Psoriatic Arthritis and Temporomandibular Joint Involvement – Literature Review with a Reported Case

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SUMMARY In addition to psoriasis, between 5% and 24% of patients will develop psoriatic arthritis simultaneously after or even prior to skin manifestations. Psoriatic arthritis belongs to the group of seronegative spondyloarthritis. Collaboration between a dermatologist and a rheumatologist plays a more important role in cases where there is a complete absence of clinical signs of psoriasis. Since rheumatic diseases may also involve the temporomandibular joints (TMJ), psoriatic arthritis can cause problems that are an aspect of systemic disease. In general, the clinical and radiological description of a population of patients suffering from psoriasis and/or psoriatic arthritis does not mention TMJ involvement. However, as is the case with intraoral psoriasis, psoriatic changes to the TMJ also show characteristic signs of erosion, deplaned condyles, and articular effusion. Magnetic resonance imaging has shown itself to be the gold standard in the diagnostics of joints afflicted by psoriatic arthritis and TMJ disorders, regardless of the existence of a systemic disease. This paper aims to present a review of the relevant literature describing different epidemiological, clinical, and radiological characteristics of psoriasis and psoriatic arthritis, with emphasis on the involvement of TMJs in the general manifestation of the disease, illustrated by a description of the clinical case of a 77-year-old female patient.

KEY WORDS: psoriasis, psoriatic arthritis, temporomandibular joint, magnetic resonance imaging

INTRODUCTION

Traditionally, psoriasis was primarily considered to be a skin disease, i.e. a non-infectious, chronic-recurrent dermatosis that develops on the skin, scalp, and nails (1). According to modern concepts, psoriasis is not purely a skin disease, because, on account of its relatively frequent extra-cutaneous manifestations (from 5% to 42%), it is considered a systemic skin disease with relatively common joint inflammation (2-4).

In Europe, the prevalence of psoriasis ranges from 0.6/0.8% to 5.5/6.5%, depending primarily on wheth-

er the general or the patient population is being considered as well as on the research methodology (2). In Italy, a great difference was found among the regions surveyed, with the prevalence of psoriasis lowest in Sardinia (0.5%), and higher in northern regions (4.5%) (5). In Croatia, the prevalence of psoriasis ranges between 1.03 and 1.55% (6,7).

Wright (8) and Baker (9) corrected the previous erroneous assumption that inflammatory arthritis in patients with psoriasis is a co-morbidity of rheumatoid arthritis and psoriasis. Psoriasis and arthritis occurring together in the same patient were noticed as early as in the first half of the 19th century, and the fact that psoriatic arthritis is a distinct disease entity was defined under the concept of seronegative spondyloarthritis (10,11).

Temporomandibular disorders (TMDs) are one of the most common causes of orofacial pain, and encompass a group of individual diagnoses related to musculoskeletal disorders of the stomatognathic system. In addition to tendomyopathy of masticatory muscles, TMDs also include the following diagnoses of temporomandibular joint (TMJ) disorder: anterior disc displacement, osteoarthritis, and synovitis (12,13). TMJ pathology was relatively unknown until the early 1990s due to poor diagnostic means, and it was often related to erroneous etiopathogenic models (for example, Costen's syndrome), as well as to otological symptomatology on account of topographic proximity (14). Conversely, the involvement of TMDs in systemic musculoskeletal (polyosteoarthritis, rheumatoid arthritis, psoriatic arthritis, etc.) and other diseases of the general type (fibromyalgia) is well known (15,16).

This paper aims to present a review of the relevant literature describing different aspects of psoriasis and psoriatic arthritis with emphasis on the involvement of TMJs in general manifestation of the disease, which is illustrated with a clinical case of a 77-year-old female patient.

Figure 1. Patient presents with pain in the left temporomandibular joint (a) which spreads to the temple (b).

PSORIATIC ARTHRITIS

Psoriatic arthritis belongs to the group of seronegative spondyloarthritis, where the involvement of axial and peripheral joints usually implies previous or recent psoriasis, since 15% of psoriatic patients never develop psoriasis or develop skin disease after joint involvement occurs. Psoriatic arthritis is clinically similar to rheumatoid arthritis, where the discovery of the rheumatoid factor did not contribute to the distinction between these two entities (17-19). The rheumatoid factor helps in the classification of polyarthritis, whereas clinical observation is relevant to the diagnosis of psoriatic arthritis. However, the human leukocyte antigen (HLA) B-27 is dominant in the group of seronegative spondyloarthritis. In psoriatic arthritis, the frequency of HLA B-27 is between 30% and 75%. Other biomarkers studied in relation to the severity of psoriatic arthritis include C-reactive protein (CRP), matrix metalloproteinase-3, and circulating osteoclast precursors (17,20-22).

Unlike other inflammatory arthritides, psoriatic arthritis implies the presence of nail and cutaneous psoriasis as well as dactylitis. Patients suffering from psoriasis may not suffer from arthralgia, although there have been undiagnosed cases of psoriatic arthritis among patients with psoriasis who were treated by dermatologists (23). This is because in patients with severe cutaneous psoriasis a painful involvement of the joints can also be expected, but, at the same time, the severity of the skin lesions does not always correlate with the occurrence of joint lesions. In nearly 70% of patients, cutaneous lesions precede the onset of arthralgia, while in 20% involvement of the joints starts prior to skin manifestations, and in 10% the two are concurrent (24).

In addition, there is an absence of serological tests for a rheumatoid factor or for inflammatory arthritis that includes peripheral arthritis and/or sacroiliitis or spondylitis. Asymmetric sacroiliitis, non-marginal syndesmophytes, asymmetric syndesmophytes, paravertebral ossification, and more frequent involvement of the cervical spine fall into the category of psoriatic arthritis. However, the inflammatory spinal signs of the disease cannot be easily distinguished from ankylosing spondilitis. Consequently, numerous classification criteria have been developed where it has been observed that the presence of psoriasis, along with the negative rheumatoid factor, does not offer sufficient validity in the application of standard diagnostic criteria (25).

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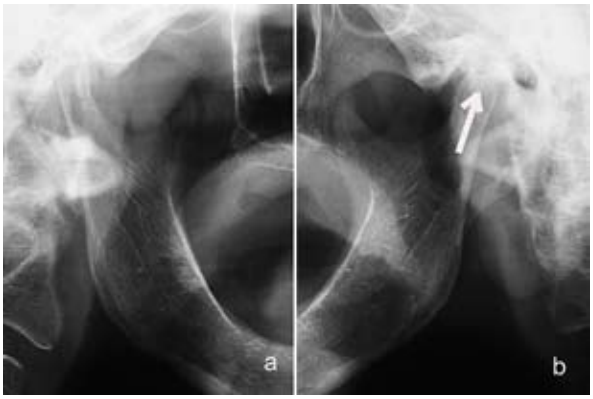

Figure 2. Asymmetrical view of the right (a) and the left (b) temporomandibular joint on a panoramic radiograph: the left joint does not show a clearly delineated condyle head cortex edge (arrow).

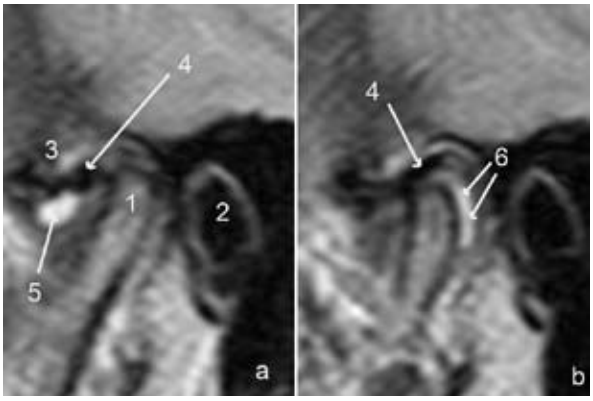

Figure 3. Magnetic resonance images of the left temporomandibular joint (a – closed mouth, b – open mouth position; 1 – condyle; 2 – external auditor meatus; 3 – articular eminence; 4 – anteriorly displaced disc with reduction; 5 – joint effusion, 6 – collection of inflammatory exudate moved along the posterior condyle edge).

According to Rudwaleit and Taylor (26), a criterion of psoriatic arthritis diagnostics is that in 66% of cases psoriasis precedes the arthritis symptomatology, in 21% they manifest simultaneously, and in 14% of cases arthritis precedes psoriasis. The exact prevalence of psoriatic arthritis is unknown, although, according to some data, between 5% and 24% of patients with psoriasis the involvement of musculoskeletal system can be expected. Jamshidi *et al.* (27) found psoriatic arthritis in 9.1% of Iranian patients with psoriasis, whereas for Croatian patients with psoriasis the prevalence was 14.3-15.3% (6,7). In Germany, Reich *et al.* (28) found psoriatic arthritis in 20.6%, of patients and Radke et al. (29) in 19% of patients with psoriasis. In Serbia, Pavlica *et al.* (30) found psoriatic arthritis in 9.3% of patients with psoriasis, while in the USA. Shbeeb et al. (31) found psoriatic arthritis in 16% of such patients.

Psoriatic arthritis has been described in various forms such as arthritis mutilans, peripheral oligoarthritis or polyarthritis, spondylitis and distal interphalangeal joint arthritis (fingers and toes), and cervical spine disease (usually involving peripheral joints), most commonly in 50% or more of the patients (17,32). Based on the results of a study of patients with psoriatic arthritis (the sample being larger than a hundred patients), Moghaddassi *et al.* (33) estimated that arthritis precedes skin symptoms in 15% to 30% of patients, while the most common forms of psoriatic arthritis were polyarthritis 25-63%, oligoarthritis 7-54%, and sacroiliitis (6-26% of cases). The prevalence of distal interphalangeal joint involvement (1-12%), axial involvement (2-21%), and mutilating arthritis (0-16%) was less common.

Shbeeb *et al.* (31) found the following diagnoses in psoriatic patients: oligoarthritis, polyarthritis, and spondylitis in 19%, 3%, and 6% of the cases, respectively. In the study by Pavlica *et al.* (30), distal interphalangeal joints were involved in 63.6%, the axial skeleton in 36.4%, oligoarthritis in 45%, polyarthritis in 55%, and mutilating form in 6.8% of the patients. Sacroiliitis was found in 46.4% of the patients with psoriatic arthritis. Nossent and Gran found (32) oligoarthritis in 48%, polyarthritis in 32%, spondylitis in 9%, monoarthritis in 7%, distal interphalangeal arthritis in 2%, and mutilating arthritis in 2% of the cases. According to Reich *et al.* (28), polyarthritis was found in 58.7% of patients, oligoarthritis in 31.6%, and mutilating arthritis in 4.9% of patients, while distal interphalangeal arthritis was diagnosed in 41% of the cases.

THE OROFACIAL REGION IN RELATION TO PSORIATIC ARTHRITIS

Psoriasis can also be identified by looking at the oral mucosa. Among papulosquamous diseases of the oral mucosa, lichen planus is more common than intraoral psoriasis. Since oral psoriasis can be primarily asymptomatic, collaboration with a dermatologist is necessary along with clinical examination and biopsy of the intraoral lesion (34).

Both the patient's personal and family medical history are needed in order to determine whether there was a previous outbreak of psoriasis, if it is currently in remission, and, in addition, whether the present arthropathy is related to skin psoriasis or changes on the nails (35). There was a case in which the typical cutaneous lesions could not be confirmed, and there

was also no confirmed family history of psoriasis (36-38). Psoriasis in the oral cavity also causes erythematous erosive areas on the gingivae, a fissured tongue showing grayish areas on its ventral surface, whitish lesions, and longitudinal sulci, as well as lesions on the hard and soft palate. If oral lesions are manifesting, differential diagnostics plays a role in the general diagnostics of psoriasis if it has mildly expressed and discreet skin symptoms (35-39).

TMDs

TMDs are nonspecific musculoskeletal disorders of masticatory muscles and/or TMDs, which lead to manifestation of functional disorders of the stomatognathic or masticatory system. The history of TMDs is related to numerous attempts to explain their etiopathogenesis and to place them within the context of biomedical concepts (13,40). Since TMDs are generally diagnosed and treated by dentists, musculoskeletal components and a number of other components (for example, autoimmunity) may be overlooked with respect to the dental component of the stomatognathic system (15,41).

Radiological characteristics of TMJ disorders

Magnetic resonance imaging (MRI) is the gold standard of radiological diagnostics and a non-invasive and non-ionizing examination of soft and hard TMJ tissues. Imaging of both the articular disc and the most common type of discopathy, i.e. anterior disc displacement, is the greatest achievement in the field of X-ray radiological methods (13,14). Another important TMJ pathology is the occurrence of a more or less expressed collection of exudates within a relatively small intraarticular space (42). The most common radiological method of jaw, teeth, and TMJ imaging is the panoramic radiogram, where the projection of TMJ is inadequate compared with the use of transcranial imaging by Schüller. Since the osteoarthritic changes are most visible on X-ray images, computerized tomography (CT) is the gold standard for hard tissues, although its use is still restricted due to relatively high doses of radiation (13). In the case of inflammatory exudates and/or disc displacement, CT is an inefficient diagnostic method if there are no changes in the osseous structures of the joint. MRI has proved to be an efficient method for confirming clinical diagnostics; however, its high cost prohibits its use in everyday dental practice (43).

TMJ AND PSORIATIC ARTHRITIS

Rheumatologic diseases are relatively rare in dental practice where the orofacial region is involved in the general symptomatology of the disease. In a clinical trial of a sample of 160 TMD patients, Ćelić (44) found only one patient (0.63%) with previously diagnosed rheumatoid arthritis. In our research, where the clinical diagnosis of TMJ was confirmed by MRI, rheumatic diseases (juvenile rheumatoid arthritis, rheumatoid arthritis, ankylosing spondylitis, and Sjøgren's syndrome) were found in collaboration with a rheumatologist-physiatrist in 4.6% of 214 patients in the period between 2001 and 2011 (15). As early as 1965, TMJ was described as being affected by psoriatic arthritis (45).

In orofacial symptomatology of psoriatic arthritis, the crepitation of TMJs prevails, as well as reduced mouth opening and symptoms related to masticatory muscles. Arthralgia of TMJ may by itself be a clinical sign of arthritis related to generalized psoriatic arthritis. Radiological images of changes in TMJs predominantly display signs of arthritis, which can also be seen in panoramic radiographs (46). In addition to erosion of cortical bone and inflammatory changes, along with flattening of the condylar head, radiological changes are the most common. However, more severe destruction with consequent ankylosis of the joint can occur (47). While Könönen (48) believed that a generalized type of psoriatic arthritis creates symptoms in the masticatory system after only seven years, Farronato et al. (49) presented the case of a patient whose first symptoms of psoriatic arthritis appeared right on the TMJ.

Report of a case with one year follow up

In 2011, a 77-year-old retired female patient was referred to our Department by a physiatrist-rheumatologist due to difficulties in the left TMJ (clicking, pain on mastication and when lying on the left side of the face) which started in early 2008. Psoriatic arthritis was diagnosed in 1993 when the psoriasis vulgaris also first appeared.

Medical history

Although the patient showed symptoms of arthritis since 1992, it was only during the period of further specialist treatment and after psoriatic manifestations on the skin that the definitive diagnosis was made. Even then, psoriatic polyarthritis appeared in a more severe inflammatory form in the hands and wrists, shoulders, feet, knees, and the spine. The patient has had continuous physical therapy since then, and was also treated in medical spa centers. In addition, she used gold salts, corticosteroids, and nonsteroid antirheumatics, and was treated for co-morbid arterial hypertension. Psoriatic changes were present in the lower legs, elbows, and pre/retroauricular regions in

the form of erythematosquamous changes of about 2-5 cm. She was examined by an otorhinolaryngologist before being seen by a dentist and a rheumatologist.

Dental history

The patient reported pain in the left TMJ on mastication and wider mouth opening; this pain also spread into the left ear and the temple (Figure 1). Since then, clicking had occurred in the left TMJ during mouth opening. Subjectively, she never experienced restricted mouth opening, but recently the pain had become present in a resting position, and she also complained of frequent headaches. Active mouth opening amounted to 43.5 mm, and passive mouth opening of 45.0 mm was measured on the central incisors. Her dental status showed that due to complete edentulousness she wore complete dentures, which were twenty-three-years old and had been made in a prognathic relationship with a distal bilateral reverse overlap. Pain on opening was 6 on the visual analogue scale (VAS; 0 = no pain, 10 = most severe pain), in a resting position lying on the left side of the face it was 8, and on palpation of the left TMJ it reached 6.5. Clinical examination included a manual functional analysis by Bumann and Groot Landeweer (13), which confirmed the following difficulties in the left TMJ: clicking and pain on both dynamic and passive compression; anterior disc displacement with repositioning was clinically diagnosed as well.

Radiological diagnostics of TMJ

The initially recorded X-ray images by Schüller from 2008 as well as repeated imaging from 2011, prior to a specialist dental examination, did not show changes in osseous structures, while hyperextension of condyle was noted in the open mouth position. However, the left TMJ image was technically weaker due to more pronounced superposed osseous structures. The panoramic radiograph was taken during a dental examination (Figure 2) in which a non-symmetrical image of joints was visible; the left joint, unlike the right one, did not show a clearly visible edge of the condylar head, and a definitive diagnosis of the TMJ disorder was made using MRI. TMJs were recorded in open and closed mouth positions on a supraconductive *Harmony* magnet by Siemens (Erlangen, Germany) with a magnetic field of 1 T (T1 weighted image TR 450/TE 12 and T2 TR 3000/TE 66) weighted image with matrix 256 × 192 and 160 × 160 field of view). The left TMJ (Figure 3) showed discreet erosion and the loss of cortical edge of the functional surface of the joint on the condylar head, without any changes on the subchondral bone and with intact surface of the temporal bone (posterior inclination of articular tuberculum) as well as pronounced effusion in the mesial space anteriorly from the condyle. An anteriorly displaced deformed disc was visible. Images of the open mouth position showed hypomobile condylar movement that did not reach the zenith of the articular tuberculum. A reduction of disc displacement was noticed (that is, the disc was in physiological position on the condyle) which was of biplanar form. Additionally, collection of inflammatory exudate had moved along the posterior edge of the condyle.

Recall with a yearlong follow-up

In collaboration with a rheumatology-physiatric polyclinic, the dentist instructed the patient to perform exercises for the masticatory muscles and TMJ according to a specific method devised by Schulte. After having learned the exercise regime, the patient continued to exercise at home. She was also admitted twice to a specialized hospital for psoriasis and psoriatic arthritis treatment. Along with general persisting difficulties caused by psoriatic arthritis, the patient continually mentioned difficulties in the left TMJ: pain on the VAS scale on mouth opening was of the same intensity, that is 6, and 4 on palpation of the left TMJ. There was no pain in a resting position, although she avoided lying on the left side of her face. She felt pain in the left TMJ on mastication, while speech was accompanied by a pricking pain in the left ear. Active mouth opening was slightly reduced (41.5 mm), while there were still crepitations in the left TMJ. Due to gastric problems caused by diclofenacum, she took only paracetamol when necessary, but she did not take corticosteroids.

GENERAL REMARKS AND RADIOLOGICAL CHARACTERISTICS

Reich et al. (28) stress the fact that as many as 85% of patients with psoriasis also had a new diagnosis of psoriatic arthritis. Since the study was carried out at a dermatology clinic, a high prevalence of undiagnosed disease has been noted. Conversely, Radke et al. (29) point out the fact that there were only 4.2% of newly diagnosed patients with psoriatic arthritis in their sample of psoriatic patients. Nossent and Gran (32) found that in 13.8% of cases, arthritis preceded psoriasis.

Klaassen *et al.* (50) reported that the prevalence of nail psoriasis was 66.0%. Data about patients with psoriatic arthritis has in general also been confirmed in Croatian patients, where arthritis often occurred (37.5%) in patients with psoriasis localized in the ingui-

nal and/or perianal region with toenail involvement, compared to 8.9% of patients who suffered from arthritis without any concurrent psoriasis involvement (6). According to Yamamotou (24), dactylitis is one of the cardinal symptoms of psoriatic arthritis. This is supported by a study from Serbia where 1.8% of the patients had psoriatic arthritis without psoriasis, whereas 35% of the patients had nail changes (30).

In serologic testing, it is difficult to clinically differentiate rheumatoid from psoriatic arthritis solely on the basis of a seronegative finding of the rheumatoid factor. Rheumatologists may overlook psoriasis which has been dermatologically processed, or when it is only suspected or misdiagnosed (23,51). Inflammatory arthritis can be differentiated from psoriatic arthritis by using the data from the family history even if the patient in question has not been diagnosed with psoriasis (26,52).

Psoriasis is a complex illness requiring continued long-term treatment, and thus effective and safe means of treatment should be ensured. Nonsteroidal antirheumatic drugs, methotrexate, and anti-tumor necrosis factor (TNF) therapies are recommended for systemic treatment (53).

Radiological changes were most often present in hand and foot joints, less frequently in the knees, and quite infrequently in the hips and shoulder joints. Arthritis was treated with non-steroidal anti-inflammatory drugs, and systemic corticosteroids in 41.3% of patients, and disease-modified antirheumatic drugs, most frequently methotrexate, in 59.9%. Radionuclide synovectomy was performed in 6.8%, surgery in 6.2%, and physical therapy in 100% of all patients (30).

Radiological findings of the joints involved in psoriatic arthritis predominantly show a narrowing of joint space, joint erosions, bony proliferation, and in rare cases joint ankylosis. The main feature of psoriatic arthritis is the combination of erosion and bony proliferation. Spondylitis occurs in up to 40% of patients (54). MRI showed an undisputedly higher sensitivity than radiological examination of joints, which was also shown in TMJ diagnostics (13,14). There are several subtypes of radiological findings: periarticular erosion, enthesitis (enthesophytes, syndesmophytes), osteitis (particularly sacroiliitis), and soft tissue pathology (synovitis, tendosynovitis). Joint effusion was established in 22% of joints involved in juvenile psoriatic arthritis (3,55). Besides MRI, ultrasound can also be used to display effusion. In patients suffering from psoriatic and rheumatoid arthritis, TMJ diagnostics by MRI revealed effusion and disc disorders in 54% of the cases. The most common findings were bony erosions, flattening of the condylar head, and a reduced range of movement. However, pathological TMJ changes were not found in 24% of patients, and, as already mentioned, rheumatological diseases with the exception of arthralgia do not cause visible radiological changes, at least in the initial stage of the disease (56).

CONCLUSION

The collaboration between a dermatologist and a psychiatric rheumatologist can be complemented by a specialist dental examination if the pathology of psoriatic arthritis involves the orofacial region. The involvement of TMJ in the general clinical picture of psoriatic arthritis is a rare and atypical condition, because it is mentioned infrequently in clinical and epidemiological studies. MRI is the most sensitive radiological method of intra-articular examination, in particular of soft tissues, which has also been successfully applied in TMJ examination.

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