Preventive interventions for back and neck pain problems: what is the evidence?
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Authors' objectives
To determine which interventions are used to prevent back and neck problems, and to assess the evidence of their utility.

Searching
The following databases were searched: MEDLINE from 1985 to 1998; PsycINFO from 1967 to 1998; and Arline. In addition, the bibliographies of the identified studies were examined. Studies published in English, German, Dutch or Swedish were eligible for inclusion.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) and non-randomised controlled clinical trials (CCTs) were eligible for inclusion. The follow-up, where stated, ranged from 3 to 5 years.

Specific interventions included in the review
Interventions were eligible if they were designed specifically to prevent some form of back or neck problem, or to prevent the development of long-term back or neck problems. None of the interventions were excluded.

The following preventative interventions were included, either alone or in combination with each other: lumbar support; training session on spinal anatomy and body mechanics; education and lifting instructions; back and/or neck school; manual physical therapy; compliance package; exercise programmes, including individually designed programmes; physiotherapy; the McKenzie method; nonmedical back pain pamphlets; dynamic endurance; group gymnastics; advice to exercise; free membership to a health club; short-wave heat as placebo; usual care; and no intervention or waiting-list control.

Participants included in the review
People who were not seeking treatment were eligible for inclusion. The participants were enrolled in a variety of workplace settings.

The exclusion criteria varied between the studies and included the following: people with a history of back surgery; workers with current compensation claims; current back pain; extensive sick leave; nerve root compression or tendonitis; and long-term sick leave.

The inclusion criteria also varied between the studies and included the following: back pain for less than 3 months, and pain free for the 12 months prior to the current episode; at least 3 annual episodes of lower-back pain; neck or shoulder pain, and sitting for at least 5 hours daily; with or without back pain; self-reported current or previous back pain; and frequent neck symptoms.

Outcomes assessed in the review
The inclusion criteria were not defined in terms of the outcomes. The outcomes assessed were pain, report of injury, dysfunction, time off work, health care utilisation, and cost.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
The included studies were restricted to RCTs and CCTs, but no formal validity assessment was performed.

**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.

The following information was tabulated in the review: author and year of publication; characteristics of the study population; intervention details; number of participants per intervention arm; outcome measures; results (positive, negative, or neutral); and conclusions (positive, negative or neutral). The studies were classified as follows:

positive, if the preventative intervention was more statistically significant than the control intervention on at least one key variable;

neutral, if the preventative and control interventions did not differ on any key variables; and

negative, if the preventative interventions were less effective or no more effective than the control.

**Methods of synthesis**
*How were the studies combined?*
Studies were grouped according to the type of intervention and a narrative synthesis was undertaken. The results from the RCTs and CCTs were considered separately.

*How were differences between studies investigated?*
Results were discussed according to the study design, and some differences between the studies were discussed in the text of the review.

**Results of the review**
Nineteen RCTs (7,502 participants) and 7 CCTs were included.

**Lumbar supports (4 RCTs and 2 CCTs).**

There was strong and consistent evidence that lumbar supports were not effective in preventing neck and back pain: 3 of the 4 RCTs reported no significant differences in any of the outcome measures when the use of lumbar supports was compared with no intervention in various working populations. The other RCT showed no difference between lumbar supports and training versus training only. Several studies reported problems with the patients’ compliance in using lumbar supports.

**Back schools and education (9 RCTs and 5 CCTs).**

There was consistent evidence that back and neck schools were not effective in preventing back and neck pain: 6 of the 9 RCTs reported no significant differences in any outcome variable when comparisons were made between back schools and usual care or no intervention, or between different types of back and neck schools. Only 1 RCT reported a significant positive effect on initial sick leave and the duration of symptoms.

**Exercises (6 RCTs).**

There was consistent evidence that exercises may be effective in preventing neck and back pain. However, there was inconsistent evidence on the effectiveness of exercise compared with other interventions. Four of the 5 RCTs comparing exercise with no intervention showed that exercise significantly reduced the back pain experienced, and also reduced absenteeism from work. The one RCT reporting inconsistent findings did not conduct a proper between-group analysis. One RCT reported that exercises were more effective than a back school, whilst another found no difference in pain with advice to exercise, compared with advice to exercise and free membership to a health club.
Ergonomics and risk factor modification.

There was no good-quality evidence on the effectiveness of ergonomics or modification of risk factors: no RCTs or CCTs were identified.

**Authors' conclusions**

A variety of interventions are used to prevent back and neck problems. Only exercises provided sufficient evidence to conclude that they were an effective preventative intervention. There is a dearth of controlled trials examining multidimensional programmes.

**CRD commentary**

The aims were stated and the inclusion criteria were defined in terms of intervention purpose, study design, and participants. Three relevant databases were searched and articles published in various languages were eligible for inclusion in the review. However, no details were given of the keywords used to conduct the search, or the methods used to select the primary studies. No attempt was made to locate unpublished material, thus raising the possibility of publication bias. The authors acknowledged the possibility that relevant studies may have been omitted in the text of the review. The included studies were restricted to RCTs and CCTs but no formal validity assessment was undertaken, which the authors acknowledged. Some details of the primary studies were tabulated, but the methods used to extract the data were not described.

Given the small number of studies for each type of intervention, and the differences between the studies, a narrative synthesis was appropriate and the conclusions were based on the results from RCTs. The effect of multiple outcomes on the level used to assess the statistical significance of the results was not mentioned. The authors considered the methodological deficiencies of the primary studies and the limitations of the review in the discussion.

The evidence presented supports the authors' conclusions.

**Implications of the review for practice and research**

**Practice:** The authors state that exercise interventions consistently demonstrated a modest positive effect in preventing back and neck pain. The common methods of prevention, such as back schools, lumbar supports, ergonomics and risk factor modification, have not yet been proven to be effective.

**Research:** The authors state that methodologically-sound studies are required with a focus on multidimensional programmes. This research should include tailoring interventions to the risk profile of the individual or workplace, and the use of longer follow-up periods and adequately powered studies. The authors also state that efforts should be directed at increasing compliance with preventive interventions.

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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.