Orthesis' Initial Impact in Rheumatoid Arthritis Patients with Boutonnières Deformity on the Thumb(*)

Impacto Inicial da Órtese para Polegar em Botoeira

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ABSTRACT

Objective: To evaluate the use of a static positioning orthesis for boutonnière deformity on the thumb. **Methods:** Twenty women aged between 25 and 74 years old were included in the study. They were distributed at random into a control group and a group using orthesis. Pinch and Jamar's dynamometers, Pain Visual Scale and O'Connor's Functional Evaluation were applied to all patients. Wilcoxon's, Mann Whitney's and Scheffe's tests were used for the statistical analysis. **Results:** After 30 days in the intra-group analysis, there was functional improvement, evaluated by O'Connor's test in 40% of the controls and 70% of these patients using orthesis. There was no statistically significant difference between the groups in any of the evaluated parameters. **Conclusions:** These results suggest that orthesis is beneficial to the functional improvement; the tested model was comfortable and well accepted by patients. Nevertheless, subsequent studies of longer duration and including more subjects are needed.

Keywords: orthesis, hand, boutonnière deformity, rheumatoid arthritis.

RESUMO

Objetivo: *avaliar o uso de uma órtese estática de posicionamento para a deformidade em botoeira no polegar.* ***Métodos:*** *foram incluídas mulheres com idade entre 25 e 74 anos e distribuídas de modo aleatório em grupo controle ou grupo usando órteses. Os instrumentos de avaliação utilizados foram os dinamômetros Pinch e Jamar, a escala visual de dor e o teste funcional de O'Connor. Na análise estatística foram utilizados os testes de Wilcoxon, de Mann Whitney e de Scheffe.* ***Resultados:*** *após 30 dias, na análise intragrupo houve uma melhora funcional, como medido pelo teste de O'Connor, em 40% do controle e 70% dos pacientes que usaram órteses. Não houve diferença estatisticamente significante entre os grupos em nenhum dos parâmetros avaliados.* ***Conclusões:*** *esses resultados sugerem que a órtese é benéfica na melhora funcional e o modelo testado foi confortável e bem tolerado pelos pacientes. Porém, é necessário um estudo subseqüente, mais extenso e incluindo maior número de pacientes.*

Palavras-chave: *órtese, mão, deformidades em botoeira, artrite reumatóide.*

The thumb responds for 50% of the hand workload[1], and hand deformities will affect the functional ability[2]. 60% to 80% of the rheumatoid arthritis (RA) patients present thumb involvement. Boutonnière deformity can occur in 50% to 74% of them[3] and starts at the metacarpophalangeal (MCP) or carpometacarpal (CMC)[4,5].

Orthesis gives support to joints, bones and soft tissues, and aligns them in a functional position, improving function[6,7]. The objectives of using them are joint protection, pain and inflammation decrease, prevention of both contractures and deformities, also to provide stability to improve the joint function and help in the post-operative treatment[8].

Patients who used orthesis for RA in the first CMC joint showed a subjective improvement in 54% to 61% of the cases, in a non-controlled retrospective study[9]. The scarcity of

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studies indicates that pilot studies are required to test thumb orthesis models.

This study evaluated the use of a static positioning orthesis which stabilizes MCP and CMC joints and promotes slight flexion in the thumb interphalangeal (IP) joint to improve the pulp-pulp pinching in RA patients.

Twenty women referred by the outpatient clinic of the São Paulo Federal University with RA, according ACR[10], with thumb boutonnière deformity, median age of 55 (25 to 74) years old and an average disease evolution time of 16 years (4 to 60) were included. The patients were randomly distributed into two groups: control (CON) and orthesis (ORT).

The Healthy Assessment Average (HAQ) score and standard deviation[11] was 0.86 ± 0.55 and the EPM-ROM's[12] was 3.10 ± 2.83. All of them were in type I or II functional class[13]. No pharmacological and physiotherapeutic intervention was instituted either 30 days before or during the study.

The ORT group was evaluated with and without orthesis. Strength of the studied hand, function (O'Connor's Functional Evaluation in seconds), and pain (Pain Visual Scale 0-10 cm) were measured in both groups in the beginning and at the end of the 30-day period[14,15], by a blind observer.

The orthesis limits the thumb MCF movements but allows the flexion function starting at 15° from the IP joint. It is a small functional static orthesis, with an average weight of 200 g, passing over the first CMC joint and reaching the IP joint, then stabilizing it at 15° of flexion dorsally only, so that flexion from that angle is preserved. It was made, individually for each patient, from low temperature thermoplastic material and indicated for use during the patient's daily activities.

For the statistical analysis we used non-parametric tests, the Mann Whitney and Wilcoxon's test for comparison of the groups' averages. The two-factor variance analysis by Scheffe's test was used to compare the groups' delta improvement.

The groups were not homogeneous in relation to pain (baseline). After 30 days there was no statistically significant difference in any parameters (Table 1). Though it is not significant, there was worsening in the mean value of the

TABLE 1
INDIVIDUALS DATA AND MEANS OF HAND STRENGTH (KGF) MEASURED BY PINCH AND JAMAR IN THE BEGINNING AND AFTER 30 DAYS

		JAMAR		PINCH					
				Pulp-pulp		Tripod		Key	
		T0	T30	T0	T30	T0	T30	T0	T30
C	1	6	5	2,1	3	2,6	3	3,6	4
O	2	14	14,3	1,6	1,8	1,5	1,6	3,1	2,6
N	3	3,33	2,66	1,3	1,3	2	1,6	3	2
T	4	10	8	3,5	3,6	1	3,3	1,5	4,6
R	5	4,66	5	1	1	1,6	2,3	2	2
O	6	6	6,3	3	3,3	4	4	4	4,2
L	7	6	8,3	3,6	2,8	3	2,16	4	3,6
S	8	2	2,1	1,6	1,3	3,6	2	2,8	3
	9	8,3	8	2	2	1,5	1,5	1,1	1
	10	17,3	17	1,5	1,5	1,6	1,6	2	2
	Mean	**7,76**	**7,67**	**2,12**	**2,16**	**2,24**	**2,31**	**2,71**	**2,9**
	SD	**4,80**	**4,76**	**0,93**	**0,94**	**1,01**	**0,86**	**1,02**	**1,17**
O	1	12	15,3	2,6	4	3,3	4	5,6	5,5
R	2	9,3	9	3,3	3,5	4	4,1	3,8	3,3
T	3	8,6	8	3	3	1,6	2	2,6	2,5
H	4	14,3	14	1,1	1,5	3	3	3,6	3
E	5	6	3,3	1,6	1	0,6	1	1	2
S	6	18	16,6	4	5	4,6	5,6	5	5,3
I	7	11,3	11,3	3,3	3,1	3	3,3	6	4,3
S	8	8,3	6	4	2,8	4	3,3	3,1	3
	9	8	8	0,8	2,3	2,3	2,3	6,5	3,3
	10	6,3	5,3	3,1	1,1	3,1	2,5	2,8	3,3
	Mean	**10,21**	**9,68**	**2,68**	**2,73**	**2,95**	**3,11**	**4**	**3,55**
	SD	**3,75**	**4,48**	**1,14**	**1,29**	**1,19**	**1,28**	**1,74**	**1,14**

T-0 = beginning; T-30 = after 30 days; SD = standard deviation

functional test in the CON group whereas there was an improvement in the group using orthesis. There was a functional improvement, measured by O'Connor's test, in 40% of the patients in the CON group and 70% in the ORT group (Table 2).

We noticed that, in spite of the tendency to improve in the functional test time at the end of 30 days, immediately after the orthesis are placed the patients showed a longer time (worse performance), probably because they were not adapted to the orthesis. In accordance with our results, the immediate effect of the wrist static orthesis in the hand function in RA patients was evaluated in controlled studies and, despite the significant improvement in pain, patients increased their times to perform tasks such as writing and taking small objects in Jebsen's test when the orthesis were applied[7,16].

Our study suggests that orthesis is beneficial in the functional improvement, the model applied was comfortable and well accepted by patients. However it is necessary subsequent studies of longer duration and envolving great number of patients.

TABLE 2
PAIN VISUAL ANALOGIC SCALE (CM) AND O'CONNOR'S FUNCTIONAL EVALUATION (SECONDS) OF CONTROL (CON) AND ORTHESIS (ORT) GROUPS IN THE BEGINNING AND AFTER 30 DAYS. THE ORT GROUP WAS EVALUATED WITH AND WITHOUT ORTHESIS

		VAS		O'Connor's Functional		
		beginning	30 days	beginning	30 days	
				without	without	with
C	1	5	3	513.25	391.15	
O	2	0	0	270.65	445.35	
N	3	2	2	471.25	501.25	
T	4	5	4	460.2	419.25	
R	5	6	4	348	419	
O	6	1	1	353.25	303.45	
L	7	0	0	310.3	435.25	
S	8	5	4	170.5	301.8	
	9	7	5	443.5	433.2	
	10	5	5	433.2	410.2	
	Mean	**3.60**	**2.80**	**377.41**	**405.99**	
	SD	**2.59**	**1.93**	**106.33**	**61.62**	
O	11	10	5	320.85	364.56	318.25
R	12	5	5	406.25	332.1	363
T	13	8	8	462.25	363	303
H	14	5	5	366.3	343.5	403.5
E	15	10	10	505.2	642.5	665.7
S	16	8	5	285	441.2	445.2
I	17	8	5	413.2	345	239
S	18	1	5	341.5	294.5	119.7
	19	3	1	595.3	392.3	593.5
	20	2	2	348.9	345.4	327.5
	Mean	**6**	**5.1**	**404.475**	**386.406**	**377.835**
	SD	**3.27**	**2.56**	**94.14**	**97.91**	**160.69**

VAS = Pain Visual Analogic Scale; SD = standard deviation

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