Ultrasound for osteo-arthritis of the knee: a systematic review
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Authors' objectives
To assess the efficacy of ultrasound applications in decreasing the pain and improving the function of people with osteoarthritis of the knee.

Searching
MEDLINE, CINAHL, and Excerpta Medica were searched between 1950 and 1999 using the following keywords: 'osteo-arthritis', 'knee joint', 'ultrasound', 'ultrasonic therapy', 'muscle', 'nerve', 'tendon', 'treatment' and 'electrotherapy'. The authors also performed a manual search of bibliographies of retrieved articles. Only papers published in the English language were retrieved.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials were included.

Specific interventions included in the review
Ultrasound applications were compared with different intensities of ultrasound treatment, interferential current, short-wave diathermy, placebo or sham treatment.

Participants included in the review
Patients with osteoarthritis of the knee were included.

Outcomes assessed in the review
The outcome measures were pain relief, functional performance, analgesic effect, visual analogue scale, clinical evaluation by a physician, self-evaluation, functional incapacity, isokinetic knee torques, active range of motion, pain and gait velocity.

How were decisions on the relevance of primary studies made?
Three of the authors independently selected the papers for the review using the predetermined criteria.

Assessment of study quality
The authors assessed the quality of the studies using the criteria of Beckerman et al. (see Other Publications of Related Interest no.1). A composite score was assigned to each study based on the descriptive criteria of Van den Ende et al. (see Other Publications of Related Interest no.2). Two of the authors assessed the papers for validity.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction.

Data were extracted for the following categories: study identification, sample characteristics, interventions, outcome measures, analytical tests, and results.

Methods of synthesis
How were the studies combined?
A narrative synthesis was undertaken.
How were differences between studies investigated?
The authors do not state a method for assessing any differences between the studies.

Results of the review
Five randomised controlled trials with 673 participants were included.

Three of the trials found some improvement in pain and clinical evaluation. Two of the trials found no significant differences between the treatments.

Authors' conclusions
The authors state that clear evidence of the efficacy of ultrasound as a treatment for knee osteoarthritis was found in only one of the studies appraised, but this incorporated a poor study design, thus rendering its results questionable. The remaining studies, which found either equitable outcomes between groups treated with ultrasound or other modalities, or no benefit when compared to sham ultrasound, were similarly flawed.

CRD commentary
The authors stated the research question, and the inclusion and exclusion criteria were quite thorough. The literature search was quite thorough although the search was restricted to English language publications. In addition, there was no attempt to find or include unpublished or grey literature. It is possible that additional relevant studies may have been missed. There were no tests for publication bias.

The quality of the included studies was formally assessed using two different methods of assessment. The authors reported how the articles were selected, and who performed the selection and validity assessment. However, it was not reported how the data extraction process was performed.

The extracted data were reported in tabular format, then summarised and discussed in the text of the review. The studies were not statistically combined. There was some discussion of heterogeneity, and the characteristics of the included studies that made it impossible to combine them.

The authors' conclusions appeared to follow from the results, but did not show a clear indication for the effectiveness of ultrasound in the treatment of osteoarthritis of the knee.

Implications of the review for practice and research
Practice: The authors state that when employed for knee osteoarthritis, ultrasound treatments should be specifically directed at the source(s) of joint pain or dysfunction. In addition, the dosages and durations selected should be commensurate with physiological joint status and desired outcomes. Further, to permit optimal physiological benefits to accrue, the importance of education concerning the need to adhere strictly to joint protection strategies, and to avoid joint overuse in the face of potential pain-relieving effects of ultrasound, should not be underestimated.

Research: The authors state that further research studies, using sound methodologies, are needed to clarify whether ultrasound, an expensive and time-consuming treatment, has any unique disease modifying effects as indicated in basic science studies. Studies are also required to clarify whether ultrasound is superior to the provision of personalised attention, or less time-consuming therapies, for the treatment of knee joint disease at specific disease stages or specific disease manifestations selectively.

The authors also state that to validate the use of ultrasound in treating knee joint osteoarthritis in the absence of any formal current research reports, clinical physiotherapists are urged to record the outcome of their ultrasound treatments of osteoarthritic knees with validated instruments, and to document these findings at scientific meetings and in peer-reviewed journals. Physiotherapy educators are also urged to explore this topic area in depth with their students, to hold discourses on it with peers from the core sciences and other health fields, and thereby to encourage interactive small projects or proposal development that will help to fill the gaps in the basic professional literature.
Bibliographic details

Other publications of related interest

Indexing Status
Subject indexing assigned by CRD

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.