

**Gonartrozda Klinik ve Radyolojik Uyum**  
**Clinical and Radiological Compatibility in Gonarthrosis**  
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**Özet**

**Amaç:** Bu çalışmanın amacı gonartrozu olan hastalarda semptomlar ve radyolojik derecelendirme sistemi arasındaki ilişkiyi değerlendirmektir.

**Hastalar ve yöntem:** Ocak 2012 ile Haziran 2013 tarihleri arasında primer gonartrozu olan hastalar prospektif olarak değerlendirildi. Kriterleri karşılayan 724 hastanın 512'si (%70,7) kadın, 212'si (%29,3) erkekti.Ortalama yaş 56 (35-79) yıl idi. Klinik değerlendirme için WOMAC skorlaması kullanıldı. Her iki diz yarı fleksiyonda ayakta yük alırken ön-arka, yan ve patella tanjansiyel röntgenleri çekildi ve Kellgren – Lawrence sınıflamasına göre derecelendirme yapıldı. Hastaların WOMAC skorları radyolojik derecelerine göre düzenlendi. Derece 1 derece 2 ile, derece 2 derece 3 ile ve derece 3 derece 4 ile karşılaştırıldı.Ayrıca ek görüntüleme çalışmaları ve önerilen tedavi seçenekleri not edildikten sonra Kellgren – Lawrence derecelerine göre dağılım hesaplandı.

**Bulgular:** Hastaların 89'u (%12.2) evre 1, 208'i (%28.7) evre 2, 256'sı (%35.3) evre 3 ve 171'i (%23.8) evre 4 idi. WOMAC puanlarına göre 1. ve 2. sınıf arasındaki fark istatistiksel olarak anlamlıydı (p=0.003). 2. ve 3. derece arasındaki fark anlamlı değildi (p=0.071). Aynı şekilde 3. ve 4. derece arasındaki fark anlamlı değildi (p=0.097). Ek görüntüleme çalışmaları MRI, tomografi ve sintigrafi olup; sunulan tedavi seçenekleri konservatif tedavi, artroskopi, tibial osteotomi, unikondiler diz artroplastisi ve total diz artroplastisi idi.

**Sonuç:** Tedavide karar vermede röntgen ve evreleme yeterli görünmemektedir. Ayrıca semptomlar ve radyolojik bulgular da dikkate alınmalıdır.

**Anahtar Kelimeler:** Gonartroz, klinik sonuçlar, görüntüleme

**Abstract**

**Objective:** The aim of this study was to evaluate the relationship between symptoms and radiologic grading system.

**Patients and Methods:** Patients with primary gonarthrosis between January 2012 and June 2013 were evaluated prospectively. 512 (70.7%) of 724 patients were women and 212 (29.3%) were men, who meet the criteria. Mean age was 56 (35-79). WOMAC total score was used for clinical evaluation. Both knees semiflexion weight bearing anteroposterior, lateral and patella tangential X-rays were obtained, then grading was made according to Kellgren – Lawrence classification. WOMAC scores of patients were arranged according to their radiologic grades. Grade 1 was compared with grade 2, grade 2 with 3 and grade 3 with 4. Also additional imaging studies and offered treatment choices were noted, then distribution according to Kellgren – Lawrence grades was calculated.

**Results:** 89 (%12.2) of patients were grade 1, 208 (%28.7) of patients were grade 2, 256 (%35.3) of patients were grade 3 and 171 (%23.8) of patients were grade 4. There was a significant difference between grade 1 and 2 according to WOMAC scores ( $p=0.003$ ). The difference between grade 2 and 3 was not significant ( $p=0.071$ ). The difference between grade 3 and 4 was not significant ( $p=0.097$ ). Additional imaging studies were MRI, tomography and scintigraphy. Offered treatment options were non operative, arthroscopy, tibial osteotomy, unicondylar knee arthroplasty and total knee arthroplasty.

**Conclusion:** X-rays and staging seems to be not enough for decision making in treatment. Also symptoms and radiological findings should be considered.

**Keywords:** gonarthrosis, clinical results, imaging

## Introduction

Gonarthrosis progresses with degeneration and loss of function in the joint cartilage. In terms of incidence, it ranks third after the spine and hip (1-4). Pain, stiffness, deformity, decreased range of motion, crepitus, locking and muscle weakness can be listed among the symptoms of gonarthrosis (5). X-ray radiography findings are focal narrowing of the joint space, marginal osteophyte, sclerosis, bone cysts, bone loss, deformity of the bone ends and malalignment.

Gonarthrosis treatment is usually planned considering the radiographic findings. Considering only radiographic findings in the selection of surgical treatment may cause serious mistakes. In addition to the radiographic findings, clinical findings and symptoms should also be considered (6).

In this study, clinical symptom-radiographic staging compatibility and recommended treatment options in gonarthrosis were evaluated.

## Patients and Methods

All patients diagnosed with knee osteoarthritis according to American Rheumatism Association (ACR) criteria between December 2019 and December

2020 in our hospital were evaluated prospectively.

While patients with primary osteoarthritis were included in the study; Patients with secondary osteoarthritis, systemic metabolic disease, other rheumatological diseases other than osteoarthritis with joint involvement, acute synovitis, a history of previous knee surgery, skeletal development problems and charcot joint were excluded from the study. 575 (68.2%) of 842 patients who met the criteria were female, while 267 (31.8%) were male. Average age was 57 (35-79). In addition to clinical examination findings, WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index) scoring was performed in all patients under outpatient clinic conditions, and WOMAC total score was used in the analyzes. Radiologically, both knees were pressed in semiflexion and anteroposterior and lateral radiographs and tangential patella radiographs were taken. Graphs were evaluated in computer environment using the hospital's existing imaging software and radiographic staging was done according to Kellgren - Lawrence Classification. The distribution of the patients in all 4 stages of the classification was made according to the WOMAC score, and stage 1 and 2, stage 2 and 3, and stage 3 and 4 were compared.

In addition, additional examinations and treatments applied to the patients in their further follow-up were recorded and their distribution was calculated according to the Kellgren and Lawrence Classification.

Statistical analyzes were performed using SPSS (Statistical Package for Social Sciences, SPSS Inc., Chicago, IL, United States) ver 16.0 package program. Statistical significance limit (p) was set at 0.05. Student's t test, Pearson and Spearman tests were used for analysis.

## Results

A total of 118 patients, 63 women and 55 men, were excluded from the study because they did not continue their follow-up. The mean age of the 724 patients included in the evaluation was 56 (35-79); 512 (70.7%) patients were female and 212 (29.3%) patients were male. 89 of the patients (12.2%) were stage I, 208 (28.7%) were stage II, 256 (35.3%) and 171 (23.8%) were stage IV. The mean WOMAC score of the patients in stage I

was  $84.4 \pm 17.2$ , the patients in stage II were  $75.8 \pm 19.4$ , the patients in stage III were  $71.8 \pm 21.8$ , and the patients in stage IV were  $68.8 \pm 19.4$ . In statistical comparison, there was a significant difference in WOMAC score between stages I and II ( $p = 0.003$ ). The difference between stage II and III was not statistically significant ( $p = 0.071$ ). The difference between stages III and IV was also not significant ( $p = 0.097$ ) (Table 1).

In addition to the X-ray requested at the first examination, additional examinations performed due to unresolved symptoms at the first examination or at the follow-up were magnetic resonance imaging, computed tomography and scintigraphy (Table 2).

Treatment options recommended at the first admission or follow-up of the patients were non-surgical, arthroscopy, tibial osteotomy, unicondylar knee arthroplasty, and total knee arthroplasty (Table 3).

**Table 1:** Distribution of the patients in terms of WOMAC scores and Kellgren-Lawrence stages

Stage	Patients	WOMAC Score (Mean)
I	89	$81.4 \pm 17.2$
II	208	$72.8 \pm 19.4$
III	256	$68.4 \pm 21.8$
IV	171	$70.6 \pm 19.4$

**Table 2:** Distribution of additional examinations requested by patients according to stages

Stage	MRI	CT Scan	Scintigraphy
I	%37.3	%5.4	-
II	%21.3	%4,6	-
III	%19.2	%4,7	%1.9
IV	%2.6	-	-

**Table 3:** Distribution of the treatments recommended to the patients according to the stages

Stage	Non-Surgical*	Arthroscopy**	Tibial Osteotomy	Unicondylar Knee Arthroplasty	Total Knee Arthroplasty
I	%92.4	%28.2	%4.4	-	-
II	%92.6	%23.7	%2.9	%34.7	%38.7
III	%94.4	%26.5	%3.6	%29.4	%40.5
IV	%86.3	-	-	-	%74.8

\*NSAID ± Weight loss ± Physical Therapy ± Brace ± Intraarticular injections

\*\*Debridement ± Chondroplasty

## Discussion

Plain radiographs are traditional methods for determining structural radiographic changes in gonarthrosis. There are many studies examining the compatibility of the Kellgren-Lawrence system, which is the most commonly used staging system in radiological evaluation, with clinical disease. In the study

conducted by Duncan et al. In 2007, it was reported that radiographic findings and clinical symptoms were correlated (7). Dowsey et al. and Neogi et al. published studies containing similar inferences (8, 9).

There are also publications reporting that radiological findings are not related to the severity of pain and loss of function. In the study conducted by

Çubukçu et al. In 2012, it was suggested that gonarthrosis treatment should be planned according to clinical symptoms instead of radiological findings (10). Sanghi et al. and Özçakır et al. They also made similar inferences with similar studies (11, 12). Although gonarthrosis is classified according to radiological findings in most studies; It is emphasized that the radiological changes and symptoms are not compatible. In the literature, there is not a clear study about which radiological finding causes what kind of symptom, and there is no study about whether there are clinical findings specific to the radiological stages. Moreover, the fact that the same clinical symptoms can be seen in knees at different radiological stages can cause confusion in treatment selection.

According to our findings, direct radiography and staging do not seem sufficient to decide on treatment in gonarthrosis. This is supported by the diversity of the treatments applied in stages II and III and the additional examinations requested, and the fact that the treatment can be different even in patients at the same stage. However, the treatment approach seems almost standard in stage I and IV. Therefore, especially in the planning of treatment in stage II and III; In addition to staging, we think that

symptoms and radiological findings (cyst, osteophyte, location of cartilage lesion, meniscal pathology, bone edema and malalignment problems) should be considered.

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