Positive forward-bending tests for scoliosis are usually false positives. Negative tests are usually true negatives

Synopsis


Questions: Does the Adams forward-bending test provide an accurate assessment (compared with radiography) of the presence of scoliosis? Do radiographic findings of scoliosis predict curve progression? Design: Population-based cross-sectional study and prospective study with 10-year follow-up. Setting: Schools on the island of Samos, Greece. Patients: All 2,700 school pupils on the island. Pupils were aged 8-16 years. Intervention: During a mass screening program for lung disease, all students were subjected to low-dose long chest radiographs. At the same time, all were examined with the Adams forward-bending test. Those pupils with positive forward-bending tests or signs of scoliosis on low-dose radiographs were subjected to conventional antero-posterior standing radiographs. Cobb angles > 5 degrees were recorded. Ten years later, clinical and radiological assessments were performed on subjects with initial Cobb angles > 5 degrees. The remaining subjects were re-evaluated by postal questionnaire and examined clinically if that was deemed necessary. Results: The sensitivity and specificity of the forward-bending test for Cobb angles of > 10 degrees were 84% and 93%, respectively (positive and negative likelihood ratios of 13 and 0.17, respectively). Thus, for the sample in this study (prevalence of 1.2%) a positive forward-bending test indicates a 13% probability of scoliosis (Cobb angle > 10 degrees), and a negative forward-bending test indicates a 99.7% probability of no scoliosis (0.3% probability of scoliosis). Of those pupils with Cobb angles > 10 degrees, 44% had progressed at 10 years (by at least 5 degrees in more than one examination), and the mean increase was 8 degrees. Conclusion: Positive forward-bending tests are usually false positives. Negative tests are usually true negatives. Over 10 years, curve progression occurs in about half of all patients with Cobb angle > 10 degrees, but progression is usually modest.

Commentary

Whether or not school children should be screened for scoliosis has been debated for decades. Unfortunately, the debate has been based on opinion and anecdote, rather than high quality evidence. The ideal way to assess any screening program is to conduct a randomised trial and compare clinically relevant outcomes between people who are screened (and, if an abnormality is detected, treated appropriately) and those who are not screened. No such trial has been done to evaluate scoliosis screening.

In the absence of any randomised trials of scoliosis screening programs, judgments about the value of screening should be based on knowledge of the validity (sensitivity and specificity) of the screening tests and the efficacy of scoliosis treatment. The paper by Karachalios and colleagues provides data relevant to both these issues.

All subjects had both the Adams forward-bending test (and Moire topography, scoliometry and humpometry) and spinal radiographs, the gold standard for diagnosis of scoliosis. This enabled the investigators to calculate the sensitivity and specificity of several screening tests for scoliosis. This has not been done before. The sensitivity of the forward-bending test was 84% and the specificity was 93%. Contrary to the authors' assertions, both these figures are quite good for a screening test. While the imperfect sensitivity means that some school children with scoliosis will be missed (five out of 32 in this study), the relatively high specificity means that the number of false positives is much lower for the forward-bending test than for the other scoliosis screening tests evaluated here. Nevertheless, most positive tests will be false positives, leading to unnecessary referrals with consequent financial and psychological costs.

The study by Karachalios et al also investigated the efficacy of scoliosis treatment by following up subjects with scoliosis for 10 years. No children with screen-detected scoliosis required surgery and only three needed a brace. The remainder were managed with observation and/or physiotherapy (no details were provided). These data strongly suggest that scoliosis detected by school screening programs tends to be a benign condition.

The evidence provided by this important study suggests that school screening for scoliosis is not worthwhile.

Bob Cumming

The University of Sydney
Physical training improves asthmatic subjects’ cardiopulmonary function

Synopsis


Question: Does physical training improve an asthmatic subject's cardiopulmonary fitness, lung function or quality of life? Data sources: Randomised controlled trials were identified up to 1998 by searching MEDLINE, Embase, Sportdiscus, Current Contents Index and Science Citation Index and the Cochrane Airways Group asthma register, searching reference lists of located papers. Study selection: Randomised controlled trials of physical training of asthmatic subjects eight years and older. The training had be at least 20-30 minutes, 2-3 times per week over a minimum of four weeks. Data extraction: Data were extracted on study quality and lung function, cardiopulmonary fitness or quality of life outcomes. Results were pooled quantitatively. Main results: Eight studies were included in the review. The pooled data from five studies revealed that training increased maximal oxygen uptake by 5.6ml/kg/min (95% CI 3.9 to 7.2). One study reported that training increased work capacity by 28 watts (95% CI 22.6 to 33.4). Training had no effect on peak expiratory flow rate, forced expiratory volume in one second, forced vital capacity, maximal minute ventilation or the number of days of wheeze. No studies reported quality of life measures. Conclusion: Physical training can improve an asthmatic subject's cardiopulmonary fitness without changing lung function. It is not known whether training improves quality of life.

Commentary

Only eight out of a possible 47 articles fitted the criteria for inclusion in this Cochrane Review. The main findings were that exercise training consisting of at least 20-30 minutes, 2-3 times per week over a minimum of four weeks in people over eight years old resulted in an increase in work capacity without any significant change in lung function. This is similar to the response to exercise training in non-asthmatic subjects. One drawback of the description of training was that there was no indication of exercise intensity. Intensity of exercise is an important factor in determining the degree of the training effect.

An issue that the review did not address was whether exercise training decreases the incidence of exercise-induced asthma (EIA). As physical training lowers the ventilation required at mild to moderate exercise intensities, this could result in a decreased stimulus for EIA. One study included in those reviewed found no significant decrease in EIA at an equivalent sub-maximal workload after exercise training (Fitch et al 1986). Further research is required to confirm or refute this.

Although many asthmatics feel symptomatically better when in physical training, symptoms and related quality of life were not addressed by the articles reviewed, suffice that the number of episodes of wheeze, although reduced by 7.5 days, was not significantly different after training. Further randomised controlled trials are needed to establish whether quality of life is altered by exercise training.

The message from this review for physiotherapy practice is that it is possible to achieve a training effect in people with asthma. As asthma is prevalent in the Australian community, this knowledge is useful for physiotherapists dealing with sporting teams, those prescribing exercise for musculoskeletal disorders and those working in preventative or rehabilitation medicine. Advice on the use of medications prior to exercise, to block EIA, is important and physiotherapists should be aware of the types of medications available (Anderson and Hendriksen 1999).

Jenny Alison,
The University of Sydney

References


Soft tissue manipulation, exercise and education improve pain and disability in patients with non-specific low back pain

**Synopsis**


**Question:** Is soft tissue manipulation, exercise and education, or both treatments combined more effective than placebo laser in reducing low back pain (LBP) and LBP-related disability? **Design:** Randomised controlled trial. **Setting:** University clinic, Canada. **Patients:** Subjects had non-specific LBP between one week and eight months duration. Exclusion criteria included nerve damage, fracture, pregnancy, severe psychiatric condition. One-hundred-and-sixty-five subjects volunteered, 107 met the inclusion criteria, 104 were randomised and 91 completed all follow-up measures. **Interventions:** All subjects received six treatments over one month. The soft tissue manipulation group received treatment tailored to the patient presentation and included techniques such as friction, trigger points and neuromuscular therapy in sessions lasting 30-35 minutes. The exercise and education group were taught stretching exercises, encouraged to undertake general exercises such as walking, swimming or aerobics and given education on posture and body mechanics treatments in sessions lasting 15-20 minutes. The combination treatment group received both active therapies. The placebo laser group received 20 minutes of sham laser by an unblinded treatment provider. **Main outcome measures:** At the completion of treatment and one month later, LBP-related disability was measured using the Roland Morris scale (range 0-24) and pain was measured using the pain rating index of the McGill Pain Questionnaire (range 0-78). An intention-to-treat analysis was not used. **Main results:** The sham laser group demonstrated trivial improvement with treatment. For example the group means (SD) for disability scores at baseline and one month follow-up were 7.2 (4.2) and 6.5 (4.2). At one month follow-up the combined therapies group had less pain and disability than the sham laser group; mean and 95% CI for between-groups difference: pain -1.3 (-1.7 to -1.0); disability -5.0 (-6.9 to -3.0). The soft tissue manipulation group had less disability than the sham group: -3.6 (-5.9 to -1.4) but pain was similar in the two groups -0.6 (-1.2 to 0.1). The exercise and education group had similar pain and disability to the sham laser group. **Conclusion:** Six sessions of soft tissue manipulation combined with exercise and education reduced pain and disability for patients with non-specific LBP. [Confidence intervals calculated by Maher from original data in paper.]

**Commentary**

The effectiveness of various treatments for low back pain is the subject of many studies, with increasing consensus on the positive effect of staying active. Most guidelines concerning the treatment of low back pain advocate staying active, especially for (sub)acute low back pain (Koes 1998).

The Preyde paper concludes that massage therapy is beneficial, but close reading reveals that the exercise and education group hardly improved on functional status. This is remarkable, as most studies show that exercise normally gives at least some improvement in functional status (van Tulder 1997). The reason why in this particular trial this is not the case remains unclear. Apart from this issue, it is still not possible to conclude that massage in itself is an effective treatment, as it was a component of the combined therapies. Additionally, there is a limitation in generalisability as there were only two therapists involved (in a single setting) in providing the treatment. So results should be confirmed in a trial where the effectiveness of this treatment is investigated rather than the effectiveness of the therapists.

Raymond WJG Ostelo
Maastricht University, Belgium

**References**


The efficacy of exercises, electrical stimulation and cones in the treatment of genuine stress incontinence in women

Synopsis


Question: For women with genuine stress incontinence, how effective are pelvic floor exercises, electrical stimulation or vaginal cones compared with no treatment? Design: Stratified, single blind, randomised controlled trial. Setting: Five centres in southeast Norway. Interventions: All participants were educated about pelvic floor anatomy and function. Active interventions comprised pelvic floor exercises (8-12 high intensity contractions three times per day, coupled with weekly training with a physiotherapist), electrical stimulation using MS 106 Twin for 30 minutes biphasic intermittent current of individually adapted cycles, or vaginal cones (Marbella, progressed in weight for 20 minutes per day). Participation in other treatments was discouraged for the six months of the study. The active intervention groups had contact monthly with a physiotherapist. The untreated control group undertook no treatment and had no contact with study physiotherapists. Patients: Participants were recruited from surgery waiting lists or by newspaper advertisements. One hundred and twenty-two consenting women were stratified into categories of leakage (≤ 20g and > 20g urine loss), and then were randomised into one of the four groups. One hundred and seven women completed the study (30 controls, 25 each in pelvic floor exercises and electrical stimulation groups, and 27 in vaginal cone group). Main outcome measures: Pad test with standardised bladder volume, self report of severity of incontinence. Investigators were blind to allocation of subjects to treatment groups. Women participating in the active intervention groups were told that all treatments were equally effective. Main results: The pelvic floor muscle exercise group showed a significant improvement in the pad test compared with the other interventions or the control group. Mean change (grams) (95% CI) for the exercise group was -30.2 (-43.3 to -16.9), compared with the electrical stimulation group (-7.4 (-20.9 to 6.1), vaginal cone group (-14.7 (-27.6 to -1.8) and the control group (-12.7 (-27.2 to 1.8). Significantly more women in the pelvic floor exercise group reported being continent after intervention than in the other groups (12/25 in the pelvic floor exercise group, 3/25 in the electrical stimulation group, 5/27 in the vaginal cone group and 1/30 in the control group). Conclusion: Training of the pelvic floor muscles is superior to electrical stimulation, vaginal cones or no treatment in the management of genuine stress incontinence.

Commentary

That this paper was published in the prestigious British Medical Journal is testament to the fact that this work is an example of physiotherapy research at its best. Not only has Kari Bo done much to advance the physiotherapy profession as being integral to the management of female urinary incontinence, but she has also added a great deal to the body of knowledge available to all health care professionals working in this particular field.

Some of the study subjects were recruited by newspaper advertisement which might be seen to introduce some response bias in relation to the motivation these particular women. The power provided by the sample size allowed for accurate and reliable statistical analysis, which is so often lacking in clinical trials involving conservative management protocols for incontinent women.

The subjects were screened using gold standard objective criteria, to ensure that only women with the correct continence diagnosis were entered into the study, and the randomisation into groups was stratified to ensure that women of different incontinence levels were represented in each group. Urinary incontinence is difficult to measure objectively. In this study, the problem was overcome by using a number of different parameters to measure the pre- and post-treatment incontinence experienced by the study participants. An “intention to treat” analysis is important to any physiotherapy research since patient drop-out must be considered an integral part of any treatment program.

Clinicians might argue that physiotherapists would not choose to use electrotherapy without any exercise prescription but in view of the fact that electro-stimulators and cones might be purchased or hired by the public at large, and that health care professionals might wrongly prescribe electrotherapy as a sole home program for incontinent women, I feel these arguments to be unjustified.

Pauline Chiarelli
The University of Newcastle