



ORIGINAL RESEARCH

CLINICAL AND RADIOGRAPHIC (CBCT) FEATURES OF TMJ IN RELATION TO DISEASE ACTIVITY AND DURATION IN RHEUMATOID ARTHRITIS, ANKYLOSING SPONDYLITIS PATIENT

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Abstract

Background: Rheumatoid arthritis (RA) is an immune-mediated inflammatory condition that involves the symmetrical joints, and 50% of them exhibit TMJ involvement. Ankylosing spondylitis is a chronic systemic inflammatory disorder primarily affecting the axial skeleton. Disease activity of RA was measured by the combined index of dass (28) and for AS by the index of ASDAS. The Helkimo index is a validated metric for evaluating temporomandibular disorders (TMD) within a defined population.

The study aimed to assess TMJ involvement in RA and AS affection about the clinical, and radiological changes of TMJ by CBCT, to Determine osteo-arthritic changes of TMJ about disease activity index.

Materials and Methods: This study used a cross-sectional design involving 31 patients (21 with RA, 10 with AS) we examined the TMJ using helkimo index then we figured out the disease severity by using dass (28), ASDAS and radiographic changes in TMJ, using CBCT.

Results: About the helkimo index of TMPD, the majority (70%) of AS patients had fatigue in the joint, compared with 23.8% of the RA patients. No significant differences were detected between the two groups of patients about joint sound, morning rigidity difficulty in the opening, locked mandible in the opening, and muscle pain, about all the CBCT findings, and anamnestic symptoms and these factors: age, disease duration, and disease activity scale (DAS28). The same can be applied to the AS group, where no significant association was detected with age, disease duration, and ASDAS.

Conclusion: About the helkimo index, anamnestic results mild cases were less than severe in RA patients but in AS mild cases were more than the sever. Clinical dysfunction severe cases were more in RA just like the AS Patients. CBCT shows no significant differences between two groups of patients.

Keywords: Ankylosing Spondylitis; Cone-Beam Computed Tomography; Disease Activity Score (DASS 28, ASDAS); Helkimo Index; Rheumatoid Arthritis; Temporomandibular Joint.

INTRODUCTION

The glenoid fossa of the squamous part of the temporal bone and the mandibular condyle creates the articular surfaces of the temporomandibular joint (TMJ), a diarthrodial joint¹. Rheumatoid arthritis (RA) is an immune-mediated inflammatory disorder. The condition changes symmetrical joints, resulting in swelling, warmth, and functional restriction, pain is a persistent symptom²⁻³, 1–1.5% of the global population is afflicted by one of the most common autoimmune disorders (4–8). The joints most often

affected by RA are the hands, wrists, elbows, shoulders, hips, knees, and feet; other joints, such as the TMJ, are less commonly engaged. TMJ involvement is clinically seen in 4–80% of RA patients, exceeding 50% among them (9). According to standard TMJ radiographs, between 19% and 86% of RA patients had morphologic changes¹⁰. The axial skeleton is the primary target of ankylosing spondylitis (AS), a chronic systemic inflammatory disease. Involvement of the peripheral joints is rarely persistent or erosive. The involvement of the TMJ in patients with AS has been previously

documented, the reported frequency ranges from 11% to 35%, depending on the diagnostic criteria, the examined population, and the assessment processes employed for TMJ involvement.¹ DAS (28) is a composite score showed in the 1980s to assess disease activity in individuals with rheumatoid arthritis (RA). It has been thoroughly confirmed for application in clinical studies alongside the EULAR response criteria.¹² (ASDAS) is an index used to assess disease activity in (AS)¹³. A reliable index for evaluating TMD in a particular community is the Helkimo index. Since there are no numerical parameters to figure out the degree of severity of TMD, indices are crucial in figuring out how common the disorder is in a particular region. Helkimo's index was further subdivided into occlusal dysfunction, clinical, and anamnesis¹⁴. The use of CBCT to find irregularities in the dental field is prevalent, and its consistency in finding early degenerative changes of the TMJ has been described widely¹⁵. CBCT is an imaging technique that provides volumetric, surface, and sectional information about TMJ RA in all three dimensions. CBCT has high motion detectability, high sensitivity, high specificity, and more details¹⁶. The study aimed to assess TMJ involvement in RA and AS affection about the clinical and radiological changes of TMJ by CBCT, to determine osteo-arthritic changes of TMJ about disease activity index.

MATERIAL AND METHODS

This cross-Sectional (Clinical study) was performed on 31 patients, 21 patients with R.A and 10 patients with AS. The study was conducted at Hawler Teaching Hospital Rheumatoid Department in Erbil City from December 2022 - 2023. The study was approved by Ethics and Scientific Committee of Research Ethics at Kurdistan Higher Council of Medical Specialties. Each patient was informed about this study and given verbal and written consent.

Inclusion criteria: Patients that they are diagnosed as RA AS according to EULAR, the age of the patient must be between (20-70) years. Exclusion criteria: Pregnancy, patient must not have any malignant disease, other bone disease or taking bisphosphonates. Clinical examination: Helkimo index is a reliable tool for evaluating temporomandibular disorders in an identified group. Questionnaires for the anamnestic component include asking the patients specific questions and summarizing the results. Clinical dysfunction component includes clinical check for the patients and calculate the results¹⁴.

(DAS28, ASDAS) was obtained from the rheumatologist on the same day of the TMJ examination. Comparison of the DAS28-CRP and

DAS28-ESR in patients with rheumatoid arthritis. Disease activity indicators and enhanced discriminative capacity in distinguishing patients with diverse disease activity levels and various degrees of change¹³. Which contains a questionnaire¹⁷.

CBCT scans were conducted using the PaX-i3D Smart (PHT-30LFO), a computed tomography x-ray system designed to generate panoramic, cephalometric, or cross-sectional images of oral anatomy in real-time through computer reconstruction of x-ray image data bought from the same axial plane at various angles.

(a) Osseous changes of the condyles:

1- Flattening is characterized by a planar bone contour that diverges from the convex shape. 2-erosion (characterized as a region of diminished density in the cortical bone and the contiguous subcortical bone), 3-osteophytes (marginal bony outgrowths on the condyle), 4-sclerosis (an area of increased density in cortical bone spreading into the bone marrow), 5-subchondral cyst (partial loss of the condylar head).

Erosion severity has been identified as grade 0 (no erosion), grade 1 (mild erosion, with diminished density merely in cortical bone), grade 2 (moderate erosion evident in cortical bone and penetrating into the upper layer of subcortical bone), or grade 3 (severe erosion with diminished density in cortical bone and extending underneath the upper layer of adjacent subcortical bone).

(b) Osseous changes of the mandibular fossae: defined as 1-erosion, 2-sclerosis, and 3-resorption.

(c) The joint space was (1) larger when the distance between the condylar head and mandibular fossa was greater than 4 mm, (2) regular when the distance was between 1.5 and 4 mm, (3) decreased when the distance was less than 1.5 mm, and (4) bony contact between the condyle and mandibular fossa. The measurement tool included in the CBCT program was used to do the measurements on lateral slices at the subjectively closest distance between the condyle and mandibular fossa¹⁸.

RESULTS

Twenty-one patients with rheumatoid arthritis (RA) were included in the study. Their mean age (SD) was 53.7 (13.1) years, and the largest proportion of them (38.1%) were aged 50-59 years. Around half (52.4%) were males. The disease duration was less than five years in 38.1% of the patients. Ten patients with ankylosing spondylitis (AS) were also included in the study. Their mean age (SD) was 51.8 (16.9) years, and 40% of them were aged ≥ 60 years. No significant differences were detected between these two groups of patients about age, gender, and duration of the disease, as presented in Table 1.

Table 1. Basic characteristics of patients.

Table 1. Basic characteristics of patients.

	Rheumatoid arthritis		Ankylosing spondylitis		p-value
	No.	(%)	No.	(%)	
Age (years)					
< 40	4	(19.0)	3	(30.0)	
40-49	3	(14.3)	2	(20.0)	
50-59	8	(38.1)	1	(10.0)	
≥ 60	6	(28.6)	4	(40.0)	0.474*
Mean (SD)	53.7	(13.1)	51.8	(16.9)	0.731**
Gender					
Male	11	(52.4)	2	(20.0)	
Female	10	(47.6)	8	(80.0)	0.129*
Duration of the disease (years)					
< 5	8	(38.1)	3	(30.0)	
5-9	7	(33.3)	1	(10.0)	
10-14	3	(14.3)	2	(20.0)	
15-20	3	(14.3)	4	(40.0)	0.314*
Total	21	(100.0)	10	(100.0)	

*Calculated by Fisher's exact test. **Calculated by unpaired t-test.

Considering the anamnestic component of Helkimo index, the majority (70%) of AS patients had fatigue in the joint, compared with 23.8% of the RA patients. No significant differences were detected between the two groups of patients regarding joint sound morning rigidity difficulty in the opening, locked mandible in the opening, and muscle pain. Other details are presented in Table 2. About the clinical part, the mouth opening of 19.4% of patients was < 3 mm, but the difference was not significant between the two groups. The mandibular deviation in opening was > 5 mm in 30% of the AS group, compared with 0% in the RA group, while the deviation of 2-5 mm was found in 23.8% of the RA group, compared with 0% of the AS group ($p = 0.012$). Evident TMJ clicking was found in 12.9% of patients but the difference was not significant between the groups. Around one-third (30%) of AS patients had palpebral reflux, compared with 0% of the RA patients. About muscle pain examination, 20% of the AS patients had palpebral reflux, compared with 0% among the RA patients. More details are presented in Table 2.

Table 2. Anamnestic Helkimo index by type of disease.

	RA (n = 21)	AS (n = 10)	Total	
	No. (%)	No. (%)	No. (%)	p-value*
<u>Anamnestic component</u>				
Joint sound	6 (28.6)	6 (60.0)	12 (38.7)	0.127
Morning rigidity	6 (28.6)	6 (60.0)	12 (38.7)	0.127
Fatigue in the joint	5 (23.8)	7 (70.0)	12 (38.7)	0.021
Difficulty in opening	4 (19.0)	3 (30.0)	7 (22.6)	0.652
Locked mandible in opening	3 (14.3)	0 (0.0)	3 (9.7)	0.533
Muscle pain	4 (19.0)	2 (20.0)	6 (19.4)	1.000
<u>Clinical dysfunction component</u>				
Mouth opening (mm)				
≥ 40	17 (81.0)	6 (60.0)	23 (74.2)	
30-39	0 (0.0)	2 (20.0)	2 (6.5)	
< 30	4 (19.0)	2 (20.0)	6 (19.4)	0.187
Mandibular deviation in opening (mm)				
< 2	16 (76.2)	7 (70.0)	23 (74.2)	
2-5	5 (23.8)	0 (0.0)	5 (16.1)	
> 5	0 (0.0)	3 (30.0)	3 (9.7)	0.012
TMJ dysfunction				
No clicking	16 (76.2)	7 (70.0)	23 (74.2)	
Palpable clicking	1 (4.8)	3 (30.0)	4 (12.9)	
Evident clicking	4 (19.0)	0 (0.0)	4 (12.9)	0.097
TMJ pain				

No pain	16 (76.2)	6 (60.0)	22 (71.0)	0.042
Pain on palpation	5 (23.8)	1 (10.0)	6 (19.4)	
Palpebral reflux	0 (0.0)	3 (30.0)	3 (9.7)	
Muscle pain examination				
No pain	16 (76.2)	8 (80.0)	24 (77.4)	0.054
Pain on palpation	5 (23.8)	0 (0.0)	5 (16.1)	
Palpebral reflux	0 (0.0)	2 (20.0)	2 (6.5)	
Total	21 (100.0)	10 (100.0)	31 (100.0)	

*Calculated by Fisher's exact test.

No significant differences were detected between the two groups of patients about the clinical dysfunction score, and the anamnestic symptoms, as presented in Table 3.

Table 3. Anamnestic symptoms and clinical dysfunction among patients with rheumatoid arthritis (RA) and ankylosing spondylitis (AS).

Ankylosing spondylitis (AS):				
	RA	AS	Total	P Value*
Clinical dysfunction Score				
0 (No dysfunction)	15 (71.4)	5 (50.0)	20 (64.5)	0.541
1-4 (Mild)	2 (9.5)	2 (20.0)	4 (12.9)	
10-25 (Severe)	4 (19.0)	3 (30.0)	7 (22.6)	
Anamnestic Symptoms				
No symptoms	12 (57.1)	2 (20.0)	14 (45.2)	0.104
Mild symptoms	4 (19.0)	5 (50.0)	9 (29.0)	
Severe symptoms	5 (23.8)	3 (30.0)	8 (25.8)	
Total	21 (100.0)	10 (100.0)	31 (100.0)	

*Calculated by Fisher's exact test.

No significant differences were detected between the two groups of patients about all the CBCT findings, as presented in Table 4. The most frequent feature is the erosion as shown in figure 1. And the osteophytes as shown in figure 2.

Table 4. CBCT findings.

	RA (n = 21)	AS (n = 10)	Total	P-Value*
Flattening	12 (57.1)	6 (60.0)	18 (58.1)	1.000
Subchondral cyst	3 (14.3)	1 (10.0)	4 (12.9)	1.000
Condyle erosion				
No erosion	3 (14.3)	1 (10.0)	4 (12.9)	0.609
Slight	14 (66.7)	5 (50.0)	19 (61.3)	
Moderate	3 (14.3)	3 (30.0)	6 (19.4)	
Extensive	1 (4.8)	1 (10.0)	2 (6.5)	0.609
Osteophyte	8 (38.1)	5 (50.0)	13 (41.9)	0.701
Sclerosis	15 (71.4)	5 (50.0)	20 (64.5)	0.423
Articular eminence erosion	11 (52.4)	5 (50.0)	16 (51.6)	1.000
Joint Space (Right)				
Reduced (<1.5 mm)	2 (9.5)	0 (0.0)	2 (6.5)	0.621
Normal (1.5-4 mm)	17 (81.0)	8 (80.0)	25 (80.6)	
Increased (>4 mm)	2 (9.5)	2 (20.0)	4 (12.9)	
Joint Space (Left)				
Reduced (<1.5 mm)	2 (9.5)	0 (0.0)	2 (6.5)	0.621
Normal (1.5-4 mm)	17 (81.0)	8 (80.0)	25 (80.6)	
Increased (>4 mm)	2 (9.5)	2 (20.0)	4 (12.9)	
Total	21 (100.0)	10 (100.0)	31 (100.0)	

*Calculated by Fisher's exact test. N/A: Not applicable.

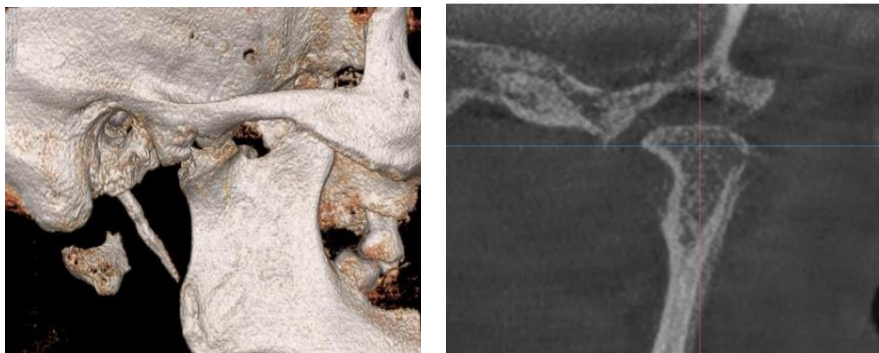


Figure 1. showing the severe erosion in the condyle

Figure 2. showing the osteophyte formation on the condyle

In the RA group, no significant association was detected between the anamnestic symptoms and these factors: age, disease duration and disease activity scale (DAS28). The same can be applied to the AS group, where no significant association was detected with age, disease duration and ASDAS, as presented in Table 5.

Table 5. Anamnestic Symptoms by age and disease duration in each of the studied groups.

	Anamnestic symptoms				
	None	Mild	Severe	Total	p-value*
<u>Rheumatoid arthritis</u>					
Age					
<40	1 (25.0)	1 (25.0)	2 (50.0)	4 (100.0)	0.728
40-49	3 (100.0)	0 (0.0)	0 (0.0)	3 (100.0)	
50-59	4 (50.0)	2 (25.0)	2 (25.0)	8 (100.0)	
≥ 60	4 (66.7)	1 (16.7)	1 (16.7)	6 (100.0)	
Disease duration (years)					
<5	5 (62.5)	3 (37.5)	0 (0.0)	8 (100.0)	0.330
5-9	4 (57.1)	1 (14.3)	2 (28.6)	7 (100.0)	
10-14	1 (33.3)	0 (0.0)	2 (66.7)	3 (100.0)	
15-20	2 (66.7)	0 (0.0)	1 (33.3)	3 (100.0)	
DAS 28					
Low severity	11 (68.8)	2 (12.5)	3 (18.8)	16 (100.0)	0.126
Moderate severity	1 (20.0)	2 (40.0)	2 (40.0)	5 (100.0)	
Total	12 (57.1)	4 (19.0)	5 (23.8)	21 (100.0)	
<u>Ankylosing spondylitis</u>					
Age (years)					
<40	1 (33.3)	1 (33.3)	1 (33.3)	3 (100.0)	0.629
40-49	0 (0.0)	1 (50.0)	1 (50.0)	2 (100.0)	
50-59	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	
≥ 60	1 (25.0)	3 (75.0)	0 (0.0)	4 (100.0)	
Disease duration (years)					
<5	2 (66.7)	1 (33.3)	0 (0.0)	3 (100.0)	0.338
5-9	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	
10-14	0 (0.0)	1 (50.0)	1 (50.0)	2 (100.0)	
15-20	0 (0.0)	3 (75.0)	1 (25.0)	4 (100.0)	
ASDAS					
Low	2 (40.0)	2 (40.0)	1 (20.0)	5 (100.0)	0.524
High	0 (0.0)	3 (60.0)	2 (40.0)	5 (100.0)	
Total	2 (20.0)	5 (50.0)	3 (30.0)	10 (100.0)	

*Calculated by Fisher's exact test.

Table 6. Clinical dysfunction by age and disease duration in each of the studied groups

	Clinical dysfunction				
	None	Mild	Severe	Total	p-value*
	No. (%)	No. (%)	No. (%)	No. (%)	
<u>Rheumatoid Arthritis</u>					
Age					
<40	2 (50.0)	1 (25.0)	1 (25.0)	4 (100.0)	0.570
40-49	2 (66.7)	1 (33.3)	0 (0.0)	3 (100.0)	
50-59	6 (75.0)	0 (0.0)	2 (25.0)	8 (100.0)	
≥ 60	5 (83.3)	0 (0.0)	1 (16.7)	6 (100.0)	
Disease Duration in Years					
<5	8 (100.0)	0 (0.0)	0 (0.0)	8 (100.0)	0.153
5-9	4 (57.1)	1 (14.3)	2 (28.6)	7 (100.0)	
10-14	1 (33.3)	1 (33.3)	1 (33.3)	3 (100.0)	
15-20	2 (66.7)	0 (0.0)	1 (33.3)	3 (100.0)	
DAS28					
Low Severity	12 (75.0)	2 (12.5)	2 (12.5)	16 (100.0)	0.405
Moderate Severity	3 (60.0)	0 (0.0)	2 (40.0)	5 (100.0)	
Total	15 (71.4)	2 (9.5)	4 (19.0)	21 (100.0)	
<u>Ankylosing Spondylitis</u>					
Age					
<40	2 (66.7)	0 (0.0)	1 (33.3)	3 (100.0)	0.338
40-49	0 (0.0)	1 (50.0)	1 (50.0)	2 (100.0)	
50-59	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	
≥ 60	3 (75.0)	1 (25.0)	0 (0.0)	4 (100.0)	
Disease Duration in Years					
<5	2 (66.7)	1 (33.3)	0 (0.0)	3 (100.0)	0.943
5-9	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	
10-14	1 (50.0)	0 (0.0)	1 (50.0)	2 (100.0)	
15-20	2 (50.0)	1 (25.0)	1 (25.0)	4 (100.0)	
ASDAS					
Low	2 (40.0)	2 (40.0)	1 (20.0)	5 (100.0)	0.524
High	3 (60.0)	0 (0.0)	2 (40.0)	5 (100.0)	
Total	5 (50.0)	2 (20.0)	3 (30.0)	10 (100.0)	

*Calculated by Fisher's exact test.

DISCUSSION

The purpose of this study was to assess radiographic alterations in the temporomandibular joint (TMJ) area in individuals suffering from ankylosing spondylitis (AS) and rheumatoid arthritis (RA). Additionally, the Helkimo Index was used to evaluate clinical dysfunction and anamnestic components, compare these findings, and examine the outcomes of disease activity and duration. Half of the 21 RA patients who took part were male, and the majority were between the ages of 50 and 59. 10 AS patients were also included; their average age was 51.8 years. Most of them were women, and 40% were over 60. Since many female patients were unable to travel for X-rays because of the distance from the rheumatologist's clinic, there were less RA patients in the study. On the other hand, more female AS patients took part since they were actively looking for a diagnosis and treatment and had clinical symptoms such clicking and pain in the TMJ area. Our study found that 23% of patients with rheumatoid arthritis (RA) had severe anamnestic symptoms, 19% had mild symptoms, and 57.1% had no symptoms at all. These results contrast with other studies⁽¹⁹⁾ that found that 45.7% of patients experienced moderate to severe symptoms, 50% had mild symptoms, and just 4.3% were dysfunction-free. The subjective character of symptom reporting—which depends on the patient's self-evaluation—is the cause of this disparity. We also found that 19% of cases were categorized as severe based on the clinical dysfunction part, most patients showed either no symptoms or mild symptoms. These results are consistent with earlier research by Suzana¹⁹. This is since the evaluation is dependent on the practitioner's application, which yields a more correct assessment. AS has not been the subject of any prior research. nevertheless, since the Helkimo Index shows that overall clinical involvement was according to the anamnestic part for RA patients 42.8% and 80% for AS. As for the clinical dysfunction score 28.5% in RA and 50% in AS patients this involves all the patient that have mild, moderate to severe which showed elevated scores in AS in both results.

Furthermore, only one side of the joint was taken into consideration for differentiation because the CBCT analysis revealed no discernible difference between the left and right sides. According to RA patients' condylar erosion was the most frequent CBCT imaging observation in 85.8% of our study's cases. Different numbers were recorded in earlier studies 67% in Sulaimania²³, 85% in another Egyptian study from 2018²², and 40% in an Egyptian survey from 2020²¹. In contrast we found 57% had condylar flattening earlier studies reported greater rates—80%²¹, 89%²², and 65%²³, respectively and subchondral cysts were detected in 14.3% of our cases, compare to greater incidence of 65%, 32%, and 17% in another research²¹⁻²³.

The 38% of our cases had osteophytes, compared to 32% in the prior study⁽²²⁾, and 65% in another investigation⁽²¹⁾. In contrast to a prior study that found articular eminence degradation in 30% of instances⁽²¹⁾, our investigation found it in 52% of cases. Differences in patient profiles are the cause of this disparity. Our study included patients with a range of disease activity levels, while the Egyptian study from 2020⁽²¹⁾ focused on cases that were under control, had modest clinical symptoms, and had a light- to-moderate Disease Activity Score (DAS). Our results, however, are more in line with the 2018 Egyptian study which similarly found that many cases had mild to severe symptoms.

One significant difference between our work and others is that, unlike other research, we tried to assess joint space. On the other hand, one study examined condylar form. Furthermore, our study focused on articular eminence degradation, something that was only covered in one earlier study. According to our analysis of osseous alterations in ankylosing spondylitis (AS), 90% of patients had erosion of some kind, with 50% having mild erosion and the rest instances being moderate to severe. A prior study, however, found that erosion was only 9%. Furthermore, in contrast to Cesar's findings, 50% of our AS patients showed osteophytes, although in another study, this trait was seen in just 3% of cases in our study flattening was 60% other study was 21.5 our study sclerosis was 50% but other study was 25%⁽²⁰⁾. The use of a more sophisticated CBCT equipment, which enables better diagnosis of osteophytes and erosion, is the cause of this disparity. Our results, however, are consistent with recent research that shows sclerosis and flattening are frequent osteoarthritic alterations in AS patients. When comparing the CBCT results between AS and RA, we could not find any statistically significant differences. Subchondral cysts and sclerosis were more common in RA cases, but condylar flattening, erosion, and articular eminence erosion were slightly more common in AS cases. 80% of the RA and AS cases in our study had standard joint space on both sides.

About the relationship between the Helkimo Index's clinical dysfunction and anamnestic symptoms and age, disease duration, and the Disease Activity Scale (DAS28 in RA and ASDAS in AS), no discernible correlation was found. However, as was also seen in AS cases, most patients had mild to moderate DAS28 scores, because of being on medication and having their illness under control. The highest disease duration was less than 20 years, and no severe cases were documented in AS patients older than 60. 25% of these instances were considered serious. TMJ involvement is a late manifestation in both disorders, as showed by the fact that 60% of individuals with high ASDAS scores had no TMJ involvement and 40% had severe symptoms.

CONCLUSION

About the Helkimo index, anamnestic results showed mild cases were less than severe cases in RA patients, but in AS, mild cases were more than severe. Clinical dysfunction cases were more common in RA, just like the AS patients. No significant differences were detected between the two groups of patients despite some raised fatigue and pain percentages in AS regarding CBCT. No significant differences were found between the two groups of patients in all the results. However, AS patients showed more flattening erosion osteophyte formation, while the other results were lower; even with this slight difference, the joint space was normal in both groups; in the RA and AS groups, there was no significant link between the past symptoms and factors like age, how long they had the disease, and the disease activity scale.

DECLARATION

Ethical Approval

The study was approved by the Institutional Ethics Committee. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Informed Consent

Written informed consent was obtained from all participants included in the study.

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Conflict of Interest Statement

The authors declare no conflicts of interest related to this study.

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