"Effectiveness of Core Strengthening Exercises for Chronic Nonspecific Low Back Pain (CNLBP): A Critical Review of the Literature"

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Abstract

Introduction: Low back pain is a leading cause of disability. One factor proposed as an important source of chronic nonspecific low back pain (CNLBP) is instability and poor control of the spine, specifically the deep trunk muscles. Exercise therapy has been found to be more effective than no treatment or minimal intervention but the most effective specific type of exercise has yet to be determined. The purpose of this review is to determine the evidence for the use of core strengthening exercises for the treatment of chronic low back pain.

Methods: Three online databases were searched (MEDLINE/PUBMED, CINAHL, and EMBASE) using the key words “exercise” or “therapy” and back pain). Full text articles published in English using only human subjects from the time range of January 2000 to June 2014 were searched. Specific inclusion criteria were used to target the general exercise interventions. One review examined all trials and others were designed for potentially eligible citations based on the specific criteria below.

Introduction (continued)

Table 1

<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention</th>
<th>Intervention Frequency</th>
<th>Sample Size</th>
<th>Study design</th>
<th>Outcome measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marshall et al. 2013</td>
<td>Core: 8 component structure including: stretching, abdominal contraction and trunk exercise (out and in)</td>
<td>Twice a week, duration 8 wks n=45 both groups</td>
<td>Randomized, single-center, single-blinded controlled study</td>
<td>No significant differences in treatment to control</td>
<td></td>
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<tr>
<td>Maccio et al. 2012</td>
<td>Core: contraction of core muscles in specific manner with feedback by palpation and ultrasound imaging</td>
<td>14 sessions, 60 min., duration, total 6 wks home exercises prescribed in diet at discretion of therapist</td>
<td>Prospective, randomized controlled trial</td>
<td>Improved core strength with feedback by palpation and ultrasound imaging</td>
<td></td>
</tr>
<tr>
<td>Wopedi et al. 2012</td>
<td>Core: individualized Pilates exercise program prescribed by therapist (reformer and mat)</td>
<td>60 min. duration, total 6 wks home daily exercise, core wks n=45 General exercise</td>
<td>Prospective, randomized controlled trial</td>
<td>Improved core strength with feedback by therapist</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

We found only a small number of randomized controlled trials focusing on the use of core strengthening exercises for the treatment of chronic low back pain. For all studies there was a short duration of follow-up, from 4 weeks as the shortest duration and 24 weeks as the maximum duration. All studies reviewed had an improvement in pain and disability scores with core strengthening exercise, although in 2 of 3 the studies the general exercise group also improved. In summary, core strengthening is possibly more effective than general exercise in the short-term (<6 weeks) in younger patients (30-40 years old) with mild to moderate CNLBP and low disability. There was no evidence that core strengthening was more effective than general exercise at long-term follow-up. This is an AAN Recommendation Level C. Clinicians may offer core strengthening exercises for CNLBP to improve pain and disability. There are numerous limitations to these studies. In the future, studies need larger sample sizes, longer follow-up periods, and should target more representative populations. We need a more accurately defined What constitutes core strengthening exercise. There should be more objective evidence (i.e. muscle strength, endurance, discomfort, radiology, return to work, etc.) and more control of core exercises (i.e. anatomic, kinematic program) in future studies.

References


Discussion

Low back pain is a leading cause of disability and a common reason for physician visits. In many cases the source of back pain is not validated, hence the term “non-specific low back pain.” One factor proposed as an important source of pain is instability and poor control of the spine, specifically the deep trunk muscles. Exercise therapy is one management strategy for chronic low back pain with a heterogeneous group of interventions. Exercise has been found to be more effective than no treatment or minimal intervention but the most effective specific type of exercise has yet to be determined. The purpose of this study was to critically review the literature to determine whether core strengthening exercises are more effective in reducing pain and disability when compared to other general exercise interventions in persons with CNLBP.

Table 2

<table>
<thead>
<tr>
<th>Study</th>
<th>Summary of Results</th>
<th>Level of Evidence</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marshall et al. 2013</td>
<td>Core: statistically significant reduction in VAS (5%) and ODI (11%) scores at 4 weeks (p&lt;0.05). Improvements maintained at 6 month follow-up.</td>
<td>Class II evidence</td>
<td>No-representative population (i.e. mean age 37-50 yrs) General exercise group with significantly more dropouts</td>
</tr>
<tr>
<td>Maccio et al. 2012</td>
<td>Core: no statistically significant difference between treatment groups for any outcome (VAS, PSF, etc.) at any time point (6 wks, 6 and 12 month follow-up).</td>
<td>Class III evidence</td>
<td>Participants not blinded to treatment group</td>
</tr>
<tr>
<td>Wopedi et al. 2012</td>
<td>Core: statistically significant reduction in VAS at 6 wks (p&lt;0.05) but no statistically significant reduction in ODI at 8 wks. Both VAS and ODI had significant reductions at 6 month follow-up with no significant between-group differences when compared to “core” exercise group.</td>
<td>Class III evidence</td>
<td>Participants not blinded to treatment group</td>
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