Targeted physiotherapy treatment for low back pain based on clinical risk can improve clinical and economic outcomes when compared with current best practice

Synopsis


**Question:** Does a stratified primary care approach for patients with low back pain result in clinical and economic benefits when compared with current best practice? **Design:** A randomised, controlled trial with stratification for three risk groups and a targeted treatment according to the risk profile. Group allocation was carried out by computer-generated block randomisation in a 2:1 ratio. **Setting:** Ten general practices in England. **Participants:** Men and women at least 18 years old with low back pain of any duration, with or without associated radiculopathy. Exclusion criteria were potentially serious disorders, serious illness or comorbidity, spinal surgery in the past 6 months, pregnancy, and receiving back treatments (except primary care). **Interventions:** In the intervention group decisions about referral to risk group were made by use of the STarT Back Screening Tool. The 30-min assessment and initial treatment focused on promotion of appropriate levels of activity, including return to work, a pamphlet about local exercise venues and self-help groups, the Back Book, and a 15-min educational video Get Back Active. Low-risk patients were only given this clinic session. Medium-risk patients were referred for standardised physiotherapy to address symptoms and function. High-risk patients were referred for psychologically informed physiotherapy to address physical symptoms and function, and psychosocial obstacles to recovery. In the control group a 30-min physiotherapy assessment and initial treatment including advice and exercises was provided, with the option of onward referral to further physiotherapy, based on the physiotherapist’s clinical judgement. **Outcome measures:** The 12 months score of Roland and Morris Disability Questionnaire (RMDQ). Secondary measures were referral for further physiotherapy, back pain intensity, pain catastrophising, fear-avoidance beliefs, anxiety, depression, health-related quality of life, reduction of risk-subgroup, global change of pain, number of physiotherapy treatment sessions, adverse events, health-care resource use and costs over 12 months, number of days off work because of back pain, and satisfaction with care. **Results:** Of 851 patients assigned to the intervention (n = 568) and control groups (n = 283) a total of 649 completed the 12 months follow-up. Adjusted mean changes in RMDQ scores were significantly higher in the intervention group than in the control group at 4 months (4.7 [SD 5.9] vs 3.0 [5.9], between-group difference 1.8 [95% CI 1.6 to 2.6]) and at 12 months (4.3 [6.4] vs 3.3 [6.2], 1.1 [0.6 to 1.9]). At 12 months, stratified care was associated with a mean increase in generic health benefit (0.039 additional QALYs) and cost savings (£240.01 vs £274.40) compared with the control group. There were significant differences in favour of the intervention group in many of the secondary outcomes. **Conclusion:** A stratified management approach including a prognostic screening and treatment targeting, showed improved clinical and economic benefits when compared with current best practice.

Commentary

This trial represents a new and promising approach for the physiotherapy management of low back pain in primary care. By using a previously validated and simple-to-use prognostic screening tool developed in a primary care physician setting, Hill and colleagues found that a stratified management approach, in which prognostic screening and treatment targeting were combined, resulted in improved primary care efficiency of physiotherapy. The potential for targeting treatment has been emphasised as a research priority (Borkin and Cherkin 1996, Bouter et al 1998). The study is well-conducted, powered to detect differences between subgroups, and satisfies the recommendations for studying subgroups of responders to physiotherapy interventions (Hancock et al 2009). The results are consistent and in favour of the intervention group across most outcome variables, included cost-effectiveness analysis. It should however be noted that the difference between groups in the main outcome variable (Roland Morris Disability Questionnaire) reached the pre-specified level of 2.5 only at one time point (2.5 (95% CI 0.9 to 4.2) in the high-risk group at 4 months follow-up) and ranged from 0.1 (95% CI –1.1 to 1.4) to 2.0 (95% CI 0.8 to 3.2) for all other comparisons. This effect is similar to other primary care trials. Further, drop-out was substantial (almost 25% drop-out at 12 months follow-up) and a co-intervention consisting of a 15 minute educational video and the Back Book given all participants in the intervention group may have influenced the results of the prognostic screening and targeted treatment. The study is however much needed and shows that physiotherapy management of low back pain can be improved. The promising approach by Hill and colleagues and other recent literature indicating that low back patients are heterogeneous and profit by targeted treatment should be implemented by physiotherapists and further developed to find the best treatment strategy for this large and costly patient group.

Kjersti Storheim

Communication-and Research Unit for Musculoskeletal Disorders (FORMI) and Orthopaedic Department, Oslo University Hospital and University of Oslo, Norway

References

Eccentric hamstring muscle training can prevent hamstring injuries in soccer players

Synopsis


Question: Does eccentric muscle training of hamstring muscles reduce the rate of hamstring injuries in male soccer players? Design: Cluster randomised, controlled trial with concealed allocation. Setting: The 5 top men's soccer divisions in Denmark. Participants: First team squad soccer players from teams in the top 5 national soccer divisions were included. Players who joined a team after the start of the trial were excluded. Randomisation of 54 teams allocated 26 to the intervention group and 28 to a control group. Interventions: Both groups followed their usual training program. In addition, the intervention group completed 27 sessions of the eccentric hamstring muscle training in a 10-week period during the midseason break, and once a week in the second half of the season. The hamstring exercise (the Nordic curl) involves the player using hamstrings to resist forward falling of the trunk from a kneeling position. Players completed 2–3 sets of 5–12 repetitions of the exercise for 1–3 sessions per week. Outcome measures: The primary outcome was the number of overall, new, and recurrent acute hamstring injuries during one full soccer season. A hamstring injury was defined as any acute physical complaint in the region of the posterior thigh sustained during a soccer match or training. Recurrence of an injury already reported in the trial period was not included to avoid recording the same injury more than once. Results: 50 teams with 942 players completed the study. At the end of the season, there had been 15 hamstring injuries (12 new, 3 recurrent) in the eccentric hamstring exercise group and 52 injuries (32 new, 20 recurrent) in the control group. The number needed to treat (NNT) to prevent 1 hamstring injury (new or recurrent) was 13 (95% CI 9 to 23). The NNT to prevent 1 new injury was 25 (95% CI 15 to 72) and the NNT for recurrent injury was 3 (95% CI 2 to 6). Apart from short term muscle soreness no adverse events were reported in the exercise group. Conclusion: An eccentric strengthening exercise program for the hamstring muscles that can be performed during training can help prevent hamstring injuries in soccer players.

Commentary

It is well documented that acute hamstring muscle strain is the most common injury in many sports that involve repeated bouts of sprinting, including soccer (Ekstrand et al 2011) and Australian Rules football (Orchard and Seward 2011). Prevention of primary and recurrent injury is therefore paramount, but unfortunately little evidence currently exists to support the efficacy of preventive interventions (Goldman and Jones 2011).

This rigorous large-scale trial is extremely relevant for physiotherapists who treat sports people with acute hamstring muscle strains, as it provides the strongest evidence yet that eccentric strength training can significantly reduce the incidence rate of both primary and especially recurrent injury. The intervention was not complicated nor did it rely upon expensive gym-based equipment: repeated sessions of the Nordic hamstring exercise were performed over a 10-week period, and the dosage prescribed produced a preventive effect for at least 12 months. While the Nordic hamstring exercise might be considered an intense load, particularly for people who are unaccustomed to eccentric strength training, it is important to note that no injuries were actually experienced during the conduct of the exercise program. Thus, even though the intervention likely evoked considerable muscle soreness, it was safe.

A minor criticism of this trial is that exposure time was not specifically quantified, which means that it cannot be stated with certainty that there was no difference in the amount of training and/or match participation between the control and intervention groups. However, given the large numbers involved in this study and that professional versus amateur players were evenly distributed between the groups, it is highly likely that any difference in exposure time was only small (if present at all) and thus of no consequence to the reported outcomes.

As acute hamstring muscle strain is likely a multifactorial injury, it is acknowledged that comprehensive preventive programs should be diverse but the fundamental components of these programs must always comprise evidence-based interventions, such as the Nordic hamstring exercise.

Anthony Schache
Department of Mechanical Engineering, The University of Melbourne, Australia

References

Bimanual therapy and constraint-induced movement therapy are equally effective in improving hand function in children with congenital hemiplegia

Synopsis


**Question:** Does constraint-induced movement therapy (CIMT) improve hand function in children with congenital hemiplegia compared to bimanual therapy? **Design:** Randomised trial with concealed allocation and blinded outcome assessment. **Setting:** 6 CIMT and bimanual therapy day camps were conducted at a University in the United States. **Participants:** Children with congenital hemiplegia aged 3.5 to 10 years, with basic movement and grasp in their paretic hand, and who attended mainstream school. **Interventions:** Both groups received 90 hours of therapy, delivered in day-camps with 2–5 children in each group. Participants completed 6 hours of therapy a day for 15 consecutive weekdays. Treatment was delivered by physiotherapists, occupational therapists, and students enrolled in health related courses. Participants worked individually and in groups. The CIMT group had their less affected hand restrained in a sling and performed age appropriate fine and gross motor unimanual activities. The bimanual therapy group engaged in age appropriate fine and gross motor bimanual activities. **Outcome measures:** The primary outcomes were the Jebsen-Taylor Test of Hand Function (JTTHF) to assess unimanual capacity and the Assisting Hand Assessment (AHA) to assess bimanual performance. Secondary outcome measures were Goal Attainment Scale, Quality of Upper Extremity Skills Test (QUEST), and physical activity (percentage time each hand was used during the AHA assessment). Assessments were completed before treatment, 2 days after treatment, and 1 and 6 months after treatment. **Results:** 42 participants completed the study. At the end of the 15-day intervention period, the groups did not significantly differ on the primary outcome measures and on two secondary outcome measures (QUEST, physical activity). There were significant within group changes for both groups on each primary outcome (mean change score JTTHF −137 s, 95% CI −174 to −99; mean change score AHA −0.49 logits, 95% CI 0.25 to 0.73) which were maintained at the 6 month follow-up. There were also significant within group changes for both groups for the QUEST and physical activity assessments. The bimanual therapy group made greater progress than the CIMT group on their Goal Attainment Scale scores (mean difference between groups 8.1 T-score, 95% CI 0.7 to 15.5). **Conclusion:** CIMT and bimanual therapy resulted in similar improvements in hand function among young children with congenital hemiplegia. The bimanual therapy group made better progress on established goals.

[Mean difference between groups calculated by the CAP Editor]

Commentary

Constraint induced movement therapy (CIMT) has emerged as a promising upper limb rehabilitation approach for children with congenital hemiplegia. Until recently, CIMT has been compared to control groups receiving standard care or no treatment, raising questions whether improvements gained were a result of treatment methods or intensity of intervention (Sakzewski et al 2009). Gordon et al's (2011) results suggest the latter and confirm similar findings (Facchin et al 2011, Sakzewski et al 2011) that either intensive treatment approach leads to sustained improvement in upper limb function and achievement of individualised goals. Both approaches are goal directed and provide intensive repetitive task practice using incremental challenges to drive changes in upper limb function.

While results from either approach are similar, the interventions are not the same. CIMT changes the role of the impaired hand. It becomes the dominant hand with unimanual activities aimed to improve dexterity and efficiency of movement of that limb. It is assumed that gains in unimanual abilities will translate to improved bimanual performance, a premise supported by results of this study. In bimanual training, the role of the impaired upper limb remains as the assisting hand with therapy aiming to improve bimanual co-ordination and goal achievement through carefully tailored bimanual activities. Therefore, the choice of either approach will depend on a child's individual goals, and consideration of behavioural aspects (eg, tolerance of restraint).

The current study delivered 90 hours of therapy over a three week period. While results of this well designed and rigorous study are positive, translation of such intensive models of intervention into a real world clinical setting is challenging. There remains limited data to suggest the optimum dosage required for either approach. What is clear is that current standard practice probably does not offer sufficient intensity of intervention necessary to drive sustained changes in upper limb function for children with congenital hemiplegia.

Leanne Sakzewski
Queensland Cerebral Palsy and Rehabilitation Research Centre, The University of Queensland, Australia

References

Action plans and case manager support may hasten recovery of symptoms following an acute exacerbation in patients with chronic obstructive pulmonary disease (COPD)

Synopsis


**Question:** In patients with COPD, does an action plan (AP) with support from a case manager lead to earlier contact with healthcare professionals and faster recovery from an exacerbation? **Design:** Randomised, controlled trial with concealed allocation. Patients were unaware of the study aims. **Setting:** 8 regional hospitals and 5 general practices in Europe. **Participants:** Adults with COPD, aged > 40 years, with a substantial smoking history, and using bronchodilators were eligible. Exclusion criteria were a primary diagnosis of asthma or cardiac disease, or presence of disease that would affect mortality or participation (eg. confusion). Randomisation of 233 patients allocated 111 to the intervention group and 122 to the control group. **Interventions:** Both groups received usual care and brief nurse-led education about management of their disease. In addition, the intervention group received an individualised written AP, encouragement to contact the nurse for more information if needed, and two standardised telephone reinforcement sessions at 1 and 4 months following randomisation. The nurse, in consultation with physician, was able to provide a course of corticosteroids and antibiotics. **Outcome measures:** Patients recorded their symptoms daily and completed the 24-hour Clinical COPD Questionnaire (CCQ) every 3 days, for 6 months. The primary outcome was time to recovery of health status following an exacerbation, defined as a return to pre-exacerbation CCQ scores. Secondary outcomes included the time delay between exacerbation onset and exacerbation-related healthcare contact and exacerbation-related self-efficacy. **Results:** CCQ data were available for 216 patients. The mean symptom recovery time was shorter in the AP group by 3.68 days (95% CI 0.04 to 7.32). Patients in the AP group with an exacerbation sought treatment 2.9 days earlier (95% CI 2.4 to 3.5) than patients in the control group. The change in self-efficacy was higher in favour of the AP group. There were no differences in the number of exacerbations or healthcare contact between the groups. **Conclusion:** An AP with case manager support enhanced early detection of exacerbations and expedited recovery from symptoms following these events.

Commentary

Self-management places patients and healthcare professionals in partnerships. Patients are trained to be in charge of their day-to-day illness management, while healthcare professionals assist with decision-making and goal achievement. Specialised nurses or other allied health professionals often act as case managers in self-management programs for patients with chronic obstructive pulmonary disease (COPD). Case managers can be contacted by patients if they feel they need to.

This well performed study provides additional evidence for the use of individualised written action plans for exacerbations with ongoing case management in people with COPD. The authors hypothesised that in the event of an exacerbation, an action plan that aims at early contact with healthcare providers would promote prompt intervention, leading to faster recovery in symptoms and health status. The study shows positive results for health status and symptom recovery, without an increase in the proportion of exacerbations reported to healthcare providers. The latter is somewhat surprising, but the authors indicate that a possible explanation can be found in the increased self-efficacy (and possible better self-management strategies) and milder exacerbations in the intervention group. In contrast to other studies (Bourbeau et al 2003, Effing et al 2009, Rice et al 2010) overall health care use did not change.

Whereas stand-alone COPD exacerbation action plans are used with increasing frequency, evidence is accumulating that the effectiveness of these plans without case manager back-up and self-management training is very limited (Walters et al 2010). Self-management training aimed at behavioural change along with case-manager assistance are the strategies most likely crucial to the success of action plans. This study underlines the usefulness of action plans during COPD exacerbations when coupled with case management and implemented as part of straightforward self-management training programs for patients without severe co-morbid diseases.

Tanja Effing
Department of Respiratory Medicine, Repatriation Hospital, Adelaide, Australia

References