Exercise for the Management of Fibromyalgia: 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 fibromyalgia?

Key Findings
Twenty-two systematic reviews (11 with meta-analysis) were identified regarding the clinical benefits and harms of exercise for adults with fibromyalgia.

Methods
A limited literature search 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. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials and non-randomized studies. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2012 and July 7, 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>
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<tr>
<th>Table 1: Selection Criteria</th>
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<tr>
<td><strong>Population</strong></td>
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<td><strong>Intervention</strong></td>
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<td><strong>Comparator</strong></td>
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<td><strong>Outcomes</strong></td>
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<td><strong>Study Designs</strong></td>
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Results
Twenty-two systematic reviews (11 with meta-analyses) were identified regarding the clinical benefits and harms of exercise for adults with fibromyalgia. No relevant health technology assessments were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings
Twenty-two systematic reviews (11 with meta-analyses) were identified regarding the clinical benefits and harms of exercise for fibromyalgia in adults. There were a variety of exercise programs investigated in the literature, including aerobic, aquatic, hydrotherapy, yoga, tai chi, qigong, muscle stretching, walking, resistance exercise training, and general exercise. Overall, the large volume of evidence suggested that exercise can be beneficial for symptom reduction in patients with fibromyalgia. Although some forms of exercise appear to have a stronger effect in symptom reduction, there was no literature identified that suggested a non-exercise control group performed significantly better than any exercise group (regardless of the exercise intervention). Exercise programs are well-tolerated by adults with fibromyalgia. Detailed study characteristics are provided in Table 2.

Table 2: Summary of Included Studies on the Clinical Benefits and Harms of Exercise for Fibromyalgia in Adults

<table>
<thead>
<tr>
<th>First Author, Year</th>
<th>Study Characteristics</th>
<th>Intervention</th>
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<th>Outcomes</th>
<th>Conclusions</th>
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<tr>
<td>Systematic Reviews and Meta-Analyses</td>
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<tr>
<td>Bidonde, 2017²</td>
<td>13 included RCTs</td>
<td>Aerobic exercise training</td>
<td>Treatment as usual</td>
<td>HRQoL, Pain intensity, Stiffness, Fatigue, Physical function, Withdrawals, Adverse events</td>
<td>Moderate quality evidence reports improvement in HRQoL and all-cause withdrawal</td>
</tr>
<tr>
<td></td>
<td>N = 839</td>
<td></td>
<td>No exercise</td>
<td></td>
<td>Low quality evidence suggests aerobic exercise decreases pain intensity, improves physical function</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non-exercise interventions (medication, education)</td>
<td></td>
<td>Long-term effects of aerobic exercise are uncertain</td>
</tr>
<tr>
<td>McDowell, 2017³</td>
<td>MA performed</td>
<td>Exercise training</td>
<td>Non-exercise control</td>
<td>Anxiety</td>
<td>Exercise training significantly reduced anxiety symptoms</td>
</tr>
<tr>
<td></td>
<td>10 included studies</td>
<td></td>
<td></td>
<td></td>
<td>Increase in the length of the exercise program increased symptom reduction</td>
</tr>
<tr>
<td></td>
<td>N = 595</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angel, 2016⁴</td>
<td>6 included guidelines</td>
<td>Physical exercise Cognitive-behavioural</td>
<td>No comparator</td>
<td>Not specified in abstract</td>
<td>Final recommendations were made identifying optimal treatments (NR in abstract)</td>
</tr>
<tr>
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| Garcia-Hermoso, 2015<sup>5</sup> | 5 included RCTs  
N = NR | Exercise programs  
(Aerobic and aquatic) | No exercise | Functional aerobic capacity  
(6-minute walk test) | Aerobic and aquatic exercise programs increased functional aerobic capacity |
| Lauche, 2015<sup>5</sup> | Overview of SRs  
25 included SRs  
N = NR | Complementary and alternative medicine  
(including exercise, manipulative therapies, Mind/Body therapies, acupuncture, hydrotherapy, phytotherapy, and homeopathy) | Not specified in abstract | Not specified in abstract | Exercise programs were reported to have a consistently beneficial effect included tai chi, yoga, and hydrotherapy  
Included SRs showed various methodological flaws, limiting conclusions that can be drawn |
| Lorena, 2015<sup>6</sup> | 5 included RCTs  
N = NR | Muscle stretching exercises | Not specified in abstract | Pain | Muscle stretching exercises reduced the amount of pain experienced by FM patients  
Included RCTs were of low methodological quality |
| Myrhaug, 2015<sup>7</sup> | 2 included studies  
N = NR | Hydrotherapy | Education program only | Self-reported sick absence  
Pain  
Function  
QoL | Due to very low quality evidence, unclear if hydrotherapy is beneficial to patients suffering from FM |
| O'Connor, 2015<sup>8</sup> | MA performed  
26 RCTs and qRCTs  
N = 2,384 | Walking interventions | No exercise  
Non walking exercise | Pain  
Self-reported function | Evidence of fair methodological quality suggests that walking can be an effective form of exercise for individuals with chronic musculoskeletal pain (including FM) |
| Rain, 2015<sup>9</sup> | MA performed  
25 RCTs from 14 SRs were included | Regular physical exercise | Not specified in abstract | Pain | MA suggests that regular physical exercise is likely helpful in reducing pain |
<table>
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</table>
| Bidonde, 2014<sup>10</sup> | • Overview of SRs  
  • 9 included SRs (containing 60 RCTs)  
  • N = 3,816 | • Physical activity interventions | • Not specified in abstract | • Pain  
  • QoL  
  • Physical function  
  • Adverse effects | • Most physical activity interventions reported a positive effect on all outcomes of interest  
  • No evidence identified supported qigong and tai chi  
  • No serious adverse effects were reported |
| Bidonde, 2014<sup>11</sup> | • MA performed  
  • 16 included RCTs  
  • N = 881 | • Aquatic exercise training | • Control  
  • Land-based exercise  
  • Alternative aquatic exercise program | • Multidimensional function  
  • Self-reported physical function  
  • Pain  
  • Stiffness  
  • Muscle strength  
  • Submaximal cardiorespiratory function  
  • Withdrawal rates  
  • Adverse effects | • The aquatic exercise group had significant improvements in all major outcomes compared to control group  
  • Aquatic exercise versus land-based exercise results in no statistically significant differences (with the exception of strength which favoured the land-based group)  
  • Little differences observed between different aquatic based exercises  
  • Overall, quality of evidence was very low to moderate |
| Kelley, 2014<sup>12</sup> | • 2 includes MAs  
  • N = 870 | • Exercise | • Control | • Depressive symptoms | • Exercise improves depressive symptoms in FM patients |
| Naumann, 2014<sup>13</sup> | • MA performed  
  • Total number of studies included not specified in abstract  
  • N = NR | • Balneotherapy  
  • Hydrotherapy | • Not specified in abstract | • Pain  
  • HRQoL  
  • Depressive symptoms  
  • Tender point count | • Hydrotherapy observed to reduce pain (moderate-to-strong evidence) and improve HRQoL at the end of treatment (moderate-to-strong evidence) |
| Perrot, 2014<sup>14</sup> | • 85 RCTs included | • Pharmacologic treatments  
  • Non-pharmacologic treatments (including exercise programs) | • Placebo or sham | • Pain  
  • Sleep disturbance  
  • Fatigue  
  • Depression  
  • Anxiety  
  • Functional deficit  
  • Cognitive impairment | • Pool therapy and exercise had significant effects (to various degrees) improving the outcomes of interest |
| Busch, 2013<sup>15</sup> | • MA performed  
  • 5 included | • Resistance exercise | • Control  
  • Other | • FIQ  
  • Physical function | • Low quality evidence reported that resistance |
<table>
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<tr>
<td><strong>Langhorst, 2013</strong>&lt;sup&gt;16&lt;/sup&gt;</td>
<td>MA performed 7 included studies N = 362</td>
<td>Meditative movement therapies (qigong, tai chi and yoga)</td>
<td>Control group</td>
<td>Pain, Sleep, Fatigue, Depression, HRQoL</td>
<td>Meditative movement therapies were effective in reducing sleep disturbances, fatigue, and depression and improved HRQoL. No difference in pain was observed between the two groups.</td>
</tr>
<tr>
<td><strong>Lima, 2013</strong>&lt;sup&gt;17&lt;/sup&gt;</td>
<td>MA performed 27 included studies N = NR</td>
<td>Aquatic physical therapy</td>
<td>No treatment Land-based exercises</td>
<td>FIQ, Stiffness, 6-minute walk test</td>
<td>Some evidence reported aquatic therapy provided benefit to functional ability and stiffness over no treatment. Authors concluded that the evidence reviewed was insufficient to demonstrate statistical clinical differences in most outcomes of interest (due to low methodological rigor).</td>
</tr>
<tr>
<td><strong>Mist, 2013</strong>&lt;sup&gt;18&lt;/sup&gt;</td>
<td>Ma performed Total number of studies included not specified in abstract N = NR</td>
<td>Complementary and alternative medicine (including tai chi, qigong, yoga, and other movement therapies)</td>
<td>Not specified in abstract</td>
<td>Not specified in abstract</td>
<td>Most studies reported a medium-to-high effect size in pain reduction (moderately weak evidence). Authors concluded that there is little risk in recommending these exercises due to the lack of adverse events.</td>
</tr>
</tbody>
</table>

**RCTs**

- **N** = 219

- Training exercise training

- Tenderness

- Muscle strength

- Pain

- Training improved FIQ scores, pain, tenderness, and muscle strength versus a control group in women with FM.

- Additional low quality evidence suggested that aerobic exercise was superior to resistance training for improving pain.

- Low quality evidence reported that 12 weeks of resistance training was superior to flexibility exercise training for improving pain and FIQ score.

**Meditative movement therapies (qigong, tai chi and yoga)**

- Control group

- Pain

- Sleep

- Fatigue

- Depression

- HRQoL

- Meditative movement therapies were effective in reducing sleep disturbances, fatigue, and depression and improved HRQoL.

- No difference in pain was observed between the two groups.

**Aquatic physical therapy**

- No treatment Land-based exercises

- FIQ

- Stiffness

- 6-minute walk test

- Some evidence reported aquatic therapy provided benefit to functional ability and stiffness over no treatment.

- Authors concluded that the evidence reviewed was insufficient to demonstrate statistical clinical differences in most outcomes of interest (due to low methodological rigor).
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<tr>
<td>Nuesch, 2013&lt;sup&gt;19&lt;/sup&gt;</td>
<td>• NMA performed&lt;br&gt;• 102 included RCTs&lt;br&gt;• N = 14,982</td>
<td>• Pharmacologic treatments&lt;br&gt;• Non-pharmacologic treatments (including aerobic exercise)</td>
<td>• Control intervention (placebo)</td>
<td>• Pain&lt;br&gt;• QoL</td>
<td>• Aerobic exercise showed small to moderate benefits over placebo</td>
</tr>
<tr>
<td>Chan, 2012&lt;sup&gt;20&lt;/sup&gt;</td>
<td>• 4 included RCTs&lt;br&gt;• N = NR</td>
<td>• Qigong exercise</td>
<td>• Group education&lt;br&gt;• Daily activities&lt;br&gt;• Aerobic exercise</td>
<td>• Not specified in abstract</td>
<td>• Included RCTs had mixed results regarding the effectiveness of qigong exercise&lt;br&gt;• Authors concluded additional research required to determine whether qigong exercise can be effective for the treatment of FM</td>
</tr>
<tr>
<td>Hagan, 2012&lt;sup&gt;21&lt;/sup&gt;</td>
<td>• Overview of SRs&lt;br&gt;• 9 included SRs (containing 224 trials)&lt;br&gt;• N = 24,059</td>
<td>• Exercise therapy</td>
<td>• Not specified in abstract</td>
<td>• Pain&lt;br&gt;• Physical function</td>
<td>• Solid evidence supporting exercise in the management of FM</td>
</tr>
<tr>
<td>Terry, 2012&lt;sup&gt;22&lt;/sup&gt;</td>
<td>• Overview of SRs&lt;br&gt;• 5 included SRs&lt;br&gt;• N = NR</td>
<td>• Complementary or alternative medicine (including hydrotherapy)</td>
<td>• Not specified in abstract</td>
<td>• Not specified in abstract</td>
<td>• Some evidence of beneficial effects from hydrotherapy</td>
</tr>
</tbody>
</table>

Abbreviations: FIQ = fibromyalgia impact questionnaire; FM = fibromyalgia; HRQoL = health-related quality of life; MA = meta-analysis; NMA = network meta-analysis; NR = not reported; QoL = quality of life; qRCT = quasi-randomized controlled trial; RCT = randomized controlled trial; SR = systematic review.
References Summarized
Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-Analyses


PubMed: PM23569397

PubMed: PM22739992

PubMed: PM22757663

PubMed: PM23253613

PubMed: PM21614472
Appendix — Further Information

Previous CADTH Reports


Guidelines and Recommendations


Review Articles


