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A Rare Case of Temporal Bone and Temporomandibular Joint Involvement in Psoriatic Arthritis: A Case Report

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ABSTRACT

Background and Objective: Psoriatic arthritis (PSA) is a multifactorial disease that affects 5-8% of patients with psoriasis. This disease is rarely reported in temporomandibular joint (TMJ). Female patients are generally prone to temporomandibular disorders (TMDs), and disorders affecting this joint cause secondary symptoms such as general mouth and face pain, headache, masticatory myalgia, and sleep disturbance. A rare case of temporal bone and temporomandibular joint involvement in psoriatic arthritis is reported here.

Case Report: The patient is a 62-year-old woman who referred with pain in the right ear, physical imbalance, restricted mouth opening, along with the habit of clenching. CBCT findings showed evidence of reduced joint space on the right and left TMJ, the presence of erosive lesions on the right condylar head. Dehiscence of the roof of the middle ear was also present on the right and left sides. Also, the petrotympanic fissure or the foramen tympanicum was open on the right and left sides. She had previously used a soft night guard on the right side for TMJ pain, but due to the treatment failure, a prosthodontist recommended the use of a hard night guard.

Conclusion: Based on the results of this study, temporal bone involvement should also be considered in people with a history of psoriasis.

Keywords: *Temporomandibular Joint, Temporal Bone, Arthritis, Psoriatic.*

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Introduction

Psoriatic arthritis affects 5-8% of patients with psoriasis and is a multifactorial disease (1). The first case of psoriatic TMJ arthritis was reported in 1965, although psoriatic arthritis is rarely reported in TMJ (less than 50 reported cases in the last 50 year) (2). According to evidence, some degree of TMJ involvement is often observed in one-third to one-half of patients with psoriatic arthritis (1). In psoriatic arthritis (PSA), peripheral arthritis (such as TMJ) is seen with higher level of disability in women (3).

Radiographic evaluation is recommended in all PSA cases, and conventional radiography is usually used. CBCT is used as advanced imaging for TMJ assessment. CT scans and CBCT do not show the soft tissue changes that characterize TMJ arthritis's early stages. Consequently, MRI is used, which is a highly sensitive tool to study soft tissue changes. Besides, ultrasound may be used to examine effusions (1, 4, 5).

In their study, Wenneberg et al. observed radiological changes in TMJ in 66% of patients with rheumatoid arthritis (RA), 38% of patients with psoriatic arthritis, and 30% of patients with ankylosing spondylitis (AS), whereas only 12% were involved in the control group (6). The study by Falisi reported a 65-year-old woman with right ear pain, joint sounds, and a history of skin psoriasis. On radiographic examination, bone remodeling was observed at both levels of the TMJ condyle (right more than left). In addition, both the articular eminence of the zygomatic process and the upper surface of the condyle were flattened, resulting in reduced intra-articular space (7). Roopa reported a 44-year-old man complaining about right ear pain. CBCT of TMJ showed mild bone erosion in the internal and lateral sides of the right condyle as well as a reduction in the articular disc space on the right, indicating early degenerative changes in the right condyle (8).

TMJ, like all other complex joints, can be affected by PSA, and its involvement has negative consequences for the quality of life of patients, especially female patients. The temporal bone affects an important part of the structure of the ear, so it is important to diagnose involvement in this area.

In this article, we report TMJ radiographic findings in patients with PSA and a rare case of the disease in a woman with temporal bone involvement and TMJ. According to our knowledge, this is the first case of temporal bone involvement in PSA.

Case Report

This study was conducted after approval by the ethics committee of Mashhad University of Medical Sciences with the code IR.MUMS.REC.1401.009. A 62-year-old woman suffering from right earache has been referred to an otolaryngologist. After a thorough ENT examination, the ear showed no hearing loss, or inflammatory or infectious disease. The patient was referred to a prosthodontist and medical attention was focused on TMJ. Her symptoms included pain in the right ear, physical imbalance in some directions, restrictions on opening the mouth, and the habit of clenching, which was increased when watching thriller movies. External examination showed tenderness of the right TMJ area when opening the mouth. When opening and closing the mouth, there was evidence of crepitus in the right TMJs. Furthermore, her joints of hands had stretched skin and she had curved fingers due to arthritis psoriasis and the patient was under the control of a rheumatologist.

The CBCT images of TMJ using a Planmeca device (MID model made in Finland) with a voxel size of 0.2 mm showed reduced joint space on the right and left (Figures 1 and 2), the presence of erosive lesions on the right condyle head and thinning of the roof of glenoid fossa (Figure 1). Dehiscence of the middle ear roof was also noted on the right and left, and the foramen tympanicum was patent on the right and left (Figures 3 and 4).

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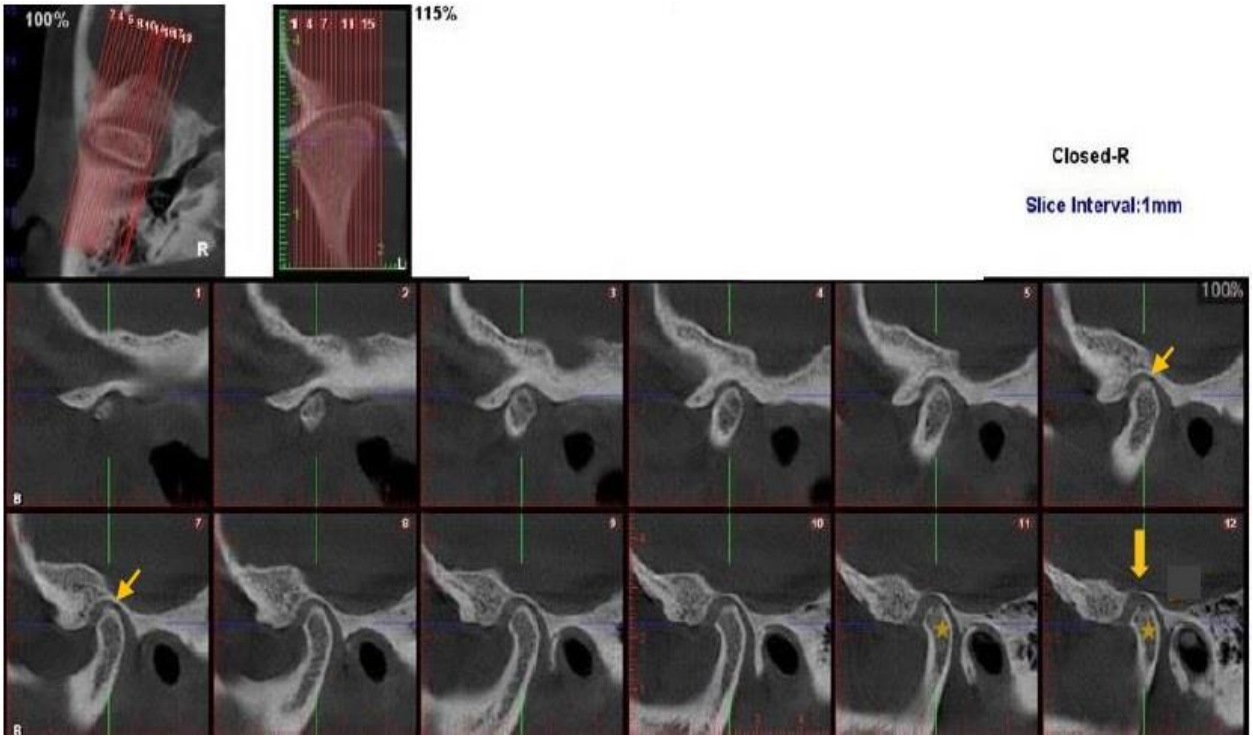


Figure 1. The CBCT series of sagittal images show the right condyle head when the mouth is shut. The presence of an erosive lesion in the right condyle head (stars), thinning of the glenoid fossa roof (arrow) and reduced joint space (thin arrows) are observed.

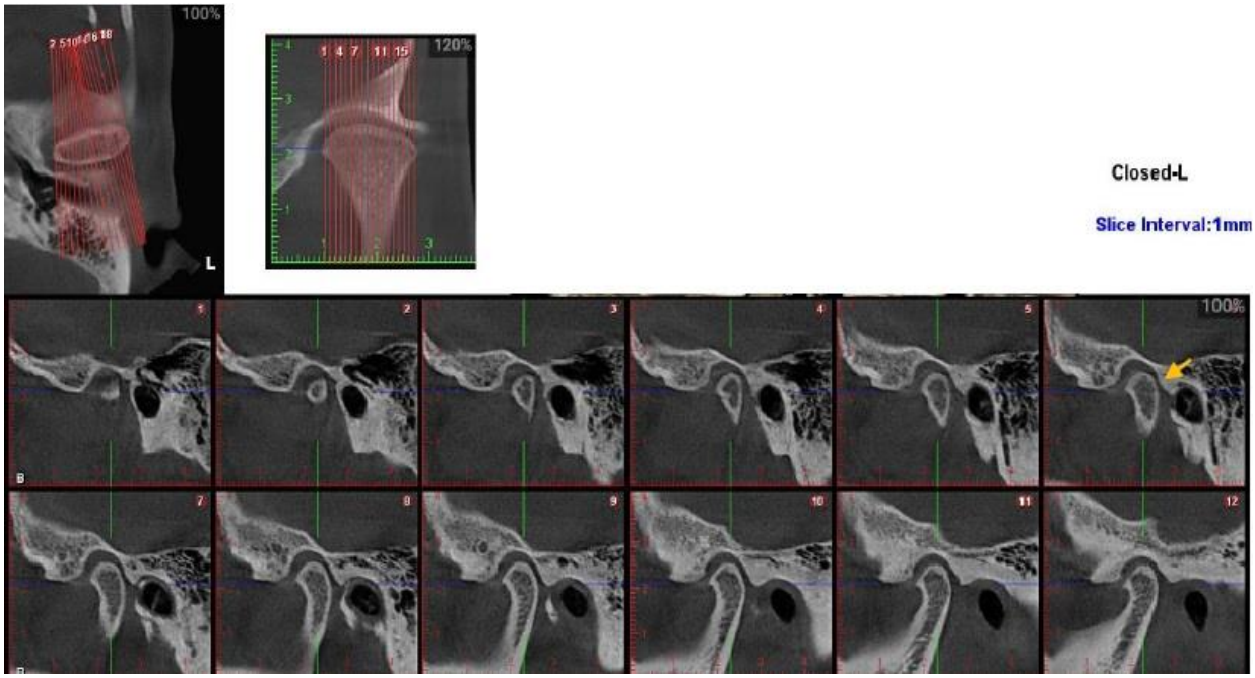


Figure 2. The CBCT series of sagittal images show the left condyle head when the mouth is shut. Reduced joint space (thin arrow) is observed.

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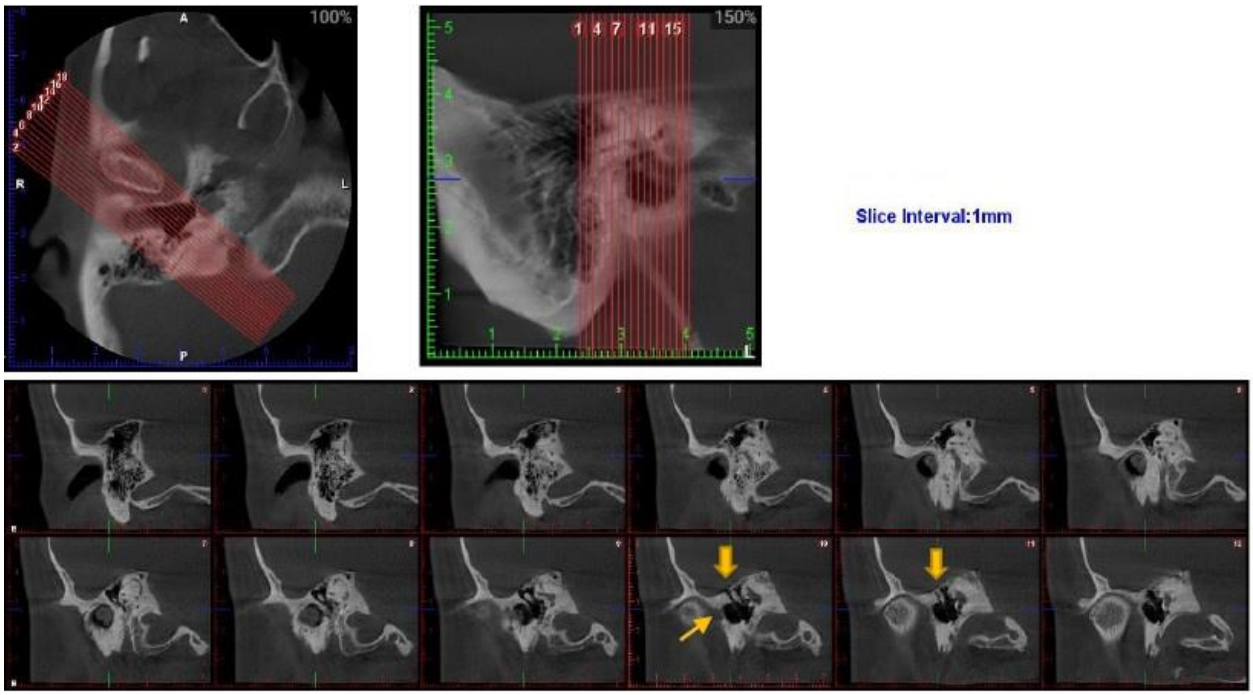


Figure 3. CBCT images (Poschl plane) show dehiscence of the right middle ear roof (arrows). The foramen tympanicum on the right is patent (thin arrow).

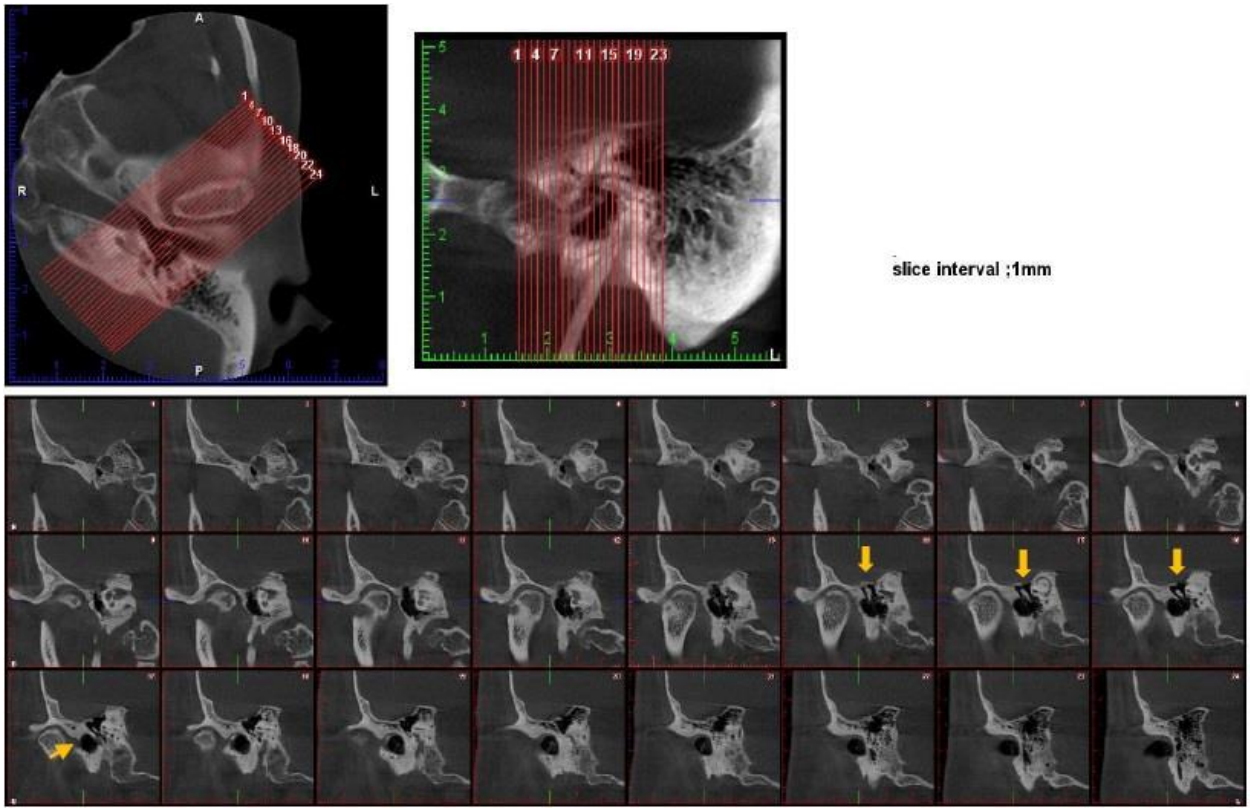


Figure 4. CBCT images (Poschl plane) show dehiscence of the left middle ear roof (arrows).

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Clinical and radiological information with medical history led to the diagnosis of degenerative joint disease. Based on the RDC/TMD system (group I [muscle disorders], group II [disc displacement], group III Arthralgia [Osteoarthritis, Osteoarthrosis]), our patient was in group III (9).

Treatment was causal and therefore the patient was monitored by a rheumatologist for appropriate treatment. In addition, the prosthodontist replaced the soft night guards with hard night guards due to the failure to improve the patient's symptoms.

Discussion

In this reported case, CBCT images showed thinning of the roof of glenoid fossa, dehiscence of the middle ear roof on the right and left, patent foramen tympanicum on the right and left, and the ear-related symptoms of these patients could be due to involvement of these bony landmarks, but more research is needed in other patients to prove it.

Khojastepour et al. found that discontinuity or thinning of the roof of glenoid fossa was observed in a high percentage of patients with TMD. This discontinuity in CBCT studies may be due to the voxel size greater than 0.3, as the thickness of the bone may be below this size, and non-ossified bones may not be seen (10). In our patient, the roof of glenoid fossa was also very thin on the right side. The findings were similar to those reported by Skármeta et al., who presented a 63-year-old woman with PSA with mild pain in the right TMJ with the erosion of the roof of glenoid fossa (11). The clinical significance of a very thin roof of glenoid fossa is not entirely clear. However, the risk of traumatic condyle displacement to the inside of the cranial fossa should be considered. Although displacement in the middle cranial fossa area is rare, factors that increase the risk of displacement include round condyle, increased pneumatization of the temporal bone, and lack of posterior tooth (10).

Tegmen tympani dehiscence was observed in our patient. Whyte et al. showed that tegmen tympani dehiscence increased the risk of dehiscence of the roof of glenoid fossa. The risk for tegmen tympani dehiscence also increased with age (12). Our patient is also an elderly woman (62 years old) who has tegmen tympani dehiscence associated with dehiscence of the roof of glenoid fossa.

Foramen tympanicum is present at birth on the temporal bone's tympanic plate and usually closes before the age of five. Foramen tympanicum closing failure turns it into a persistent foramen tympanicum as a normal variation in the external auditory canal's anterior wall. Foramen tympanicum or foramen of Huschke is not a real foramen. Therefore, it is better to use the terms “bone defect” or “dehiscence”. This dehiscence allows access to surrounding structures to the external auditory canal (TMJ, parotid, infratemporal fossa, etc.), which may transmit the infection or tumor to the external auditory canal or vice versa (13).

Deniz et al. concluded that unilateral foramen of Huschke involvement is more than bilateral involvement (14). Contrarily, Lima et al. stated that bilateral involvement is more common than unilateral involvement (15). In our patient, the foramen tympanicum was patent on both sides. These differences may possibly be attributed to the effect of variable voxel size on the spatial resolution, using different types of CT images for foramen tympanicum diagnosis, chewing habits, and genetic factors of the study population (14, 15).

Our patient was a 64-year-old woman. In the study of Lacout, three of the four patients with foramen tympanicum were females. Moreover, a localized decrease in tympanicum bone thickness was observed in female patients (13). This difference may be caused due to differences in the growth and development of mandible bone between men and women (13). In the study of Borgia et al., hearing loss was significantly more common in patients with psoriasis (especially in the arthropathic type, patients with a history of over ten years, more severe types of psoriasis, and in smokers) compared with the healthy individuals. Ossicular

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discontinuity and the flaccid tympanic membrane were observed in patients with psoriasis history for more than 20 years. In such cases, the tightening of the tympanic-bone complex may reduce the system's elasticity and reduce flexibility and adaptability (16). Karabulut et al. did not report a significant hearing impairment in patients with psoriasis compared to the control group (17). In our patient, evidence of dehiscence was also seen in the middle ear roof on the right and left sides, though no hearing loss was detected.

Common clinical features of PSA in TMJ include pain and tenderness in the TMJ and masticatory muscles, limited range of motion, clicking sound during jaw movements, joint stiffness, jaw pain and fatigue, earache, and onychocryptosis (1, 2, 4). TMJ unilateral involvement is more common than bilateral involvement (3, 4). Our patient had the mentioned symptoms as well as bilateral TMJ involvement.

There was evidence of clenching in our patient. Crincoli et al. observed a statistically significant increase in symptoms of TMD, including bruxism and temporomandibular joint sounds in patients with PSA, especially in women, compared with psoriatic patients without arthritis and the control group (18). It was similar to the results of a study by Stodolkiewicz, who divided psoriatic patients into three subgroups: type 1 psoriasis (patients under the age of 40 and with hereditary disease), type 2 psoriasis (patients over the age of 40 and with non-hereditary disease), and psoriatic arthritis, and found that patients with psoriasis arthritis suffer more daily clenching and more pain compared with type 1 psoriasis. They also found that patients with psoriatic arthritis with TMD experience more clenching than those without TMD (both during the day and at night) (19). Our patient also had clenching with TMD. Surprisingly, it got worsened when watching thriller movies, which may be due to stress. However, in the study of Leovigildo et al. regarding the extent of stress-induced changes in psoriatic patients, the rate of clenching due to stress was reported to be low (7.84%) (20). Radiographic images of this disease show erosive changes in the condylar head with osteoporotic lesions, joint space narrowing, condylar head flattening, subchondral sclerosis, proliferative lesions, joint effusion, osteophyte formation, and TMJ ankylosis. Since these findings are non-specific, they cannot distinguish PSA from other arthritis types (1, 4, 5). Erosive changes of the condyle head and the narrowing of joint space were also observed in our patient.

Radiographic changes such as erosion, flattening and etc. are non-specific. Thus, we need to find a specific radiographic finding. In this article, we recognized a new radiographic change in PSA, i.e., the thinning of the roof of glenoid fossa, the dehiscence of the middle ear, and the patent foramen tympanicum. CBCT can be more reliable for foramen tympanicum detection since it provides high-resolution images of bone tissue without overlapping surrounding structures. These findings need further investigation and may be helpful in disease diagnosis.

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