Exercise for the Management of Neck Pain: Clinical Effectiveness
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Acknowledgments:

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About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada’s health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

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Research Question
What is the clinical effectiveness of exercise for the management of neck pain?

Key Findings
Eleven systematic reviews (three with meta-analyses) were identified regarding the clinical effectiveness of exercise for the management of neck pain.

Methods
A limited literature search, with main concepts appearing in title or major subject heading, was conducted on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD), Canadian and major international health technology agencies, as well as a focused Internet search. A second broader search with main concepts appearing in the title, abstract or subject heading was also done. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses and randomized controlled trials. For both searches, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2012 and July 17, 2017. Internet links were provided where available.

Selection Criteria
One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Adults with acute or chronic neck pain</th>
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<tbody>
<tr>
<td>Intervention</td>
<td>Exercise (e.g., hydrotherapy, aquatic exercise)</td>
</tr>
<tr>
<td>Comparators</td>
<td>Opioids; No treatment; Wait-list; Placebo</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Clinical benefits and harms (e.g., pain, physical function, social function [including return to school or work], emotional and psychological functioning [e.g., anxiety, depression, sleep], health-related quality of life)</td>
</tr>
<tr>
<td>Study Designs</td>
<td>Health technology assessments, systematic reviews, meta-analyses</td>
</tr>
</tbody>
</table>
Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented in that order.

Eleven systematic reviews (three with meta-analyses) were identified regarding the clinical effectiveness of exercise for the management of neck pain. No relevant health technology assessments were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Eleven systematic reviews\(^1\)\(^{-}\)\(^{11}\) (three with meta-analyses)\(^6\)\(^{,7,11}\) were identified regarding the clinical effectiveness of exercise for the management of neck pain. All of the systematic reviews analyzed pain level as an outcome after treatment.\(^1\)\(^{-}\)\(^{11}\) Detailed study characteristics are provided in Table 2.

The majority of studies found a benefit of exercise for chronic neck pain,\(^3\)\(^{-}\)\(^{8,11}\) whiplash associated neck pain,\(^1\)\(^{-}\)\(^{3}\) and general neck pain.\(^4\)\(^{-}\)\(^{8}\) The authors of one systematic review observed no differences between spinal manipulation and exercise in individuals with neck pain.\(^9\) The reviews analyzed general exercise programs,\(^1\)\(^{-}\)\(^{2,5}\)\(^{-}\)\(^{7}\)\(^{-}\)\(^{9}\)\(^{-}\)\(^{11}\) strengthening exercises,\(^3\)\(^{-}\)\(^{4,6,8,11}\) flexibility,\(^3\)\(^{6,11}\) Qigong,\(^3\) hydrotherapy,\(^4\) range-of-motion exercise,\(^6\) and endurance training.\(^6\)\(^,8\)

Table 2: Summary of Included Studies on the Clinical Effectiveness of Exercise for the Management of Neck Pain

<table>
<thead>
<tr>
<th>First Author, Year</th>
<th>Study Characteristics</th>
<th>Population, Condition</th>
<th>Outcomes</th>
<th>Conclusions</th>
</tr>
</thead>
</table>
| **Griffin, 2017**\(^1\) | • 3 studies included | • WAD NP | • Pain  
• Disability | • No clinically meaningful differences between exercise programs and minimal intervention control programs observed |
| **Swedish Agency for Health Technology Assessment and Assessment of Social Services, 2016**\(^2\) | • 36 studies included | • WAD NP | • Pain | • Supervised active treatment with physical training of the neck is more effective than standard treatment (i.e., written advice with instruction to start exercise at home after a few weeks) |
| **Southerst, 2016**\(^3\) | • 10 studies included | • NP  
• WAD Grade I-III | • Pain | • For NP Grade I/III, ROM exercise is similar to non-steroidal anti-inflammatory drugs and manual therapy |
<table>
<thead>
<tr>
<th>First Author, Year</th>
<th>Study Characteristics</th>
<th>Population, Condition</th>
<th>Outcomes</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wong, 2016&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• 38 studies included</td>
<td>• NP</td>
<td>• Recovery • Pain • QoL • AE • Psychological outcomes</td>
<td>• High-dose strengthening exercise not superior to patient advice • Grade strengthening exercises more effective than patient advice but similar to cervical collars for NP Grade III • Qigong, strengthening, ROM, and flexibility exercises more effective than wait list for WAD and chronic NP</td>
</tr>
<tr>
<td>Zronek, 2016&lt;sup&gt;b&lt;/sup&gt;</td>
<td>• 7 studies included</td>
<td>• NP</td>
<td>• Pain • Function • Disability</td>
<td>• For NP Grade III, strengthening exercises and cervical collars had similar outcomes • Hydrotherapy is not effective and should not be used</td>
</tr>
<tr>
<td>Gross, 2015&lt;sup&gt;c&lt;/sup&gt;</td>
<td>• MA performed • 27 studies included • N=2485</td>
<td>• NP</td>
<td>• Pain • Function • Disability • Satisfaction • QoL</td>
<td>• Upper extremity strength training improved pain immediately post treatment and in the short-term follow-up • Upper extremity endurance training has slight benefit for pain immediately post treatment and in the short-term follow-up • Combined cervical, shoulder and scapulothoracic strengthening and stretching exercises improved pain immediately post treatment and in the short-term and long-term follow-up • General fitness training with pattern synchronization may not be effective for pain or functioning</td>
</tr>
<tr>
<td>Bertozzi, 2013&lt;sup&gt;d&lt;/sup&gt;</td>
<td>• MA performed • 7 studies included</td>
<td>• Chronic NP</td>
<td>• Pain • Disability</td>
<td>• Therapeutic exercise improved short-term and immediate pain and disability</td>
</tr>
<tr>
<td>Damgaard, 2013&lt;sup&gt;e&lt;/sup&gt;</td>
<td>• 42 studies included • N=3919</td>
<td>• Chronic NP</td>
<td>• Pain</td>
<td>• Strength and endurance training had an effect on NP</td>
</tr>
<tr>
<td>Schroeder, 2013&lt;sup&gt;f&lt;/sup&gt;</td>
<td>• 7 studies included</td>
<td>• NP</td>
<td>• Pain</td>
<td>• No difference in pain between SM and exercise</td>
</tr>
<tr>
<td>First Author, Year</td>
<td>Study Characteristics</td>
<td>Population, Condition</td>
<td>Outcomes</td>
<td>Conclusions</td>
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</tbody>
</table>
| Hagen, 2012<sup>10</sup> | • Overview of SRs  
• 9 studies included  
• N=24,059 | • NP with MSCs | • Pain  
• Function | • Inconsistent results for short-term functional improvement when comparing SM to exercise  
• Minimal short and long term differences in outcomes between SM and exercise |
| Kay, 2012<sup>11</sup> | • MA performed  
• 6 studies included | • Chronic NP | • Pain  
• Function | • Overall supports exercise for MSCs, but NP has small and sometimes insignificant effect estimates  
• Exercise is beneficial in the short term for pain and function  
• Upper extremity stretching, strengthening, or general exercise did not have an effect on NP |

Abbreviations: AE = adverse events; MA = meta-analysis; MSC = musculoskeletal conditions; NP = neck pain; NR = not reported; QoL= Quality of life; ROM = range of motion; SM = spinal manipulation; WAD = whiplash associated disorders.

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses


Appendix — Further Information

Previous CADTH Reports


Guidelines and Recommendations


Review Articles
