The Effectiveness of Comprehensive Physiotherapy in the Treatment of Adults with Rheumatoid Arthritis: A Systematic Review

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Outline

• BACKGROUND
• METHODS
• RESULTS
• DISCUSSION
• IMPLICATIONS FOR RESEARCH
• CONCLUSION
• IMPLICATIONS FOR PRACTICE
BACKGROUND
Rheumatoid Arthritis

• Definition:
  – Chronic inflammatory autoimmune disease that affects synovial joints and other organs

• Characterized by:
  – Joint inflammation, joint damage, pain, stiffness, decreased muscle strength and ROM, difficulties with ADLs
Rheumatoid Arthritis

• Epidemiology:
  – affects ~ 1-2% of the population\(^3\)
  – women 2-3 x’s more affected than men\(^3-4\)

• Disease implications:
  – Body structure/function → activity and participation\(^5\)
What do we know?

• Previous systematic reviews evaluating the efficacy of single physiotherapy interventions

• Physiotherapy improves outcomes for individuals with RA

• Multidisciplinary care is optimal

• Number of alternative methods of care are emerging
Comprehensive Physiotherapy

- Combination of therapeutic interventions delivered by a PT based on client’s needs\textsuperscript{20}

- Various levels of rheumatology training
Why do this review?

• No systematic review on comprehensive physiotherapy and managing RA

• The most effective and efficient method of physiotherapy delivery has yet to be determined$^{21}$

• Evidence based practice
Objective

To evaluate the effectiveness of comprehensive physiotherapy for adults with RA compared to waitlist control or a single non-pharmacological intervention.
METHODS
Search Strategy

- **Electronic search:**
  - EMBASE
  - Medline
  - CINAHL
  - PEDro
  - Cochrane
  - DARE
  - Proquest

- **Hand search:**
  - Arthritis Care and Research (1998-2008)
  - Reference lists of included studies
Selection Protocol – Stage 1

• 2 reviewers independently screened titles and abstracts
• Selection criteria:

1. Kept if “rheumatoid arthritis” present & “physical therapy or physiotherapy” or “rehabilitation”

2. Excluded if “osteoarthritis, juvenile arthritis, or ankylosing spondylitis” present without “rheumatoid arthritis”

3. Kept if title or abstract ambiguous

4. Kept if article available in English
Selection Protocol – Stage 2

- Full text articles divided among reviewers
- 2 reviewers independently examined each article for inclusion criteria

<table>
<thead>
<tr>
<th>P</th>
<th>Diagnosis of RA and ≥16 years of age</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Comprehensive PT (≥2 types of PT tx)</td>
</tr>
<tr>
<td>C</td>
<td>Waitlist or medical treatment control or single non-pharmacological intervention</td>
</tr>
<tr>
<td>O</td>
<td>Outcomes fit into at least one category of the ICF</td>
</tr>
</tbody>
</table>
Selection Protocol – Stage 3

• Common trends emerged

• 2 subgroups created
  – Post entry-level rheumatology trained physiotherapy (PERPT)
  – Entry-level rheumatology trained physiotherapy (ERPT)
Methodological Quality

• 2 reviewers independently scored each article using PEDro scale

• PEDro designed to assess RCTs for PT interventions\(^{22}\)

• High quality = >50% of criteria met\(^{22-23}\)

\[ 6/10 \text{ a priori} \]
Data Extraction

• Data extraction form made for review

• Pilot tested 3x to achieve inter-rater reliability

• 2 reviewers independently extracted data

• Disagreements resolved by discussion
Outcomes

• Primary Outcomes
  – Pain
  – Functional Ability
  – Health Related Quality of Life (HRQoL)
  – Disease Knowledge
  – Self-efficacy

→ **REASON:** Important tx goals ID by ppl with arthritis\(^{24}\)

• Secondary Outcomes
  – Any other outcome measures utilized in included studies

→ **REASON:** Multiple variables measured in tx of RA
Outcomes & ICF

- ICF used to classify outcome measures
  - Inclusive nature
  - Globally agreed upon framework

<table>
<thead>
<tr>
<th>Pain</th>
<th>Body Structure &amp; Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Ability</td>
<td>Activity &amp; Participation</td>
</tr>
<tr>
<td>HRQoL</td>
<td>Activity &amp; Participation</td>
</tr>
<tr>
<td>Disease Knowledge</td>
<td>Contextual Factors</td>
</tr>
<tr>
<td>Self Efficacy</td>
<td>Contextual Factors</td>
</tr>
</tbody>
</table>
Data Analysis

- Comparison groups:
  1. PERPT vs. ERPT or wait-list control
  2. ERPT vs. single non-pharmacological intervention or wait-list control

- Heterogeneity = no meta-analysis

- Effect Sizes (Hedge’s g) reported as SMD & 95% CI
### Best Evidence Synthesis (BES)

<table>
<thead>
<tr>
<th>Evidence Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strong Evidence</strong></td>
<td>Statistically significant findings in outcome measures in $\geq 2$ high quality RCTs</td>
</tr>
<tr>
<td><strong>Moderate Evidence</strong></td>
<td>Statistically significant findings in outcome measures in $\geq 1$ high quality RCT &amp; $\geq 1$ low quality RCT</td>
</tr>
<tr>
<td><strong>Limited Evidence</strong></td>
<td>Statistically significant findings in outcome measures in $\geq 1$ high quality RCT</td>
</tr>
<tr>
<td><strong>Indicative Findings</strong></td>
<td>Statistically significant findings in outcome measures in $\geq 1$ low quality RCT</td>
</tr>
<tr>
<td><strong>No Evidence</strong></td>
<td>No statistically significant findings for the outcome measures of this review or in the case of conflicting results among included studies</td>
</tr>
</tbody>
</table>

Adapted from Van Tulder et al, 2002$^{25}$
Article Selection

Total Studies Retrieved $N=702$

Excluded by Title / Abstract $N=677$

Studies Retrieved for Full Text Analysis $N=25$

Excluded by evaluating Full Text $N=19$

Studies Retrieved for Data Extraction $N=6$

Studies Retrieved from Hand Searching $N=1$

Included Studies $N=7$
Studies

• Post Entry-Level Rheumatology Trained Physiotherapy (PERPT)
  4 Studies

• Entry-Level Rheumatology Trained Physiotherapy (ERPT)
  3 Studies
## Quality of Studies

<table>
<thead>
<tr>
<th>Post Entry-Level Rheumatology Trained Physical Therapy (PERPT)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Author</strong>&lt;br&gt;<strong>(Year)</strong></td>
</tr>
<tr>
<td>Bell (1998)</td>
</tr>
<tr>
<td>Helewa (1994)</td>
</tr>
<tr>
<td>Li (2005)</td>
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<tr>
<td>Li (2006)</td>
</tr>
</tbody>
</table>
## Quality of Studies

**Entry-Level Rheumatology Trained Physical Therapy (ERPT)**

<table>
<thead>
<tr>
<th>Primary Author (Year)</th>
<th>Title</th>
<th>PEDro Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buljina (2001)</td>
<td>Physical and exercise therapy for the treatment of the rheumatoid hand</td>
<td>6</td>
</tr>
<tr>
<td>van den Berg (2006)</td>
<td>Using internet technology to deliver a home-based physical activity intervention for patients with RA: A randomized control trial</td>
<td>8</td>
</tr>
</tbody>
</table>
## Effect Sizes

<table>
<thead>
<tr>
<th>Primary Author (Year)</th>
<th>PAIN</th>
<th>Functional Ability</th>
<th>HRQoL</th>
<th>Disease Knowledge</th>
<th>Self Efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERPT vs. single non-pharmacological or waitlist control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O’Brien (2005)</td>
<td>Not measured</td>
<td>0.03[-0.64, 0.70]</td>
<td>-0.21[-0.89, 0.48]</td>
<td>0.12[-0.55,0.80]</td>
<td>-0.27[-0.93,0.40]</td>
</tr>
<tr>
<td>Van den Berg (2006)</td>
<td>Not measured</td>
<td>Not estimable</td>
<td>Not estimable</td>
<td>Not measured</td>
<td>Not measured</td>
</tr>
<tr>
<td>Buljina (2001)</td>
<td>2.19[2.69,1.69]</td>
<td>0.81[0.40, 1.22]</td>
<td>Not measured</td>
<td>Not measured</td>
<td>Not measured</td>
</tr>
<tr>
<td>Author (Year)</td>
<td>Effect Sizes [95% confidence interval]</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>--------------</td>
<td>---------------------------------------</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>PAIN</td>
<td>Functional Ability</td>
<td>HRQoL</td>
<td>Disease Knowledge</td>
<td>Self Efficacy</td>
</tr>
<tr>
<td><strong>PERPT vs. ERPT or waitlist control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Li (2005)</td>
<td>0.34[1.67, -0.99]</td>
<td>-0.06[-1.38,1.25]</td>
<td>0.18[-0.65, 1.00]</td>
<td>0.60[0.77,1.96]</td>
<td>Not measured</td>
</tr>
<tr>
<td>Li (2006)</td>
<td>0.01[0.41,-0.39]</td>
<td>0.03[-0.37,0.43]</td>
<td>Not measured</td>
<td>0.23[-0.17,0.64]</td>
<td>0.24[-0.19,0.67]</td>
</tr>
<tr>
<td></td>
<td>notch measured</td>
<td>notch measured</td>
<td>notch measured</td>
<td>0.34[-0.02,0.69]</td>
<td>0.29[-0.06,0.64]</td>
</tr>
<tr>
<td>Bell (1998)</td>
<td>0.27[0.62,-0.08]</td>
<td>Not measured</td>
<td>Not measured</td>
<td>0.34[-0.02,0.69]</td>
<td>0.29[-0.06,0.64]</td>
</tr>
<tr>
<td>Helewa (1994)</td>
<td>Not measured</td>
<td>Not estimable</td>
<td>Not measured</td>
<td>Not measured</td>
<td>Not measured</td>
</tr>
</tbody>
</table>
## BES Results for Primary Outcomes

### ERPT vs. single non-pharmacological intervention or wait list control

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Limited evidence</td>
</tr>
<tr>
<td>Functional Ability</td>
<td>No evidence</td>
</tr>
<tr>
<td>HRQoL</td>
<td>Not estimable</td>
</tr>
<tr>
<td>Disease Knowledge</td>
<td>Not measured</td>
</tr>
<tr>
<td>Self Efficacy</td>
<td>Not measured</td>
</tr>
</tbody>
</table>

### PERPT vs. ERPT or waitlist control

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>No evidence</td>
</tr>
<tr>
<td>Functional Ability</td>
<td>No evidence</td>
</tr>
<tr>
<td>HRQoL</td>
<td>No evidence</td>
</tr>
<tr>
<td>Disease Knowledge</td>
<td>No evidence</td>
</tr>
<tr>
<td>Self Efficacy</td>
<td>No evidence</td>
</tr>
</tbody>
</table>

*Based on our effect size calculations*
## BES Results for Secondary Outcomes

<table>
<thead>
<tr>
<th>ERPT vs. single non-pharmacological intervention or wait list control</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑ Key Grip Strength</td>
</tr>
<tr>
<td>↑ Ability to perform mod-intense PA</td>
</tr>
<tr>
<td>↑ ROM</td>
</tr>
<tr>
<td>↓ Joint Tenderness</td>
</tr>
<tr>
<td>Strong evidence</td>
</tr>
<tr>
<td>Limited evidence</td>
</tr>
<tr>
<td>No evidence</td>
</tr>
<tr>
<td>No evidence</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PERPT vs. ERPT or waitlist control</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑ Medication Compliance</td>
</tr>
<tr>
<td>↓ Coping Efficacy</td>
</tr>
<tr>
<td>↓ Morning Stiffness</td>
</tr>
<tr>
<td>Limited evidence</td>
</tr>
<tr>
<td>Indicative findings</td>
</tr>
<tr>
<td>No evidence</td>
</tr>
</tbody>
</table>

*Based on findings reported by authors of included studies*
Overall Findings

• Limited evidence supporting treatment provided by entry-level rheumatology trained PTs vs. waitlist control for reducing pain

• No evidence for the effectiveness of treatment provided by PTs with post entry-level rheumatology training vs. ERPT or waitlist control for our primary outcomes
DISCUSSION
DISCUSSION

1. Counterintuitive Results

2. Findings for PERPT

3. Findings for ERPT

4. Strengths & Limitations

5. Implications for Research and Practice
Why were the results counterintuitive?

1. Heterogeneity of outcomes measures and interventions
   - Inability to pool data
   - No meta-analysis
   - Small sample sizes
   - Insufficient power
Why were the results counterintuitive?

2. Not all studies provided necessary data.

   Limited calculation of effect sizes

* This resulted in exclusion of some studies in the analysis of the primary outcomes.
Why were the results counterintuitive?

3. Methodological limitations of included studies
   – No control for participants’ concurrent medical treatment
   – Changes in participant outcomes from medical treatment or PT interventions?
Deterioration in Coping Efficacy?

• Indicative findings for deterioration in coping efficacy from one PERPT study (Li 2006)

WHY?

Increasing disease knowledge linked with changing expectations about prognosis\(^{31}\)

↓

Decrease in coping efficacy
Findings for PERPT

• Discrepancy around disease knowledge for PERPT

  – Original studies found statistical significant improvements (Li et al 2006 & Bell et al 1998)

  – No significant results found in our effect size calculation

  WHY?
Reasons for Discrepancy

1. Type of statistical analysis used
   - Authors used change scores
   - We used point estimates

2. Sample size required to reach significance
   - Li et al (2006) used dichotomous variables
   - We used continuous measures
Findings for ERPT

• Limited evidence found for use of ERPT to decrease pain

  – Chronic pain common in RA and is shown to increase over time\textsuperscript{26-28}

  – Strong positive association between pain & depression\textsuperscript{29-30}

  – Pain & depression can further increase personal suffering, health service utilization & societal costs\textsuperscript{29-30}
Findings for ERPT

- No evidence to support ERPT for improvement in functional ability due to conflicting results

<table>
<thead>
<tr>
<th>Buljina 2001</th>
<th>O’Brien 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Result:</strong> Strong effect</td>
<td><strong>Result:</strong> No effect</td>
</tr>
<tr>
<td><strong>Outcome Measure:</strong> ADL scale</td>
<td><strong>Outcome Measure:</strong> Jebsen-Taylor Hand Fxn Test &amp; AIMS II subscales</td>
</tr>
</tbody>
</table>
Limitations & Strengths of Included Studies

**L:** Small sample sizes $\rightarrow$ low power to detect clinically important differences

**S:** Majority of outcomes measures were reliable and valid $\rightarrow$ change can be attributed to intervention
Limitations of Review

• Overestimation of quality of included studies → use of PEDro scale

• Language bias → only English articles

• Overestimation bias → potential unpublished negative studies

• Did not evaluate cost-effectiveness → possibly excluded studies that had clinical measures of HRQoL
Strengths of Review

• External validity $\rightarrow$ interventions & outcome measures applicable to clinical practice$^{32}$

• Internal validity $\rightarrow$ rigorous review process

• All RCTs $\rightarrow$ most reliable form of scientific evidence in healthcare$^{33}$

• ICF $\rightarrow$ internationally recognized classification system & allows for comprehensive representation of RA patients’ experiences
IMPLICATIONS for RESEARCH
What does future research need?

• This review limited by heterogeneity of interventions and outcome measures

We Recommend:
1) Core set of outcome measures that encompass all categories of ICF
2) Clear description of interventions including amount of rheumatology training

Increases possibility of a meta-analysis
What does future research need?

- Length of interventions as well as presence and length of follow-ups varied among included studies

We Recommend:
3) Future studies conduct follow-up measurements and track participants for longer periods post-discharge
Positive results were found for the effectiveness of entry-level rheumatology trained physiotherapy for the secondary outcomes, key pinch strength and ability to perform moderate to intense physical activity.

Limited evidence was found for effectiveness of treatment provided by an entry-level rheumatology trained PT versus waitlist control for reducing pain in adults with RA.
Results were found for the effectiveness of post entry-level trained physiotherapy in terms of increased patient medication compliance and decreased coping efficacy.

Inconclusive evidence was found for the effectiveness of treatment provided by PTs with post entry-level rheumatology training for our primary outcomes.
Implications for Practice

- Evidence to support entry-level rheumatology trained PTs providing comprehensive physiotherapy

- Inconclusive evidence to support that PTs with additional training will produce better outcomes than PTs with entry-level training
Acknowledgements

Linda Li
BSc(PT), MSc, PhD

Angela Busch
Dip (PT), BPT, MSc, PhD

Charlotte Beck
UBC Reference Librarian
QUESTIONS ?
References


32. Rothwell PM. External validity of randomised controlled trials: "to whom do the results of this trial apply?". *Lancet*. 2005;365:82-93.