Temporomandibular Joint in Systemic Lupus Erythematosus: Literature Review

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Abstract

The aim of this study is to analyze the literature on temporomandibular joint (TMJ) diseases in systemic lupus erythematosus (SLE).

This literature review includes articles from 2003 to 2018 describing clinical studies or clinical cases of TMJ diseases in SLE. Publications not related to the study topic and those that did not have enough data were excluded from the survey.

The investigation initially involved 35 articles, four of which were selected. The articles included studies on the pediatric and adult populations. In all the studies, except for one, a clinical examination was carried out, and in three of the studies additional radiographic methods were used. The information also included an overview of drug therapy.

At present, there is limited information on the TMJ disorders in systemic lupus erythematosus and further research is required to properly diagnose the disease in dental appointments.

Review (J Int Dent Med Res 2019; 12(2): 727-732)

Keywords: rheumatic disease, systemic lupus erythematosus, temporomandibular joint disease.

Received date: 25 October 2018 **Accept date:** 15 November 2018

Introduction

Systemic lupus erythematosus (SLE) is a complex autoimmune disorder with a chronic relapsing-remitting course and different manifestations from mild mucocutaneus symptoms to destructive and life-threatening lesions.[1,3] This disease is a classic example of an immune-mediated collagen disorder or a connective tissue disease.[4]

The American College of Rheumatology (ACR) classification (1972) was wildly used as one of the SLE diagnostic methods. It was reviewed twice in 1982 and in 1997.[4-6] The Systemic Lupus International Collaborating Clinics (SLICC) revisited the criteria from previous SLE diagnostic classifications for several problem solutions that have become known since the criteria development of 1982. Derivation and validation steps were wildly described in 2012.[16] These classifications are based on different tissue and organ lesions and conditions.

The range of SLE manifestations includes hematological conditions (anemia, leucopenia, lymphopenia, thrombocytopenia and etc.), neurological conditions and symptoms (cognitive disease, headache and etc.), cardiopulmonary conditions (pleurisy, pericarditis, myocarditis, endocarditis and etc.), and renal conditions (proteinuria, nephritic syndrome and etc.).[4,7-15].

Another group of lesions includes joint and mucocutaneus manifestations. Oral lesions are usually ulcerative and similar to those in lichen planus. [17] Most frequently they appear in gingiva, palatal and buccal mucosa.[4] SLE lesions are either non-specific (e.g. aphtous mouth ulcers) or specific (e.g. in discoid oral lupus erythematosus), according to the Gilliam classification.[18,19]

Joint diseases are arthralgia, arthritis (non-erosive and non-deforming) and synovitis, in which small and middle joints are frequently affected, including temporomandibular joint (TMJ).[20,21] Approximately 20% of subjects with SLE are diagnosed in childhood or adolescence (11-12 years)[22-25], which is known juvenile-onset systemic lupus erythematosus (JSLE) or Childhood-onset SLE.[26,27]

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It is difficult to confirm SLE during its early stages.[4] Patients can present different SLE manifestations in a dental office, such as mucocutaneus manifestations in the orofacial region and periodontitis.[33,34] But what TMJ manifestations can be presented? The aim of this study is the literature analysis related to the TMJ disorders in SLE.

Materials and methods

Search strategy

A systematic search in the English language with no time restrictions was performed by three independent readers in the PubMed electronic database. The following research query was used: [systemic AND lupus AND erythematosus AND temporomandibular AND joint]. Besides the electronic database, other sources were also used to find relevant information on the topic. This included a Google search and the references of relevant studies and reviews.

Inclusion and exclusion criteria

Publications with the following eligibility criteria were included:

1 Articles in English published from 2003 to 2018.
2 Clinical studies and clinical cases.
3 Full-text articles with TMJ disorders in SLE in adult and pediatric patients.

Exclusion criteria involved publications not related to the subject and articles with insufficient evidence for evaluation.

Study selection

Studies were subjected to several filtration and selection phases. Firstly, they were sorted according by the publication year. Secondly, selected papers in the first phase were further assessed by reading abstracts and full-text reading. In each phase three readers worked independently. Differences in the article selection were resolved through discussion by the readers (Figure 1).

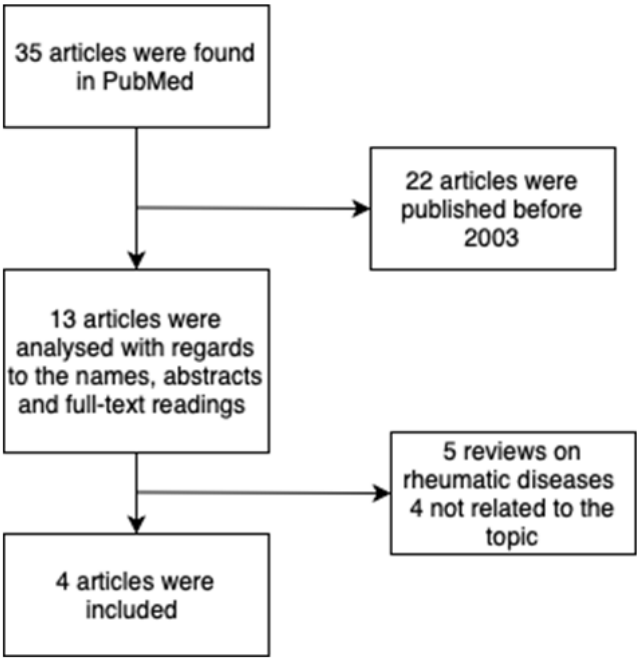

Figure 1. The article selection process.

Results

The literature search resulted in a total of 35 records. After selection stage by titles, abstracts and publication years and articles not related to the topic, finally four articles were included (table 1). Two of selected studies were provided in pediatric patients (aged under than 18) [28,30] and one on adult patients [21] and in one article the age data is not available [29]. All studies except for one [30] had clinical examinations, and three studies had additional radiographic examinations [28,29,30]. Clinical examinations revealed changes in occlusion [28] or changes in mandibular movements [21,29]. None of the studies indicated whether disorders were unilateral or bilateral. The panoramic radiograph did not reveal any statistically significant difference between the detection of erosion and the condyle complete destruction [29] compared to MRI [30]. Also, the MRI and ultrasonography data significantly correlated [30]. In addition to changes in the condyle with ultrasound and MRI, an increase in the width of the capsule at the subcondylar and condylar levels was 1.4 ± 0.8 mm and 1.3 ± 0.67 mm, respectively [30].

Author	Year	Type	Methods	Female	Male	Mean age
Aliko et al. [21]	2011	Clinical study	Clinical examinations and survey	22	0	40.2
Golin et al [28]	2017	Clinical study	Clinical examinations and MRI	45	5	17.4
Fernandes et al. [29]	2010	Clinical study and clinical casess	Clinical examinations and panoramic radiograph	N/A	N/A	N/A
Kirkhus et al. [30]	2016	Clinical study	Ultrasonography and MRI	42	13	<18

Table 1. Summary of publications included in this literature review. N / A - information is not available.

Aliko et al. **[21]**	2011	Arthritis	9.1 ± 8.1	• TMJ sounds (36.4) • Pain (27.3) • Decresed mouth opening (4.5) • Crepitus (4.5)	N/A	N/A	• NAIDS • GCS • DMARD • Methotrexat • Hydroxychloroquine
Golin et al **[28]**	2017	N/A Patients were referred by pediatrician	N/A	• Closed bite (26.7) • Overjet (13.3) • Crossbite (13.3)	Non-significant condylar changes in MRI	All patients have the start of disease before 16; Masticatory atrophy due to GCS	• GCS
Fernandes **[29]**	2010	• Arthritis • Osseonecrosis	2-3.3	• Mandibular disfunction (69) • Mandibular movement changes (53.5)	Two patients presented complete destruction of condyles in the panoramic radiographs (clinical cases)	Osseonecrosis was avascular due to ischemia	• GCS • Methotrexat
Kirkhus et al. **[30]**	2016	• Arthritis • Synovitis	0 - 16	N/A	Ultrasound: increased capsule width MRI: synovitis	MRI and ultrasound data are correlated	• NAIDS • GCS • DMARD

Table 2. Results of main and additional examination methods, as well as data on the treatment of diseases. N / A - the data is not available; NSAID are non-steroidal anti-inflammatory drugs; GCS - glucocorticosteroids; DMARD - disease-modifying anti-rheumatic drugs.

Also, all patients took glucocorticosteroids as an anti-inflammatory and immunosuppressive therapy [21,28-30]. The most frequent oral steroids and DMARDs given were methylprednisolone and methotrexate, respectively. According to Golin et al [28], this medication caused changes in the masticatory system, including the TMJ.

The remaining data from clinical and radiographic studies, as well as the type of disease and other medications for treatment are presented in Table 2.

Discussion

Systemic lupus erythematosus (SLE) is an autoimmune disease of unknown origin that affects the connective tissue, and during the course of the disease there may be periods of exacerbation and remission [32].

The pathogenic mechanisms implicated in the development of joint involvement have been investigated only marginally and most of the data can be extrapolated from other inflammatory arthropathies, such as rheumatoid arthritis (RA) [42]. Moving from a multifactorial pathogenic model, a recent review evaluated the association between this specific phenotype and some

genetic variants [43]. Some studies have investigated the pathogenesis of joint involvement starting from the evaluation of synovial fluid and membrane - a white blood cells count typically lower than 2.000/µl, with predominance of lymphocyte, a good viscosity and the possible presence of antinuclear antibodies[44]. Together with autoantibodies, several inflammatory cytokines have been investigated in order to elucidate their role as biomarkers in SLE joint involvement. The most encouraging results derive from the evaluation of interleukin (IL)-6 [45].

Sapienza Lupus Cohort reported musculo-skeletal involvement in up to 80% of the patients [46]. In addition, the dentist can discover to other SLE lesions in the orofacial region, in particular, to TMJ disorders [35]. One study presented the prevalence (67%) of TMJ disorders among affected SLEs and the study included in this literature review [21].

In the Aliko et al. study [21] patients complained of pain and difficulty when opening the mouth. Our literature review showed that the best additional radiographic examination methods are MRI and ultrasonography [28,30]. However, none of the studies contained data on CBCT examination of the TMJ, despite the fact that it is a valuable method for the diagnosis of non-inflammatory diseases of the TMJ [36]. For example, Liebling et al [38], using a CT scan of TMJ diagnosed its erosion in three patients. Conversely, aseptic arthritis can be misleading on MRI and be diagnosed as a manifestation of rheumatic disease [40].

As for medication, glucocorticosteroids are widely used for these purposes [21,28-30], but there are data on their negative impact. The adverse effects of steroids in various inflammatory rheumatologic conditions are well known. Musculoskeletal damage includes osteoporosis, myopathy, and avascular necrosis, the latter being more closely related to high doses/pulses than to the accumulated dose [47,48]. Muscle atrophy and decreased bone density induced by corticosteroids can lead to TMJ disorder [41], therefore, these drugs should be used competently or other methods of treatment should be used [30,31,37,54,55,56]. The heterogeneity of SLE necessitates individualization of treatment strategies [49]. Treatment with HCQ is beneficial for many other aspects of SLE [50,51], however all patients require regular retinal monitoring.

TMJ disorder signs in patients with RA OR SLE may not be solely due to the inflammatory process[21]. It is often difficult to discriminate between TMJ disorders affected by systemic inflammatory disease and any other local pathology (arthritis secondary to disc displacement, osteoarthritis, traumatic arthritis). An examination of the psychosocial factors appears sensible, in that anxiety, life stress, depression and muscle hyperactivity are common in RA and SLE [52], and have often been proposed as possible risk factors for temporomandibular disorders [53].

It is also important not to forget about differential diagnosis. TMJ disorders and related lesions in the oral cavity can manifest in other autoimmune diseases, so a comprehensive diagnosis of this disease should be done [35,57].

Conclusions

Unfortunately, at present there is a limited data on TMJ disease in SLE. Is the TMJ disease the first sign of SLE? Does it manifest itself or in conjunction with other orofacial lesions? Is it primary or secondary due to glucocorticosteroid therapy? These questions require answers for a clearer diagnosis of SLE including it in pediatric patients.

Declaration of Interest

None declared.

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