An internet-based computer-tailored physical activity intervention has short term positive effects on physical activity levels among adolescents

Synopsis


Question: Does an internet-based computer-tailored physical activity intervention improve physical activity levels in adolescents? Design: A cluster randomised, controlled trial. Setting: 49 schools with 82 different classes in Austria, Belgium, Crete, Germany, Greece, and Sweden. Participants: Adolescents attending school. Classes were randomised resulting in 581 adolescents allocated to receive computer-tailored advice on physical activity and 469 adolescents allocated to a control group that received generic advice. Interventions: Both groups received advice promoting physical activity at baseline and at 1 month. The intervention group received tailored feedback about their attitudes, self-efficacy, social support, knowledge, perceived benefits, and barriers related to their physical activity. The control group received general advice that included all the above elements but the advice was not tailored to each student. Teachers guided the students through the computer-program available at www.helenastudy.com. Outcome measures: The primary outcome was physical activity levels determined using an adolescent adaptation of the International Physical Activity questionnaire. Activity levels were calculated for total moderate to vigorous physical activity (MVPA). The change in physical activity levels after 1 month and 3 months was assessed by intention to treat analysis using the carry forward technique. Subgroup analysis was completed for adolescents who were sedentary at baseline. Results: 494 participants (47%) completed the study. At the end of 1 month, the intervention group spent an additional 44.8 min/wk (95% CI 8.0 to 81.6) engaged in MVPA compared to the control group. Among sedentary adolescents, those who completed the intervention spent an additional 52.8 min/wk (95% CI 8.5 to 97.8) engaged in MVPA compared with the control group. At the end of 3 months, the intervention group were engaged in an additional 59.1 min/wk (95% CI 18.5 to 99.8) of MVPA compared to the control group. Among sedentary adolescents, those who completed the intervention spent an additional 83.8 min/wk (95% CI 20.5 to 147.1) engaged in MVPA compared with the control group at 3 months. Conclusion: Computer-tailored feedback for adolescents resulted in favourable short-term changes in physical activity levels that were superior to generic advice. The results of the intervention were also favourable for those adolescents considered to be sedentary. The relatively high number of students who did not complete the study highlighted the importance of providing adequate resources, IT support, and teacher support for this type of intervention.

Commentary

Interventions aimed at increasing physical activity have become commonplace. With continual improvements in technology and the widespread availability of computers and the internet, computer-based interventions are emerging as a novel and accessible delivery mode. A handful of studies using internet-based interventions in children have been published (Baranowski et al 2003, Palmer 2005, Haerens et al 2006, Jago et al 2006). These have varied in their setting, program features, intensity, level of tailoring, and degree of interactivity. Efficacy has been mixed. Overall, findings have been modestly promising; however it is unclear which intervention parameters are most effective.

With participants from six European countries, this is the largest study to date examining an internet physical activity intervention in adolescents. The trial was well designed and reported. Participant retention was fair (47% overall), limiting the generalisability of results. It was unfortunate that the primary outcome measure (IPAQ-A) has demonstrated such low validity in other studies (0.20 in correlation with accelerometry (Hagstrømer et al 2008)), thus one cannot be confident that the IPAQ-A measures or detects change in activity accurately.

Results showed that tailored advice led to a significant increase in physical activity compared with generic advice, suggesting that individuals are more likely to change their behaviour favourably in response to personally relevant and specific information. The magnitude of change in physical activity was, however, relatively small (seven minutes per day). The benefits associated with an increase of this magnitude are unclear.

Several feasibility issues were identified. Implementation was aided where a large number of computers were readily available, where there was a fast internet connection, and where an educator facilitated the intervention. Clinicians considering using internet-delivered health services should bear these factors in mind.

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References

High-intensity resistance training restored lean body mass and physical function in patients with rheumatoid arthritis

Synopsis


Question: Can high-intensity progressive resistance training (PRT) restore muscle mass and improve function in patients with rheumatoid arthritis (RA)? Design: A randomised, controlled trial. Setting: A hospital rheumatology department in the UK. Participants: Men and women > 18 years, fulfilling the American College of Rheumatology 1987 revised criteria for the diagnosis of RA with mild to moderate disability (functional class I and II) and on stable medication. Randomisation of 36 participants allocated 18 to the PRT group and 18 to the control group. Interventions: The PRT program was designed according to the American College of Sports Medicine recommendations, and consisted of 3 sets of 8 repetitions with a load corresponding to 80% of the 1-repetition maximum with 1–2 minutes of rest between the sets. The exercises (leg press, chest press, leg extension, seated rowing, leg curl, triceps extension, standing calf raises, and biceps curl) were performed twice a week for 24 weeks on a multi-stack machine in a community gym. The control group sessions included 10 minutes of low-intensity ROM exercises twice weekly at home, considered as insufficient intensity to elicit muscle hypertrophy. Outcome measures: The outcomes were collected immediately following the training period and included: total and regional lean body mass (LBM), maximal voluntary isometric knee extensor strength at 90° flexion (KES), objective physical function measures (30-second arm curl, 30-second chair stand, and 50-foot walking) and patient-reported function (The Multidimensional Health Assessment Questionnaire). Results: 13 participants (72%) in the PRT group and 15 (83%) in the control group completed the study. Participants in the PRT group completed on average 73% of the sessions, and participants in the control group completed on average 54% of the sessions. At baseline, the mean (SD) total LBM in the PRT group was 37.2 (3.9) kg compared to 40.4 (8.9) kg in the control group. PRT increased total LBM by 1.5 (1.5) kg compared to a slight decrease in the control group (p = 0.006 for between group difference). KES and objective physical function measures increased between 17% and 19% in the PRT group compared to no change in the control group (p values ≤ 0.027 for between group differences). Self reported function remained unchanged in both groups. Conclusion: Progressive resistance training can restore the muscle mass and the functional capacity in patients with established, stable RA.

Commentary

Rheumatoid arthritis (RA) is associated with impaired physical function, loss of lean body mass, adiposity, and increased risk for cardiovascular diseases. Thus, the present study focusing on the efficacy of Progressive Resistance Training (PRT) in restoring muscle mass in patients with RA is of utmost importance, both for the patients and for health care providers.

The exercise intervention followed current guidelines for PRT from the American College of Sports Medicine (2009). To our knowledge, this is the first study of an isolated PRT intervention in RA patients. The present study demonstrated that PRT is effective in restoring muscle mass and physical function in RA patients with low degree of disability (function class I and II).

From a clinical perspective the PRT group was supervised during each training session. This supervision seems to have had a positive effect on adherence to training in the PRT group, indicating this as an important aspect when recommending PRT to patients with RA.

Further, a relatively long adaptation period of sub-maximal training (6 weeks) was applied when introducing PRT. The adaptation period may have contributed to the participants reports of no training related injuries or other adverse events. A similar adaptation period was reported by Häkkinen et al (2005), who also concluded that PRT was well tolerated by patients with RA.

A strength of the present study is the use of ‘the gold standard’, the DXA scanner, in assessing body composition. However, we consider the imbalance in lean body mass at baseline between the groups as a weakness. This may be due to the small sample size, with only 28 participants included in the main analysis.

In conclusion, this study showed promising results after PRT in a selected group of patients with RA, which should encourage physiotherapists to consider PRT for patients with mild to moderate disability. However, further research is warranted before the results can be generalised to patients with more affected joints and active disease.

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References


Early physiotherapy after surgery for breast cancer can reduce the incidence of lymphoedema in the following 12 months

Synopsis


Participants: Women after unilateral breast cancer surgery with axillary lymph node dissection. Bilateral breast cancer, surgery without axillary lymph node dissection, and systemic disease were exclusion criteria. Randomisation of 120 participants allocated 60 to the early physiotherapy and education group, and 60 to an education group.

Interventions: Both groups received a physiotherapist-led education program about lymphoedema and strategies for prevention. In addition, the early physiotherapy group received manual lymph drainage (a gentle massage technique to improve lymph circulation), massage of the scar, stretching exercises for the shoulder muscles, and active and active-assisted shoulder exercises, including proprioceptive neuromuscular facilitation patterns without resistance. Both groups started their intervention about 5 days after surgery and received treatment 3 days a week for 3 weeks. In addition, the early physiotherapy group completed a home program of shoulder and stretching exercises once daily during the 3 week intervention.

Outcome measures: The primary outcome was the incidence of lymphoedema in the 12 months after surgery, defined as a greater than 2 cm increase in arm circumference at two adjacent points compared with the unaffected arm. Secondary outcome measures were volume ratio (the volume of the affected arm divided by the volume of the unaffected arm), and a survival analysis over the 4 assessment times of 1, 3, 6 and 12 months.

Results: 116 participants completed the study. After one year 4 women in the early physiotherapy and education group had developed lymphoedema and 14 women in the education group had developed lymphoedema. Therefore one case of lymphoedema was prevented for every 6 women treated with the early physiotherapy program (95% CI 3 to 20). At 12 months the average volume of the affected arm was 1.6% greater than the unaffected arm in the early physiotherapy group but 5.1% greater in the education group. The survival analysis showed that lymphoedema was diagnosed four times earlier in the education group than in the early physiotherapy group (hazard ratio 0.26, 95% CI 0.09 to 0.79). Conclusion: A relatively short-term early physiotherapy program involving manual lymph drainage, scar massage, exercise and education can reduce the incidence of lymphoedema in the first 12 months after surgery for breast cancer.

[95% CIs calculated by the CAP Co-ordinator.]

Commentary

Lymphoedema remains a prevalent and potentially debilitating side effect of breast cancer treatment. Data from recent research studies suggest that the incidence of lymphoedema after axillary node dissection and radiation therapy ranges from 10% to 31% (Shih 2009, Thomas-McLean 2008, Hayes 2008). Lately, attention has focused on early detection and management of lymphoedema using sensitive measurement techniques (Thomas-McLean 2008, Stout-Gergich 2008).

This study is to date the largest randomised controlled trial examining the benefit of early comprehensive physiotherapy in this group of patients. This single-centre trial with blinded outcome assessment provides evidence in support of early physiotherapy to prevent lymphoedema after axillary node dissection surgery for breast cancer.

In the study, 18 women (16%) developed lymphoedema over the 12-month post-operative period, with 14 cases occurring in the control group and 4 cases in the intervention group. It is not clear, however, whether some of the cases of lymphoedema that developed were transient increases in limb volume or the more chronic form of the condition (present for > 3 to 6 months). Further follow-up may have been helpful to distinguish whether some of the cases may have dissipated over time (Hayes 2008).

The early physiotherapy program examined in this study included 9 physiotherapy treatment sessions delivered over a 3-week period by physiotherapists with specialised training. The program was similar in approach to the Physiotherapy Management Care Plan proposed in 2002 (Box et al 2002).

While the analysis shows a potential protective benefit, given the relatively small numbers that developed lymphoedema, the cost in terms of time and finances (and the need for physiotherapist specialist training) may make routine provision of this early physiotherapy program prohibitive. Moreover, as a combination of treatments were provided, it is unclear whether the benefit in reduced incidence of lymphoedema was due to the manual lymph drainage, scar massage, the focused exercise, or the combination of treatments.

Based on the positive findings of this trial, future research should attempt to elucidate the relative benefit of individual components of this type of program.

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References

McKenzie treatment for acute back pain added to first-line care does not result in appreciable clinical improvements

Synopsis


Question: Does the addition of McKenzie treatment to first-line care improve symptoms and function for patients with acute low back pain? Design: A randomised controlled trial with concealed allocation and blinded outcome assessment Setting: 27 primary care medical practices in Sydney, Australia. Participants: Patients aged between 18 to 80 years seeking medical care from a primary care physician for a new episode of acute non-specific low back pain. Nerve root compromise, serious spinal pathology, and recent spinal surgery were exclusion criteria. Randomisation of 148 participants allotted 73 to the McKenzie treatment and first-line care group, and 73 to a first-line care only group. Interventions: Both groups received the following recommended first-line care for acute low back pain: advice to remain active and avoid bed rest, reassurance of a favourable prognosis and instructions to take paracetamol. In addition, the intervention group received McKenzie therapy, commenced within 48 h of their physician consultation. Treatment was provided by 15 accredited McKenzie therapists. Treatment for most patients encouraged directions of movement and postures that centralised pain. Patients received up to 6 treatment sessions over 3 weeks. They were provided with the book Treat Your Own Back, prescribed home exercises, and most were prescribed lumbar rolls. Outcome measures: Primary outcomes were pain and global perceived effect. Pain was measured during the first 7 days, and at Weeks 1 and 3, with the Numerical Rating Scale scored from 0 (no pain) to 10 (worst pain possible), with a between-group difference of 1 unit considered clinically important. Patient-rated global perceived effect was assessed at 3 weeks on a –5 to 5 scale, anchored at ‘vastly worse’ and ‘completely recovered.’ Secondary outcome measures were disability, function, global perceived effect at 1 week, persistent low back pain at 3 months, and use of additional health care services. Results: 138 participants provided data at 3 months. At Week 1, pain was less in the McKenzie treatment group by 0.4 points (95% CI –0.1 to –0.8). At Week 3, pain was less in the McKenzie treatment group by 0.7 points (95% CI –1.2 to –0.1). The groups did not differ on other outcomes. However, patients receiving McKenzie treatment sought less additional health care than those receiving only first-line care (p = 0.002). Conclusion: When added to the recommended first-line care of acute low back pain, a McKenzie treatment program did not produce clinically significant additional short-term improvements in pain, disability, function or global perceived effect but resulted in patients seeking less additional health care.

Commentary

Despite evidence that exercise therapy is of limited value for patients with acute low back pain (pain of less than 6 weeks) (Hayden et al 2005, Chou et al 2007), many physiotherapists continue to use treatment approaches that incorporate exercise. This trial investigated whether short-term pain outcomes were improved by adding McKenzie treatment to recommended first-line care for patients with acute low back pain.

The trial has many merits, including the attention to working with highly trained McKenzie therapists to deliver the intervention, the blinded outcome assessments, the high follow-up rates, the attention to the measurement of adherence to the McKenzie exercise program, and recruitment of patients consulting their family doctor about their low back pain. The results show small but statistically significant differences in pain at 1 and 3 weeks, the clinical importance of which the research team quite appropriately question. Their pre-set level of difference between groups was a difference of 1 (on a 0 to 10 scale of pain) and the differences they saw (0.4 and 0.7 at 1 and 3 weeks respectively) were smaller than this. Overall, the trial concludes that a treatment program based on the McKenzie method does not produce clinically important short-term improvements in pain but it did seem to reduce health care use in the follow-up period through to 3 months.

Given that we know the course of low back pain tends to follow a recurrent pattern (Dunn et al 2006), it is a pity that this trial stopped follow-up at only 3 months. It could be hypothesised that many of the 148 patients recruited will proceed to future recurrences and, for some, long term persistence. One might argue that patients treated with the McKenzie approach to self-management might be equipped to manage their own low back pain. This is partially supported by the short-term data on lower health care use in the group receiving the McKenzie intervention in this trial. Future trials of the McKenzie approach could usefully incorporate longer-term data collection with robust health economic analyses.

This trial encourages us to think about which patients with back pain we target with which treatments. The results suggest there seems little point in providing McKenzie treatment to all patients with acute low back pain seeking primary care, and thus there is a need to better identify those patients who would benefit most from treatment options.

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References