

Splinting Rheumatoid Hand Deformities: A Case Report

Romatoid El Deformitelerinde Splintleme: Olgu Sunumu

İsmail CEYLAN¹  Mehmet CANLI¹ 

ÖZ

Romatoid artrit (RA), eklem, kıkırdak ve kemiğin sinovyal dokusunda ve daha az sıklıkla eklem dışı bölgelerde inflamatuvar değişikliklerle karakterize, kökeni bilinmeyen bir hastalıktır. RA'lı hastaların ellerindeki karakteristik deformiteleri tanımlamak için kullanılan terim olan romatoid el, tipik olarak değişen derecelerde başparmak deformitesi, parmak deformiteleri ve ulnar deviasyonu içerir. RA el deformitelerinde bir çok tedavi yaklaşımından birisi de splintleme yaklaşımıdır. Bu vakamızda, RA'lı bir hastada meydana gelen el deformitelerine uygulanan splintleme sonuçları verilmektedir.

Anahtar Kelimeler: boutonniere splint; düzeltici splint; eklem hareket açıklığı

ABSTRACT

Rheumatoid arthritis (RA) is a disease of unknown origin characterized by inflammatory changes in the synovial tissue of joints, cartilage, and bone, and less frequently in extra-articular sites. The rheumatoid hand term used to describe the characteristic deformities of the hands of patients with RA typically includes varying degrees of thumb deformity, finger deformities, and ulnar deviation. One of the treatment approaches in RA hand deformities is the splinting approach. In this case, the results of splinting applied to hand deformities in a patient with RA are presented.

Keywords: boutonniere splint; corrective splint; joint range of motion

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¹School of Physical Therapy and Rehabilitation, Ahi Evran University, Kırşehir, Türkiye.

Corresponding Author: Mehmet Canlı, School of Physical Therapy and Rehabilitation, Ahi Evran University, Kırşehir, Türkiye.

E-mail: canlimehmet600@gmail.com

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INTRODUCTION

Rheumatoid arthritis (RA) is a systemic disease that results in synovial inflammation affecting the joints, tendons, and bursae. Since the disease causes joint involvement in different periods, it appears as a primary joint disease. Arthritis in RA is common in joints such as the hand, wrist, foot, and ankle but also affects the shoulder, knee, and hip joints.¹

Approximately 90% of individuals with RA develop hand deformities during the course of their disease.² RA may cause cartilage destruction, ligamentous laxity, subchondral erosion, and deterioration of the anatomical alignment of the joint due to inflammatory synovitis, thereby upsetting this delicate balance.³ Classic RA deformities involving the digits are the ulnar deviation, boutonniere, swan neck and Z-thumb deformities. These changes result from damage to the tendons and joint capsule.¹

Various therapeutic options are available for the treatment of RA, such as exercise, orthotics, splints, physiotherapy, and surgical treatments.^{4,5} Although these therapeutic interventions play an important role in the treatment of RA, more studies are needed on the effectiveness of these interventions. Tijhius et al. suggested the use of orthoses in the conservative treatment of RA.⁶ It is known that orthotic treatment provides anatomical alignment, reduces pain and inflammation; also it is non-invasive and low-cost.

This patient here complained of activity pain and functional disability that had been going on for 6 years and was having difficulty in doing his job as a bus driver. Therefore, it was aimed to apply the corrective finger orthosis for finger deformities, which is known for its rapid functional improvement effect in the literature.²

CASE REPORT

A 42-year-old male patient diagnosed with RA was admitted to our hand rehabilitation clinic with a complaint of functional loss and activity pain in both hands. After a physical examination, a Boutonniere deformity (BD) in the index finger and Z-thumb

deformity in the thumb of the right hand were noted. In addition, a hyperabduction deformity of the fifth finger on the left hand was observed. The joint range of motion of the case was evaluated with a manual goniometer, activity pain was measured with the Visual Analog Scale (VAS), and the functionality of the hand was evaluated with the Disability Arm, Shoulder and Hand Problems Questionnaire (DASH). Deformity postures and joint angles before splinting are shown in Table 1 and Figures 1, 2, and 3.

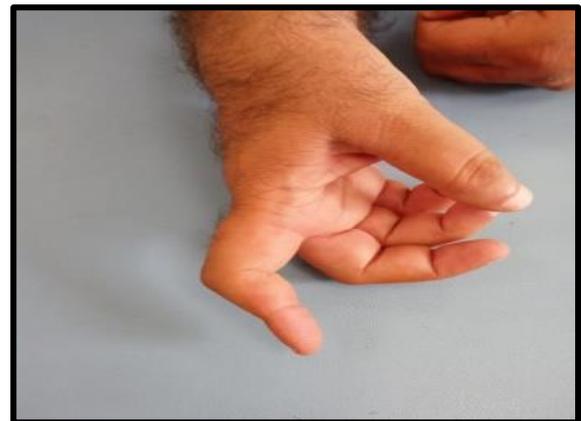


Figure 1. Boutonniere deformity.



Figure 2. Z-thumb deformity.



Figure 3. Fifth finger hyperabduction deformity.

To correct BD, a three-point splint is fabricated from thermoplastic material. This splint aims to decrease the risk of proximal interphalangeal joint (PIPJ) flexion contracture by positioning the PIPJ in 0° extension. This reduces stress on the central slip and prevents tightening of the lateral bands, and retinacular ligaments (Figure 4).⁷ To correct Z-thumb deformity, a thumb abduction splint applying volar pressure to the metacarpophalangeal joint (MCPJ) was performed (Figure 5).⁸ For repositioning for the fifth finger hyperabduction, a buddy splint around the fourth and fifth fingers was performed (Figure 6).⁹



Figure 4. Boutonniere splint.



Figure 5. Z-thumb splint.



Figure 6. Buddy splint.

After all splints were performed, the patient was advised to wear them continuously for 4 weeks. At the end of the fourth week, measurements were reperformed.

When the DASH score and VAS score (pre-splint, 4 weeks after) results were reexamined, it was seen that the VAS score decreased from 6.4 cm to 2.5 cm, and the DASH score decreased from 23.5 to 7 with splint use, respectively (Table 1).

Table 1. Finger joint angles before and after splint application.

	Before splinting	After splinting
Thumb MCPJ hyperextension (°)	40°	10°
Thumb IPJ flexion (°)	30°	10°
Index finger MCPJ hyperextension (°)	30°	10°
Index finger PIPJ flexion	50°	20°
Index finger DIP hyperextension (°)	20°	10°
Fifth finger MCP hyperabduction (°)	30°	0°
DASH (score)	23.5	7
VAS (cm)	6.4	2.5

MCPJ: metacarpophalangeal joint, IPJ: interphalangeal joint, PIPJ: proximal interphalangeal joint, DIPJ: distal interphalangeal joint, DASH: Disability Arm, Shoulder and Hand Problems Questionnaire, VAS: Visual Analogue Scale

DISCUSSION

Although the hand region is open to cumulative traumas, non-traumatic deformities due to the pathogenesis of the disease are also observed in rheumatic diseases. RA is a progressive inflammatory disease that often causes severe joint destruction and disability. It has no curative treatment, although it currently has good results with disease-modifying antirheumatic drugs and biological therapies. In a patient with RA, hand and wrist deformities may occur that limit activities of daily living, reduce quality of life, and limit hand grip strength. Management of RA hand deformities is undeniably complex.¹⁰

The patient had the most common 3 types of rheumatoid hand deformities. These conditions result in weakness, pain, and disability. While multiple studies of patients with RA have shown that splints can decrease hand and digit pain and increase grip strength, splinting alone is not efficient in persistently stabilizing joints.^{2,11} Early recognition and timely intervention are critical as flexible deformities benefit from splinting. Although the splints designed in this study partially correct the deformity, they are not flexible enough to provide maximal functional

movement. Deformities in patients with RA are progressive. Therefore, the corrective splints used in such patients should be more dynamic and produced from a softer material.

Conflict of Interest

The authors declare that there is not any conflict of interest regarding the publication of this manuscript.

Ethics Committee Permission

Informed consent was obtained from the patient.

Authors' Contributions

Concept/Design: İC, MC. Data Collection and/or Processing: İC, MC. Data analysis and interpretation: İC. Literature Search: MC. Drafting manuscript: İC. Critical revision of manuscript: MC.

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