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COMPARISON OF CLINICAL FINDINGS WITH THE RADIOGRAPHICS IN TEMPOROMANDIBULAR DYSFUNCTION IN PATIENTS WITH RHEUMATOID ARTHRITIS

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ABSTRACT

Objective: To compare the clinical findings using the Fonseca and Helkimo indices with panoramic radiographic findings in patients with and without a diagnosis of rheumatoid arthritis. **Materials and methods:** The research was approved by the ethics committee in research with the number 2.234.767, composed of 30 patients. The patients were divided into three groups, two of which were: rheumatoid arthritis patients using biological drugs (n = 9) or synthetic drugs (n = 13) and control group (n = 8). The Fonseca and Helkimo questionnaires were applied and panoramic radiographic examination was also performed. **Results:** The percentage of patients with rheumatoid arthritis of the female gender was 90.9% and male 9.1%, with the age group between 41-60 years. There were no statistical differences in the radiographic variables and TMDs severity among the groups analyzed, but the Helkimo index was higher in the group with arthritis compared to the control group. Regarding the type of droug for rheumatoid arthritis, there were no statistical differences in relation to clinical and radiographic findings. **Conclusion:** Patients with a diagnosis of rheumatoid arthritis had higher degrees in the Helkimo index and the type of medication for rheumatoid arthritis did not influence radiographic and clinical findings.

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INTRODUCTION

Rheumatoid arthritis (RA) can be conceptualized as an inflammatory, systemic, autoimmune pathology and does not have a properly defined cause yet (Moen *et al.,* 2005) and (Mota *et al.,* 2012). Its main characteristic is the symmetrical and bilateral manifestation in the form of synovial polyarthritis affecting multiple joints, commonly the peripheral joints. It is characterized by an inflammation that affects the synovial membrane, causing hyperplasias, thus leading to deformities and destruction due to bone and cartilaginous erosion (Mota *et al*., 2012), (Torres *et al*., 2010), (Aliko *et al.,* 2011) and (Delantoni *et al*., 2006). The primary manifestations are characterized by developing abnormalities in structure and function of synovial joints (Yilmaz *et al*., 2011), with a predilection for the female sex (Laurindo *et al.,* 2004) and (Malliari *et al*., 2015). Temporomandibular Joint (TMJ), as well as any synovial joint, can be affected by RA. The involvement of TMJ in patients with RA was first reported in 1874 by Garrod (Aliko *et al*., 2011), and it was not usually the first joint involved (Malliari *et al.,* 2015). According to Helenius *et al*. (2006) and Lin *et al*. (2007), the frequency of TMJ involvement in RA varies from 2% to 88%, depending on the diagnostic criteria, the population studied and the resources available for ATM evaluation. However, the magnitude of joint involvement is closely associated with RA severity. Several clinical and radiographic abnormalities of TMJ can be observed in the RA population. Among the clinical alterations of TMJ, edema, stiffness when opening the mouth and at dawn, fatigue of the masticatory muscles with reduction of bite force are highlighted. Also, articular noises (clicks and crackling), reduced joint function, midline deviation during mouth opening and closing movements, and subluxation

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(Aliko *et al*., 2011), (Yilmaz *et al.,* 2011), (Lin *et al.,* 2007), (Atsu e Ayhan-Ardic, 2006), (Helenius *et al*., 2005), (Sasaguri *et al.,* 2009) and (Chalmers e Blair, 1973). Other common symptoms are ear, head and myofascial pain, restrictions during chewing and swallowing, reduced mobility of the mandible and occlusal problems (Delantoni, 2006) and (Mehra *et al.,* 2009), being determined by periods of exacerbation and remission. (Atsu and Ayhan-Ardic, 2006).

The radiographic findings of the TMJ of patients with RA are not perceptible in the early stages of the disease, becoming more evident with its progression (Klasser *et al.,* 2007), especially condylar erosion, mandibular cysts, synovial proliferation and joint effusion.In addition, there is a reduction of joint space, destruction of joint eminence, joint fossa and disc, bone sclerosis, formation of osteophytes and extreme condyle loss or flattening of the condyle (Yilmaz *et al*., 2011) and (Mehra *et al.,* 2009).The progression of the pathology may cause TMJ fibrosis and ankylosis (Mehra *et al.,* 2009) and (Saeed *et al.,* 2001). The drugs commonly used for RA therapy are the non-steroidal anti-inflammatory drugs (NSAIDs), glucocorticoids (CGs), immunobiological agents and the synthetic and biological disease course modifying antirheumatic drugs (DMARD) (Goeldner *et al.,* 2011), where Passos (2016) reports that the latter has action in the cells of the immune system, capable of inducing remission of the disease in the medium to long term. (Disease-modifying antirheumatic drugs). To assess the severity of TMD signs and symptoms, several tools are used, such as questionnaires and anamnestic and clinical indices. Chaves *et al.* (2008) present the Fonseca Questionnaire and Anamnestic Index and Helkimo Index that allow this evaluation and gradation of the TMD. The objective of this study was to compare the clinical findings through the Fonseca and Helkimo indices with the panoramic radiographic findings in patients with rheumatoid arthritis in treatment with a biological or synthetic medication and the control group composed of patients without a diagnosis of rheumatoid arthritis.

MATERIALS AND METHODS

This study respected the ethical principles according to Resolution 466/12 of the National Health Council, and was approved by the Research Ethics Committee, with CAAE number: 72679117.5.0000.5578 and opinion: 2.234.767. This research is descriptive / observational and analytical nature, following a cross-sectional design involving a medical condition (RA) of patients receiving treatment with synthetic and biological DMARDs and a dental state (TMD). The first stage of the research was carried out in the specialized component of pharmaceutical assistance in the Vitória da Conquista-Bahia region, where a socio-demographic questionnaire was applied and the second stage of the evaluation was performed at the dentistry clinic of the Faculdade Independe do Nordeste (FAINOR) through of clinical evaluation and radiographic examination (panoramic radiography).

The study population consisted of 94 patients and after evaluation of the inclusion and exclusion criteria there were 30 patients, 22 of whom had RA, of which 9 had a biological medication and 13 had a synthetic medication and 8 had a control group without a diagnosis of AIR. The inclusion criteria encompassed individuals female and male, over the age of18 years, diagnosed with RA (ICDs: M05.0, M05.3, M05.8, M06.0, M06.8, M05.1, M05.2 and M08.0) and who signed the informed consent form. Individuals who did not accept clinical and / or radiographic evaluation were excluded. For the data collection mechanism, a structured datasheet was developed to obtain sociodemographic data in addition to the application of the Fonseca (and Helkimo indexes, both validated by the literature (Chaves *et al*., 2008). The datasheet was applied by a previously calibrated researcher. For each of the options present in Fonseca questionnaire they are determined three answers (yes, no, sometimes) for which are pre-established three scores (10, 0 and 5 respectively). With the sum of the points found, an anamnestic index was obtained which allowed the participants to be classified into categories of symptom severity: without TMD (0 to 15 points), mild TMD (20 to 45 points), moderate TMD (50 to 65) and Severe TMD (70 to 100 points). The Helkimo Index analyzes items such as consequences on range of motion, TMJ dysfunction, muscle pain, TMJ pain, and pain during mandibular movement. Each of these items have 3 scores categories. The scores were added to obtain results used to classify the TMD in: no dysfunction (index 0), mild dysfunction (index 1), moderate dysfunction (index 2) and severe dysfunction (indexes 3,4, and 5).

In the radiographic evaluation, a panoramic radiograph was performed and was later analyzed by a single researcher, who observed the radiographic characteristics of the right and left TMJ individually. In order to aid in this analysis, an individual file was prepared, with the following characteristics: condyle erosion, osteophyte formation, joint space reduction, articular eminence flattening, erosion of the mandibular fossa, decreased height of the mandible branch, flattening of the condyle, bulky condyle and development of cystic lesions. The data obtained were tabulated in the Excel worksheet. For the descriptive analysis of the data the median ± interquartile range and absolute and relative frequencies were used. The normality of the quantitative parameters was tested using the Shapiro-Wilk test. The frequencies were compared using Fisher's exact test and the differences between the groups in the quantitative variables were tested using the Mann-Whitney test. The level of significance adopted in all analyzes was 5% ($\alpha = 0.05$). The data were tabulated and analyzed in IBM SPSS Statistics for Windows (IBM SPSS, 21.0, 2012, Armonk, NY: IBM Corp.).

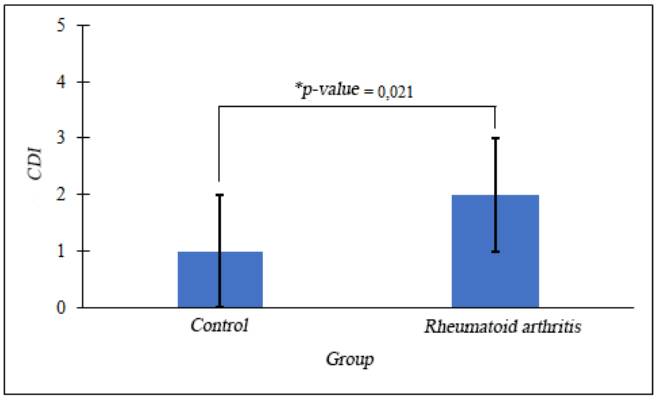
RESULTS

In the present study, data from 30 patients were analyzed, 8 of the control group (without diagnosis of rheumatoid arthritis) and 22 of the group with diagnosis of rheumatoid arthritis. Table 1 shows the demographic characteristics, radiographic parameters and TMDs severity, according to the groups evaluated. There was no significant difference between the groups without and with RA in the radiographic variables and TMDs severity. Figure 1 shows the comparison of the Clinical Dysfunction Index (CDI) between the groups. CDI was statistically higher in the AR group, compared to the control group. Table 2 shows the demographic characteristics, radiographic parameters and TMDs severity in RA patients, according to the type of drug treatment. No significant differences were identified between the patients who used biological or synthetic medication in the radiographic variables and TMDs severity. Likewise, no statistical difference was found in CDI, according to the type of drug used (Figure 2).

Table 1. Demographic characteristics, radiographic parameters and degree of involvement of temporomandibular dysfunction in the groups with rheumatoid arthritis and without rheumatoid arthritis (n = 30)

Variable	Group		
	Control (n = 8)	RA (n = 22)	
Age group			
18-40	1 (12,5%)	5 (22,7%)	
41-60	6 (75,0%)	13 (59,1%)	
> 60	1 (12,5%)	4 (18,2%)	
Sex			
Female	7 (87,5%)	20 (90,9%)	
Male	1 (12,5%)	2 (9,1%)	
Ankylosis			*p-value
Yes	4 (50,0%)	15 (68,2%)	0,417
No	4 (50,0%)	7 (31,8%)	
Fibrosis			
Yes	0 (0,0%)	0 (0,0%)	—
No	8 (100,0%)	22 (100,0%)	
Osteophytes			
Yes	2 (25,0%)	8 (36,4%)	0,682
No	6 (75,0%)	14 (63,6%)	
Reduction of joint space			
Yes	5 (62,5%)	16 (72,7%)	0,666
No	3 (37,5%)	6 (27,3%)	
Flattening of the articular eminence			
Yes	3 (37,5%)	17 (77,3%)	0,078
No	5 (62,5%)	5 (22,7%)	
Erosion of the mandibular fossa			
Yes	6 (75,0%)	18 (81,8%)	0,645
No	2 (25,0%)	4 (18,2%)	
Flattening of the condyle			
Yes	3 (37,5%)	11 (50,0%)	0,689
No	5 (62,5%)	11 (50,0%)	
Bulky condyle			
Yes	5 (62,5%)	15 (68,2%)	1,000
No	3 (37,5%)	7 (31,8%)	
Cystic lesions			
Yes	0 (0,0%)	0 (0,0%)	—
No	8 (100,0%)	22 (100,0%)	
Reduction of joint space			
Yes	2 (25,0%)	5 (22,7%)	1,000
No	6 (75,0%)	17 (77,3%)	
Condyle Erosion			
Yes	3 (37,5%)	8 (36,4%)	1,000
No	5 (62,5%)	14 (63,6%)	
TMDs Severity			
TMDs-free	5 (62,5%)	7 (31,8%)	0,257
Mild TMDs	1 (12,5%)	10 (45,5%)	
Moderate TMDs	2 (25,0%)	3 (13,6%)	
TMDs severe	0 (0,0%)	2 (9,1%)	

RA, rheumatoid arthritis; TMD, temporomandibular dysfunction. * Fisher's exact test; — It was not possible to calculate the statistic because the parameter was constant.



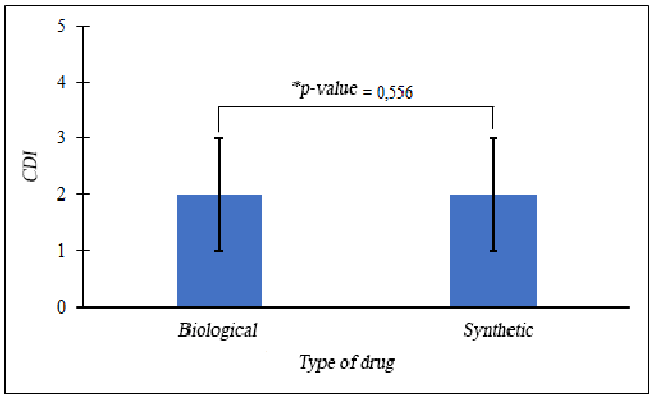
The columns represent the medians and the error bars represent the interquartile amplitudes. * Mann-Whitney Test.

Figure 1. Clinical Dysfunction Index (CDI) in the groups with rheumatoid arthritis and without rheumatoid arthritis

Table 2. Demographic characteristics, radiographic parameters and degree of temporomandibular dysfunction in patients with rheumatoid arthritis, according to type of drug treatment (n = 22)

Variable	Type of drug		*p-value
	Biological (n = 9)	Synthetic (n = 13)	
Age group			
18-40	2 (22,2%)	3 (23,1%)	1,000
41-60	5 (55,6%)	8 (61,5%)	
> 60	2 (22,2%)	2 (15,4%)	
Sex			
Female	8 (88,9%)	12 (92,3%)	1,000
Male	1 (11,1%)	1 (7,7%)	
Ankylosis			
Yes	5 (55,6%)	10 (76,9%)	0,376
No	4 (44,4%)	3 (23,1%)	
Fibrosis			
Yes	0 (0,0%)	0 (0,0%)	—
No	100 (100,0%)	13 (100,0%)	
Osteophytes			
Yes	2 (22,2%)	6 (46,2%)	0,380
No	7 (77,8%)	7 (53,8%)	
Reduction of joint space			
Yes	6 (66,7%)	10 (76,9%)	0,655
No	3 (33,3%)	3 (23,1%)	
Flattening of the articular eminence			
Yes	5 (55,6%)	12 (92,3%)	0,116
No	4 (44,4%)	1 (7,7%)	
Erosion of the mandibular fossa			
Yes	7 (77,8%)	11 (84,6%)	1,000
No	2 (22,2%)	2 (15,4%)	
Flattening of the condyle			
Yes	4 (44,4%)	7 (53,8%)	1,000
No	5 (55,6%)	6 (46,2%)	
Bulky condyle			
Yes	7 (77,8%)	8 (61,5%)	0,648
No	2 (22,2%)	5 (38,5%)	
Cystic lesions			
Yes	0 (0,0%)	0 (0,0%)	—
No	9 (100,0%)	13 (100,0%)	
Reduction of joint space			
Yes	2 (22,2%)	3 (23,1%)	1,000
No	7 (77,8%)	10 (76,9%)	
Condyle Erosion			
Yes	3 (33,3%)	5 (38,5%)	1,000
No	6 (66,7%)	8 (61,5%)	
TMDs Severity			
TMDs-free	2 (22,2%)	5 (38,5%)	0,516
Mild TMDs	5 (55,6%)	5 (38,5%)	
Moderate TMDs	2 (22,2%)	1 (7,7%)	
TMDs severe	0 (0,0%)	2 (15,4%)	

RA, rheumatoid arthritis; TMD, temporomandibular dysfunction. * Fisher's exact test; — It was not possible to calculate the statistic because the parameter was constant.



The columns represent the medians and the error bars represent the interquartile amplitudes. * Mann-Whitney Test.

Figura 2. Clinical Dysfunction Index (CDI) in patients with rheumatoid arthritis according to the type of drug treatment

DISCUSSIONx

RA is an autoimmune, chronic and inflammatory disease characterized by involvement of the synovial membrane of the joints causing hyperplasias and destruction of the joint tissues (Moen *et al.,* 2005), (Mota *et al.,* 2012), (Malliari *et al* 2015), (Cunha *et al.,* 2007) and (Grover *et al.,* 2011). Women are the group most affected by this pathology (Moen *et al.,* 2005), (Mota *et al*., 2012), (Aliko *et al.,* 2011), (Laurindo *et al.,* 2004), (Malliari *et al.,* 2015),(Mehra *et al.,* 2009), (Cunha *et al.,* 2007), (Garib e Qaradaxi, 2011), (Scott *et al.,* 2010), (Sidebottom e Salha, 2013) and (Martinez *et al.,* 2009) and the age range of 35-50 years is the most affected (Mota *et al.,* 2012), (Torres *et al*., 2010), (Malliari *et al.,* 2015),(Mehra *et al.,* 2009) and (Cunha *et al*., 2007). The demographic profile of the patients studied corroborates with the literature, in which 90.9% of the patients with RA corresponded to the female gender and 9.1% of the male gender, with a greater occurrence in the study at ages 41-60 years. In the analysis of radiographic findings of TMJ, no statistical differences were observed when comparing patients with RA with the control group. This can be justified by the fact that all patients studied with the disease were under drug therapy, which included the use of synthetic or biological DMARDS, according to Mota *et al.* (2012), Williaams *et al*. (1988) and O'Dell *et al*. (2002) for reducing the activity of the disease, providing the patient beyond the control of pain and reduction of signs and symptoms, the progression of RA detected radiographically.
Patients with RA in the present study had a greater tendency to flatten articular eminence compared to patients in the control group, but without statistical differences. Mehra *et al.* (2009) and Sidebottom and Salha (2013) have stated that articular eminence flattening is one of the most common radiographic changes to be found in patients with this pathology, although it does not represent a pathognomonic sign of RA.

When we analyzed the degree of TMD involvement in patients with RA and control group using the Fonseca anamnestic questionnaire (Chaves *et al.,* 2008), we observed that there were no statistical differences between the groups. These data disagreed with the literature that reports the joint involvement of the TMJ in the RA, causing patients to feel painful symptoms, systemic manifestations and clinical signs from the inflammation, thus developing some degree of TMD in these patients (Moen *et al*., 2005), (Torres *et al.,* 2010), (Aliko *et al.,* 2011), (Delantoni *et al.,* 2006), (Yilmaz *et al.,* 2011), (Laurindo *et al.,* 2004), (Malliari *et al.,* 2015), (Helenius *et al.,* 2005), (Chalmers e Blair, 1973), (Mehra *et al.,* 1859), (Saeed *et al.*, 2001), (Goeldner *et al.,* 2011), (Akerman *et al.,* 1988), (Voog *et al.,* 2003) and (Goupille *et al.,*1993) Nevertheless, Campos *et al*. (2009) report that the reliability of the Fonseca index to determine the presence or absence of TMD has not been investigated yet. Although in this study the Fonseca anamnestic index (Chaves *et al.,* 2008) did not show relevant results, it was possible to observe statistical differences regarding the clinical diagnosis of TMD between the patients with and without RA when using the IDCCM (Chaves *et al*. 2008). It was verified a higher prevalence of TMD in patients with RA compared to the control group, confirming the influence of this pathology on TMJ, corroborating with the study conducted by Cunha *et al*. (2007).

Regarding the drug therapy used by patients with RA, it was possible to verify with this study that the use of DMARDs, whether biological or synthetic, did not present statistical differences regarding TMD's severity, either by radiographic or clinics, thus demonstrating that its action and effectiveness is independent of the type of droug maneged. Passos (2009) explains that DMARDs present different mechanisms of action. Synthetic drugs are the drugs of first choice during treatment and act in the early and causal stages of the inflammatory chain and are considered immunomodulatory. Biological DMARDs are drugs genetically engineered to act on elements considered primordial for the onset and progression of RA, such as cytokines (TNF, IL-1, IL-6), B and T leukocytes, blocking them and preventing bone destruction and cartilaginous (Laurindo *et al.,* 2004) and (Lima *et al.,* 2015). However, Goeldner *et al.* (2011) and Scott *et al*. (2010) state according to the literature that these drugs have a common goal, in other words, they treat synovial joint concerning the remission of the inflammatory process, reducing the clinical and radiographic changes and improving function. In spite of the limitations of the present study, it is worth mentioning the importance of this work to the daily routine of dentists. It should be able to diagnose the clinical and radiographic changes in the TMJ caused by RA and thus to elaborate an adequate treatment plan for these patients with the disease. It is also relevant that the rheumatologist should be aware of these oral modifications from RA in order to define a patient referral protocol to the dentist. Based on this information it is pertinent that this topic remains the focus of analysis and study.

Conclusion

Based on the results presented, it is possible to conclude that it was not possible to observe the impact of RA on radiographic parameters. On the other hand, although RA did not influence the degree of TMD involvement, the findings of the present study indicated that this condition was associated with greater craniomandibular dysfunction. In addition, no differences were observed between biological drug and synthetic drug treatments in the radiographic and clinical parameters of RA patients.

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