Table 3. Clinical relevance Table: Quality of life and participation at follow-up (Continued)

<table>
<thead>
<tr>
<th>Joint protection</th>
<th>Waiting list</th>
<th>Group treatment</th>
<th>PAIS</th>
<th>18</th>
<th>43.2</th>
<th>44.7</th>
<th>6.5</th>
<th>15%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self instruction + practice</td>
<td>10</td>
<td>39.4</td>
<td>38.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hammond 2001</td>
<td>Group instruction</td>
<td>AIMS2</td>
<td>65</td>
<td>3.4</td>
<td>3.2</td>
<td>0.1</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Routine instruction</td>
<td>62</td>
<td>3.4</td>
<td>3.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuberger 1993</td>
<td>Self instruction + practice</td>
<td>CES-D (depression)</td>
<td>13</td>
<td>12.5</td>
<td>12.8</td>
<td>0.8</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>No intervention</td>
<td>14</td>
<td>14.5</td>
<td>12.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistive devices</td>
<td>Special selection process</td>
<td>SIP</td>
<td>29</td>
<td>11.4</td>
<td>8.0</td>
<td>2.1</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>Routine care</td>
<td>18</td>
<td>6.6</td>
<td>5.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Secondary process measures (process measures are considered to be indicators of a successful treatment): knowledge about disease management, compliance, self-efficacy, range of motion, muscle strength.

**Search methods for identification of studies**

Only full length articles or full written reports have been considered for inclusion in the review. The following procedures were used to identify trials:

1. A broad computerized search strategy for identifying RCTs, CCTs and OD was used built upon the following components:
   a) search strategy for controlled trials (RCTs, CCTs) as recommended by the Cochrane Collaboration (Dickersin 1994): see Appendix 1.
   b) search strategy for OD: see Appendix 2.
   c) Search strategy for rheumatoid arthritis: see Appendix 3.
   d) Search strategy for occupational therapy interventions: see Appendix 4.

The following databases were searched:

1. MEDLINE (1966 until December 2002)
2. CINAHL (1982 until December 2002)
5. Cochrane Controlled Trials Register (issue 4 2002)
6. The databases of the libraries of medical and rehabilitation literature of two Dutch institutes (NPI / Nivel)
7. The database of the Rehabilitation and Related Therapies (RRT) Field of the Cochrane Collaboration
8. The specialized trial’s register of the Cochrane Musculoskeletal Group

The search strategy has been formulated in WinSpirs (Medline, Cinahl) and was adapted by an experienced medical librarian to make it applicable for the other databases.

2) The same databases were searched to identify reviews about the efficacy of occupational therapy.
3) The reference lists of the identified studies and reviews were
Risk of bias in included studies

The methodological quality was assessed in 22 RCTs / CCTs and 16 ODs (Table 4). Six RCTs (Hammond 1999a, Hammond 2001, Helewa 1991, Hoenig 1993, Ter Schegget 2000, Tijhuis 1998) had a high methodological quality. All CCTs scored a low methodological quality. In particular, the following criteria were fulfilled in less than one third of the RCTs/CCTs: ‘Adequate allocation concealment’, ‘blinded care provider’, ‘blinding of patients’, ‘information on co-interventions’, ‘blinded outcome assessor’, ‘intention to treat analysis’ and ‘long term follow up’. Given the methodological constraints of other designs, nine ODs (Barry 1994, Cartlidge 1984, Hammond 1994, Hammond 1999b, McKnight 1982, Nordensk iod 1990, Nordenskiold 1994, Pagnotta 1998, Rennie 1996) had a sufficient methodological quality. The following criteria were fulfilled in one third or less of the OD studies: ‘outcome assessor not involved in treatment’ and ‘long term follow up’.

Table 4. Assessed methodological quality for RCT’s, CCT’s and OD’s

<table>
<thead>
<tr>
<th>Study design</th>
<th>Study ID</th>
<th>Internal validity</th>
<th>Descriptive</th>
<th>Statistical</th>
<th>total score</th>
<th>meth. quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT</td>
<td>Anderson 1987</td>
<td>b1, f, g, n (see appendix 1 for items)</td>
<td>c, d, m (see appendix 1 for items)</td>
<td>o, q (see appendix 1 for items)</td>
<td>4, 3, 2</td>
<td>low</td>
</tr>
<tr>
<td>RCT</td>
<td>Brighton 1993</td>
<td>b1, g, i, n (see appendix 1 for items)</td>
<td>d, m (see appendix 1 for items)</td>
<td>o (see appendix 1 for items)</td>
<td>4, 2, 1</td>
<td>low</td>
</tr>
<tr>
<td>RCT</td>
<td>Callinan 1995</td>
<td>b1, g, j, l, n (see appendix 1 for items)</td>
<td>a, d, k, m (see appendix 1 for items)</td>
<td>o (see appendix 1 for items)</td>
<td>5, 4, 1</td>
<td>low</td>
</tr>
<tr>
<td>RCT</td>
<td>Hammond 1999a</td>
<td>b1, g, i, j, n, p (see appendix 1 for items)</td>
<td>a, c, d, k, m (see appendix 1 for items)</td>
<td>o, q (see appendix 1 for items)</td>
<td>6, 5, 2</td>
<td>high</td>
</tr>
<tr>
<td>RCT</td>
<td>Hammond 2001</td>
<td>b1, b2, g, i, j, l, n, p (see appendix 1 for items)</td>
<td>a, c, d, m, m2 (see appendix 1 for items)</td>
<td>o, q (see appendix 1 for items)</td>
<td>8, 5, 2</td>
<td>high</td>
</tr>
<tr>
<td>RCT</td>
<td>Helewa 1991</td>
<td>b1, e, f, i, j, l, n, p (see appendix 1 for items)</td>
<td>a, c, d, m (see appendix 1 for items)</td>
<td>o, q (see appendix 1 for items)</td>
<td>8, 4, 2</td>
<td>high</td>
</tr>
<tr>
<td>RCT</td>
<td>Hoenig 1993</td>
<td>b1, e, f, g, i, j, n (see appendix 1 for items)</td>
<td>c, d, k, m (see appendix 1 for items)</td>
<td>o (see appendix 1 for items)</td>
<td>7, 4, 1</td>
<td>high</td>
</tr>
</tbody>
</table>

Occupational therapy for rheumatoid arthritis (Review)
Table 5. Clinical relevance Table: Training of motor functions; grip strength  (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment group</th>
<th>Outcome measure</th>
<th>N of patients</th>
<th>Baseline mean</th>
<th>End of study</th>
<th>Absolute benefit</th>
<th>Relative benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dellhag 1992</td>
<td>Wax bath + exercise</td>
<td>Grippit</td>
<td>13</td>
<td>72.4</td>
<td>79.2</td>
<td>-6.2</td>
<td>-8%</td>
</tr>
<tr>
<td></td>
<td>No treatment</td>
<td></td>
<td>12</td>
<td>82.6</td>
<td>85.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoenig 1993</td>
<td>Tendon gliding exercise + therapy putty</td>
<td>modified aneroid manometer</td>
<td>10</td>
<td>84.2</td>
<td>97.6</td>
<td>16.5</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>No treatment</td>
<td></td>
<td>11</td>
<td>68.2</td>
<td>81.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ring</td>
<td>Continuous passive motion</td>
<td>Jamar dynamometer</td>
<td>10</td>
<td>3.2</td>
<td>2.3</td>
<td>-1.4</td>
<td>-40%</td>
</tr>
<tr>
<td></td>
<td>Routine treatment</td>
<td></td>
<td>12</td>
<td>3.8</td>
<td>3.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Clinical Relevance Table: Training of Motor functions; range of motion

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment group</th>
<th>Outcome measure</th>
<th>N of patients</th>
<th>Baseline mean</th>
<th>End of study</th>
<th>Absolute benefit</th>
<th>Relative benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brighton 1993</td>
<td>Daily hand exercise</td>
<td>Goniometer Meta Phalangea Flexion</td>
<td>25</td>
<td>76.7</td>
<td>79.0</td>
<td>6.3</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>No treatment</td>
<td></td>
<td>30</td>
<td>80.4</td>
<td>72.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dellhag 1992</td>
<td>Wax bath + exercise</td>
<td>Goniometer Flexion dominant hand</td>
<td>13</td>
<td>62.3</td>
<td>52.1</td>
<td>-9.9</td>
<td>-16%</td>
</tr>
<tr>
<td></td>
<td>No treatment</td>
<td></td>
<td>13</td>
<td>59.4</td>
<td>62.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoenig 1993</td>
<td>Tendon gliding exercise + therapy putty</td>
<td>Goniometer metacarpal phalangea extension</td>
<td>10</td>
<td>0.0</td>
<td>19.3</td>
<td>19.3</td>
<td>63%</td>
</tr>
<tr>
<td></td>
<td>No treatment</td>
<td></td>
<td>11</td>
<td>13.5</td>
<td>16.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
therapy is to restore / maintain full participation in all social activities: outcome measures should reflect this aim.

In conclusion, we found strong evidence for the efficacy of instruction of joint protection on functional ability. Studies that evaluated comprehensive OT showed limited evidence for the effectiveness on functional ability. Studies that evaluated splint interventions reported indicative findings for the effectiveness on pain. These results are encouraging for the occupational therapy practice as an important part in the treatment of patients with rheumatoid arthritis. Also, this review revealed that important fields of occupational therapy, like "training of skills" and "advice in the use of assistive devices", are under researched and should get more attention. On the basis of this review we recommend that further clinical trials are necessary for each category of interventions. In future studies special attention should be given to the design of trials, the use of responsive, reliable and valid outcome measures, the inclusion of a sufficient number of patients to create statistical power and the presentation of trial results according international standards.

AUTHORS’ CONCLUSIONS
Implications for practice
This review has shown positive effect of comprehensive occupational therapy and instruction on joint protection on the important outcome functional ability. It also revealed an indication of efficacy for splinting on pain and grip strength. Provision of splints may have a decrease of dexterity as a side effect. The reviewers conclude that occupational therapy can help patients with rheumatoid arthritis to overcome problems in performing daily live activities.

Implications for research
A core set of outcome measures for the outcome of occupational therapy, reflecting the ultimate aim to restore or maintain full participation in all social and daily activities, for rheumatoid arthritis patients is needed. To state the efficacy of occupational therapy interventions, research in specific categories such as training of skills and advice/instruction of assistive devices should be extended. More high quality RCTs are needed.

ACKNOWLEDGEMENTS
The authors would like to thank Mrs. M.L Dapper and Mr. F.I. Valster for discussing occupational therapy issues and Mrs. E. Weijzen and Mrs. N. Breuning for making the search strategy applicable to all the searched databases.

REFERENCES

References to studies included in this review

Agnew 1995 [published data only]

Anderson 1987 [published data only]

Barry 1994 [published data only]

Brighton 1993 [published data only]

Callinan 1995 [published data only]

Cartlidge 1984 [published data only]

Dellhag 1992 [published data only]

Feinberg 1981 [published data only]

Feinberg 1992 [published data only]

Furst 1987 [published data only]

Gerber 1987 [published data only]

Hammond 1994 [published data only]

**Analysis 4.4. Comparison 4 Provision of splints vs control, Outcome 4 Range of motion.**

**Review:** Occupational therapy for rheumatoid arthritis

**Comparison:** 4 Provision of splints vs control

**Outcome:** 4 Range of motion

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Treatment</th>
<th>Control</th>
<th>Std. Mean Difference Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N Mean(SD)</td>
<td>N Mean(SD)</td>
<td>IV(Random,95% CI)</td>
</tr>
<tr>
<td>Tijhuis 1998</td>
<td>10 255 (73)</td>
<td>10 273 (94)</td>
<td>-0.20 [-1.08, 0.67]</td>
</tr>
</tbody>
</table>

**APPENDICES**

**Appendix 1. Search strategy for controlled trials**

("randomized controlled trials"[MESH] OR "controlled clinical trials"[MESH] OR "random allocation"[MESH] OR "double-blind method"[MESH] OR "single blind method"[MESH] OR "cross over studies"[MESH] OR "clinical trials"[MESH] OR "research design"[MESH] OR "epidemiologic research design"[MESH] OR "program evaluation"[MESH] OR crossover study OR clinical trial OR ((singl* OR doubl* OR trebl* OR tripl*) AND (blind* OR mask*)) OR random*)

**Appendix 2. Search strategy for OD**

OR patient serie* OR case serie* OR program* OR experiment* OR observation* OR method* OR effect* )

**Appendix 3. Search strategy for rheumatoid arthritis**

("Arthritis, Rheumatoid"[MESH] OR arthritis OR rheumatoid arthritis) AND

**Appendix 4. Search strategy for occupational therapy interventions**


**Appendix 5. Criteria of methodological quality**

**RCTs, CCTs**

Patient selection
a) were the eligibility criteria specified?
b) treatment allocation:
a) was a method of randomization performed?
b) was the treatment allocation concealed?
c) were the groups similar at baseline regarding the most important prognostic indicators?
Interventions
d) were the index and control interventions explicitly described?
e) was the care provider blinded for the intervention?
DECLARATIONS OF INTEREST

No potential conflicts of interest are known to the authors.

NOTES

For information concerning the multi-disciplinary education of rheumatoid arthritis patients we refer to the review "Patient Education for rheumatoid arthritis" by Riemsmma RP, Kirwan JR, Taal E, Rasker JJ.

This review is an update of the publication:


INDEX TERMS

Medical Subject Headings (MeSH)

Arthritis, Rheumatoid [*rehabilitation]; Controlled Clinical Trials as Topic; Occupational Therapy [*methods]; Quality of Life; Randomized Controlled Trials as Topic

MeSH check words

Humans