

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

# Exercise for the Management of Fibromyalgia: Clinical Effectiveness

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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 1: Selection Criteria**

<b>Population</b>	Adults with fibromyalgia
<b>Intervention</b>	Exercise (including hydrotherapy and aquatic exercise)
<b>Comparator</b>	Opioids, no treatment, wait-list, placebo
<b>Outcomes</b>	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)
<b>Study Designs</b>	Health technology assessments, systematic reviews, meta-analyses

## Results

Twenty-two systematic reviews (11 with meta-analysis) 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<sup>1-22</sup> (11 with meta-analyses)<sup>2,8,9,11,13-19</sup> 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,<sup>1,4,19</sup> aquatic,<sup>4,11,17</sup> hydrotherapy,<sup>5,7,13-14,22</sup> yoga,<sup>5,16,18</sup> tai chi,<sup>5,16,18</sup> qigong,<sup>16,18,20</sup> muscle stretching,<sup>6</sup> walking,<sup>8</sup> resistance exercise training,<sup>15</sup> and general exercise.<sup>2-3,9-10,12,14,21</sup> Overall, the large volume of evidence suggested that exercise can be beneficial for symptom reduction in patients with fibromyalgia.<sup>1-22</sup> 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).<sup>1-22</sup> Exercise programs are well-tolerated by adults with fibromyalgia.<sup>1-22</sup> 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**

First Author, Year	Study Characteristics	Intervention	Comparator	Outcomes	Conclusions
<b>Systematic Reviews and Meta-Analyses</b>					
<b>Bidonde, 2017<sup>1</sup></b>	<ul style="list-style-type: none"> <li>13 included RCTs</li> <li>N = 839</li> </ul>	<ul style="list-style-type: none"> <li>Aerobic exercise training</li> </ul>	<ul style="list-style-type: none"> <li>Treatment as usual</li> <li>No exercise</li> <li>Non-exercise interventions (medication, education)</li> </ul>	<ul style="list-style-type: none"> <li>HRQoL</li> <li>Pain intensity</li> <li>Stiffness</li> <li>Fatigue</li> <li>Physical function</li> <li>Withdrawals</li> <li>Adverse events</li> </ul>	<ul style="list-style-type: none"> <li>Moderate quality evidence reports improvement in HRQoL and all-cause withdrawal</li> <li>Low quality evidence suggests aerobic exercise decreases pain intensity, improves physical function</li> <li>Long-term effects of aerobic exercise are uncertain</li> </ul>
<b>McDowell, 2017<sup>2</sup></b>	<ul style="list-style-type: none"> <li>MA performed</li> <li>10 included studies</li> <li>N = 595</li> </ul>	<ul style="list-style-type: none"> <li>Exercise training</li> </ul>	<ul style="list-style-type: none"> <li>Non-exercise control</li> </ul>	<ul style="list-style-type: none"> <li>Anxiety</li> </ul>	<ul style="list-style-type: none"> <li>Exercise training significantly reduced anxiety symptoms</li> <li>Increase in the length of the exercise program increased symptom reduction</li> </ul>
<b>Angel, 2016<sup>3</sup></b>	<ul style="list-style-type: none"> <li>6 included guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Physical exercise</li> <li>Cognitive-behavioural</li> </ul>	<ul style="list-style-type: none"> <li>No comparator</li> </ul>	<ul style="list-style-type: none"> <li>Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>Final recommendations were made identifying optimal treatments (NR in abstract)</li> </ul>

First Author, Year	Study Characteristics	Intervention	Comparator	Outcomes	Conclusions
		therapy <ul style="list-style-type: none"> <li>• Amitriptyline</li> <li>• Pharmacologic treatments</li> <li>• Multimodal approach</li> </ul>			
<b>Garcia-Hermoso, 2015<sup>4</sup></b>	<ul style="list-style-type: none"> <li>• 5 included RCTs</li> <li>• N = NR</li> </ul>	<ul style="list-style-type: none"> <li>• Exercise programs (Aerobic and aquatic)</li> </ul>	<ul style="list-style-type: none"> <li>• No exercise</li> </ul>	<ul style="list-style-type: none"> <li>• Functional aerobic capacity (6-minute walk test)</li> </ul>	<ul style="list-style-type: none"> <li>• Aerobic and aquatic exercise programs increased functional aerobic capacity</li> </ul>
<b>Lauche, 2015<sup>5</sup></b>	<ul style="list-style-type: none"> <li>• Overview of SRs</li> <li>• 25 included SRs</li> <li>• N = NR</li> </ul>	<ul style="list-style-type: none"> <li>• Complementary and alternative medicine (including exercise, manipulative therapies, Mind/Body therapies, acupuncture, hydrotherapy, phytotherapy, and homeopathy)</li> </ul>	<ul style="list-style-type: none"> <li>• Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Exercise programs were reported to have a consistently beneficial effect included tai chi, yoga, and hydrotherapy</li> <li>• Included SRs showed various methodological flaws, limiting conclusions that can be drawn</li> </ul>
<b>Lorena, 2015<sup>6</sup></b>	<ul style="list-style-type: none"> <li>• 5 included RCTs</li> <li>• N = NR</li> </ul>	<ul style="list-style-type: none"> <li>• Muscle stretching exercises</li> </ul>	<ul style="list-style-type: none"> <li>• Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> </ul>	<ul style="list-style-type: none"> <li>• Muscle stretching exercises reduced the amount of pain experienced by FM patients</li> <li>• Included RCTs were of low methodological quality</li> </ul>
<b>Myrhaug, 2015<sup>7</sup></b>	<ul style="list-style-type: none"> <li>• 2 included studies</li> <li>• N = NR</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrotherapy</li> </ul>	<ul style="list-style-type: none"> <li>• Education program only</li> </ul>	<ul style="list-style-type: none"> <li>• Self-reported sick absence</li> <li>• Pain</li> <li>• Function</li> <li>• QoL</li> </ul>	<ul style="list-style-type: none"> <li>• Due to very low quality evidence, unclear if hydrotherapy is beneficial to patients suffering from FM</li> </ul>
<b>O'Connor, 2015<sup>8</sup></b>	<ul style="list-style-type: none"> <li>• MA performed</li> <li>• 26 RCTs and qRCTs</li> <li>• N = 2,384</li> </ul>	<ul style="list-style-type: none"> <li>• Walking interventions</li> </ul>	<ul style="list-style-type: none"> <li>• No exercise</li> <li>• Non walking exercise</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• Self-reported function</li> </ul>	<ul style="list-style-type: none"> <li>• Evidence of fair methodological quality suggests that walking can be an effective form of exercise for individuals with chronic musculoskeletal pain (including FM)</li> </ul>
<b>Rain, 2015<sup>9</sup></b>	<ul style="list-style-type: none"> <li>• MA performed</li> <li>• 25 RCTs from 14 SRs were included</li> </ul>	<ul style="list-style-type: none"> <li>• Regular physical exercise</li> </ul>	<ul style="list-style-type: none"> <li>• Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> </ul>	<ul style="list-style-type: none"> <li>• MA suggests that regular physical exercise is likely helpful in reducing pain</li> </ul>

First Author, Year	Study Characteristics	Intervention	Comparator	Outcomes	Conclusions
<b>Bidonde, 2014<sup>10</sup></b>	<ul style="list-style-type: none"> <li>• Overview of SRs</li> <li>• 9 included SRs (containing 60 RCTs)</li> <li>• N = 3,816</li> </ul>	<ul style="list-style-type: none"> <li>• Physical activity interventions</li> </ul>	<ul style="list-style-type: none"> <li>• Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• QoL</li> <li>• Physical function</li> <li>• Adverse effects</li> </ul>	<ul style="list-style-type: none"> <li>• Most physical activity interventions reported a positive effect on all outcomes of interest</li> <li>• No evidence identified supported qigong and tai chi</li> <li>• No serious adverse effects were reported</li> </ul>
<b>Bidonde, 2014<sup>11</sup></b>	<ul style="list-style-type: none"> <li>• MA performed</li> <li>• 16 included RCTs</li> <li>• N = 881</li> </ul>	<ul style="list-style-type: none"> <li>• Aquatic exercise training</li> </ul>	<ul style="list-style-type: none"> <li>• Control</li> <li>• Land-based exercise</li> <li>• Alternative aquatic exercise program</li> </ul>	<ul style="list-style-type: none"> <li>• Multidimensional function</li> <li>• Self-reported physical function</li> <li>• Pain</li> <li>• Stiffness</li> <li>• Muscle strength</li> <li>• Submaximal cardiorespiratory function</li> <li>• Withdrawal rates</li> <li>• Adverse effects</li> </ul>	<ul style="list-style-type: none"> <li>• The aquatic exercise group had significant improvements in all major outcomes compared to control group</li> <li>• Aquatic exercise versus land-based exercise results in no statistically significant differences (with the exception of strength which favoured the land-based group)</li> <li>• Little differences observed between different aquatic based exercises</li> <li>• Overall, quality of evidence was very low to moderate</li> </ul>
<b>Kelley, 2014<sup>12</sup></b>	<ul style="list-style-type: none"> <li>• 2 includes MAs</li> <li>• N = 870</li> </ul>	<ul style="list-style-type: none"> <li>• Exercise</li> </ul>	<ul style="list-style-type: none"> <li>• Control</li> </ul>	<ul style="list-style-type: none"> <li>• Depressive symptoms</li> </ul>	<ul style="list-style-type: none"> <li>• Exercise improves depressive symptoms in FM patients</li> </ul>
<b>Naumann, 2014<sup>13</sup></b>	<ul style="list-style-type: none"> <li>• MA performed</li> <li>• Total number of studies included not specified in abstract</li> <li>• N = NR</li> </ul>	<ul style="list-style-type: none"> <li>• Balneotherapy</li> <li>• Hydrotherapy</li> </ul>	<ul style="list-style-type: none"> <li>• Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• HRQoL</li> <li>• Depressive symptoms</li> <li>• Tender point count</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrotherapy observed to reduce pain (moderate-to-strong evidence) and improve HRQoL at the end of treatment (moderate-to-strong evidence)</li> </ul>
<b>Perrot, 2014<sup>14</sup></b>	<ul style="list-style-type: none"> <li>• 85 RCTs included</li> </ul>	<ul style="list-style-type: none"> <li>• Pharmacologic treatments</li> <li>• Non-pharmacologic treatments (including exercise programs)</li> </ul>	<ul style="list-style-type: none"> <li>• Placebo or sham</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• Sleep disturbance</li> <li>• Fatigue</li> <li>• Depression</li> <li>• Anxiety</li> <li>• Functional deficit</li> <li>• Cognitive impairment</li> </ul>	<ul style="list-style-type: none"> <li>• Pool therapy and exercise had significant effects (to various degrees) improving the outcomes of interest</li> </ul>
<b>Busch, 2013<sup>15</sup></b>	<ul style="list-style-type: none"> <li>• MA performed</li> <li>• 5 included</li> </ul>	<ul style="list-style-type: none"> <li>• Resistance exercise</li> </ul>	<ul style="list-style-type: none"> <li>• Control</li> <li>• Other</li> </ul>	<ul style="list-style-type: none"> <li>• FIQ</li> <li>• Physical function</li> </ul>	<ul style="list-style-type: none"> <li>• Low quality evidence reported that resistance</li> </ul>

First Author, Year	Study Characteristics	Intervention	Comparator	Outcomes	Conclusions
	<ul style="list-style-type: none"> <li>RCTs</li> <li>N = 219</li> </ul>	training	exercise training	<ul style="list-style-type: none"> <li>Tenderness</li> <li>Muscle strength</li> <li>Pain</li> </ul>	<p>training improved FIQ scores, pain, tenderness, and muscle strength versus a control group in women with FM</p> <ul style="list-style-type: none"> <li>Additional low quality evidence suggested that aerobic exercise was superior to resistance training for improving pain</li> <li>Low quality evidence reported that 12 weeks of resistance training was superior to flexibility exercise training for improving pain and FIQ score</li> </ul>
<b>Langhorst, 2013<sup>16</sup></b>	<ul style="list-style-type: none"> <li>MA performed</li> <li>7 included studies</li> <li>N = 362</li> </ul>	<ul style="list-style-type: none"> <li>Meditative movement therapies (qigong, tai chi and yoga)</li> </ul>	<ul style="list-style-type: none"> <li>Control group</li> </ul>	<ul style="list-style-type: none"> <li>Pain</li> <li>Sleep</li> <li>Fatigue</li> <li>Depression</li> <li>HRQoL</li> </ul>	<ul style="list-style-type: none"> <li>Meditative movement therapies were effective in reducing sleep disturbances, fatigue, and depression and improved HRQoL</li> <li>No difference in pain was observed between the two groups</li> </ul>
<b>Lima, 2013<sup>17</sup></b>	<ul style="list-style-type: none"> <li>MA performed</li> <li>27 included studies</li> <li>N = NR</li> </ul>	<ul style="list-style-type: none"> <li>Aquatic physical therapy</li> </ul>	<ul style="list-style-type: none"> <li>No treatment</li> <li>Land-based exercises</li> </ul>	<ul style="list-style-type: none"> <li>FIQ</li> <li>Stiffness</li> <li>6-minute walk test</li> </ul>	<ul style="list-style-type: none"> <li>Some evidence reported aquatic therapy provided benefit to functional ability and stiffness over no treatment</li> <li>Authors concluded that the evidence reviewed was insufficient to demonstrate statistical clinical differences in most outcomes of interest (due to low methodological rigor)</li> </ul>
<b>Mist, 2013<sup>18</sup></b>	<ul style="list-style-type: none"> <li>Ma performed</li> <li>Total number of studies included not specified in abstract</li> <li>N = NR</li> </ul>	<ul style="list-style-type: none"> <li>Complementary and alternative medicine (including tai chi, qigong, yoga, and other movement therapies)</li> </ul>	<ul style="list-style-type: none"> <li>Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>Most studies reported a medium-to-high effect size in pain reduction (moderately weak evidence)</li> <li>Authors concluded that there is little risk in recommending these exercises due to the lack of adverse events</li> </ul>

First Author, Year	Study Characteristics	Intervention	Comparator	Outcomes	Conclusions
<b>Nuesch, 2013<sup>19</sup></b>	<ul style="list-style-type: none"> <li>• NMA performed</li> <li>• 102 included RCTs</li> <li>• N = 14,982</li> </ul>	<ul style="list-style-type: none"> <li>• Pharmacologic treatments</li> <li>• Non-pharmacologic treatments (including aerobic exercise)</li> </ul>	<ul style="list-style-type: none"> <li>• Control intervention (placebo)</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• QoL</li> </ul>	<ul style="list-style-type: none"> <li>• Aerobic exercise showed small to moderate benefits over placebo</li> </ul>
<b>Chan, 2012<sup>20</sup></b>	<ul style="list-style-type: none"> <li>• 4 included RCTs</li> <li>• N = NR</li> </ul>	<ul style="list-style-type: none"> <li>• Qigong exercise</li> </ul>	<ul style="list-style-type: none"> <li>• Group education</li> <li>• Daily activities</li> <li>• Aerobic exercise</li> </ul>	<ul style="list-style-type: none"> <li>• Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Included RCTs had mixed results regarding the effectiveness of qigong exercise</li> <li>• Authors concluded additional research required to determine whether qigong exercise can be effective for the treatment of FM</li> </ul>
<b>Hagan, 2012<sup>21</sup></b>	<ul style="list-style-type: none"> <li>• Overview of SRs</li> <li>• 9 included SRs (containing 224 trials)</li> <li>• N = 24,059</li> </ul>	<ul style="list-style-type: none"> <li>• Exercise therapy</li> </ul>	<ul style="list-style-type: none"> <li>• Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• Physical function</li> </ul>	<ul style="list-style-type: none"> <li>• Solid evidence supporting exercise in the management of FM</li> </ul>
<b>Terry, 2012<sup>22</sup></b>	<ul style="list-style-type: none"> <li>• Overview of SRs</li> <li>• 5 included SRs</li> <li>• N = NR</li> </ul>	<ul style="list-style-type: none"> <li>• Complementary or alternative medicine (including hydrotherapy)</li> </ul>	<ul style="list-style-type: none"> <li>• Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Not specified in abstract</li> </ul>	<ul style="list-style-type: none"> <li>• Some evidence of beneficial effects from hydrotherapy</li> </ul>

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

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