser, or acupuncture was associated with patient pain and overweight, therapist gender, practice setting, having Internet access at work, search of databases, and number of articles read in the last 6 months. Only one variable, having searched databases to help answer clinical questions in the last 6 months, was significant in the multiple regression analysis. The odds of receiving TENS, low level laser or acupuncture were nearly doubled if the therapist had searched databases in the last 6 months (odds ratio (OR) 1.93, 95% confidence interval (CI) 1.08 to 3.42).

Many variables, both at patient and therapist level, were associated with provision of massage in the univariate analysis. In multivariate analysis, two factors were significant determinants for massage: not having Internet at work and using more than 4 treatment modalities through the 12 sessions (OR 0.36, 95%CI 0.19 to 0.68 for having Internet, and OR 8.92, 95% CI 4.37 to 18.21 for more than 4 modalities).

Giving advice about weight reduction was also associated with several variables in the univariate analysis. However, multiple regression analysis showed that physiotherapists who provided information about physical activity also gave advice about weight reduction (OR 11.46, 95% CI 1.170 to 112.36), and female therapists gave advice to more patients than male therapists did (OR 3.60, 95% CI 1.12 to 11.57).

The alternative analysis using the total number of each modality as variables confirmed the results. Having searched databases in the last 6 months was a predictor for using more TENS, low level laser or acupuncture ( $P=0.01$ ). Having Internet access at work and having used many modalities were predictors for more use of massage ( $P=0.03$  for Internet and  $P<0.001$  for more modalities). Giving information about physical activity was associated with giving weight reduction advice ( $P=0.01$ ).

## ***Paper IV***

In order to evaluate the effect of a small incentive to increase the response rate we randomised the participants to receive a bar of chocolate or not when they were sent the data collection form. We received 280 completed the data-collection form. Before the first reminder was sent out we had received 73 completed forms, 39 (3.8%) from the chocolate group and 34 (3.3%) from the no-chocolate group. By the end of the study, there was no difference between the chocolate and no-chocolate group in the number of completed forms, 142 (13.8%) in the chocolate group and 138 (13.4%) in the control group, absolute risk reduction (ARR) 0.4 (95% CI -3.4 to 2.6). Because we included some new physiotherapists through the follow-up contacts with practices, the number of completed data-collection forms in this study differs from the number used in the analysis in paper II and III.

## **Discussion**

In this project, we have described and explored physiotherapy for patients with knee osteoarthritis. We have focused on clinical effectiveness, which is one dimension of quality of care. Clinical effectiveness is closely linked to evidence-based practice, and we have measured physiotherapy performance by comparing actual clinical practice to evidence derived from an overview of systematic reviews. This approach has clearly excluded some other important aspects of physiotherapy performance, such as communication between the therapist and the patient, interpersonal relationships and other contextual factors which influence quality of care. Multiple research methods are needed to get a deeper understanding of the complexities of physiotherapy practice.

We found that for some treatment modalities, especially exercise, physiotherapy practice was evidence-based. Almost all therapists also gave advice and support for physical activity, and the majority provided interventions which could be classified as psychoeducation. This is also in line with high or moderate quality evidence or guideline recommendations. TENS, low level laser and acupuncture, supported by moderate quality evidence, were each used by fewer than 25% of the physiotherapists. The physiotherapists gave advice and information about weight reduction to 58% of the patients who were considered to be overweight. The therapists frequently used interventions with low quality evidence or with no evidence from systematic reviews, such as massage, traction and stretching. Characteristics of the patients, such as age, pain or co-morbidity, could not explain the variation in physiotherapy practice among patients with knee osteoarthritis. The use of specific interventions was significantly associated with having Internet access at work, having searched databases to help answer clinical questions in the last six months and with therapists' gender. The chocolate bar did not increase the response rate of the data collections forms among the physiotherapists.

### ***Methodological considerations***

As far as we know, this is the first study of physiotherapy performance in patients with knee osteoarthritis. There are some strengths to this study. Firstly, we have used an explicit and systematic method to summarize and grade the evidence for the effects of physiotherapy interventions on patients with knee osteoarthritis. The extensive overview was based on a thorough literature search, assessment of study quality, and synthesis of findings. Secondly,

the study of performance is based on information from clinical practice in terms of individual patients, as recorded prospectively by therapists during 12 treatment sessions. Compared to the use of vignettes or hypothetical patients, this approach probably provides more valid information about actual practice. Clinicians were involved in the development of the data collection tool which was piloted through several steps. Clinicians also suggested predefined factors that they thought could explain variation in practice and we used these variables in the explanatory analysis. We explored determinants for practice through two steps in the explanatory analysis, and we only considered the factors that significantly contributed to variation in the final multivariate analysis. Finally, we used a robust design to evaluate the effect of a small incentive on response rate.

However, this study also has several limitations. Firstly, we compared physiotherapy practice to findings from systematic reviews only. Because many reviews were not updated, we might have overlooked important results from new primary studies. Primary studies might also have been missed because some interventions, e.g. massage, traction and stretching were not covered in the systematic reviews. Another limitation is that primary studies and systematic reviews often lack clear descriptions of the interventions (112). This reduces the usefulness of systematic reviews for clinicians. Reviews and overviews might rather be used as a compass for deciding what type of intervention to choose, not as a detailed guide to how interventions should be delivered.

For the purpose of this study, we could instead have developed specific recommendations for practice based on high quality clinical guidelines or indicators. By using guidelines and the GRADE system, we could have graded the recommendations as "strong" or "weak" (17). Whether recommendations are classified as strong or weak not only depends on the quality of the evidence, but also on the extent to which benefits clearly outweigh harms, and also the variability of patients' preferences and values and the resource use involved (22). We decided not to develop clinical guidelines for several reasons, mainly because we did not know if there was, in fact, a gap between practice and evidence, or whether undesirable variation in physiotherapy practice among patients with knee osteoarthritis existed. Measuring baseline performance can justify the subsequent development of guidelines and a quality improvement intervention (27).



Secondly, there are some limitations to this study related to the collection of practice data. It is important to ensure that practice data is reported accurately. The source of data extraction is one important element. Because records from private practice in Norway were not suitable or available for extracting actual practice data, we collected data by self-report from physiotherapists. The physiotherapists were asked to collect information on one patient through every treatment session of 12 sessions to try to capture actual practice. Self-report of practice might represent a threat to validity because some therapists might report treatments that they do not perform, e.g. socially desirable practice. Some might also adopt new practice patterns because they think it is expected.

The data collection tool is important for the quality of the practice data. We developed a paper-based data-collection form for the purpose of this study in close collaboration with clinicians. Even though the form was developed through several steps and went through extensive piloting, the participants might have interpreted some of the variables differently and there might be misclassifications.

In the analysis, we merged different types of exercise into one treatment modality. Clearly, we lost some information about practice by this procedure, but as long as no types of exercise are shown to be more beneficial than others we think this was reasonable. We also categorised different information modalities, but separated simple information about exercise and weight reduction from psychoeducation and self-management programmes. There is clearly an overlap between these interventions that might introduce information bias or misclassification in this study.

We classified physiotherapy practice as desirable if it was supported by high or moderate quality evidence. We made this decision based on judgements and the available evidence. How to classify treatments as evidence-based or not is a matter of discussion. Using principles from GRADE, we assessed each treatment, comparison and outcome separately because each might be supported by different levels of evidence. Practice based on treatments with low quality evidence or treatments based on missing evidence might be classified as “not evidence-based” referred to the definition presented earlier (1). On the other hand, low quality evidence or no evidence from systematic reviews must not be interpreted as evidence of no effect. It implies that the evidence is unclear or lacking. In such cases, practice must be based on clinical experience and patient’s preferences, informed by judgements of cost and

considerations of the balance between potential desirable and undesirable consequences of the intervention. Because these judgements are made individually by each clinician and patient, it is hard to make overall judgements of whether such practice is evidence-based or not.

The response rate in our study of physiotherapy practice was low, and this might be a threat to validity because the therapists who responded might have different practice pattern from the study population as a whole. We invited all private practitioners in Norway to take part in the study, and because of the large sample we were not able to follow up all therapists. The responders were comparable to private practitioners in the Norwegian Physiotherapists Association regarding age, but a higher proportion was men. We have no additional information about the non-responding physiotherapists. If we had used an alternative sample strategy, for example by drawing a limited number of therapists from the whole population, we could have followed up more thoroughly, and we might have received a higher response rate. On the other hand, this could also have led to selection bias.

Each physiotherapist contributed to the study with practice data for one patient only. We asked the physiotherapists to report the management of the first patient with knee osteoarthritis referred to their practice. Self-selection of patients might be a potential source of bias, because the therapists might have chosen patients who are not representative of patients normally treated in private practice. However, the characteristics of the patients in the study are comparable to patients included in 36 trials in a systematic review on physical interventions for patients with osteoarthritis (113).

Finally, because of the cross-sectional design, we cannot claim to have identified causal relationships between the interventions and explanatory factors for practice variation. We used a limited number of factors in the analysis, based on suggestions from experienced clinicians and researchers, and the data available. There are certainly several other variables, not included in the analysis, that are determinants for practice variation. Because each therapist only contributed with data on one patient, we could only explore variation in practice between physiotherapists. Some studies have explored practice variation within individual therapists but this was not the aim of our study.

## ***Findings and implications***

Overviews, or umbrella reviews that compile evidence from multiple reviews into one accessible and usable document can serve as user friendly papers that provide the reader with a quick summary of clinically relevant evidence. Our overview of physiotherapy interventions for patients with osteoarthritis of the knee included 23 systematic reviews. As far as I am aware, only one extensive overview of the effectiveness of exercise therapy had been published earlier (114).

Only a few comparisons were graded as high quality evidence in the overview and for the other interventions and outcomes the quality of evidence was assessed as moderate, low or very low. Exercise was covered in nine reviews, but there was no evidence to support type, frequency and dose of optimal exercise programme. Many of the reviews concluded that both aerobic and strengthening exercise, as well as individual and group exercise are effective in patients with knee osteoarthritis (115;116). The conclusions were based on indirect comparisons and subgroup analysis, and should be interpreted with caution. We need head to head comparisons in which participants are randomised to different exercise modalities. Since we published the overview, a Cochrane review on exercise for osteoarthritis of the knee has been updated (117). The updated review now includes 32 randomised controlled trials, compared to 17 in the previous version. No new head to head comparison was identified. On the basis of indirect comparisons, the new analysis suggested that both pain and physical function were significantly influenced by the number of direct supervised sessions of exercise, suggesting that more than 12 sessions, either as home visits, monitored classes or individual clinic-based treatments was associated with better outcome (117). The optimal exercise frequency and intensity is still to be documented, as well as information about who will benefit the best and who will not. Overall, the treatment effects based on the meta-analysis were considered small (SMD 0.40, 95% CI 0.30 to 0.50 for pain, and SMD 0.37, 95% CI 0.25 to 0.49 for physical function). The effect estimates are, however, comparable to estimates for non-steroidal anti-inflammatory drugs (117;118).

One Cochrane review on the effect of aquatic exercise has also been published recently (119). This review found that aquatic exercise has some beneficial short-term effects for patients with hip and knee osteoarthritis. Following this review, at least two randomised controlled trials have compared aquatic exercise to land based exercise in patients with knee

osteoarthritis (120;121). One study that involved exercise for 8 weeks showed that only land-based exercise improved pain and muscle strength compared with the control group (120). However, aquatic exercise had significantly fewer adverse effects compared with a land-based programme (120). The other study found that 18 weeks of water-based and land-based exercises both reduced knee pain and increased knee function, but water exercise was superior to land-based exercise in relieving pain before and after walking during the last follow-up (121). In conclusion, both land based and water based exercise seems to be beneficial for patients with knee osteoarthritis and patient preferences and availability has to inform practice.

For TENS, low level laser and acupuncture, new systematic reviews have been published since the search was carried out in our overview. One extensive review by Bjordal et al (113) included 36 RCT and assessed the short term effect of physical agents, including acupuncture on pain relief in knee osteoarthritis. Supporting our conclusion that there is moderate quality evidence that TENS, low level laser and electro-acupuncture reduce pain, this review concluded that these modalities offer clinically relevant short term pain relief. However, the optimal treatment doses for these modalities are unclear. Despite this new evidence, the role of acupuncture in the management of chronic knee pain is still unclear and the findings of new randomised trials of acupuncture have caused debate (120;122). An updated systematic review suggested that acupuncture can reduce pain and disability in people with chronic knee pain (123). Combining five studies in 1334 patients, acupuncture was superior to sham acupuncture for both pain and function (weighted mean difference in WOMAC pain subscale score = 2.0, 95% CI 0.57-3.40, range 0–20, and for WOMAC function subscale score = 4.32, 95% CI 0.60-8.05, range 0-68) (123). The differences were still significant at long-term follow-up. A trial by Foster and colleagues (124) assessed the effects of adding acupuncture to a course of advice and exercise delivered by physiotherapists. The addition of acupuncture provided no additional improvement in pain scores. One implication of these findings might be that there is little point in recommending acupuncture to people with chronic knee pain who already exercise. However, acupuncture might be recommended to people who do not exercise (122).

Two other updated reviews add evidence to our overview. One review showed that pulsed electromagnetic field did not seem to reduce pain or improve function, based on moderate quality evidence (125). However, a more recent systematic review (113) suggested that pulsed

electromagnetic field provided a small reduction in pain leaving the conclusion open. Finally, the role of braces, orthosis and tape in knee osteoarthritis was unclear in our review, but an updated systematic review evaluating the effects of patellar medial-directed taping compared with no tape showed a significant reduction in knee pain (126). Only three percent of the patients in our study received tape.

The Royal College of Physicians in the UK has published an extensive clinical practice guideline for osteoarthritis produced by the National Institute for Health and Clinical Excellence (NICE) (71). The first recommendation in the guideline is: “Exercise should be a core treatment for people with osteoarthritis, irrespective of age, comorbidity, pain severity or disability“. The guideline explicitly recommends acupuncture not to be used, stating that there is not enough consistent evidence of clinical or cost-effectiveness to allow a firm recommendation on the use of acupuncture for the treatment of osteoarthritis (71). TENS is recommended as an adjunct to core treatment for pain relief. Nevertheless, the guideline points out that clinical judgement is important and patients themselves have to take part in treatment decisions by assessing the benefit they might obtain from these interventions. Finally, the guideline does not specify whether exercise should be provided by the NHS or whether the healthcare professional should provide advice and encouragement to the patient to obtain and carry out exercise themselves (71). Exercise has been found to be beneficial but the clinician needs to make a judgment in each case on how to ensure effective patient participation. This will depend on the patient’s individual needs, circumstances, self-motivation and the availability of local facilities (71).

Because physiotherapy practice is complex, it is challenging to measure physiotherapy performance. Treatment might differ both within and across sessions and within different contexts. Almost all physiotherapists in our study used exercise in treatment sessions, and they provided different types of exercises. The two most important aims of the treatment were to reduce pain and to increase muscle strength. According to the findings from our overview, and to new evidence and guidelines, no specific type or dose of exercise can be recommended. The Norwegian physiotherapists also seem to adhere closely to the first recommendation in the NICE guideline (71).

Following our study on physiotherapy performance, one other survey of physiotherapists` use of therapeutic exercise in patients with clinical knee osteoarthritis has been published (127).

The survey was carried out among therapists in the UK, and the researchers collected data through a clinical vignette. In response to the vignette 99% of the therapists stated that they would use exercise, and 9% would use exercise alone for the specific patient. Strengthening exercise was favoured over aerobic exercises. The findings are comparable to our findings showing that almost all physiotherapists used exercise, 11% used exercise only through 12 sessions, and strengthening exercise were most frequently used. However, patients in the UK would probably receive fewer treatment sessions than patients in our study. We found that most patients would receive 12 sessions or more whereas Holden et al found that only 9% of the therapists would offer six sessions or more (127). The authors suggested that physiotherapists in the UK should deliver more sessions to optimise the benefits of exercise (127). This variation between the UK and Norway might be due to reimbursement procedures and contextual factors.

Patient participation is one element of high quality care and evidence-based physiotherapy (1;35). The NICE guideline gives the following recommendation; “the clinician needs to make a judgement in each case on how to effectively ensure patient participation (71). This will depend on the patient’s individual needs, circumstances, self-motivation and the availability of local facilities”. The expectations and wishes about participation in decisions might vary between patients with knee osteoarthritis. In our study 92% of the therapists reported that the goals for the treatment were defined in collaboration with the patients, and these findings indicate patient participation. It has been suggested that individual differences should be considered more carefully when prescribing exercise for patients with knee osteoarthritis (128). For some patients, the major problem might be pain, and for other patients, it might be muscle weakness or perhaps loss of motion. In our study, the most frequently reported clinical problems were related to pain (100%), muscle weakness (85%) and limited range of motion (85%). Some patients might not want to exercise for several reasons, and some patients might even get more pain by doing some types of exercise. Which type of treatments, especially exercise, should be provided for the different problems and symptoms is still unclear. Factors that determine the acceptability of and motivation for exercise in patients with knee osteoarthritis, and the barriers that limit its use vary among patients (129). Four types of patients have been identified: 'long-term sedentary' who had never exercised; 'long-term active' who continued to exercise; 'exercise retired' who used to exercise, but had stopped because of their symptoms, and because they believed that exercise was damaging their joints; and 'exercise converted' who had recently started to exercise, and

preferred a gym because of the supervision and social support they received there. The findings from this qualitative study might help us to understand individual differences that might be considered more carefully when prescribing exercise to patients with knee osteoarthritis and to tailor exercise programmes. Although 34% of the patients in our study needed more activity, as assessed by the therapists, we have no additional information about patients' preferences or motivation for exercise.

The Norwegian therapists provided different types of information to the patients. The effects of advice and information about exercise and weight reduction provided by physiotherapists to patients with knee osteoarthritis are unclear. However, professional advice and guidance with continued support can encourage people from the general population to be more physically active (130). Long-term adherence to exercise is required to maintain the benefits of exercise in knee osteoarthritis, and because long-term adherence requires regular motivation, supervision and monitoring (130), physiotherapists should include such guidance in all treatment sessions. Although many physiotherapists gave advice about physical activity, only 15% of the physiotherapists reported having provided this in more than 80% of the sessions.

We found that only 58% of the patients that the physiotherapists categorized as overweight were given information and advice about weight reduction. There are many plausible explanations why many physiotherapists did not focus on weight reduction. They might not have enough knowledge or skills on how to address the problem, the topic might be too intimate or they may prefer to provide advice on physical activity instead. Still, physiotherapists should contribute to the positive outcomes of weight reduction by supervision and guidance, perhaps in cooperation with a dietician.

Practice data can be obtained from different sources, such as medical records, health practitioner or patient surveys, interviews and by direct observation (28;29). We used a practitioner survey and the therapists provided data from actual clinical practice by self-report. However, medical record audit has been referred to as the preferred method (28;29). The validity of records can vary depending on the type of information being extracted (131;132), especially in outpatient settings. In some cases clinical vignettes have been shown to be more valid than records (131;133). When researchers and clinicians extract practice data from medical records, they need to pay attention to the reliability of the record itself, as

well as to the validity of the record and the data extracted from it. Clinical vignettes have shown acceptable validity in measuring adherence to back pain guidelines in one study (134), but this has yet to be confirmed by other studies. Direct observation of practice is also suggested as a valid method for measuring practice. Strand et al used this approach together with interviews in a Norwegian study of physiotherapy performance in patients with low back pain (61). Such methods may be more valid than self-report, but may also be affected by socially desirable practice with an observer in the room. This is still to be documented.

Non-response to questionnaires is a well known problem that can introduce bias in surveys and epidemiological studies (65) and this is a major problem in surveys of clinical practice (52;59). Our study had a very low response rate, but this has also been seen in similar projects (59;127). It clearly points out the methodological challenges when conducting such studies. In the UK survey of exercise for knee osteoarthritis the response rate was approximately 25%, for a survey using clinical vignettes (127). There are several reasons for non-response in surveys of practice. Health professionals might not feel committed to contributing to such studies because they might think there are elements of external control involved. The source of the sender, whether it is a researcher, a university or an official board of health might influence how the survey is interpreted and responded to. In our study the work load was much higher than responding to a clinical vignette. We asked the participants to fill in the data collection form after every treatment session through 12 sessions, and this has clearly reduced the response rate. Many physiotherapists reported that no patient with knee osteoarthritis was referred to their practice during the study period. Even though we tried to exclude therapists which did not normally treat patients with knee osteoarthritis by sending out an invitation letter, this might still be a reason for non-response among the therapists that received the data-collection form.

It is important to find ways to increase response rates in such studies. The overall response rate was very low in our study, and a chocolate bar did not improve the rate of completed data-collection forms. The time lapse between receiving the chocolate and performing the requested tasks might be one explanation of the findings. All physiotherapists were sent two reminders. These reminders may have prompted both groups to respond, cancelling out any effect of the chocolate. Overall, a chocolate did not have a strong enough influence or one that lasted long enough to produce an effect on response. We might instead have chosen a stronger incentive, such as money or a lottery, but we did not have such recourses available. Our



findings support results from a systematic review on the effect of incentives on response rates to physician surveys. The review concluded that token nonmonetary incentives were much less effective than even small financial incentives (65).

Why health professionals do what they do is a crucial question in evidence-based practice and quality improvement. Factors influencing differences in performance are highlighted in the future research agenda for the science of quality and safety in health care (110). Variation in practice will always be expected because of the individual characteristics of patients and the differences in preferences among patients and health professionals. We found, however, that practice variation was associated with characteristics of the physiotherapists, and not with characteristics of the patients. Much of the variation in healthcare delivery has been considered unwarranted because it cannot be explained by type or severity of illness or by patient preferences (21;42). It is questionable whether the explanatory factors related to information-seeking behaviour, such as having Internet access or having searched databases, really are factors associated with the variation. Physiotherapists who are interested in seeking up-to-date information might differ from physiotherapists without this attitude (behaviour), and our findings might therefore be confounded by factors related to these personalities, such as being an innovator who wants to use new methods and new technology. Personal characteristics, especially a desire for learning and self-directed learning, have been associated with the propensity to adopt evidence-based physiotherapy, whereas characteristics of the social system made a minimal contribution to the observed variation in the propensity to adopt evidence-based physiotherapy (44). Bridges et al (44) suggested that the information-seeking behaviour common to both self-directed learning and evidence-based physiotherapy may account for the association. Our findings support results from a recent study of exercise for patients with knee osteoarthritis in the UK (127). Without including characteristics of patients in the analysis, they found that practice variation was associated with the number of years of clinical experience and with postgraduate training. Although we could not identify an association between the same factors, the findings indicate similar types of characteristics.

On the other hand, our findings do not support results from studies that concluded that variation in the number of physiotherapy treatment sessions for low back pain and ankle injuries mainly depended on patient characteristics, such as duration of complaints, prior therapy, recurrence of injury, patient age, and gender (50;51). Factors associated with

variation in number of treatment sessions might differ from factors associated with variation in the use of different treatments because these are different phenomena. Patient characteristics might be more important explanations for variation in number of treatment sessions, than for choice of treatment modalities. Contextual factors and reimbursement procedures may also be determinants of practice.

A wide range of factors can influence the clinical practice of healthcare professionals, including individual motivation for change as well as economic, political and organizational contexts (107). The problem of understanding and explaining clinical behaviour can be compared to understanding health-related behaviours, such as diet and physical activity. Lifestyle habits have been intensively investigated, and in this area social psychological theories are frequently used to explain behaviour. Such theories might also help to define and understand the importance of context on professional behaviour in health care. A recent systematic review examined the efficacy of studies based on social cognitive theories in explaining intention and predicting the clinical behaviour of healthcare professionals (135). The authors identified 16 prospective studies that provided information on the determinants of behaviour. On the basis of these studies Godin et al (135) suggested that the theory of reasoned behaviour which is an extension of the theory of reasoned action (136) appears to be an appropriate theory to predict the behaviour of healthcare professionals. The theory of reasoned action was proposed by Ajzen and Fishbein (136), and in simple terms it means that a person's voluntary behaviour is predicted by his/her attitude toward that behaviour and how he/she thinks other people would view them if they performed the behaviour. A person's attitude, combined with subjective norms, forms his/her behavioural intention. Whether this theory can help us to understand the behaviour of physiotherapists is still to be explored.

### ***Unanswered questions and further research***

This study has identified a number of unanswered questions and a need for further research within the area of physiotherapy performance and physiotherapy for patients with knee osteoarthritis. Further research is needed in clinical research, in health services research and implementation research.

Some of the questions that should be addressed in clinical research are:

- How should patients with knee osteoarthritis exercise to optimise outcomes?

- What are the effects of massage, traction and stretching in patient with knee osteoarthritis (addressed in primary studies and reviews)?
- How can the needs and preferences of patients with knee osteoarthritis be addressed in research and clinical practice?

Some questions that should be addressed in health services research and implementation research are:

- Which are the most valid, reliable and feasible methods to measure physiotherapy performance in primary care?
- How can the needs and preferences of patients be addressed in performance measurement in physiotherapy?
- Which factors can explain variation in physiotherapy performance?
- What are the effects of different strategies to promote evidence-based physiotherapy and improve clinical practice?
- How can we increase response rate and contribution in surveys of practice?

## Conclusions

- On the basis of systematic reviews, there is high quality evidence that exercise reduces pain and improves function in patients with knee osteoarthritis. There is moderate quality evidence that acupuncture, transcutaneous electrical nerve stimulation (TENS) and low level laser therapy reduce pain, and that psychoeducational interventions improve psychological outcomes. For other interventions the quality of evidence is low or there is no evidence from systematic reviews available. (Paper I).
- Among Norwegian physiotherapists the most important aim for the treatment of knee osteoarthritis was to reduce pain and to increase muscle strength. In line with high quality evidence, exercise was provided by almost all physiotherapists. TENS, low-level laser therapy and acupuncture, supported by moderate quality evidence, were each used by fewer than 25% of the therapists. Massage, traction and stretching, treatments which have missing evidence from systematic reviews, were used on approximately half of the patients. (Paper II).
- Characteristics of the patients could not explain the variation in clinical practice. The use of TENS and low level laser or acupuncture was significantly associated with having searched medical databases to help answer clinical questions in the last six months. Not having Internet access at work and the use of more than four different treatment modalities through 12 sessions were determinants for providing massage. Giving advice about weight reduction was associated with being a female therapist and with providing information about physical activity. (Paper III)
- A chocolate bar did not increase response rate. (Paper IV)

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## Papers I-IV









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# Physical Therapy Interventions for Patients With Osteoarthritis of the Knee: An Overview of Systematic Reviews

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Patients with osteoarthritis of the knee are commonly treated by physical therapists. Practice should be informed by updated evidence from systematic reviews. The purpose of this article is to summarize the evidence from systematic reviews on the effectiveness of physical therapy for patients with knee osteoarthritis. Systematic reviews published between 2000 and 2007 were identified by a comprehensive literature search. We graded the quality of evidence across reviews for each comparison and outcome. Twenty-three systematic reviews on physical therapy interventions for patients with knee osteoarthritis were included. There is high-quality evidence that exercise and weight reduction reduce pain and improve physical function in patients with osteoarthritis of the knee. There is moderate-quality evidence that acupuncture, transcutaneous electrical nerve stimulation, and low-level laser therapy reduce pain and that psychoeducational interventions improve psychological outcomes. For other interventions and outcomes, the quality of evidence is low or there is no evidence from systematic reviews.

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Osteoarthritis is the most common condition affecting synovial joints.<sup>1</sup> The prevalence of osteoarthritis increases with age, and the suffering and socioeconomic consequences are substantial. The need for clinical and cost-effective treatments is obvious.

Treatment strategies for osteoarthritis include pharmacological, non-pharmacological, and surgical interventions. In the last decade, many studies evaluating nonpharmacological treatments and physical therapy interventions have been published.

Systematic reviews of randomized controlled trials (RCTs) are considered to provide the highest level of evidence about the effectiveness of interventions. Clinicians and policy makers need evidence from systematic reviews to inform clinical practice and policy. Patients and researchers also need such information to support shared decisions and to set priorities for research. Although systematic reviews summarize the effects of a specific intervention for a specific condition, an overview of reviews (sometimes called “umbrella review”) typically summarizes evidence of many interventions for the same condition, or evidence on the same intervention for different conditions. Because the number of systematic reviews is rapidly increasing, there is a need for combining multiple reviews into overviews to provide users with easily available information. The aim of this overview is to summarize the evidence from systematic reviews on the effectiveness of physical therapy interventions for patients with osteoarthritis of the knee.

### Methods

#### Criteria for Including Reviews

We included systematic reviews published between 2000 and 2007 that examined any physical therapy intervention for patients with osteoarthritis

of the knee. We included reviews on patients with osteoarthritis in general if results from patients with knee osteoarthritis could be extracted separately. Reviews on all types of physical therapy interventions (eg, exercise, physical modalities, patient education) were included. For the purpose of this overview, we have considered pain and physical function as primary outcomes, but we also have included psychological outcomes (eg, scales of psychological disability or self-efficacy), as this information might be important to patients. The concept of “function” is based on the *International Classification of Functioning, Disability and Health* (ICF),<sup>2</sup> where “function” is an umbrella term for body function, body structure, activities, and participation. We included only reviews published in English or Scandinavian languages.

#### Search Strategy

We searched the Cochrane Library (Cochrane Database of Systematic Reviews and DARE), MEDLINE, EMBASE, and PEDro for systematic reviews published from 2000 to April 2006. In MEDLINE and EMBASE a filter based on the SIGN filters was used to identify reviews.<sup>3</sup> MESH terms and text words for osteoarthritis were entered (Appendix 1). In PEDro and the Cochrane Library, the searches were restricted to terms in the record title, abstract, or key words. In addition, we screened the reference lists of included studies. We did an updated search in the Cochrane Database of Systematic Reviews and MEDLINE in January 2007.

#### Identifying Relevant Reviews and Assessment of Methodological Quality

Two reviewers (GJ and KTD) independently assessed the relevance of all references based on abstracts, read the full text of relevant reviews, and assessed the methodological quality of included reviews using a modified version of a previously validated checklist<sup>4</sup> (Appendix 2). Nine

criteria related to search strategy, inclusion criteria, quality assessment, combining of studies, and conclusion were rated as “met,” “unclear/partially met,” or “not met.” Disagreement was resolved by discussion between the 2 reviewers. Based on a summary of these 9 criteria, an overall scientific quality of each review was labeled as “minor limitations” (at least 7 of the criteria met), “moderate limitations” (at least 4 of the criteria met), or “major limitations” (fewer than 4 of the criteria met). We excluded reviews with major limitations.

#### Data Extraction and Synthesis

One author (GJ or KTD) independently extracted data from each included review and discussed the data with the other author. Instruments and scales for assessment of methodological quality of RCTs in the reviews (eg, Jadad scale, PEDro scale) were extracted and entered into the table of characteristics of included reviews.

We applied the following criteria when we extracted data on results:

- Results for each comparison and outcome were extracted, if possible as pooled effect sizes with confidence intervals (or *P* values).
- If no direct comparison was undertaken or no quantitative pooling of data was done, the results were reported as “no quantitative pooling,” and the author’s conclusions of treatment effects were reported.
- If the results were reported inconsistently in different sections of the review, the treatment effects were extracted from the main result section.
- Inconsistency in results between reviews on the same topic was analyzed for differences in inclusion criteria, assessment of methodological quality, or methods for data synthesis.

**Table 1.**  
Quality of Evidence

Level of Quality of Evidence <sup>a</sup>	Based on:
High-quality evidence	One or more updated, high-quality systematic reviews that are based on at least 2 high-quality primary studies with consistent results
Moderate-quality evidence	One or more updated systematic reviews of high or moderate quality <ul style="list-style-type: none"> <li>● Based on at least 1 high-quality primary study</li> <li>● Based on at least 2 primary studies of moderate quality with consistent results</li> </ul>
Low-quality evidence	One or more systematic reviews of variable quality <ul style="list-style-type: none"> <li>● Based on primary studies of moderate quality</li> <li>● Based on inconsistent results in the reviews</li> <li>● Based on inconsistent results in primary studies</li> </ul>
No evidence from systematic reviews	There is no systematic review identified on this topic

<sup>a</sup> Based on principles from Grading of Recommendations Assessment, Development, and Evaluation (GRADE).<sup>5</sup>

Finally, principles from Grading of Recommendations Assessment, Development, and Evaluation (GRADE) were used to assess the quality of evidence for each outcome across reviews. GRADE is a system for grading the quality of evidence and strengths of recommendations.<sup>5</sup> The quality of evidence indicates the extent to which one can be confident that the estimate of effect is correct. High quality of the evidence means that further research is very unlikely to change our confidence in the estimate of effect.<sup>5</sup> Based on judgments considering design of primary studies, quality of primary studies, consistency (similarity of estimates of effect across studies), and directness (the extent to which comparisons, people, interventions, and outcome measures were similar to those of interest), the quality of evidence for each outcome in each main comparison was classified as “high,” “moderate,” “low,” or “no evidence from systematic reviews.” After grading the quality of evidence for each outcome in each comparison in each systematic review, the overall level of quality of the combined evidence was considered, as detailed in Table 1. In the table of overall level of quality, the following statements were used to indicate di-

rection of effect: “improves,” “reduces,” “no difference,” and “unclear.” “Unclear” also includes inconsistent evidence.

## Results

The literature search identified 1,027 relevant reviews (301 from MEDLINE, 552 from EMBASE, 114 from the Cochrane Library, and 60 from PEDro). After screening of abstracts, 49 reviews were retrieved in full text. Finally, 23 reviews fulfilled the inclusion criteria and were included in the overview. Reasons for exclusion of 26 reviews were: major limitations in methodological quality (n=4), duplicates (n=3), not a systematic review (n=10), published before the year 2000 (n=6), language restriction (n=2), and review withdrawn (n=1). Characteristics and results of included reviews are presented in Table 2.

The reviews covered the following topics: exercise, psychoeducational interventions, braces and orthoses, electromagnetic field, weight reduction, acupuncture, transcutaneous electrical nerve stimulation, low-level laser therapy, ultrasound, thermotherapy, electrical muscle stimulation, and balneotherapy. Sixteen of the reviews were of high quality (minor

limitations), and 7 reviews were of moderate quality.

## Exercise

A total of 9 reviews examined the effect of exercise on osteoarthritis of the knee. There was extensive overlap among primary studies in the reviews. A total of 113 RCTs were included in the 9 reviews, but these RCTs referred to 49 different trials only. Five reviews compared exercise with a control (home visits, telephone calls, education, or no intervention). The most updated review included 18 RCTs and concluded that exercise reduced pain.<sup>6</sup> A high-quality review conducted a meta-analysis of 17 RCTs that compared land-based exercise with a control intervention.<sup>7</sup> Overall, land-based exercise reduced pain and improved function. Both effect sizes were considered small. Subgroup analysis showed that both individual and group exercise reduced pain and improved function. The effect sizes were considered moderate.<sup>7</sup> The reviews by Pelland et al<sup>8</sup> and Petrella<sup>9</sup> confirmed these results in descriptive summaries. A meta-analysis from another updated review found that exercise did not improve psychological outcomes, but reported small to moderate effects

## Physical Therapy for Patients With Osteoarthritis of the Knee

**Table 2.**  
Characteristics of Included Reviews<sup>a</sup>

Reference	No. of Included Studies and Participants	QR <sup>b</sup> /QPS	Results
Effectiveness of exercise interventions in reducing pain symptoms among older adults with knee osteoarthritis: a review (Focht) <sup>6</sup>	18 RCTs (N=2,320)	QR: moderate limitations QPS: not reported	No quantitative pooling, descriptive summary Author's conclusion: aerobic training, strength training, and combination of aerobic and strength training reduce pain
Chronic osteoarthritis and adherence to exercise: a review of the literature (Marks and Allegrante) <sup>14</sup>	7 RCTs (2 knee) (N=2,165)	QR: moderate limitations QPS: not reported	No quantitative pooling, descriptive summary Authors' conclusion: interventions to enhance self-efficacy, social support, and skills in long-term monitoring of process are necessary to foster exercise adherence among people with OA
Do exercise and self-management interventions benefit patients with osteoarthritis of the knee? a meta-analytic review (Devos-Comby et al) <sup>10</sup>	16 RCTs (N=2,154)	QR: moderate limitations QPS: not reported	Exercise had small to moderate effect on physical outcomes compared with control (12 RCTs, including 808 participants), pooled ES=0.29 (95% CI= 0.23 to 0.36) Exercise did not improve psychological outcomes (4 RCTs, including 530 participants), mean ES=0.04, range=-0.11-0.13 (95% CI=-0.04 to 0.13) Exercise had a small positive effect on direct measures of impairment (11 RCTs, including 740 participants), mean ES=0.15, range=0.03-0.55 (95% CI= 0.08 to 0.23) Exercise had a small positive effect on overall impact of OA (13 RCTs, including 824 participants), mean ES=0.20, range=0.04-0.88 (95% CI= 0.13 to 0.27)
Aerobic walking or strengthening exercise for osteoarthritis of the knee? a systematic review (Roddy et al) <sup>11</sup>	13 RCTs (N=2,304)	QR: minor limitations QPS: 6 studies, 3/5, range=1-3 (Jadad scale: 0-5)	Aerobic walking reduced pain (4 RCTs, including 449 participants), pooled ES=0.52 (95% CI=0.34 to 0.70), and self-reported disability (2 RCTs, including 385 participants), pooled ES=0.46 (95% CI=0.25 to 0.67), compared with control Home-based quadriceps femoris muscle strengthening reduced pain (11 RCTs, including 2,004 participants), pooled ES=0.32 (95% CI=0.23 to 0.42), and self-reported disability (11 RCTs, including 2,004 participants), pooled ES=0.32 (95% CI=0.23 to 0.41), compared with control

(Continued)

Table 2.

Continued

Reference	No. of Included Studies and Participants	QR <sup>a</sup> /QPS	Results
Efficacy of strengthening exercise for osteoarthritis, part 1: a meta-analysis (Pelland et al) <sup>8</sup>	21 RCTs (18 knee) (N=2,325)	QR: minor limitations QPS: median=2, range=0-4 (out of 5)	No quantitative pooling, descriptive summary Authors' conclusion: evidence is provided for the inclusion of strengthening exercises in the rehabilitation of patients with OA to reduce pain and improve strength, function, and quality of life; there is no evidence that the type of strengthening exercise has an important impact on outcome
Efficacy of aerobic exercise for osteoarthritis, part 2: a meta-analysis (Brosseau et al) <sup>12</sup>	12 RCTs (11 knee) (N=1,363)	QR: minor limitations QPS: median=1, range=1-3 (out of 5)	No quantitative pooling, descriptive summary Authors' conclusion: aerobic exercise in various forms has beneficial effects on pain, joint tenderness, functional status, and respiratory capacity; aerobic exercise, in general, is more beneficial to patients with OA than no exercise at all and is superior or equivalent to strengthening exercises
Intensity of exercise for the treatment of osteoarthritis (Brosseau et al) <sup>13</sup>	1 RCT (N=39)	QR: minor limitations QPS: 3/5	No quantitative pooling, descriptive summary Authors' conclusion: there is no difference between high- and low-intensity stationary cycling on pain, function, gait, or $\dot{V}O_2/kg$
Exercise for osteoarthritis of the hip or knee (Fransen et al) <sup>7</sup>	17 RCTs (N=2,562)	QR: minor limitations QPS: median=3, range=2-5 (Jadad scale: 0-5)	Land-based exercise reduced pain compared with control (17 RCTs, including 2,394 participants), pooled ES=-0.39 (95% CI=-0.47 to -0.30) Individual exercise reduced pain compared with control (5 RCTs), pooled ES=-0.52 (95% CI=-0.72 to -0.32) Group exercise reduced pain compared with control (9 RCTs), pooled ES=-0.47 (95% CI=-0.60 to -0.34) Home-based exercise reduced pain compared with control (4 RCTs), pooled ES=-0.28 (95% CI=-0.40 to -0.16) Land-based exercise improved physical function compared with control (17 RCTs, including 2,562 participants), pooled ES=-0.31 (95% CI=-0.39 to -0.23)

(Continued)



## Physical Therapy for Patients With Osteoarthritis of the Knee

**Table 2.**

Continued

Reference	No. of Included Studies and Participants	QR <sup>b</sup> /QPS	Results
			Individual exercise improved physical function compared with control (5 RCTs), pooled ES= -0.32 (95% CI= -0.52 to -0.12) Group exercise improved physical function compared with control (9 RCTs), pooled ES= -0.39 (95% CI= -0.52 to -0.25) Home-based exercise improved physical function compared with control (5 RCTs), pooled ES= -0.32 (95% CI= -0.40 to -0.24)
Is exercise effective treatment for osteoarthritis of the knee? (Petrella) <sup>9</sup>	17 RCTs (N=unclear)	QR: moderate limitations QPS: not reported	No quantitative pooling, descriptive summary Author's conclusion: exercise had a small to moderate beneficial effect on pain compared with no treatment (4 studies); exercise had a small beneficial effect on self-reported disability compared with no treatment (6 studies); exercise had a small beneficial effect on walking speed compared with no treatment (8 studies); no evidence whether exercise improved global patient assessment compared with no treatment (2 studies)
Do exercise and self-management interventions benefit patients with osteoarthritis of the knee? a meta-analytic review (Devos-Comby et al) <sup>10</sup>	16 RCTs (N=2,154)	QR: moderate limitations QPS: not reported	Self-management programs did not improve physical outcomes compared with control (12 RCTs, including 387 participants), pooled ES=0.09 (95% CI= -0.01 to 0.19) Self-management programs had a small effect on psychological outcomes (9 RCTs, including 264 participants), mean ES=0.20 (95% CI=0.08 to 0.33) Self-management programs had no effect on direct measures of impairment (3 RCTs, including 44 participants), mean ES=0.04 (95% CI= -0.25 to 0.34) Self-management programs had a small positive effect on overall impact of OA (13 RCTs, including 387 participants), mean ES=0.11 (95% CI=0.01 to 0.21)
Meta-analyses: chronic disease self-management programs for older adults (Chodosh et al) <sup>15</sup>	53 studies (14 studies of OA)	QR: minor limitations QPS: not reported	Self-management programs reduced pain compared with control (21 comparisons from 14 studies), pooled estimate= -0.06 (95% CI= -0.10 to -0.02)

(Continued)

Table 2.

Continued

Reference	No. of Included Studies and Participants	QR <sup>b</sup> /QPS	Results
			Self-management programs improved function compared with control (916 comparisons from 12 studies), pooled estimate = -0.06 (95% CI = -0.10 to -0.02)
Effectiveness of psychoeducational interventions in osteoarthritis (Marks and Allegrante) <sup>16</sup>	17 studies with different designs, including 7 RCTs (6 knee) (N=871)	QR: moderate limitations QPS: unclear	No quantitative pooling, descriptive summary Authors' conclusion: research findings indicate that OA treatment and management may be greatly facilitated by the insightful application of interventions that reduce anxiety and foster patient understanding, coping skills, and confidence
Braces and orthoses for treating osteoarthritis of the knee (Brouwer et al) <sup>17</sup>	4 studies (N=444)	QR: minor limitations QPS: 4-6 on a Delphi score up to 10	No quantitative pooling, descriptive summary Authors' conclusion: there is "silver"-level evidence that a knee brace is better than a neoprene sleeve, which is better than no support, for reducing pain and stiffness and improving function (119 participants in 3 groups); 2 studies showed that a laterally wedged insole and a strapped insole may decrease pain, swelling, and medication needed, but a naturally wedged insole also improved some outcomes
Are foot orthotics efficacious for treating painful medial compartment knee osteoarthritis? a review of the literature (Marks and Penton) <sup>18</sup>	10 studies with different designs, including 3 RCTs (N=217)	QR: moderate limitations QPS: unclear	No quantitative pooling, descriptive summary Authors' conclusion: the data indicate a strong scientific basis for applying wedged insoles in attempt to reduce osteoarthritic pain of biomechanical origin
Pulsed electromagnetic energy treatment offers no clinical benefit in reducing the pain of knee osteoarthritis: a systematic review (McCarthy et al) <sup>19</sup>	5 RCTs (N=276)	QR: minor limitations QPS: median=4, range=3-5 (Jadad scale: 0-5)	No difference between groups was found for pain, ES=-0.66 (95% CI=-1.67 to 0.35), or function, ES=-0.70 (95% CI=-1.92 to 0.52); ES was not statistically or clinically significant for any outcomes, with the exception of function in one study, SMD=0.58 (95% CI=0.14 to 1.02)
Electromagnetic fields for the treatment of osteoarthritis (Hulme et al) <sup>20</sup>	3 RCTs (N=259)	QR: minor limitations QPS: median=4, range=4-5 (Jadad scale: 0-5)	No quantitative pooling, descriptive summary Authors' conclusion: electrical stimulation therapy had a small to moderate effect on outcomes for knee OA, all findings statistically significant, with clinical benefit ranging from 13% to 23% greater with active treatment than with placebo

(Continued)

## Physical Therapy for Patients With Osteoarthritis of the Knee

**Table 2.**

Continued

Reference	No. of Included Studies and Participants	QR <sup>b</sup> /QPS	Results
The effect of weight reduction in obese patients diagnosed with knee osteoarthritis: a systematic review and meta-analysis (Christensen et al) <sup>21</sup>	4 RCTs (N=454)	QR: minor limitations QPS: 3, 3, 2, 2 (Jadad scale: 0-5)	Pooled ES for pain (4 RCTs, including 417 patients)=0.20 (95% CI=0.00 to 0.39) Pooled ES for self-reported disability=0.23 (95% CI=0.04 to 0.42)
Transcutaneous electrical nerve stimulation for knee osteoarthritis (Osiri et al) <sup>23</sup>	7 RCTs (N=294)	QR: minor limitations QPS: median=3, range=1-3 (Jadad scale: 0-5)	TENS reduced pain compared with control (6 RCTs, including 264 participants), SMD=-0.45, VAS (95% CI=-0.70 to -0.20) Knee stiffness also improved significantly in the active treatment group compared with placebo (2 RCTs, including 90 participants), WMD=-5.97 cm (95% CI=-9.89 to -2.1)
A systematic review of low-level laser therapy with location-specific doses for pain from chronic joint disorders (Bjordal et al) <sup>25</sup>	11 RCTs (N=565 participants with knee OA from 5 studies)	QR: minor limitations QPS: mean=6.9, range=5-9 (PEDro scale: 0-10)	LLLT reduced pain compared with control (7 RCTs), WMD=29.8 mm on a 100-mm VAS (95% CI=18.9 to 40), 5 studies involved patients with knee OA LLLT improved health status compared with control (5 RCTs), RR of not improving=0.52 (95% CI=0.36 to 0.76), 2 studies involved patients with knee OA
Therapeutic ultrasound for osteoarthritis of the knee (Robinson et al) <sup>26</sup>	3 RCTs	QR: minor limitations QPS: 4, 1, 0 (Jadad scale: 0-5)	One study (quality score=4) compared US with placebo (N=74); no differences were found between groups for pain, WMD=1.3 on a 10-cm VAS (95% CI=-0.07 to 2.67), range of motion, WMD=-2.7° (95% CI=-15.98 to 10.58), or gait speed
Acupuncture for peripheral joint osteoarthritis: a systematic review and meta-analysis (Kwon et al) <sup>22</sup>	18 RCTs (N=1,745 participants with knee OA from 14 studies)	QR: minor limitations QPS: median=4, range=1-5 (Jadad scale: 0-5)	Manual acupuncture reduced pain compared with sham acupuncture (3 RCTs, including 407 participants, 2 studies of knee OA), SMD=0.24 (95% CI=0.01 to 0.47)
Electrical muscle stimulation for osteoarthritis of the knee: biological basis and systematic review (Marks et al) <sup>28</sup>	7 studies with different designs, including 6 RCTs (N=206)	QR: moderate limitations QPS: range=8-16 (out of 25) (Beckerman et al, 1992) <sup>c</sup>	No quantitative pooling, descriptive summary Authors' conclusion: in 6 of the 7 trials, there was a positive result for the group receiving EMS compared with the control group for different outcomes, irrespective of stimulus mode and intensity (no number reported); confidence in this conclusion is weakened by low quality of the studies

(Continued)

Table 2.

Continued

Reference	No. of Included Studies and Participants	QR <sup>a</sup> /QPS	Results
Thermotherapy for treatment of osteoarthritis (Brosseau et al) <sup>27</sup>	3 RCTs (N=179 participants with knee pain)	QR: minor limitations QPS: median=2/5 (Jadad scale: 0-5)	No quantitative pooling, descriptive summary Authors' conclusion: one study (50 participants) showed significant and clinically important improvement in quadriceps femoris muscle strength for ice massage compared with placebo TENS (29% relative difference); another trial showed that ice packs decreased knee edema; ice packs reduced edema more than hot packs in the third study, WMD= 2.01 (95% CI=0.92 to 3.10)
Efficacy of balneotherapy for osteoarthritis of the knee: a systematic review (Brosseau et al) <sup>29</sup>	3 RCTs (N=160)	QR: minor limitations QPS: 2, 4, 5 (Jadad scale: 0-5)	No quantitative pooling, descriptive summary Authors' conclusion: balneotherapy (combination baths) had short-term benefits for pain relief and function

<sup>a</sup> QR=quality of review, QPS=quality of primary studies, RCT=randomized controlled trial, OA=osteoarthritis, CI=confidence interval, Vo<sub>2</sub>=oxygen consumption, SMD=standardized mean difference, ES=effect size, TENS=transcutaneous electrical nerve stimulation, VAS=visual analog scale, LLT=low-level laser therapy, WMD=weighted mean difference, RR=relative risk, US=ultrasound, EMS=electrical muscle stimulation.

<sup>b</sup> Assessed by Oxman and Guyatt.<sup>4</sup>

<sup>c</sup> Beckerman H, Bouter LM, van der Heijden GJMG, et al. Efficacy of physiotherapy for musculoskeletal disorders: what can we learn from research? *Br J Gen Pract.* 1993;43:73-77.

on physical outcomes.<sup>10</sup> The quality of primary studies was not reported in this review.

Three reviews compared different types of exercise or different exercise intensities. Two reviews<sup>11,12</sup> concluded that there was no difference in effect between aerobic exercise (including walking) and strengthening exercise. The conclusion was based on subgroup analysis. Another review<sup>13</sup> included one study that compared high- and low-intensity exercise (stationary cycling) and found no difference in any outcome.

Marks and Allegrante<sup>14</sup> assessed the effect of adherence to exercise. From a descriptive summary of 7 RCTs on patients with osteoarthritis (2 studies on knee osteoarthritis),

the authors concluded that interventions to enhance self-efficacy and social support are necessary to foster exercise adherence among people with osteoarthritis.

All reviews concluded that exercise reduces pain and improves physical function. The effects are considered small to moderate in both high- and moderate-quality reviews. Thus, we conclude that there is high-quality evidence that exercise improves physical function and reduces pain. The reviews did not find any effect on psychological outcomes. This is based on documentation of moderate-quality evidence (Tab. 3).

#### Psychoeducational Interventions

Three reviews<sup>10,15,16</sup> summarized studies on self-management, psychoeducational interventions, and pa-

tient education. In the most updated review by Devos-Comby et al,<sup>10</sup> a meta-analysis of 12 RCTs showed no improvement in physical outcomes. Small improvements in psychological outcomes and overall impact of osteoarthritis were reported. In another meta-analysis,<sup>15</sup> the authors estimated the effect size of improvement in pain and function to equate to less than 2 mm on a 100-mm visual analog scale and to about 2 points on the Western Ontario and McMaster Universities Osteoarthritis Index. The authors concluded that these findings were not of clinical importance. The quality of primary studies was not reported in the reviews. Based on these 3 reviews, we conclude that there is moderate-quality evidence that psychoeducational interventions improve psychological outcomes, but no clinically impor-

## Physical Therapy for Patients With Osteoarthritis of the Knee

**Table 3.**  
Summary of Findings for Quality of Evidence Across Systematic Reviews

Intervention	Comparison	Results (Combined)	Quality of Evidence <sup>a</sup>
Exercise	No intervention, home visit, telephone call, education	Reduces pain	High
		Improves physical function	High
		No difference in psychological outcomes	Moderate
Weight reduction	Exercise, walking, or presentation	Improves self-reported disability	High
		Reduces pain	High
Pulsed electromagnetic energy	Placebo	No difference in pain	Moderate
		No difference in physical function	Moderate
Acupuncture	Sham, waiting list, transcutaneous electrical nerve stimulation, physical therapy	Reduces pain	Moderate
Transcutaneous electrical nerve stimulation	Placebo	Reduces pain	Moderate
		Reduces knee stiffness	Moderate
Low-level laser therapy	Placebo	Reduces pain	Moderate
Psychoeducational interventions and patient education	No intervention, standard care, attention control group, sham electrical stimulation	Improves psychological outcomes	Moderate
		No difference in pain	Moderate
		No difference in physical function	Moderate
Ultrasound	Placebo, galvanic current	Unclear	Low
Electrical stimulation Braces and orthoses Thermotherapy Balneotherapy	No intervention, placebo and other interventions	Unclear	Low
Massage Traction Magnet bracelets Tape		No included reviews	No evidence from systematic reviews

<sup>a</sup> Based on principles from Grading of Recommendations Assessment, Development, and Evaluation (GRADE).<sup>5</sup>

tant difference was found for pain or function (Tab. 3).

### Braces and Orthoses

Two reviews evaluated the effect of braces and orthoses. Brouwer et al<sup>17</sup> included 4 RCTs of low to moderate quality. Three studies evaluated the effect of different orthoses, and one study evaluated the effect of braces compared with medical treatment. The results varied. Marks and Penton<sup>18</sup> included 10 studies of different designs. Three RCTs overlapped

with studies included in the review by Brouwer et al. Both reviews concluded that braces and wedged insoles reduce pain for patients with osteoarthritis of the knee. We find the results conflicting and conclude that the effects of braces and orthoses are unclear (low-quality evidence).

### Electromagnetic Field

The effects of pulsed electromagnetic energy and electromagnetic fields were presented in 2 reviews. McCarthy et al<sup>19</sup> included 5 RCTs in

a meta-analysis and concluded that there was no difference between electromagnetic energy and a placebo for pain and function. The primary studies were of high quality. Hulme et al<sup>20</sup> concluded that electromagnetic fields reduced pain based on 3 included studies, but they did not perform a meta-analysis. We conclude that there is no difference between electromagnetic fields and placebo for pain and function. This is based on documentation of moderate-quality evidence (Tab. 3).

### Weight Reduction

One recently published review<sup>21</sup> evaluated the effect of weight reduction in patients with obesity who were diagnosed with osteoarthritis of the knee. In 4 RCTs, participants received nutrition classes and behavioral therapy, and the control groups received exercise, walking, or a presentation by a dietitian. Three studies demonstrated a significant weight loss in the intervention group. The mean weight loss was 6.1 kg. The meta-analysis reported improved self-reported disability and reduction in pain, but based on a meta-regression, the authors concluded that weight loss could not predict a significant reduction in pain score, although the *P* value for the pooled effect size was .05. A clinical effect on reduction in self-reported disability was confirmed by the meta-regression. The quality of primary studies was rated as high to moderate, and we conclude that there is high-quality evidence that weight reduction improves self-reported disability and reduces pain (Tab. 3).

### Acupuncture

Kwon et al<sup>22</sup> included 18 RCTs reporting on the effect of acupuncture for peripheral joint osteoarthritis. Fourteen studies were carried out on patients with osteoarthritis of the knee. Ten studies evaluated manual acupuncture compared with a control intervention, and 8 studies evaluated electrical acupuncture compared with sham or placebo acupuncture. Most of the control groups received sham acupuncture, but some groups were allocated to waiting lists or received transcutaneous electrical nerve stimulation or physical therapy modalities (eg, exercise). A meta-analysis including 3 RCTs (2 on the knee) reported a significant reduction in pain following acupuncture compared with sham acupuncture. Based on primary studies of moderate and high

quality with consistent results, we conclude that there is moderate-quality evidence that acupuncture reduces pain compared with a control intervention (Tab. 3). The quality is graded down to moderate because few studies included patients with knee osteoarthritis.

### Transcutaneous Electrical Nerve Stimulation

One review<sup>23</sup> compared transcutaneous electrical nerve stimulation with a placebo intervention. A meta-analysis of 6 RCTs revealed a reduction in pain after transcutaneous electrical nerve stimulation compared with the control intervention. The quality of the primary studies was moderate. Based on primary studies of moderate quality with consistent results, we conclude that there is moderate-quality evidence that transcutaneous electrical nerve stimulation reduces pain compared with a placebo intervention (Tab. 3).

### Low-Level Laser Therapy

We originally included 2 reviews on low-level laser therapy,<sup>24,25</sup> but in the updated search we found that the Cochrane Review on low-level laser therapy<sup>24</sup> was withdrawn because it needed to be updated. Thus, only one review summarizing 14 RCTs of low-level laser therapy for chronic joint disorders<sup>25</sup> is included. The meta-analysis of 7 RCTs concluded that laser therapy reduced pain and improved function compared with a placebo intervention. Two major studies in this meta-analysis did not include patients with osteoarthritis of the knee. Therefore, we graded the evidence down to moderate and conclude that there is moderate-quality evidence that low-level laser therapy reduces pain and improves function (Tab. 3).

### Ultrasound

One review<sup>26</sup> summarized the effect of ultrasound based on 3 RCTs. One high-quality study compared ultra-

sound with a placebo intervention, and 2 low-quality studies compared ultrasound with active therapy. No reduction in pain or improvement in function or range of motion were observed in the high-quality study, and the results in the other studies were unclear. Thus, we conclude that the effect of ultrasound is unclear (low-quality evidence) (Tab. 3).

### Thermotherapy

One review<sup>27</sup> included 3 RCTs on the effects of heat packs, cold packs, or ice massage. All studies had small sample sizes and low quality. The results for pain or function are not consistent, and we conclude that the effect of thermotherapy is unclear (low-quality evidence) (Tab. 3).

### Electrical Muscle Stimulation

One review of 6 RCTs<sup>28</sup> summarized the effect of electrical muscle stimulation. Some of the studies reported reduction in pain, but 3 studies had fewer than 25 participants and were of low to moderate quality. Based on one moderate-quality review with low- to moderate-quality primary studies and inconsistent results, we conclude that the effect of electrical muscle stimulation is unclear (low-quality evidence) (Tab. 3).

### Balneotherapy

One review including 3 RCTs<sup>29</sup> evaluated different types of balneotherapy. No meta-analysis was performed. At least one primary study was of low quality. The authors concluded that combination baths seem to have a short-term benefit for pain relief compared with tap water. Based on few studies and heterogeneous results, we conclude that the effect of balneotherapy is unclear (low-quality evidence) (Tab. 3).

### Other Interventions

There is no systematic review published on the effects of massage, traction, magnet bracelets, or tape for knee osteoarthritis (Tab. 3).

### Discussion

This overview of systematic reviews on physical therapy interventions for patients with osteoarthritis of the knee is based on a thorough literature search, assessment of study quality, and synthesis of findings. One extensive overview of the effectiveness of exercise therapy was published earlier,<sup>30</sup> but, to our knowledge, no overview has used our explicit and systematic method.

Given the large number of reviews included in this overview, few comparisons could be graded as high-quality evidence. Only exercise for reducing pain and improving function and weight loss for disability were supported by high-quality evidence. Acupuncture, transcutaneous electrical nerve stimulation, and low-level laser therapy for pain reduction were graded as moderate-quality evidence, although they were all close to high quality. Updating of these reviews might confirm the findings and upgrade the evidence to high quality. For other interventions and outcomes, the quality of evidence was assessed as moderate, low, or no evidence from systematic reviews. New trials are needed within these areas. For a few interventions, no systematic review was identified.

Exercise was covered in 9 reviews. Because most patients with osteoarthritis receive exercise as part of their treatment, physical therapists need updated evidence concerning type, frequency, and dose of optimal exercise. Many of the reviews concluded that both aerobic and strengthening exercise, as well as individual and group exercise, are effective in patients with knee osteoarthritis.<sup>11,12</sup> The conclusions are based on indirect comparisons and subgroup analysis and should be interpreted with caution. To answer questions of optimal type, frequency, and dose of exercise, head-to-head comparisons in which participants are ran-

domly assigned to receive different exercise modalities are highly needed. One review concluded that weight reduction decreased pain and improved self-reported disability for patients who are obese. The intervention was carried out as a nutrition class and was combined with cognitive behavioral therapy. We included this review because physical therapists may play an important role in supporting people to lose weight. Based on the high-quality evidence for weight loss and exercise, physical therapists should consider collaborating with dietitians in order to reduce pain and improve function in patients with osteoarthritis of the knee.

There are important limitations in summarizing evidence based on systematic reviews only. First, primary studies might be overlooked. Even though reviews should be updated regularly, new studies are published frequently. This overview clearly shows that several reviews need updating. Not all interventions are covered by a review, and we did not find any review on massage, traction, tape, and magnet bracelets for osteoarthritis of the knee. Second, because the reviews have limited information about the trials, the conclusions may become too broad to be useful for clinicians. We think that findings from overviews should be used primarily as a compass for deciding what type of intervention to use. With regard to how interventions should be specifically carried out, overviews may have limited value. It also is important for clinicians and policy makers not to interpret low-quality evidence as evidence of no effect. Low-quality evidence means unclear evidence, and findings should initiate more research and reviews.

It was difficult to extract data on methodological quality and results from some reviews because of poor reporting. Authors of systematic re-

views should use explicit and systematic methods for including, finding, assessing, and summarizing evidence. Although a meta-analysis cannot always be performed, a synthesis of results should be expected. Sometimes conclusions were not supported by the data presented. We often found results presented study by study and by individual forest plots, making the overall results difficult to interpret. We strongly encourage authors of systematic reviews to make a synthesis of the results instead of summarizing study by study only. In this overview, 12 out of 23 included reviews come from 2 research teams. Whether this could introduce a source of bias is difficult to estimate, but it should be kept in mind.

We included 23 reviews in this overview. Reviews on exercise contributed a lot to this by 9 included reviews. Clinical guidelines often are based on evidence from systematic reviews; therefore, we need more reviews. From 1999 to 2006, the number of included reviews in the PEDro database increased from 200 to more than 1,400.<sup>31</sup> More effort also should be put into primary research.

Physical therapy interventions might be useful for people with osteoarthritis of the knee, but for some of the interventions the effect is unclear. A survey revealed that patients with osteoarthritis of the knee are interested in, and want, alternative treatments.<sup>32</sup> The study also concluded that there was a mismatch between the amount of research and the degree of interest from consumers.<sup>32</sup> A recent systematic review of the course of functional status and pain in people with osteoarthritis of the hip and knee showed that increased muscle strength (force-generating capacity), better self-efficacy, and aerobic exercise all were protective factors in the first 3 years of osteoarthritis.<sup>33</sup> The findings



and conclusions from the present overview confirm that physical therapy is beneficial for patients with osteoarthritis of the knee, but more research is needed. Exercise, including a weight reduction program for patients who are obese, seems to be a valuable treatment option for patients with pain and functional problems due to osteoarthritis of the knee.

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## Physical Therapy for Patients With Osteoarthritis of the Knee

### Appendix 1.

#### Search Strategy

<p>EMBASE</p> <ol style="list-style-type: none"> <li>1. Systematic Review/</li> <li>2. meta analysis/</li> <li>3. metaanaly\$.tw.</li> <li>4. meta analy\$.tw.</li> <li>5. ((systematic or comprehensive or literature or quantitative or critical or integrative or evidence\$) adj2 (review\$1 or overview\$1)).tw.</li> <li>6. literature study.tw.</li> <li>7. (critical adj (appraisal or analysis)).tw.</li> <li>8. cochrane.ab.</li> <li>9. medline.ab.</li> <li>10. embase.ab.</li> <li>11. (psychlit or psyclit).ab.</li> <li>12. (psychinfo or psycinfo).ab.</li> <li>13. (cinahl or cinhal).ab.</li> <li>14. science citation index.ab.</li> <li>15. bids.ab.</li> <li>16. cancerlit.ab.</li> <li>17. reference list\$.ab.</li> <li>18. bibliograph\$.ab.</li> <li>19. hand-search\$.ab.</li> <li>20. relevant journals.ab.</li> <li>21. manual search\$.ab.</li> <li>22. selection criteria.ab.</li> <li>23. data extraction.ab.</li> <li>24. 22 or 23</li> <li>25. review.pt.</li> <li>26. 24 and 25</li> </ol>	<ol style="list-style-type: none"> <li>27. or/1-21,26</li> <li>28. editorial.pt.</li> <li>29. letter.pt.</li> <li>30. Animal/</li> <li>31. Nonhuman/</li> <li>32. 30 or 31</li> <li>33. Human/</li> <li>34. 32 not (32 and 33)</li> <li>35. or/28-29,34</li> <li>36. 27 not 35</li> <li>37. exp Osteoarthritis/</li> <li>38. osteoarthritis.tw.</li> <li>39. 37 or 38</li> <li>40. 39 and 36</li> <li>41. limit 40 to yr="2000-2006"</li> </ol> <p>MEDLINE</p> <ol style="list-style-type: none"> <li>1. Meta-analysis/</li> <li>2. meta analy\$.tw.</li> <li>3. metaanaly\$.tw.</li> <li>4. meta analysis.pt.</li> <li>5. ((systematic or comprehensive or literature or quantitative or critical or integrative or evidence\$) adj2 (review\$1 or overview\$1)).tw.</li> <li>6. literature study.tw.</li> <li>7. (critical adj (appraisal or analysis)).tw.</li> <li>8. exp Review Literature/</li> <li>9. cochrane.ab.</li> <li>10. medline.ab.</li> <li>11. embase.ab.</li> </ol>	<ol style="list-style-type: none"> <li>12. (psychlit or psyclit).ab.</li> <li>13. (psychinfo or psycinfo).ab.</li> <li>14. (cinahl or cinhal).ab.</li> <li>15. science citation index.ab.</li> <li>16. bids.ab.</li> <li>17. cancerlit.ab.</li> <li>18. reference list\$.ab.</li> <li>19. bibliograph\$.ab.</li> <li>20. hand-search\$.ab.</li> <li>21. relevant journals.ab.</li> <li>22. manual search\$.ab.</li> <li>23. selection criteria.ab.</li> <li>24. data extraction.ab.</li> <li>25. 23 or 24</li> <li>26. review.pt.</li> <li>27. 25 and 26</li> <li>28. or/1-22,27</li> <li>29. comment.pt.</li> <li>30. letter.pt.</li> <li>31. editorial.pt.</li> <li>32. animal/</li> <li>33. human/</li> <li>34. 32 not (32 and 33)</li> <li>35. or/29-31,34</li> <li>36. 28 not 35</li> <li>37. exp Osteoarthritis/</li> <li>38. limit 37 to yr="2000-2006"</li> <li>39. 36 and 38</li> <li>40. osteoarthritis.tw.</li> <li>41. 37 or 40</li> <li>42. 41 and 36</li> <li>43. limit 42 to yr="2000-2006"</li> </ol>
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### Appendix 2.

#### Criteria for Assessment of Quality of the Reviews

The following 9 criteria were rated as "met," "unclear/partly met," or "not met" according to a criteria list modified from Oxman and Guyatt<sup>4</sup>:

1. Is the search strategy described in enough detail for the search to be reproducible?
2. Was the search for evidence reasonably comprehensive?
3. Were the criteria used for deciding which studies to include in the review reported?
4. Was bias in the selection of articles avoided?
5. Were the criteria used for assessing the validity of the studies that were reviewed reported?
6. Was the validity of all of the studies referred to in the text assessed using appropriate criteria in analyzing the studies that are cited?
7. Were the methods used to combine the findings of the relevant studies (to reach a conclusion) reported?
8. Were the findings of the relevant studies combined (or not combined) and analyzed appropriately relative to the primary question the review addresses and the available data?
9. Were the conclusions made by the author(s) supported by the data and/or the analysis reported in the review?





## Measuring physiotherapy performance in patients with osteoarthritis of the knee: A prospective study

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### Abstract

**Background:** Patients with knee osteoarthritis [OA] are commonly treated by physiotherapists in primary care. Measuring physiotherapy performance is important before developing strategies to improve quality. The purpose of this study was to measure physiotherapy performance in patients with knee OA by comparing clinical practice to evidence from systematic reviews.

**Methods:** We developed a data-collection form and invited all private practitioners in Norway [ $n = 2798$ ] to prospectively collect data on the management of one patient with knee OA through 12 treatment sessions. Actual practice was compared to findings from an overview of systematic reviews summarising the effect of physiotherapy interventions for knee OA.

**Results:** A total of 297 physiotherapists reported their management for patients with knee OA. Exercise was the most common treatment used, provided by 98% of the physiotherapists. There is evidence of high quality that exercise reduces pain and improves function in patients with knee OA. Thirty-five percent of physiotherapists used acupuncture, low-level laser therapy or transcutaneous electrical nerve stimulation. There is evidence of moderate quality that these treatments reduce pain in knee OA. Patient education, supported by moderate quality evidence for improving psychological outcomes, was provided by 68%. Physiotherapists used a median of four different treatment modalities for each patient. They offered many treatment modalities based on evidence of low quality or without evidence from systematic reviews, e.g. traction and mobilisation, massage and stretching.

**Conclusion:** Exercise was used in almost all treatment sessions in the management of knee OA. This practice is desirable since it is supported by high quality evidence. Physiotherapists also provide several other treatment modalities based on evidence of moderate or low quality, or no evidence from systematic reviews. Ways to promote high quality evidence into physiotherapy practice should be identified and evaluated.

### Background

Osteoarthritis [OA] is the most common condition affect-

ing synovial joints [1]. The number of persons affected by OA in the western world will increase because its preva-

lence increases with age [1]. Patients with knee OA are managed in primary care, and they represent a large group seen by physiotherapists. An overview of systematic reviews covering physiotherapy interventions for patients with osteoarthritis of the knee demonstrates that exercise can reduce pain and improve function in patients with knee OA [2]. It also indicates that low-level laser, transcutaneous electrical nerve stimulation and acupuncture can reduce pain, and that psychoeducation, including patient education and self-management programmes, can improve psychological outcomes. Thus, physiotherapy can improve pain and function and play an important role in the management of patients with knee OA.

Improving the quality of care is a major issue for all health care systems, and measuring performance is essential for the planning and evaluation of quality improvement strategies [3-5]. Measuring performance means comparing actual clinical practice to desired clinical practice. Patient perspectives of care and patient outcomes can also be included in performance measurements [3]. Most performance studies in physiotherapy have described management of low back pain [6-9]. Although OA is a highly prevalent disease, little is known about the performance, including physiotherapy for patients with OA [10].

The aim of this study was to measure physiotherapy performance in patients with knee OA by comparing actual clinical practice to evidence from systematic reviews.

## Methods

The study was conducted among private physiotherapy practitioners in Norway, who are integrated into primary health care. The National Committees for Research Ethics in Norway approved the protocol for the study.

### Data collection form

For the purpose of this study, we developed a paper-based data-collection form to register actual clinical practice for patients with knee OA. We started the development by visiting several practices, observing physiotherapists treating patients with knee OA. In two one-day meetings, ten clinicians invited through The Norwegian Physiotherapy Association developed, piloted and revised the data-collection form in collaboration with the researchers. We piloted the form among 10 physiotherapists and assessed the reliability of the form using 15 independent observations of treatment sessions. We evaluated the relationship between data entered independently by the observer, who was an experienced physiotherapist, and data entered by the treating physiotherapists and calculated kappa scores.

The final form was in three parts (see variables and the original data-collection form in Additional files 1 & 2). Part one covered patient characteristics, the physiotherapy

examination and the treatments goals, e.g. the patients gender and age, time since diagnosis, type of pain classified in six categories (e.g., pain at night, rest, weight bearing, start of activity) and intensity of pain measured on a ten point visual analog scale (VAS), co-morbidity and the physiotherapist's judgement of physical activity level and patient weight. The aims of treatment, e.g. reducing pain, improving function, muscle strength, aerobic capacity or increasing knowledge were assessed on a six point scale from "Not important at all" to "Very important".

Part two was designed to report the treatment modalities used in each session during 12 sessions. This part contained a list of 35 different treatments, e.g. types of exercise, massage, traction, hot packs, physical modalities, information and patient education. We also collected information about whether the patients were treated individually or in groups. We chose 12 treatment sessions because this is the number most often used when general practitioners refer patients to physiotherapy in Norway. Part three collected information on characteristics of the physiotherapists, e.g. gender, age, years since qualification, work setting and postgraduate education. A designer contributed to the lay-out to create a user-friendly form.

### Recruitment

We invited all private practitioners, identified by membership of The Norwegian Physiotherapy Association in February 2006, to participate in the study [n = 2798]. We asked the physiotherapists to report the management of the first patient with knee OA referred to their practice [one case], and to complete the form at every treatment session. The diagnosis should be confirmed by x-ray or magnetic resonance imaging. Patient who had a knee arthroplasty or postoperative treatments were excluded.

In response to an invitation letter sent out in May 2006, 744 physiotherapists replied that they did not normally treat patients with OA, or that they had other reasons for not being eligible. In August 2006 we distributed the anonymous data-collection form with a pre-paid return envelope to the remaining physiotherapists [n = 2054]. To increase the response rate, we sent two reminder letters to all, and one e-mail postcard to those with an e-mail address, and we contacted practices with more than five physiotherapists by telephone. The study was also described in the *Norwegian Physiotherapy Journal* and in a newsletter sent to all private practitioners. The data collection period was nine months, from August 2006 to May 2007.

### Research evidence and performance

We have previously summarised the evidence from systematic reviews on physiotherapy interventions for patients with knee OA in an overview, and assessed the

quality of evidence for each intervention, comparison and outcome [2]. The quality of evidence for the interventions was categorised as high, moderate or low, or as no evidence from systematic reviews. The quality of the evidence indicates the extent to which one can be confident that the estimate of effect is correct. High quality evidence indicates that further research is very unlikely to change our confidence in the estimate of effect.

We measured physiotherapy performance by comparing practice reported in the data-collection forms to the findings from the overview. If the physiotherapist used interventions that were supported by evidence for improving patient outcomes of high or moderate quality, we interpreted the practice as desirable. Even though there was a lack of evidence for the effects of giving advice, we considered giving advice and information about physical activity and weight reduction as desirable practice.

### Analysis

We performed descriptive analysis, based on frequency distribution and percentages, to assess characteristics of the patients and the physiotherapists, and the treatments used. Different types of exercise, e.g. exercises aimed to increase muscle strength, aerobic capacity, coordination or range of motion, were merged into one treatment modality. We classified the use of each treatment modality into three categories, "not used", "used in up to 80% of the sessions" and "used in more than 80% of the sessions". "Used in more than 80% of the sessions" was interpreted as treatment used in almost all sessions. We also calculated the total number of different treatment modalities used by each physiotherapist through the sessions.

### Results

We received a response from 527 therapists. Among these, 297 had treated one patient with knee OA and had completed the data-collection form. The responders that did not complete the form ( $n = 230$ ) reported various reasons for not completing, e.g. no patient referred during the study period ( $n = 109$ ), not working in clinical practice ( $n = 41$ ) or specialist in other areas such as neurology, child or mental health ( $n = 46$ ).

When assessing the reliability of the data-collection form we found that the different items had a kappa score that varied from 0.8 to 1.0. For some types of exercise, e.g. exercise aimed at increasing strength, coordination and stability, the score was lower.

The mean age of the physiotherapists was 47 years [SD = 11]. Almost half [47%] were women [Table 1]. Patients had a mean age of 65 years [SD = 11], and 67% were women. Pain intensity during the last week was 5.9 [SD =

**Table 1: Characteristics of physiotherapists (N = 297)**

Variable	
Age [mean [SD]]	47 [11]
Year since qualification [mean [SD]]	21 [12]
Women [%]	47
Practice setting [%]	
Single practice	15
2–5 colleagues	58
More than 5 colleagues	27
Postgraduate education [%]	26
Specialist [%]	11
Masters degree [%]	3

2.1] on a 10-point visual analogue scale [VAS]. Almost half of the patients [46%] suffered from pain during night, or at rest. More than half had bilateral knee OA, and 32% were diagnosed more than five years ago. Thirty three percent were considered overweight, and 31% had important co-morbidity, most frequently reported was cardiovascular diseases or low back pain. Fifty percent of the patients were referred to physiotherapy for knee OA for the first time.

The most important aim for the treatment, as reported by the therapists, was to reduce pain [92%], followed by increasing muscle strength [85%].

Exercise was used by all but six physiotherapists [2%], and 86% used exercise in almost all sessions; 11% of physiotherapists provided exercise as the only treatment at all 12 sessions. As described in Table 2, there is high quality evidence that exercise reduces pain and improves physical function in patients with knee OA. Type of exercise, e.g., improving muscle strength, gait, range of motion and stability varied widely, both within and across sessions. Muscle strengthening exercises were most commonly used (90%). Few physiotherapists (17%) treated their patients in a group setting.

There is evidence of moderate quality that transcutaneous electrical nerve stimulation [TENS], low-level laser therapy and acupuncture reduce pain. Each of these modalities were used by less than 25% of the therapists [Table 2]. Moderate quality evidence suggests that short-wave or pulsed electromagnetic energy has no effect on outcomes for knee OA. This modality was provided by only 10% of physiotherapists.

The physiotherapists applied a median number of four [range 1–10] different treatment modalities for each patient throughout the sessions. Massage, traction/mobilisation and stretching were the next most common modalities after exercise, and were applied in approximately half of patients [Table 2]. There is no evidence

**Table 2: Number [%] of treatment modalities used in the management of patients with knee osteoarthritis according to quality of evidence from systematic reviews (SR)**

Type of intervention	Not used at all	Used in up to 80% of the sessions	Used in more than 80% of the sessions	Quality of evidence
Exercise	6 [2]	35 [12]	256 [86]	High for pain reduction and improved physical function Moderate for no improvement in psychological outcomes Moderate for pain reduction
TENS (transcutaneous electrical nerve stimulation)	260 [88]	16 [5]	21 [7]	Moderate for pain reduction
Low level laser therapy	265 [89]	22 [7]	10 [4]	Moderate for pain reduction
Acupuncture (manual, electrical and trigger point)	237 [80]	40 [14]	20 [7]	Moderate for pain reduction
Short wave therapy (and pulsed electromagnetic energy)	268 [90]	16 [5]	13 [4]	Moderate for no reduction in pain or improvement in physical function
Patient education, self-management and psychoeducation	53 [18]	214 [72]	29 [10]	Moderate for improving psychological outcomes Moderate for no difference in pain or physical function
Ultrasound	249 [84]	21 [7]	27 [9]	Low for all outcomes
Thermotherapy (heat packs)	251 [85]	20 [7]	26 [8]	Low for all outcomes
Thermotherapy (cold packs)	278 [94]	12 [4]	7 [2]	Low for all outcomes
Braces and orthosis	273 [92]	21 [7]	3 [1]	Low for all outcomes
Tape	286 [96]	10 [3]	1 [0]	No evidence from SR
Massage	137 [46]	69 [24]	91 [30]	No evidence from SR
Traction	158 [53]	60 [20]	78 [26]	No evidence from SR
Stretching	158 [53]	57 [19]	81 [27]	No evidence from SR
Advice about physical activity	32 [11]	220 [74]	45 [15]	No evidence from SR
Advice about weight reduction among 102 patients considered overweight	43 [42]	55 [54]	4 [4]	No evidence from SR

from systematic reviews about the effect of these treatments.

There is evidence of moderate quality that psychoeducation, including patient education and self-management programmes improve psychological outcomes, e.g., scales of psychological disability, mental functioning, self-efficacy or depressive symptoms. Sixty eight percent used interventions that were classified as psychoeducation, such as education about OA and coping with the disease. Almost all physiotherapists [90%] provided information and guidance about physical activity, and 76% prescribed a home exercise programme.

The physiotherapists provided advice and information about weight reduction to 59 [58%] of the 102 patients that they considered overweight. On the other hand, almost all patients that the physiotherapist assessed to need more physical activity [n = 101] received advice and support for increasing activity level [n = 92].

## Discussion

To our knowledge, this is the first study of physiotherapy performance for patients with knee OA. The study describes clinical practice in terms of individual patients,

as recorded prospectively by therapists during every treatment session. We compared the treatment to findings from an overview of systematic reviews. Quality of care includes many elements. We have studied one important factor that contributes to quality, – the factor of clinical effectiveness.

Almost all therapists in this study used exercise in all treatment sessions. This current practice is desirable, since it is supported by evidence of high quality. Less than 35% of physiotherapists used acupuncture, low-level laser therapy or TENS which have moderate-quality evidence for reducing pain. In addition, physiotherapists used many treatment modalities with low-quality evidence or no evidence from systematic reviews, e.g., traction, massage and stretching.

The physiotherapists provided different types of exercises. Because there is no evidence from systematic reviews to support one specific type or dose [11], we merged different types of exercise into one treatment modality. Clearly, we lost some information about practice by this procedure, but as long as no type of exercise is shown to be more beneficial than another we think this was reasonable. We also categorised different information modalities,

but separated simple information about exercise and weight reduction from psychoeducation and self-management programmes. There is clearly an overlap between these interventions that might introduce information bias or misclassification in this study. The effects of advice and information about exercise and weight reduction provided by physiotherapists to patients with knee OA is unclear, although systematic reviews have demonstrated that exercise and weight reduction improve outcomes in knee OA [2]. However, professional advice and guidance with continued support can encourage people from the general population to be more physically active [12]. Long-term adherence to exercise is required to maintain the benefits of exercise in knee OA, and because long-term adherence requires regular motivation, supervision and monitoring [12], physiotherapists should include such guidance in all treatment sessions. Although many gave advice about physical activity, few physiotherapists [15%] reported having provided this in more than 80% of the sessions.

Only 58% of the patients that the physiotherapists categorized as overweight were given information and advice about weight reduction. The therapists rated subjectively if the patient was overweight. This method might be prone to bias because we do not know how this measure compares with body mass index, which is commonly used to identify overweight. However, clinical judgement and experience might be as important as body mass index for offering patients advice about weight reduction. There are many plausible explanations why many physiotherapists did not focus on weight reduction, e.g., they do not have enough knowledge and/or skills on how to address the problem, the topic is too intimate or they provide advice on physical activity instead. Still we think that physiotherapists might contribute to the positive outcomes of weight reduction by supervision and guidance, perhaps in cooperation with a dietician.

Our findings are comparable to studies of physiotherapy performance for low back pain which demonstrate that adherence to guidelines varies across different treatment modalities [6,9,13]. Treatments for which evidence is limited or absent are also frequently used [6,9]. Interestingly, our study shows that electrotherapy modalities that can reduce pain supported by moderate quality evidence were used by less than 35% of the physiotherapists. In studies of low back pain [6,14], electrotherapy was more frequently used even though there was no evidence of effect. However, interventions should always be specified to meet the need from individual patients, and the physiotherapists might choose not to use these modalities if the patient had mild pain. If providing electrotherapy, the physiotherapist should choose modalities supported by moderate quality evidence instead of modalities with no

evidence, or with evidence of no effect. Still, almost all therapists used exercise, and exercise can also reduce pain. Though, we can not argue that the therapists were providing inadequate care by not using low level laser, TENS or acupuncture.

There are some limitations to this study. The response rate was low, and this might be a threat to the validity of the data of physiotherapy performance because the therapists that responded might have different practice pattern than the study population. We feared that a low response rate might be a problem, and we tried to develop a strategy to get a large and unbiased sample of responses from Norwegian physiotherapists. We invited all private practitioners in Norway to the study. We used finding from a systematic review on how to increase response rate [15]. We contacted the physiotherapists before the study started, the data-collection form was user-friendly with pre-paid return and we had several follow-up contacts. In addition, we enclosed a bar of dark chocolate with a sticker saying "Thank you for contributing to physiotherapy documentation" randomly to half of the physiotherapists.

The physiotherapists who participated were comparable to private practitioners in Norway regarding age [mean age reported by the Norwegian Physiotherapists Association is 48], although a higher proportion of men responded to our study. We have no additional information about the non-responding physiotherapists. Surprisingly many physiotherapists reported that they did not treat a patient with knee OA during the study period. This might also be the case for many of the non-responders.

Other studies of physiotherapy performance in primary care that have used a prospective design have experienced the same lack of participation [6,16]. When Swinkels et al established a network to collect practice data on a continuous basis in The Netherlands they only collected data from 90 physiotherapists [9].

Another potential source of bias is the self-selection of patients, because the therapists might choose patients that are not representative to patients normally treated in private practice. We asked the physiotherapists to report the management of the first patient with knee OA. The characteristics of the patients in the study are comparable to patients included in 36 trials in a systematic review on physical interventions for patients with OA [17]. The mean age was 65.1 years and the mean baseline pain score was 62.9 on a 100-mm VAS.

We collected data by self-report from the therapist. Self-report of practice might represent a threat to validity because some therapists might report treatments that they do not perform. Some might also adopt new practice pat-



tern because they think it is expected. This might mean that self-reported adherence rates to guidelines could exceed the rate measured by medical records or observation [18]. There might be variation in how the therapists interpret and respond to the data collection from.

We measured performance by comparing practice to findings from systematic reviews. For some interventions we lack evidence because we did not identify any systematic reviews. Evidence of high quality from primary studies not included in systematic reviews might be available for such interventions. This is clearly a limitation to our approach. Secondly, some reviews needed updating. Inclusion of new primary studies might change the estimates of effect and the quality of evidence. Finally, it is crucial to remember that "no evidence from systematic reviews" does not imply "evidence of no effect".

It is difficult to measure physiotherapy performance because physiotherapy practice is complex. Treatment can differ both within and across sessions. Type, dose and frequency vary and the interaction and communication between patient and therapist are important parts of the therapy. In the present study we assessed performance for one measurable part of physiotherapy practice, but we excluded interpersonal communication, structural aspects of care, organisational culture, teamwork and access. These are other important parts of high quality physiotherapy care. Multiple data collection methods might be used to get a more comprehensive picture of actual physiotherapy practice.

Despite clear limitations in our methods, this study contributes to the knowledge about physiotherapy performance in patients with knee OA. We need research to develop valid and reliable methods to measure physiotherapy performance in primary care, as well as research on how to bridge research and clinical practice. Specifically, we should identify effective ways to promote interventions supported by high quality evidence. Finally, in order to be able to measure performance in physiotherapy, we need more research and more systematic reviews on the effects of physiotherapy interventions for patients with knee OA. Because physiotherapists use exercise regularly for patients with knee OA, and there are different opinions about optimal exercise regimen, studies should compare different types, settings, intensities and volumes of exercise. Interventions that are frequently used by physiotherapists without evidence from systematic reviews, e.g., traction, massage and stretching for patients with knee OA, should be tested in rigorous trials and summarised in reviews.

## Conclusion

This study provides information about physiotherapy performance in patients with knee OA. Exercise is the most common treatment and this is supported by high quality evidence. Physiotherapists also provide several treatment modalities based on moderate and low quality evidence of benefit, or without evidence from systematic reviews. We need more research to develop and identify the best methods to measure physiotherapy performance in primary care.

## Abbreviations

OA: osteoarthritis; SD: standard deviation; TENS: transcutaneous electrical nerve stimulation; VAS: visual analogue scale.

## Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

GJ wrote the protocol and designed the study, developed the data-collecting instrument, performed the analysis and drafted the first version of the manuscript. KTD contributed to designing the study, piloted the instrument, entered data into SPSS and revised drafts of the manuscript. IH and SF contributed to the idea of the project and to design and analysis and revised drafts of the manuscript. All authors approved the final manuscript

## Additional material

### Additional file 1

Variable list.

Click here for file

[<http://www.biomedcentral.com/content/supplementary/1472-6963-8-145-S1.doc>]

### Additional file 2

Data collection form.

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# Explaining variation in physiotherapy practice for patients with knee osteoarthritis

## Short Title: Practice Variation

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Short Report

Open Access

## Chocolate bar as an incentive did not increase response rate among physiotherapists: a randomised controlled trial

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### Abstract

**Background:** The aim of this study was to assess the effect of a small incentive, a bar of dark chocolate, on response rate in a study of physiotherapy performance in patients with knee osteoarthritis.

**Findings:** Norwegian physiotherapists from private practice were randomised in blocks to an intervention group (n = 1027) receiving a bar of dark chocolate together with a data-collection form, and a control group (n = 1027) that received the data-collection form only. The physiotherapists were asked to prospectively complete the data-collection form by reporting treatments provided to one patient with knee osteoarthritis through 12 treatment sessions. The outcome measure was response rate of completed forms.

Out of the 510 physiotherapists that responded, 280 had completed the data-collection form by the end of the study period. There was no difference between the chocolate and no-chocolate group in response rate of those who sent in completed forms. In the chocolate group, 142 (13.8%) returned completed forms compared to 138 (13.4%) in the control group, ARR = 0.4 (95% CI: -3.44 to 2.6).

**Conclusion:** A bar of dark chocolate did not increase response rate in a prospective study of physiotherapy performance. Stronger incentives than chocolate seem to be necessary to increase the response rate among professionals who are asked to report about their practice.

**Trial Registration:** Current Controlled Trials register: ISRCTN02397855

### Background

Non-response to postal questionnaires is a well known problem that can introduce bias in surveys and in epidemiological studies. Several ways of increasing response rate have been identified, and research has shown that the odds of response can double using monetary incentives [1]. Even small financial incentives are found to be effective in improving physician response [2]. Non-monetary incentives can also be effective, though should be handed

out together with questionnaires rather than afterwards [1]. Interventions that trigger positive emotions, such as candy, have also been shown to have an effect on trial participants' willingness to solve tasks and to increase response rate among physicians [3-5].

Problems with non-response have been demonstrated in surveys of practice performance in health care [6,7]. The quality of research within this field could be improved by

identifying ways to increase response. Therefore, while planning a prospective study of physiotherapy performance in Norway we decided to test the effect of a non-monetary incentive on response. To our knowledge no study has evaluated the effect of chocolate. Thus, the aim of this study was to assess the effect of a bar of dark chocolate on response rate in a study of physiotherapy performance in patients with knee osteoarthritis.

## Methods

In May 2006 all Norwegian physiotherapists in private practice (n = 2798) were invited to participate in a prospective study measuring physiotherapy performance for knee osteoarthritis [8]. Based on feedback from the first invitation, 744 were considered not eligible, mainly because they did not treat patients with osteoarthritis. The remaining physiotherapists were randomly assigned to an intervention group (n = 1027) that received a bar of chocolate together with the data-collection form, and a control group (n = 1027) that received the data-collection form only. The physiotherapists were randomised in blocks of six by a computer generated table. We distributed the forms and chocolates by postal mail including a pre-paid return envelope. The chocolate bar consisted of 36 grams 70% cacao, wrapped in a specially designed sticker bearing survey logo and the text "Thank you for helping us to document physiotherapy practice", Figure 1.

The six-page long data-collection form was developed through several steps involving clinicians and experts. It was designed to prospectively report treatments provided to one patient with knee osteoarthritis through 12 treatment sessions. There were three sections including questions about physiotherapist and patient characteristics.

After the first mailing all physiotherapists were sent one follow-up reminder by mail and one by e-mail. All practices with more than five physiotherapists were also contacted by telephone. The study period spanned over nine months.

The proportion of completed data-collection forms (response rate) was the primary outcome.



**Figure 1**  
Bar of chocolate with sticker.

By assuming a worst case response rate of 20% and with 1094 participants in each arm, the study had 80% power to detect a 5% increase in response rate in the chocolate group.

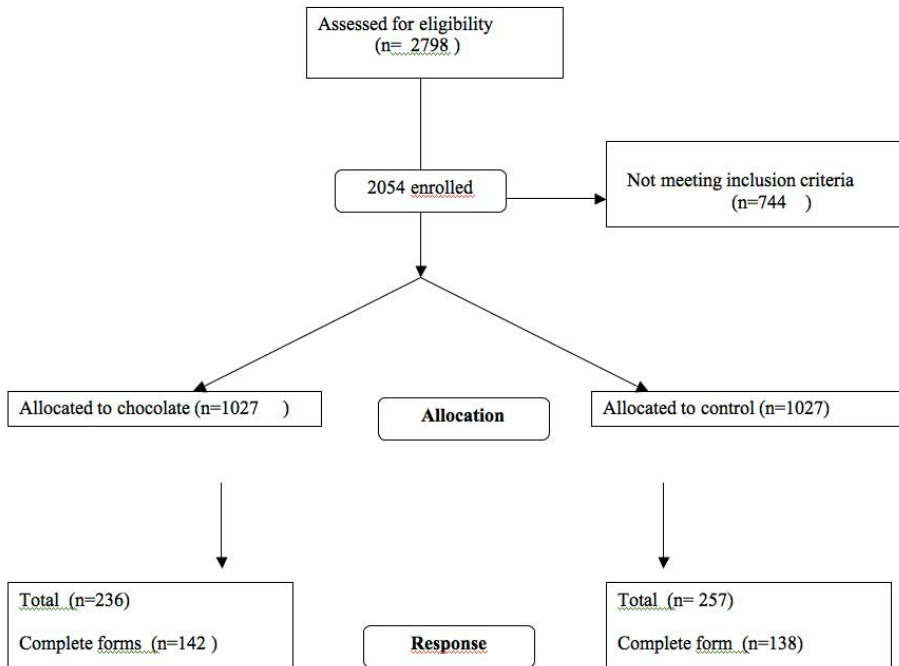
## Results

We received a response from 510 physiotherapists (236 in the chocolate group and 257 in the no-chocolate group). Some stated that they did not treat patients with knee osteoarthritis or they reported other reasons for not participating, such as not working in clinical practice or focusing on areas like neurology, child or mental health. Among the responders 280 had completed the data-collection form (Figure 2). Before the first reminder was sent out we had received 73 completed forms, 39 (3.8%) from the chocolate group and 34 (3.3%) from the no-chocolate group. By end of the study there was no difference between the chocolate and no-chocolate group in the number of completed forms, 142 (13.8%) in the chocolate group and 138 (13.4%) in the control group, ARR = 0.4 (95%-CI: -3.4 - 2.6).

## Discussion

In this study we evaluated the effect of a bar of dark chocolate on response rate in a prospective study of physiotherapy performance. The overall response rate was very low and the chocolate bar did not improve the number of completed data-collection forms. The findings are similar to the study by Halpern et al which found that mints did not influence response rate in a mailed questionnaire among physicians [5], and support findings from a systematic review on effects of incentives to improve response rates to physician surveys that concluded that token nonmonetary incentives were much less effective than even small financial incentives [2]. One explanation to our findings may be the time lapse between receiving the chocolate and performing the requested tasks, or the amount of work requested. The study required subjects to document treatment over a period of several weeks, and chocolate did not seem to have had a strong enough influence or one that lasted long enough to produce the desired effect. All physiotherapists were sent two reminders. These reminders may have prompted both groups to respond equally, cancelling out any effect of the chocolate.

The overall response rate was very low in this study although we tried to prevent non-response in different ways. We contacted participants before they received the questionnaire, the questionnaires were sent by first class post and stamped-return envelopes were provided and we sent two reminders [1,2]. It was professionally designed and kept as short as possible. However, if the use of short questionnaires reduces the accuracy of the measurement



**Figure 2**  
Flow diagram.

process, there are trade-offs between non-response and less precise measurement.

**Conclusion**

There are many barriers for health professionals in reporting their practice behaviour. Adding one bar of chocolate did not seem to be a sufficiently strong incentive to increase the response rate.

**Competing interests**

We enjoy eating chocolate, but still all authors declare that they have no competing interests.

**Authors' contributions**

SR had the idea about the chocolate incentive. GJ wrote the protocol and designed the study performed the analysis and drafted the first version of the manuscript. KTD contributed to designing the study, entered data into SPSS and revised drafts of the manuscript. SR and SF contributed to the idea of the project and to design and analysis and revised drafts of the manuscript. All authors approved the final manuscript

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# Appendix 1



<b>Variables</b>	<b>Response categories</b>
<i>Patient characteristics</i>	
Gender	Male; Female
Age	Year of birth
Work status	Employed; On sick leave; Disability pension/early retirement; Home maker; Retired; Other
Time since diagnosis	Less than one year; 1-5 years; More than 5 years
Pervious knee injury	Yes; No; Don't know
Pervious knee surgery	Yes; No; If yes, what and when?
Bilateral knee OA	Yes; No; Don't know
Type of pain	Pain during activity; Pain during weight load; Pain at rest; Pain at night; Pain at start of movement; Not assessed
Intensity of pain	VAS 0 - 10
Varus/valgus	Yes; No; Don't know; Not assessed
Hydrops	Yes; No; Don't know; Not assessed
Medication	NSAIDS; Paracet, Glucosamine; Other; Doesn't use
Co-morbidity	Yes; No; If yes, what type of co-morbidity?
Overweight (subjectively assessed by the physiotherapists)	Yes; No; Don't know; Not assessed
Need more physical activity (subjectively assessed by the physiotherapists)	Yes; No; Don't know; Not assessed
Previous physiotherapy for the same condition	No, first time; Yes, once; Yes, more than once
<i>Assessment</i>	
Physiotherapist used outcome measures?	Yes; No; If yes, which measures were used
Findings	6 predefined findings on different ICF-levels (impairment, function and disability) reported as: Yes; No; Not assessed
Treatment goals were defined	Yes; No
Patients treatment goals were clarified	Yes; No
Who defined the treatment goals	The therapist; The patient; Shared
Treatment goals	13 predefined goals on different ICF-levels (impairment, function and disability) reported on a 6 point scale for each goal from "Not important at all" to "Very important"
Follow-up goals defined	Yes; No
<i>Setting and treatment modality used in each</i>	

<i>session through 12 treatment sessions</i>	
Setting of treatment	Individual treatment; Individual training with some supervision; Group (specific exercise); Group (general exercise)
Exercise for: Pain reduction Muscle strengthening Range of motion Stability Coordination Aerobic capacity Relaxation ADL-activities	Each type of exercise reported at every treatment session through 12 sessions as: Used; Not used
All other relevant treatment modalities and types of advise and patient education (20 modalities and 10 types of advise/education listed)	Each type of treatment modality reported at every treatment session through 12 sessions as: Used; Not used
<i>Variables reported at end of 12 treatment sessions</i>	
Changed the treatment goals during the treatment period?	Yes; No
Evaluated the goals by end of treatment period?	Yes; No
Goals reached at end of treatment period? (assessed by physiotherapists by end of 12 sessions)	Yes; No; Partially
Will the patient continue physiotherapy treatment after the 12 sessions reported?	Yes, will continue; Will continue unsupervised exercise; No, will not continue
<i>Physiotherapists characteristics</i>	
Gender	Male; Female
Age	Year of birth
Year since qualification	Year
Postgraduate and continuing education	Continuing education; Postgraduate education; Master Degree; Specialists in area of physiotherapy
Type of practice	Solo practice; 2-5 colleagues; More than 5 colleagues
Operating Contribution	Yes; No; If yes, list percent contribution
Internet access at work	Yes; No
Exercise facility in separate room	Yes; No



Use of electronically journal system	Yes, all of us; Yes, some; None
Number articles read last 6 months	None; Less than 5; 5-10; More than 10
Used medical databases last 6 months	Yes; No; If yes, list database:
Problems finding relevant information	Often; From time to time; Rarely; Never
Read article about knee OA the past year	Yes; No
Attended a lecture or course on knee OA last two years	Yes; No



## Appendix 2



ID				
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# Fysioterapi praksis

## FYSIOTERAPI TIL PASIENTER MED KNELEDDARTROSE

### Kartlegging av praksis

#### Skjemaet er tredelt:



**Del 1** skal gi informasjon om pasienten og mål for behandlingen. Det skal fylles ut etter første eller annen gangs konsultasjon og vil ta ca 5 min

**Del 2** skal kartlegge behandlingstiltak, skal fylles ut under behandlingsforløpet og vil ta ca 1/2 min per gang

**Del 3** skal gi informasjon om behandlende fysioterapeut, skal fylles ut en gang og vil ta ca 5 min

# DEL 1

## INFORMASJON OM PASIENTEN MED KNELEDDARTROSE FUNN OG MÅL FOR BEHANDLING

<b>Mann</b>  <input type="checkbox"/>	<b>Kvinne</b>  <input type="checkbox"/>	<b>Fødselsår</b> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
--	--	---

### Arbeidssituasjon

I arbeid    Sykmeldt    Uføretrygdet    Hjemmeværende    Pensjonist    Annet

### Hvor lenge er det siden diagnose ble stilt?

Under 1 år    1-5 år    Over 5 år

### Har pasienten tidligere skadet kneet, for eksempel menisk eller korsbånd?

ja    nei    vet ikke

### Er pasienten operert i kneet ?

ja    nei   Hvis ja, hva slags operasjon og når?

### Har pasienten artrose i begge knær ?

ja    nei    vet ikke

### Type smerter?

Smerter v/ spesielle aktiviteter    Belastningssmerter    Startsmarter  
 Hvilesmerter    Nattsmerter    Ikke kartlagt

### Angi pasientens smerter (siste uke) på skalaen hvor 0 er ingen smerter, og 10 er verst tenkelige smerter (sett et kryss i aktuell rute)

0  10

### Har pasienten forøket valgus eller varusstilling?

ja    nei    vet ikke    Ikke vurdert

### Har pasienten hydrops/hevelse i kneet?

ja    nei    vet ikke    Ikke vurdert

### Bruker pasienten medikamenter for kneartrosen?

NSAIDS    Paracet    Glucosaminer    Annet    Bruker ikke

### Har pasienten andre sykdommer eller helseplager av betydning for behandlingen?

ja    nei   Hvis ja, hvilke sykdommer eller plager:

### Vurderer du pasienten som overvektig?

ja    nei    vet ikke    Ikke vurdert

**Vurderer du pasienten til å være for lite fysisk aktiv?**

ja       nei       vet ikke       Ikke vurdert

---

**Har pasienten fått fysioterapibehandling for kneleddsartrose før?**

Ja, flere ganger       Ja, en gang tidligere       Nei

---

**Benyttet du funksjonsskåreskjema eller smerter skala i undersøkelsen?**

(for eksempel WOMAC, COOP WONCA eller VAS-skala)

ja       nei

Hvis ja, – hvilke?

---

**Ved undersøkelsen, identifiserte du funn relatert til:**

	JA	NEI	IKKE VURDERT
Smerter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bevegelighet (fleksjon/ekstensjon)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bevegelighet (patellas bevegelse)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Muskulatur (styrke el utholdenhet)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Koordinasjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stabilitet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gange	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADL-funksjon (dagligliv el fritid)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annet:			

---

**Ble det satt konkrete mål for behandlingen?**

ja       nei

---

**Ble pasientens mål klarlagt?**

ja       nei

---

**Hvis det ble satt mål, hvem satte de endelige målene?**

Pasienten       Fysioterapeuten       I samarbeid

---

Mål for behandlingen (ranger viktighet på en skala fra 0 – 5 ved å sette kryss i aktuelle ruter)

	IKKE VIKTIG 0	1	2	3	4	5 SVÆRT VIKTIG
Redusere smerter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bedre bevegelse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bedre koordinasjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bedre stabilitet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bedre muskelstyrke/utholdenhet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bedre avspenning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bedre ADL-funksjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bedre gangfunksjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bedre sosial fungering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Øke kunnskap hos pasienten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Påvirke fysisk aktivitetsnivå	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Redusere vekt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

---

**Ble det satt noen langsiktige mål? (sett opp i prioritert rekkefølge dersom flere mål)**

ja       nei

Mål 1:

Mål 2:

# DEL 2

## BEHANDLINGSTILTAK

Sett kryss for hver behandling

BEHANDLING NR	1	2	3	4	5	6	7	8	9	10	11	12	Sum
---------------	---	---	---	---	---	---	---	---	---	----	----	----	-----

### VARIGHET AV HVER

BEHANDLING (ca i minutter)

Behandling på benk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Individuell behandling/trening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gruppebehandling/trening med spesifikke øvelser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Egentrening med spesifikke øvelser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gruppetrening med generelt program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### ØVELSER med mål å påvirke:

Muskelstyrke	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bevegelighet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smerter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Koordinasjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kondisjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stabilitet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Avspenning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADL-funksjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annet, spesifiser:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### ANDRE BEHANDLINGSTILTAK

Ergometersykel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bassentrening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Massasje/bløtdelsbehandling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leddmobilisering/traksjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tøyning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Varme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ultralyd	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TENS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kortbølge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sjokkbølge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen elektroterapi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Dersom tiltakene ultralyd, TENS, laser, kortbølge, sjokkbølge eller annen elektroterapi er gitt, oppgi intensitet og varighet per gang:  (intensitet)  minutter



<b>BEHANDLING NR</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>Sum</b>
Tape	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ortose/såler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slyngeterapi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manuell akupunktur	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elektrisk akupunktur	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Triggerpunktbehandling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### INFORMASJON OG RÅDGIVNING

Informasjon om fysisk aktivitet og mosjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Råd og tilrettelegging for egen trening og mosjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hjemmeprogram med spesifikke øvelser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Informasjon og råd om vektreduksjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Informasjon om leddvern	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Råd om ro og avlastning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samtale om å leve med kneartrose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hjelpemidler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tilrettelegging i hjemmet eller på arbeidsplass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andre, spesifiser:													

### Kommentarer til behandlingsforløpet m.m.

### EVALUERING AV MÅL (fylles ut ved slutten av behandlingsserien)

Er målene evaluert underveis i behandlingen ?

ja                       nei

### Er målene evaluert etter fullført behandling?

ja                                       nei

### Er målene oppnådd?

ja                                       nei                                       delvis

### Skal pasienten ha flere behandlinger utover denne serien eller fortsette med egen trening?



skal fortsette med behandling       skal fortsette med egen trening       skal ikke fortsette

### KOMMENTARER

# DEL 3

## INFORMASJON OM BEHANDLENDE FYSIOTERAPEUT

(fylles ut en gang)

<b>Mann</b>  <input type="checkbox"/>	<b>Kvinne</b>  <input type="checkbox"/>	<b>Fødselsår</b> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
--	--	--

År siden avsluttet grunnutdanning i fysioterapi:

### Etter- og videreutdanning

Etterutdanningskurs (korte kurs) siste 3 år

Spesialist i fysioterapi

Videreutdanning

Hovedfag/mastergrad

Oppgi type spesialitet, videreutdanning og/eller grad:

### Praksistype

Jobber alene

2-5 sammen på instituttet

Mer enn 5 sammen

% stilling:

### Driftstilskudd

ja

nei

Oppgi % andel:

### Tilgang til Internett på jobben

ja

nei

### Tilgang til treningssal på instituttet

ja

nei

### Benytter elektronisk journal

Ja, alle på instituttet

Noen av oss

Ingen

### Hvor mange fagartikler har du lest siste 6 måneder?

Ingen

Under 5

5-10

Over 10

### Har du i løpet av siste 6 måneder benyttet elektroniske databaser for å søke svar på faglige spørsmål?

ja

nei

Hvis ja, – hvilke?

**Hvis du tar hele din arbeidssituasjon i betraktning, har du problemer med å få tak i relevant informasjon i faglige spørsmål?**

ofte       av og til       sjelden       aldri

---

**Har du lest noen fagartikkel om kneleddsartrose siste år?**

ja       nei

---

**Har du hørt foredrag eller deltatt på kurs om kneleddsartrose siste to år?**

ja       nei

## KONTAKT

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### **Har du spørsmål, kontakt**

**Gro Jamtvedt**

Forsker og fysioterapeut

T: 97 51 81 44

E: [grj@kunnskapssenteret.no](mailto:grj@kunnskapssenteret.no)

**Kristin Thuve Dahm**

Forskningsassistent og fysioterapeut

T: 46 40 04 52

E: [ktd@kunnskapssenteret.no](mailto:ktd@kunnskapssenteret.no)

**Nasjonalt kunnskapssenter for helstjenesten**

**Postboks 7004, St. Olavs plass, N-0130 Oslo**

