

## **AT511: Pathomechanics and Assessment: Upper Extremity Injuries Orthopedic Evidence Annotation**

Egan M, Brosseau L, Farmer M, Ouimet M, Rees S, Tugwell P, G W. Splints and Orthosis for treating rheumatoid arthritis. *The Cochrane Collaboration*. 2007;1-48.

Nearly 1% of those in industrialized countries are suffering from rheumatoid arthritis (RA), with this number expected to rise with the aging population. While splints and orthoses are commonly prescribed as a method of treating the symptoms associated with RA, the actual effects of these orthoses are largely unknown. The purpose of this systematic review is to determine the effectiveness of orthoses in relieving pain, decreasing swelling, and preventing deformity, and additionally, to determine their impact on strength, mobility and functionality in individuals suffering from RA.

Types of studies considered for review included randomized controlled trials, controlled clinical trials, case-control studies, and cohort studies comparing the use of particular orthoses against a placebo, another active intervention, or a regular treatment. All participants were over 18 years of age and had been diagnosed with RA. Interventions specifically entailed the use of rigid, semi-rigid, or soft orthotics, designed to provide pain relief and support for various joints. Inclusion criteria incorporated the measurement of OMERACT outcomes, specifically, the number of tender joints per participant, number of swollen joints per participant, pain, physician's global assessment, participant's global assessment, functional status, acute phase reactants, and radiological evidence of joint damage. The seven databases utilized for the search include: The Cochrane Field of Physical and Related Therapies Register, Cochrane Musculoskeletal Group Register, Cochrane Controlled Trials Register, MEDLINE, EMBASE, and the PEDro databases. Additionally, other articles were sought through hand-searching techniques and in making contact with experts on the subject. Two reviewers determined the studies to be retrieved, while two additional reviewers verified this data.

Twelve papers were extracted that reported on 10 eligible studies involving a total of 449 participants. None of these studies were similar enough to pool results. In three studies that examined the effects of working wrist splints versus no splint, statistically significant differences were found in lower grip strength in the non-dominant hand with both the palmar custom molded and the elastic ready-made splints. Those who wore ready-made elastic splints for six months, working wrist splints, or resting wrist and hand splints showed no differences in pain, grip strength, morning stiffness, pinch grip, forearm joint circumference, or quality of life. According to the AAOS, the level of evidence is consistent with Level III.

It is highly likely that athletic trainers working in a non-traditional, perhaps clinical setting, may treat patients suffering from rheumatoid arthritis. Although there is no definitive evidence to support the use of particular orthoses in reducing symptoms associated with RA, because they are relatively inexpensive and many patients prefer to wear them rather than not, it would be reasonable to continue their use in clinical practice. Patients must be educated on the potential for decreased ROM and dexterity associated with the use of working splints.

### **Critical Appraisal Worksheet: Systematic Reviews**

**1. Why was the study done (what was the research question)?**

Because rheumatoid arthritis currently affects 1% of the population with an anticipated rise in this prevalence, the study was performed to assess the effectiveness of orthoses in relieving pain, decreasing swelling and preventing deformity. Furthermore, orthoses were assessed for their implications on strength, mobility, and function.

**2. Is it a systematic review of high-quality studies which are relevant to your question?**

No; overall, the quality of most of the studies included was only fair. Most of the studies failed to use a placebo and/or to document whether evaluators were blinded to the participants' group allocation. Other potential problems with the studies at hand include the possibility of over-estimation of results from analyzing cross-over trials as parallel trials and the relatively small trial size.

**3. Did it describe a comprehensive search for all relevant studies?**

Yes; seven different databases were examined for potentially usable studies. Additionally, unpublished studies were sought through hand-searches and key experts were contacted. French studies in the literature were also searched.

**4. Were the criteria for study inclusion predetermined and clearly stated?**

Yes; inclusion criteria constituted measurement of OMERACT outcomes, specifically, the number of tender joints per participant, number of swollen joints per participant, pain, physician's global assessment, participant's global assessment, functional status, acute phase reactants, and radiological evidence of joint damage. Studies were also considered for inclusion if any of these additional outcomes were measured: duration of morning stiffness, muscle strength, endurance, range of motion, postural status, gait status, walking speed, walking distance, cadence, stride length, systemic components, concomitant medication use, adverse side effects, quality of life, length of stay, discharge disposition, cardiopulmonary capacity, and return to work.

**5. Did the authors adequately assess the quality of the included studies?**

Yes; methodological quality of the studies was assessed using a validated scale focusing on the presence and quality of randomization, double-blinding, and description of withdrawals and drop-outs. Out of 5 possible points quality rating ranged from 1-5, with five of the ten studies receiving a score of 2 and three receiving a score of 3.

**6. What were the results of the review?**

Because the studies included involved different design, the results could not be pooled. Based on the studies examining the effects of working wrist splints, resting and wrist splints, there was no evidence found to support their use in changing pain, grip strength, or number of swollen joints in individuals with rheumatoid arthritis. However, people who utilized these splints for two months preferred to wear these orthoses over nothing.

**7. How precise are the results?**

Results were expressed as mean difference (MD) with 95% confidence intervals.

**8. Did the interpretation of the review's results accurately reflect the results themselves? Are the results generalizable?**

Yes; it is accurately interpreted that the limitations in the designs of the studies under review make it difficult to make any conclusive convictions on the benefits of wrist and hand splints on the symptoms associated with rheumatoid arthritis. Had statistically significant results been determined to perhaps have a positive affect on pain, range of motion, and strength in these participants, then those results may have been generalizable among individuals at least 18 years old suffering from rheumatoid arthritis.