

## **HIGHER ORTHESIS USE IN RHEUMATOID ARTHRITIS: A REVIEW OF LITERATURE**

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**Abstract:** Introduction: Rheumatoid Arthritis is a chronic, systemic and inflammatory disorder of unknown cause, characterized by a pattern of symmetrical joint involvement. Its main aggression region is the joint synovium. Objective: To carry out a literature review on the use of upper limb orthoses in sequelae individuals with rheumatoid arthritis. Methods: The bibliographic survey was carried out in the electronic databases LILACS, SciELO, BIREME and on the Academic Google website, following the Portuguese language as a search strategy, with research restricted to the period 2000 to 2016. The keywords used were Rheumatoid Arthritis, Devices Assistives, Orthosis, Upper Limb, Physiotherapy. Results: Among the selected studies, the authors highlighted the effects of the use of orthotics, adaptations and indications, benefits, some negative points and the effectiveness of the therapeutic treatment. Conclusion: Orthotics have several effects, depending on the pathology and need for use. Each orthosis has indications for the respective treatments and in the case of Rheumatoid Arthritis, the patient can count on different types of orthoses, according to the acquired sequel. The benefits aim to provide an improvement in the individual's performance of daily life activities.

**Keywords:** Rheumatoid Arthritis, Assistive Devices, Orthosis, Upper Limb, Physiotherapy.

## INTRODUCTION

Rheumatoid Arthritis (RA) is a chronic, systemic and inflammatory disorder of unknown cause that is characterized by a pattern of symmetrical joint involvement. Its region of main aggression is the joint synovium (WEST, 2001; LAURINDO et al, 2004.; PEREIRA et al, 2004). The membrane initially becomes inflamed and proliferates, forming a pannus with bone, cartilage and ligament invasion, causing injury and deformities,

which consequently can lead to disabilities, ie, there is an extensive proliferation of fibroblasts and amphigenesis, forming a granular tissue matoso, particularly in the region of contact between the synovial membrane, cartilage and bone (YOSHINARI et al., 2000) Thus, the inflamed synovia becomes swollen and develops villous projections (RIBEIRO, 2005).

The RA (Rheumatoid Arthritis) presents at any age, but its incidence peaks between 30 and 50 years of age and the most recent estimates have shown an increase in the prevalence of the disease up to the seventh decade (COMIN et al, 2003). Women show more impairments compared to men, in a ratio of 3 to 1, that is, women constitute 70% of cases (West, 2001). The main theories of its cause are changes in genetic predisposition, autoimmunity or related to infection (SARAIVA, 2003). Manifestations of RA (Rheumatoid Arthritis) can affect any of the 68 diarthrodial joints of the body, with the joints of the hands and feet being the most affected, representing about 70% of cases and extra-articular and intra-articular manifestations may also occur (RIBEIRO, 2005).

According to Rodrigues et al (2005), the diagnosis is based on seven criteria, elaborated by the American College of Rheumatology, which include the most characteristic clinical aspects of the disease: (1) morning stiffness for more than an hour; (2) signs of arthritis in three or more joints; (3) signs of arthritis in the small joints of the hand and wrist; (4) symmetric arthritis and edema; (5) subcutaneous rheumatoid nodules; (6) presence of serum rheumatoid factor; (7) osteopenia or periarticular erosion demonstrated radiologically in the hands and wrists. To confirm the diagnosis, the patient must meet at least four of these seven criteria.

With the progression of the disease, the appearance of joint deformities is observed and the most commonly presented are in the

upper limb, namely: ulnar deviation of the fingers, spindle fingers, swan neck fingers, buttonhole finger, Z-shaped thumb and hand on camel's back (RODRIGUES et al., 2007). The installation of deformities is associated with decreased range of motion, loss of muscle strength, increased pain and decreased physical performance, and impairment in performing daily activities (ARAÚJO, 2006; BUENO et al., 2007). In general, patients with this rheumatic pathology experience functional limitations that restrict participation and involvement in areas of occupation (SILVA et al., 2015). In addition, orthotics can be used as external instruments that help to improve and/or correct the lost/limited function of members. These rises are divided according to functionality into: static or dynamic orthoses (EGAN et al., 2010). Individuals with RA (Rheumatoid Arthritis) can benefit from using this resource to increase or maintain functional capacity - favoring range of motion (ROM), correct limb alignment, joint stabilization and pain reduction - necessary when performing routine activities (SILVA et al., 2015).

Physical therapy is essential in all stages of the disease, as it aims to correct the loss or limitation of joint movement, muscle atrophy or weakness, instability and misalignment. The proper use of orthotics can help preserve energy and joint function and prevent major deformities (SATO et al., 2000). Rest in Rheumatoid Arthritis contributes to the control of the inflammatory process, particularly during cases of acute exacerbation (CARVALHO et al., 2001). Exercise programs have as fundamental objective the maintenance of range of motion and muscle strength, the exercises cause the release of B-endorphins that consequently relieve the patient's pain, bringing greater mobility in the periarticular structures, including the joint capsule, tendons and muscles, however, it must be avoided during the acute phase, and

must also avoid traumatic or contact activities, as these can increase the picture of rheumatic synovitis (RIBEIRO, 2005).

By analyzing the exposed information and the little literature found on the subject, the present study aimed to identify research on upper limb orthoses used in people with sequelae from rheumatoid arthritis who underwent physical therapy treatment, characterizing the population, the type of research and the outcomes obtained.

## METHODS

The search was carried out through consultations in the electronic databases LILACS, SciELO, BIREME and on the Academic Google website, following the Portuguese language as a search strategy, with investigation restricted to the period 2000 to 2016. The keywords used were Rheumatoid Arthritis, Devices Assistives, Orthosis, Upper Limb, Physiotherapy.

The articles were selected by 3 researchers after reading the titles and abstracts, and the inclusion criteria were: 1. Population: children, adolescents and adults; 2. Type of intervention performed: the use of orthotics in the upper limb; 3. Investigated outcome: muscle activity in the upper limb; use of orthotics during functional activities. When the title or abstract of the study did not explain these three criteria, the article was automatically discarded from the selection. The articles that met the inclusion criteria defined above were critically analyzed, performing a flowchart to organize the discussed articles.

## RESULTS

In the literature review performed, a total of 302 articles were identified, of which 15 were pre-selected for the title content, and of these, 10 were discarded after reading the abstract for not meeting the inclusion criteria previously defined.

For the present study, five articles were included, which were summarized in a standardized way, based on the following topics: author(s); purpose of the study; methodology, results found and conclusion; as can be seen in Table I.

Regarding the objectives and results, it was observed that the authors surveyed presented a consensus in their studies to investigate and highlight the real effects of orthotics, verifying their suitability and indications for treatment, in addition to exposing the benefits provided by the use of same: decrease in pain and inflammation; increased range of motion and grip strength; reduction in the evolution of joint deformities; improvement in the quality of life of patients with RA and its effectiveness related to physical therapy treatment. It was observed that, in certain cases, more attention is paid to patient comfort with the use of the orthosis than to the effectiveness of the treatment, considering that inconveniences related to the use of orthotics are one of the main reasons for the non-use of them by patients.

## DISCUSSION

The treatment of Rheumatoid Arthritis consists of preventing and controlling joint damage, preventing dysfunction, reducing pain, and improving the quality of life of patients. The therapeutic approach starts with the re-education of the patient, together with the family, about the pathology, aiming at not worsening the condition, as well as clarifying the possible treatments. In the rehabilitation process, rest is used as a way to reduce inflammation, pain and joint contractures. However, if used for a long time, the therapeutic effect will be reversed, impairing the integrity of joint structures and cartilage.

The activity must be intense enough to be effective and at the same time not so intense as to threaten the necessary therapeutic rest.

It is all about alleviating the amount of activity that will be beneficial to each body segment; neither more than tolerated, nor less than effective (RIBEIRO, 2005).

According to Silva and Massa (2015), with the appearance and aggravation of deformities, the manual function of the individual with RA is compromised with regard to strength, skill, range of motion, as well as the ability to position and make use of the same for their functional activities. In this context, the orthosis appears as an auxiliary technology resource of fundamental importance for the maintenance of function and the rescue of previously compromised activities.

In their review, Silva and Massa selected 12 articles, in which the most cited orthoses for wrist and hand deformities caused by RA were: static and dynamic wrist and finger orthoses, in addition to other specific orthoses for certain deformities such as static orthosis for swan neck and the 8-oval static finger orthosis.

The authors also highlighted some negative points related to the use of orthotics, found in their review, such as the lack of improvement in grip strength and inconveniences related to the use of the orthosis. No improvement in grip strength was proven by using a dynamometer. According to the authors, this conclusion was justified by the numerous deformities that had already been installed and that prevented the performance of gripping movements. In cases where the deformities are already well established, in order to produce incapacities for carrying out routine activities of the patient.

According to Goia, orthotics are used to delay the increase in deformities resulting from RA, in addition to promoting functional independence. However, for structures with cracked deformities, orthotics are not effective, as they are not able to generate alignment to the original position. Taking into

Authors/Year	Objetivo	Method	Results found	Conclusion
GOIA, D.N., 2012	This study aims to design and develop an orthosis, articulated and original, with the function of correcting the deformity in ulnar deviation of the fingers and favoring functionality.	Type of non-quantitative descriptive intervention. The methodological procedures were divided into: Recognition of Needs; Specification and Concept.	As a result, the first prototype in available material was obtained and, using the solid edge Insight CAD program, a digitalized prototype of the orthosis was proposed, defining the proposals and requirements necessary for the development of the orthosis.	The effectiveness and favorable opinion of the volunteers to use the orthosis.
RODRIGUES, A. M. V. N. et. al., 2007.	Carry out a commented review of the literature through the selection and careful analysis of scientific articles that investigated which the real effects of wrist orthoses on the muscle activity of the forearm and to verify the adequacy of the indication of this type of equipment in the treatment of wrist disorders.	The intervention is done through the use of wrist orthoses; investigated outcome: muscle activity in the forearm, via electromyography, with the use of the intervention is made through the use of orthotics of fist; investigated outcome: muscle activity in the forearm, via electromyography, with the use of wrist orthoses during functional activities. The research was carried out through consultations in libraries and in the databases. MEDLINE, LILACS, PUBMED and BIREME electronics, following as English language search strategy, with investigation restricted to the period from 1995 to 2004.	Four articles were included, which were summarized in a standardized way based on the following topics: author(s); study objective; characterization of the sample; study design and results	As the evidence presented in this article is inconclusive, it is not possible to sustain that the rest goal proposed by the principle of orthotics can be effectively achieved. Therefore, it is unreasonable, in this review, to suggest which is the most indicated orthosis in the treatment of wrist disorders.
SARAIVA, C.A, 2003	Evaluate the benefits acquired with the use of orthoses for positioning the wrist in patients with RA.	Introduce positioning wrist orthoses in juvenile rheumatoid arthritis patients during 18 months of treatment.	It was observed a decrease in the inflammatory condition and pain, increased range of motion, in addition to a reduction in the evolution of joint deformities.	Improvement in functional capacity and in the development of the bio-psycho-social in this disease.

<p>SILVA, T. S. S;          MASSA, L. .D.          B. A, 2015</p>	<p>The study aimed to identify research on upper limb orthoses used in people with rheumatoid arthritis and who were assisted by occupational therapy, characterizing the population, the type of research and the outcomes obtained.</p>	<p>It is a literature review study and, as selection criteria, we searched for articles from the last ten years, in the English, Spanish and Portuguese languages, through experimental, observational or case report research in patients with RA and who were assisted by an OT. Twelve articles were selected for review.</p>	<p>The literature review points out the benefits found by the use of orthosis, with regard to manual dexterity, strength prehension and pain relief, and aspects related to patient comfort and satisfaction .</p>	<p>The orthosis emerges as an important assistive technology resource for the maintenance of function and resgate of the activities that were compromised</p>
<p>RIBEIRO,          L.A.C; GARCIA          R.R, 2005</p>	<p>Conduct a literature review, showing the development of disease and identifying whether energy conservation and joint protection are efficient in relation to physical therapy treatment.</p>	<p>The work was carried out through a literature review where evidence was found that energy conservation and joint protection provide important clinical benefits.</p>	<p>The procedures for joint protection and energy conservation were verified, which show that a patient with awareness applies joint protection techniques, with or without the aid of orthotics, and energy conservation, resting the joint or the entire choir, thus verifying that they are efficient in relation to physical therapy treatment because they act in the delay of disease progression and reduce joint stress.</p>	<p>It reduced the number of inflamed joints and the pain, consequently, offering an improvement in the quality of life of people with RA.</p>

Table I - Revised studies on the use of upper limb orthotics in sequelae patients with rheumatoid arthritis.

account the researcher's clinical experience, it was observed that orthotics for correction of ulnar deviation of the fingers are the most used in clinical practice in Brazil, whether in conservative treatments, pre or postoperative, restricting the actions of joints that were not affected in the upper limb. It was also reported that the most used orthoses in conservative RA treatments are: functional resting orthosis for the hands, thumb abductor, wrist extensor, finger orthoses, and special shoes and insoles. However, a certain difficulty in the individual's functionality was noted during the performance of their daily activities, either as a result of the model or the material used. Even after several technological advances, there is still a lack of care in relation to treatment aspects, such as pain relief and edema reduction.

Researcher Claudia Saraiva reported that the objective of RA treatment is pain relief, prophylaxis, and treatment of joint deformities. In summary, the maintenance of the individual's psychosocial functional capacity, aiming to control the disease, suppressing its activity, preventing and preventing deformities, keeping the patient in a family and school environment and enabling appropriate physical and emotional development.

However, the use of orthotics is observed, mainly in RA inflammatory conditions. Despite being a widespread use, the rationale for prescribing the use of orthosis is still not clear. Orthotics are prescribed with the aim of reducing pain and reducing the inflammatory condition, however, the standard protocol for the use of orthotics is not used. In the other case, it is observed that orthoses for wrist repositioning promote rest and support of weakened structures through correct joint positioning, thus generating a reduction in the inflammatory condition and minimization of joint deformities.

## CONCLUSION

Orthotics have several effects, depending on the pathology and the need for use. Each orthosis has indications for the respective treatments, and in the case of Rheumatoid Arthritis, the patient can count on different types of orthoses, according to the acquired sequel. This was noticed in the reviewed studies, where the authors addressed the use of static orthoses for joint rest in patients who presented sequelae in the upper limbs caused by RA.

The benefits provided by the use of orthotics range from a reduction in pain and inflammation, to an increase in range of motion, strength and a reduction in the evolution of joint deformities resulting from the pathology, which will provide an improvement in the performance of life activities the individual's daily lives.

It is also evident that the use of orthotics must follow the correct time of use, as they must be used long enough to promote the therapeutic purpose, but must not exceed the limit of use prescribed by the physiotherapist, as it will worsen the condition, or even trigger other dysfunctions.

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