

SURFACE NEUROMUSCULAR ELECTRICAL STIMULATION FOR QUADRICEPS STRENGTHENING PRE AND POST TOTAL KNEE REPLACEMENT

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Cochrane Database of Systematic Reviews, Issue 08, 2011 (Status in this issue: NEW)

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DOI: 10.1002/14651858.CD007177.pub1

This review should be cited as: Monaghan Brenda, Caulfield Brian, O'Mathúna Dónal P. Surface neuromuscular electrical stimulation for quadriceps strengthening pre and post total knee replacement. Cochrane Database of Systematic Reviews. In: *The Cochrane Library*, Issue 08, Art. No.

CD007177. DOI: 10.1002/14651858.CD007177.pub1

ABSTRACT

Background

Total knee replacement has been demonstrated to be one of the most successful procedures in the treatment of osteoarthritis. However quadriceps weakness and reductions in function are commonly reported following surgery. Recently Neuromuscular Electrical Stimulation (NMES) has been used as an adjunct to traditional strengthening programmes. This review considers the effectiveness of NMES as a means of increasing quadriceps strength in patients before and after total knee replacement.

Objective

To assess the effectiveness of NMES as a means of improving quadriceps strength before and after total knee replacement.

Criteria for considering studies for this review

We searched The Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE (1950 to January week 1 2008), EMBASE (1980 to 2008 week 2), Cumulative Index to Nursing and Allied Health Literature (CINAHL)(1982 to 2007/11), AMED (1985 to Jan 2008), Web of Science, and Pedro (Jan 2008) (<http://www.pedro.fhs.usyd.edu.au/index.html>) for randomised controlled trials and controlled clinical trials. The electronic search was complimented by hand searches and experts in the area and companies supplying NMES equipment were also contacted.

Selection criteria

Randomised controlled trials and controlled clinical trials were accepted that used NMES for the purpose of quadriceps strengthening either pre or post total knee replacement.

Data collection and analysis

Two review authors decided which studies were suitable for inclusion based on the inclusion and exclusion criteria in the protocol and the data was extracted using pre-developed data extraction forms. Two review authors (BM and BC) independently assessed the methodological quality of the included trials using a descriptive approach as advocated by the Musculoskeletal group. Only two studies were included in the review. Neither study presented results in a form suitable for meta-analysis. The authors of both studies were contacted to obtain the raw data but they were no longer available. The data from both studies are described in the review.

Main results

Two studies were identified for inclusion in the review. No significant differences were reported in either study for maximum voluntary isometric torque or endurance between the NMES group and the control group but significantly better quadriceps muscle activation was reported in the exercise and neuromuscular stimulation group compared with the exercise group alone in the second study. This difference was significant at the mid training (six week) time point but not at the twelfth week post training time point. Further analysis of both studies were not possible due to the absence of raw data scores. Both studies carried a high risk of bias. Mean values were not given for strength, endurance, cross sectional area or quality of life. Pain outcomes, patient satisfaction or adverse effects were not reported in either study. The results were presented as percentage improvements from baseline and the number of subjects in each group was unclear.

Authors' conclusions

The studies found in this review do not permit any conclusions to be made about the application of neuromuscular stimulation for the purposes of quadriceps strengthening before or after total knee replacement. At this time the evidence for the use of neuromuscular stimulation for the purposes of quadriceps strengthening in this patient group is unclear.
