Süleyman Demirel Üniversitesi
Sağlık Bilimleri Dergisi
Cilt 14, Sayı 2, 162 – 169, 2023

Suleyman Demirel University
Journal of Health Sciences
Volume 14, Issue 2, 162- 169, 2023

Investigation of Functional Status of Foot/Ankle in Individuals with Rheumatoid Arthritis

Romatoid Artrit'li Bireylerde Ayak/Ayak Bileği ile İlgili Fonksiyonel Durumun İncelenmesi

Elif GÜR KABUL [1]*, Sinem BOZCUK [2], Bilge BAŞAKCI ÇALIK [2], Sinem KURU [2], Murat YİĞİT [3]

[1] Uşak Üniversitesi, Sağlık Bilimleri Fakültesi, Fizyoterapi ve Rehabilitasyon, Uşak, Türkiye
[2] Pamukkale Üniversitesi, Fizyoterapi ve Rehabilitasyon Fakültesi, Denizli, Türkiye
[3]Pamukkale Üniversitesi, Tıp Fakültesi, Romatoloji Bilim Dalı, Denizli, Türkiye

ABSTRACT

Objective=The aim of this study was to examine the functional limitations of foot/ankle in terms of age in individuals with Rheumatoid Arthritis (RA).

Material-Method=Forty individuals diagnosed with RA were included in the study. Individuals with RA were divided into two groups (under 65 years old (n:24) and 65 years old and over (n:16)).Functional status of foot/ankle were evaluated with Foot and Ankle Outcome Score (FAOS), general health status with Visual Analogue Scale (VAS), and disability level with Health Assessment Questionnaire (HAQ). FAOS consists of five subtests: pain, other symptoms, activities of daily living, sport and recreational function, and foot/ankle related quality of life. Relationships between continuous variables were evaluated with Pearson Correlation Analysis.

Results=HAQ had low to moderate correlation with FAOS_pain (r:-0.435), FAOS_activities of daily living (r:-0.647), FAOS_sport and recreational function (r:-0.495) and FAOS_total (r:-0.582) in RA with under 65 years old while HAQ had moderate to high correlation with FAOS_other symptoms (r:-0.579), FAOS_pain (r:-0.702), FAOS_activities of daily living (r:-0.868), FAOS_sport and recreational function (r:-0.683) and FAOS_total (r:-0.806) ($p<0.05$) in RA with 65 years old and over. In addition, VAS had moderate correlation with FAOS_pain (r:-0.517), FAOS_activities of daily living (r:-0.590), FAOS_sport and recreational function (r:-0.550) and FAOS_total (r:-0.587) in RA with 65 years old and over ($p<0.05$).

Conclusion=Although functional limitations related to foot/ankle affect disability levels of RA of all ages, this effect is greater for RA aged 65 and over.In addition, functional limitations related to foot/ankle cause a worse perception of general health status of RA patients aged 65 and over.

Keywords: Foot, rheumatoid arthritis, ankle

Alınış / Received: 22.02.2023 Kabul / Accepted: 05.06.2023 Online Yayınlanma / Published Online: 15.08.2023

DOI: 10.22312/sdusbed.1254897
ARAŞTIRMA MAKALESİ

*Corresponding author: elifgur1988@hotmail.com

ÖZ

Amaç=Bu çalışmanın amacı, Romatoid Artrit (RA)'li bireylerde ayak /ayak bileği ile ilgili fonksiyonel limitasyonların yaş açısından incelenmesi idi.

Materyal-Metot=Çalışmaya RA tanısı almış 40 birey dahil edildi. RA'lı bireyler iki gruba ayrıldı [65 yaş altı (n:24) ve 65 yaş ve üstü (n:16)]. Ayak/ayak bileği ile ilgili fonksiyonel durum Ayak Ayak Bileği Sonuç Skoru (FAOS) ile, genel sağlık durumu Visüel *Analog Skalası (VAS)* ile, özür düzeyi Sağlık Değerlendirme Anketi (SDA) ile değerlendirildi. FAOS beş alt testten oluşmaktadır: ağrı, diğer semptomlar, günlük yaşam aktiviteleri, spor ve eğlence faaliyetleri, ayak/ayak bileği ile ilgili yaşam kalitesi. Sürekli değişkenlerin birbiri ile ilişkisi Pearson Korelasyon Analizi ile değerlendirildi.

Bulgular=65 yaş altı RA'lılarda SDA; FAOS'un ağrı (r:-0.435), iş/günlük yaşam (r:-0.647), iş/spor/eğlence (r:-0.495) ve toplam skoru (r:-0.582) ile düşük ve orta düzeyde korele iken; 65 yaş ve üstü RA'lılarda FAOS'un belirtiler/tutukluk (r:-0.579), ağrı (r:-0.702), iş/günlük yaşam (r:-0.868), iş/spor/eğlence (r:-0.683) ve toplam skoru (r:-0.806) ile orta ve yüksek düzeyde korele idi ($p<0,05$). Ayrıca 65 yaş ve üstünde VAS; FAOS'un ağrı (r:-0.517), iş/günlük yaşam (r:-0.590), iş/spor/eğlence (r:-0.550) ve toplam skoru (r:-0.587) arasında orta düzeyde ilişkili idi ($p<0,05$).

Sonuç=Ayak/ayak bileği ile ilgili fonksiyonel limitasyonlar, her yaştaki RA'lı bireylerin özür düzeylerini etkilese de; 65 yaş ve üzerinde bu etki daha fazladır. Ayrıca ayak/ayak bileği ile ilgili fonksiyonel limitasyonlar,65 yaş ve üstündeki RA'lılar tarafından genel sağlık durumlarının daha kötü algılanmasına sebep olmaktadır.

Anahtar Kelimeler: Ayak, romatoid artrit, ayak bileği

1. Introduction

Rheumatoid Arthritis (RA) is the most common rheumatic disease of adulthood [1]. The incidence of RA may increase with age and peaks in the age range of 50-75 years [2].

Functional disorders and complications caused by RA seriously affect the daily life and quality of life of the individual [3]. Joint pain, swelling, and morning stiffness are the most common symptoms among RA patients [4]. Individuals with RA are also affected psychosocially due to reasons such as joint problems, limitations due to morning stiffness, loss of functional work force [5].

Although RA affects every joint in the body, it is most commonly involved in the hand (15.7%) and foot (14.7%) joints [6]. The first problems that come to mind in RA are in the hands and wrists, but 90% of long-term RA patients also have foot problems [7]. The first symptoms in 16-36% of RA patients begin in the foot area [8]. Pain and structural deformities related foot are the most common complaints of patients with RA. Foot-related complaints may develop at any stage of the disease and as the disease progresses, the frequency of foot involvement increases in individuals with RA [9,10]. Inflammation of the foot joints and synovial tissues causes joint damage and structural deformities. Wickman, in 2004, reported that serious negative effects on functionality, mobility in daily life and functional capacity began to be seen with RA starting to affect the foot [11].

The hand involvement and functions of individuals with RA have been frequently investigated in detail in the studies in the literature. However, the effect of foot problems seen in individuals with RA on

functionality and activities of daily living has been less studied. In recent years, the tendency towards foot/ankle problems in individuals with RA is increasing [11-13]. The foot problems seen in these patients create a great burden for the patients [14].

This study was planned to examine the functional limitations of foot/ankle involvement in terms of age in individuals with RA.

2. Material and Method

The study was planned as cross-sectional. The sample of the study consisted of individuals with RA who applied to Pamukkale University Rheumatology Clinic between 15.11.2021 and 15.05.2022 and met the inclusion and exclusion criteria.

Participants

Forty RA patients were included in the study and were divided into two groups [under 65 years old (n:24) and 65 years old and over (n:16)] Inclusion criteria: (a) Being diagnosed with RA according to the 2010 American College of Rheumatology/EULAR criteria. (b) being 18 years or older. (c) Volunteer to participate in the study. Exclusion criteria: (a) serious psychiatric conditions (eg psychotic disorders). (b) have a surgery within the past year. (c) Cognitive inability to cooperate (d) Being pregnant. (e) Concurrent autoimmune or inflammatory disease. (f) having central nervous system diseases (eg multiple sclerosis, parkinson's disease).

Confirmation that there is no ethical problem for this study was obtained from the local Clinical Research Ethics Committee (meeting dated 02.11.2021 and numbered 20). Verbal information was given to all individuals and an informed consent form was signed.

Evaluations

All evaluations were performed by the same researcher in a single session with face-to-face interview method in approximately 40-45 minutes. After obtaining demographic data, functional status of the foot/ankle were evaluated with the Foot and Ankle Outcome Score (FAOS), general health status with the Visual Analogue Scale (VAS), and disability level with the Health Assessment Questionnaire (HAQ).

Foot and Ankle Outcome Score (FAOS): FAOS is used to examine functional conditions related to the foot/ankle in individuals with 42 items and five subtests: pain (9 item), other symptoms (7 item), activities of daily living (17 item), sport and recreational function (5 item), and foot/ankle related quality of life (4 item). Scoring is done for each subtest and the scoring of each subtest is calculated out of 100. The higher the score on FAOS, the less functional limitations [15].

Visual Analogue Scale (VAS): VAS is used to convert the values that cannot be measured numerically by writing the evaluation parameters at both ends of a 10 cm line. The patient place a dot or pointing at the appropriate place for his/her condition on this line. VAS was used to evaluate the general health status of RA (0='best health condition', 10='worst health condition') in this study [16].

Health Assessment Questionnaire (HAQ): HAQ is used to evaluate the disability level. HAQ consists of 20 questions and eight subsections. Scoring is done between 0 and 3. Higher score means more disability [17].

Statistical Analysis

The data were analyzed with the IBM SPSS Statistics 22 package program. Continuous variables were given as mean ± standard deviation and median (minimum/maximum) and categorical variables were given as numbers and percentages. Relationships between continuous variables were evaluated with Pearson Correlation Analysis. Correlation was categorized as low (r:0.100-0.499), moderate (r:0.50-0.69) or high (r:0.70-1.00) [18]. Statistical significance value was accepted as $p<0.05$.

3. Results

Demographic and disease-related data of RA included in the study are shown in Table 1.

HAQ had negative low to moderate correlation with FAOS_pain (r=-0.435, p=0.038), FAOS_activities of daily living (r=-0.647, p=0.001), FAOS_sport and recreational function (r=-0.495, p=0.016) and FAOS_total (r=-0.582, p=0.004) in RA with under 65 years old whereas HAQ had negative moderate to high correlation with FAOS_other symptoms (r=-0.579, p=0.024), FAOS_pain (r=-0.702, p=0.003), FAOS_activities of daily living (r=-0.868, p=0.000), FAOS_sport and recreational function (r=-0.683, p=0.005) and FAOS_total (r=-0.806, p=0.000) in RA with 65 years old and over (Table 2).

In addition, VAS had no correlation with any of FAOS_subtests and FAOS_total in RA with under 65 years old (p>0.05) while VAS had negative moderate correlation with FAOS_pain (r=-0.517, p=0.040), FAOS_activities of daily living (r=-0.590, p=0.016), FAOS_sport and recreational function (r=-0.550, p=0.027) and FAOS_total (r=-0.587, p=0.017) in RA with 65 years old and over (Table 2).

Table 1: Demographic and descriptive data of individuals with rheumatoid arthritis

	Under 65 years old (n=24)		**65 years old and over (n=16)**	
	Mean±SD	**Median(Min/Max)**	**Mean±SD**	**Median (Min/Max)**
Age (years)	49.29±11.50	54.50 (21/63)	69.62±4.68	69.50 (65/80)
Height (m)	1.61±0.08	1.60 (1.47/1.78)	1.57±0.06	1.58 (1.50/1.70)
Body weight (kg)	74.56±14.01	70.50 (49/100)	69.84±7.15	70 (56/82)
BMI (kg/m^2)	28.15±5.29	27.97 (19.14/40)	28.67±4.15	28.89 (20.57/35.56)
Morning stiffness (min)	62.30±81.28	30 (0/300)	52.85±81.47	17.50 (0/240)
FAOS_ other symptoms	74.08±21.19	80.50 (21/100)	71.87±23.99	82 (36/100)
FAOS_pain	72.16±19.78	76.50 (31/97)	72.81±21.78	79 (39/100)
FAOS_activities of daily living	76.00±19.10	80 (43/100)	70.68±25.99	79 (26/100)
FAOS_sport and recreational function	50.62±35.94	50 (0/100)	44.37±36.14	30 (0/95)
FAOS_foot and ankle related quality of life	57.66±29.74	56 (0/100)	56.37±27.74	47 (19/100)
FAOS_total	70.08±20.00	70 (33/98)	66.81±23.63	76.50 (27/96)
HAQ	1.04±0.74	1 (0/2.38)	1.10±0.90	0.62 (0/2.75)
VAS	5.29±2.14	5 (1.50/10)	5.07±1.90	4.95 (2.20/10)
Gender-Women n (%)	21 (87.5)		14 (87.5)	
-Men n (%)	3 (12.5)		2 (12.5)	

BMI=Body Mass Index. m:meter. kg:kilogram. min:minutes. SD: standard deviation. FAOS: Foot and Ankle Outcome Score. HAQ: Health Assessment Questionnaire. VAS: Visual Analogue Scale

Table 2: Correlation analysis results

	Under 65 years old				65 years old and over			
	HAQ		VAS		HAQ		VAS	
	r	p	r	p	r	p	r	p
FAOS_other symptoms	-0.365	0.087	-0.311	0.139	-0.579	**0.024**	-0.477	0.062
FAOS_pain	-0.435	**0.038**	-0.266	0.208	-0.702	**0.003**	-0.517	**0.040**
FAOS_activities of daily living	-0.647	**0.001**	-0.271	0.200	-0.868	**0.000**	-0.590	**0.016**
FAOS_sport and recreational function	-0.495	**0.016**	-0.215	0.313	-0.683	**0.005**	-0.550	**0.027**
FAOS_foot and ankle related quality of life	-0.411	0.051	-0.221	0.299	-0.453	0.090	-0.342	0.194
FAOS_total	-0.582	**0.004**	-0.297	0.159	-0.806	**0.000**	-0.587	**0.017**

Pearson Correlation Analysis, FAOS: Foot and Ankle Outcome Score. HAQ: Health Assessment Questionnaire. VAS: Visual Analogue Scale

4. Discussion and Conclusion

This study showed that functional problems related to the foot/ankle affect the disability levels of RA of all ages. This effect is greater for RA aged 65 and over. In addition, functional problems related to the foot/ankle cause a worse perception of general health status of RA patients aged 65 and over.

From the onset of the disease, RA negatively affects individuals in many ways. Foot/ankle complaints are frequent in patients with RA and cause serious disability and limitation in daily life activities [19]. The problems experienced by RA can also affect their family, professional and social relationships [20,21]. This causes additional burdens for individuals who are already suffering from the disease.

Stolt et al. (2017), in their review, aimed to define the foot health of patients with RA and to determine how they care for their feet. They determined that foot/ankle problems have a high prevalence in patients with RA (especially pain and structural deformities). These foot problems are a big burden for patients. RA have difficulty taking care of their own feet and finding suitable shoes. The self-care abilities of RA patients may decrease. They also stated that future studies are needed for accuracy across cultures [14].

Yano et al. (2018) examined 5637 individuals with RA and concluded that clinicians should pay more attention to the foot/ankle joints of individuals with RA in daily practice [22].

Reinoso-Cobo et al. (2020), which they conducted with 229 RA and 73 healthy controls, reported that the presence of RA was associated with high pain score and the physical component of quality of life of advanced age and that the morphological and structural features of the foot were not necessarily associated with pain, disability and loss of function [23]. Fazaa et al. (2022) concluded that foot pain is common in RA patients (especially in the forefoot). There is a relationship between functional foot index and disability level (HAQ) and foot pain. And it can have significant effects on the quality of life. In addition, the feet need to be carefully examined and their functional effects evaluated [24].

Stating that studies focusing on foot problems in RA were mostly conducted in the adult population and there was insufficient evidence in the elderly population, Stolt et al. evaluated foot health in RA patients over 65 years of age with a mean age of 74 years in 2021. While they found the most common complaints as foot pain, dry skin and thickened toenails, they determined common structural complaints are foot deformities. They emphasized the relationship between daily walking or standing time and using walking or running shoes with the level of foot health. Foot problems limit patients' ability to perform daily activities. Because elderly with RA live with complex foot problems, they need health services related to foot problems. There is also need to develop and implement care practices to relieve foot pain and

support foot health and functional ability in elderly with RA [25]. Parallel to current studies, our study once again emphasized the negative effects of foot/ankle problems in individuals with RA and revealed that these problems increase with increasing age. In the light of these results, we recommend that more attention should be paid to foot/ankle problems in order to change the general perceptions of individuals with RA in a positive way.

Katarzyna et al. examined the relationship between static foot dysfunction assessed by plantoconturography and quality of life in 102 elderly patients with RA in remission. They found a relationship between static foot dysfunction and physical activity domain and emotional domain of quality of life in patients with RA [26]. Based on this result, we see that foot/ankle problems affect the psycho-social parameters of the person, and we think how important and necessary are the intervention methods for foot/ankle problems.

In parallel with the literature, in this study, we observed that the functional problems related to the foot/ankles of RA in all ages were associated with the level of disability, and this relationship was even stronger at the age of 65 and over. In addition to these, functional limitations related to the foot/ankle negatively affect the perspective of patients with RA on their health status and cause them to perceive their health worse at the age of 65 and over. Descriptive data show that RA patients with under 65 years old are exposed to morning stiffness for a longer time. Morning stiffness may be the cause of the association between foot/ankle functional problems and disability in this age group. Studies have reported that morning stiffness is associated with impaired morning function and functional disability [27,28].

The reason why the effects of RA are seen more intensely at the age of 65 and over may be due to the more severe damage caused by the disease in this age group, the greater physical and psychological exposure due to longer exposure to the disease, and/or the greater feeling of psychological vulnerability in this age group. Also, another reason may be problems in the musculoskeletal system. The immune system becomes non-specifically active with age, increasing inflammation and comorbidities. In individuals with RA, this occurs more rapidly and more intensely. [29]. Systemic inflammation accelerates age-related sarcopenia. Compared to healthy controls in their age group, elderly RAs have greater loss of muscle mass, muscle strength, and physical loss. [30].

The strength of the study is that it is possible to simultaneously access the evaluation results of individuals with RA, both under the age of 65 and the aged 65 and over. The other strength of the study is that the variables that could affect RA symptoms such as gender and BMI were similar between the groups. The limitation of the study is the failure to examine the relationship between subjective results and objective results by examining the structural changes in the foot/ankle with radiography.

Further studies can be planned longitudinally to investigate the effects of treatment/physiotherapy methods on foot/ankle function in patients with RA. In addition, we recommend that the biological, psychological and social effects of foot care education can be investigated by applying to RA patients of all ages, especially aged 65 and over.

As a result, although functional limitations related to the foot/ankle in individuals with RA affect the disability levels of individuals of all ages, this effect is greater for RA aged 65 and over and cause worse perception of their general health. For this reason, patient education including information about preventive foot/ankle problems, foot care, shoe selection and appropriate exercise approaches is important in the management of the disease in order to reduce the disability levels of individuals with RA and to change their perceptions about the disease in a positive way. In addition, more attention should be paid to foot/ankle care practices for all ages, especially aged 65 and over. Also, increasing the clinical skills of physiotherapists working in this field will contribute to minimizing the functional losses associated with foot/ankle involvement caused by RA.

Declaration of Ethical Code

In this study, we undertake that all the rules required to be followed within the scope of the "Higher Education Institutions Scientific Research and Publication Ethics Directive" are complied with, and that none of the actions stated under the heading "Actions Against Scientific Research and Publication Ethics" are not carried out.

Confirmation that there is no ethical problem for this study was obtained from the local Clinical Research Ethics Committee (meeting dated 02.11.2021 and numbered 20).

References

[1] Symmons, D.P.M. 2002. Epidemiology of rheumatoid arthritis: Determinants of onset, persistence and outcome. Best Pract Res Clin Rheumatol, 16(5), 707-22.

[2] [Crowson, C.S., Matteson, E.L., Myasoedova, E., Michet, C.J., Ernste, F.C., Warrington, K.J., et al. 2011. The lifetime risk of adult-onset rheumatoid arthritis and other inflammatory autoimmune rheumatic diseases. Arthritis Rheum, 63(3), 633-9.

[3] Walker, R., Wong, F., Singh, S., Ajuied, A. 2019. The foot in systemic disease: management of the patient with rheumatoid arthritis or diabetes mellitus. Orthopedics and Trauma, 33(4), 249-62.

[4] Harris, E.D., Firestein, G.S. 2009. Clinical features of rheumatoid arthritis. In: Firestein GS, Kelley WN. Kelley's textbook of rheumatology. 8th ed. Philadelphia: Saunders/Elsevier, 1087-1118.

[5] Yalıman, A., Şen, E., Eskiyurt, N., Budiman-Mak, E. 2014. Turkish Translation and Adaptation of Foot Function Index in Patients with Plantar Fasciitis. Turk J Phys Med Rehab, 60, 212-22

[6] Baysal, Ö., Baysal, T., Altay, Z., Akyol, G. 2004. Foot Deformities in Rheumatoid Arthritis. Journal of Turgut Ozal Medical Center, 11(3), 173-176

[7] Matsumo, T., Nakada, I., Juji, T., Nakamuro, I., Ito, K. 2016. Radiologic Patterning of Hallux Deformity in Rheumatoid Arthritis and Its Relationship to Flatfoot. J Foot Ankle Surg, 55: 948-954.

[8] Bek, N., Kavlak, Y., Yağlı, V.N. 2006. Evaluation of foot deformities in women with rheumatoid arthritis and osteoarthritis. Fizyoter Rehabil, 17(2), 70-77

[9] Woodburn, J., Helliwell, PS. 1997. Foot problems in rheumatology. Br J Rheumatol, 36, 932–6.

[10] van der Leeden, M., Steultjens, M., Dekker, J.H., Prins, A.P., Dekker, J. 2007. The relationship of disease duration to foot function, pain and disability in rheumatoid arthritis patients with foot complaints. Clin Exp Rheumatol, 25, 275–80.

[11] Wickman, A.M., Pinzur, M.S., Kadanoff, R., Juknelis, D. 2004. Health-related quality of life for patients with rheumatoid arthritis foot involvement. Foot Ankle Int, 25(1), 19-26.

[12] [Turner, D.E., Helliwell, P.S., Emery, P., Woodburn, J. 2006. The impact of rheumatoid arthritis on foot function in the early stages of disease: a clinical case series. BMC Musculoskelet Disord, 7, 102.

[13] Karatepe, G.A., Günaydin, R., Adibelli, Z.H., Kaya, T., Duruöz, E. 2010. Foot deformities in patients with rheumatoid arthritis: the relationship with foot functions. Int J Rheum Dis, 13(2), 158-63.

[14] Stolt, M., Suhonen, R., Leino-Kilpi, H. 2017. Foot health in patients with rheumatoid arthritis-a scoping review. Rheumatol Int, 37(9), 1413-1422.

[15] Roos, E.M., Brandsson, M.D., Karlsson, J. 2001. Validation of the foot and ankle outcome score. Foot Ankle Int, 22, 788–794.

[16] Wewers, M.E., Lowe, N.K. 1990. A critical review of visual analogue scales in the measurement of clinical phenomena. Res Nurs Health, 13, 227-236.

[17] Fries, J.F., Spitz, P.W., Young, D.Y. 1982.The dimensions of health outcomes: the health assessment questionnaire, disability and pain scales. J Rheumatol, 9(5), 789-93.

[18] Cohen, J., Cohen, P., West, S.G., Aiken, L.S. 2013. Applied multiple regression/ correlation analysis for the behavioral sciences. Routledge.

[19] Wilson, O., Hewlett, S., Woodburn, J., Pollock, J., Kirwan, J. 2017. Prevalence, impact and care of foot problems in people with rheumatoid arthritis: results from a United Kingdom based crosssectional survey. J Foot Ankle Res, 10, 46.

[20] Katz, P.P. 1995. The impact of rheumatoid arthritis on life activities. Arthritis Care Res, 8(4), 272-8.

[21] Griffith, J., Carr, A. 2001. What is the impact of early rheumatoid arthritis on the individual? Best Pract Res Clin Rheumatol, 15(1), 77-90.

[22] Yano, K., Ikari, K., Inoue, E., Sakuma, Y., Mochizuki, T., Koenuma, N., et al. 2018. Features of patients with rheumatoid arthritis whose debut joint is a foot or ankle joint: A 5,479-case study from the IORRA cohort. PLoS One, 13(9), e0202427.

[23] Reinoso-Cobo, A., Gijon-Nogueron, G., Caliz-Caliz, R., Ferrer-Gonzalez, M.A., Vallejo-Velazquez, M.T., Morales-Asencio, M.J., et al. 2020. Foot health and quality of life in patients with rheumatoid arthritis: a cross-sectional study. BMJ Open, 10(5), e036903.

[24] Fazaa, A., Triki, W., Ouenniche, K., Sellami, M., Miladi, S., Souabni, L., et al. 2022. Assessment of the functional impact of foot involvement in patients with rheumatoid arthritis. Foot (Edinb), 52, 101907.

[25] Stolt, M., Kilkki, M., Katajisto, J., Suhonen, R. 2021. Self-assessed foot health in older people with rheumatoid arthritis-A cross-sectional study. Int J Older People Nurs, 16(4), e12380.

[26] Kaniewska, K., Kuryliszyn-Moskal, A., Hryniewicz, A., Moskal-Jasińska, D., Wojciuk, M., Dzięcioł-Anikiej, Z. 2022. Static Foot Disturbances and the Quality of Life of Older Person with Rheumatoid Arthritis. Int J Environ Res Public Health, 19(14), 8633.

[27] Khan, N.A., Yazici, Y., Calvo-Alen, J., Dadoniene, J., Gossec, L., Hansen, T.M., et al. 2009. Reevaluationof the role of duration of morning stiffness in the assess-ment of rheumatoid arthritis activity. J Rheumatol, 36, 2435–42.

[28] Yazici, Y., Pincus, T., Kautiainen, H., Sokka, T. 2004. Morningstiffness in patients with early rheumatoid arthritis is asso-ciated more strongly with functional disability than withjoint swelling and erythrocyte sedimentation rate. J Rheumatol, 31, 1723–6.

[29] Lindstrom, T., Robinson, W. 2010. Rheumatoid arthritis: A role for immunosenescence? J Am Geriatr Soc, 58, 1565–75.

[30] Baker, J.F., Von Feldt, J., Mostouf-Moab, S., Noaiseh, G., Taratuta, E., Kim, W., et al. 2014. Defcits in muscle mass, muscle density, and modifed associations with fat in rheumatoid arthritis. Arthritis Care Res, 66, 1612–1618.