

Psoriatic arthritis and the temporomandibular joint



Question:

What are the implications of psoriatic disease in dentistry?

Background:

Psoriasis has a complex clinical profile with many different forms (Fig. 1); these may be associated with inflammatory altered joints, enthesitis, spondyloarthropathies of the spine, dactylitis, characteristic scaly skin changes as well as tongue and nail changes [7, 9, 24]. We distinguish an early form (onset at the age of 10–25 years) in the case of corresponding genetic disposition and a later form (onset at the age of 35–60 years), which generally shows no familial clustering. The special form of psoriatic arthritis has only been classified as an independent clinical picture since the 1960s and has been distinguished from rheumatoid arthritis with parallel skin changes. Psoriatic arthritis may have regionally variable incidences (0.05–0.24%) [11]. Its prevalence among patients with psoriasis has been reported to be around 6–41% [17]. The disease has relevance in dentistry because the temporomandibular joint and the mucosa of the oral cavity, including the tongue, may be affected.

Comorbidities. Patients with psoriasis require special attention due to their multiple comorbidities [24, 25]; the goal is to minimize the

risks associated with comorbidities during dental procedures [5]. The list of possible comorbidities is extensive [21]; it includes cardiovascular disease with an increased risk of myocardial infarction, structural coronary artery disease, and a predisposition to hypertension [28]. In patients with psoriasis, there is an increased risk of stroke [10] and of developing dementia as well as Parkinson's disease [26]. Furthermore, there is an increased incidence of liver and kidney dysfunction associated with psoriasis [24]. In addition, there is an increased risk of diabetes mellitus, Crohn's disease, pulmonary diseases such as bronchial asthma [24], endocrine diseases, as well as ophthalmologic complications such as conjunctivitis, cataract, or uveitis [5, 16].

Clinic. Psoriatic arthritis mostly manifests between the 30th and 55th year of life. As a rule, disorders in the temporomandibular joint only appear years (~10 years) [5] after the onset of the skin and nail changes (Fig. 2), the characteristic swelling of the finger joints, or after the onset of disorders in other joints. In some cases, arthritis of the temporomandibular joint may occur as the initial manifestation of psoriatic disease. Dental practitioners then have the responsibility of establishing the course of treatment and referring patients to the appropriate specialists. At pres-

ent, if psoriatic arthritis is recognized and treated in time, damage to the joints can be avoided or significantly reduced [27].

Classification and forms of psoriatic arthritis. Based on topography and structural differences, four forms can be distinguished [19]. Along with them all the above-mentioned pathological patterns can occur. The four forms are:

- Axial type. It occurs along the axial skeleton. Disease patterns include mainly sacroilitis and ankylosing spondylitis. In most cases, it is associated with the peripheral type.
- Peripheral type. This is the most common type. It is characterized by destructive arthritis/polyarthritides of the small joints of the hand and foot, but also to some extent of the large joints (knee joint). Periosteal changes and acroosteolysis are often present.
- Monoarthritis type. It mostly affects the large joints such as the knee and hip as well as the upper and lower ankle joints. Manifestation together with the axial and peripheral types is possible.
- Arthritis mutilans. Besides the above-mentioned arthritides, bone resorptions are possible.

In addition to complaints in the joints, changes in the skin, skin appendages and soft tissues are also relevant for the diagnosis and therapy of patients.

Regensburg University Hospital, Polyclinic for Prosthetic Dentistry, Franz-Josef-Strauß-Allee 11, D-93053 Regensburg: Prof. Dr. Michael Behr

Regensburg University Hospital, Polyclinic for Orthodontics, Franz-Josef-Strauß-Allee 11, 93053 Regensburg: Prof. Dr. Jochen Fanghänel

Greifswald University Hospital, Institute for Anatomy and Cell Biology, Friedrich-Loeffler-Str. 23c, 17487 Greifswald: Dr. Bärbel Miehe

Regensburg University Hospital, Clinic and Polyclinic for Dermatology, Franz-Josef-Strauß-Allee 11, 93053 Regensburg: Univ.-Prof. Dr. med. Stephan Schremel

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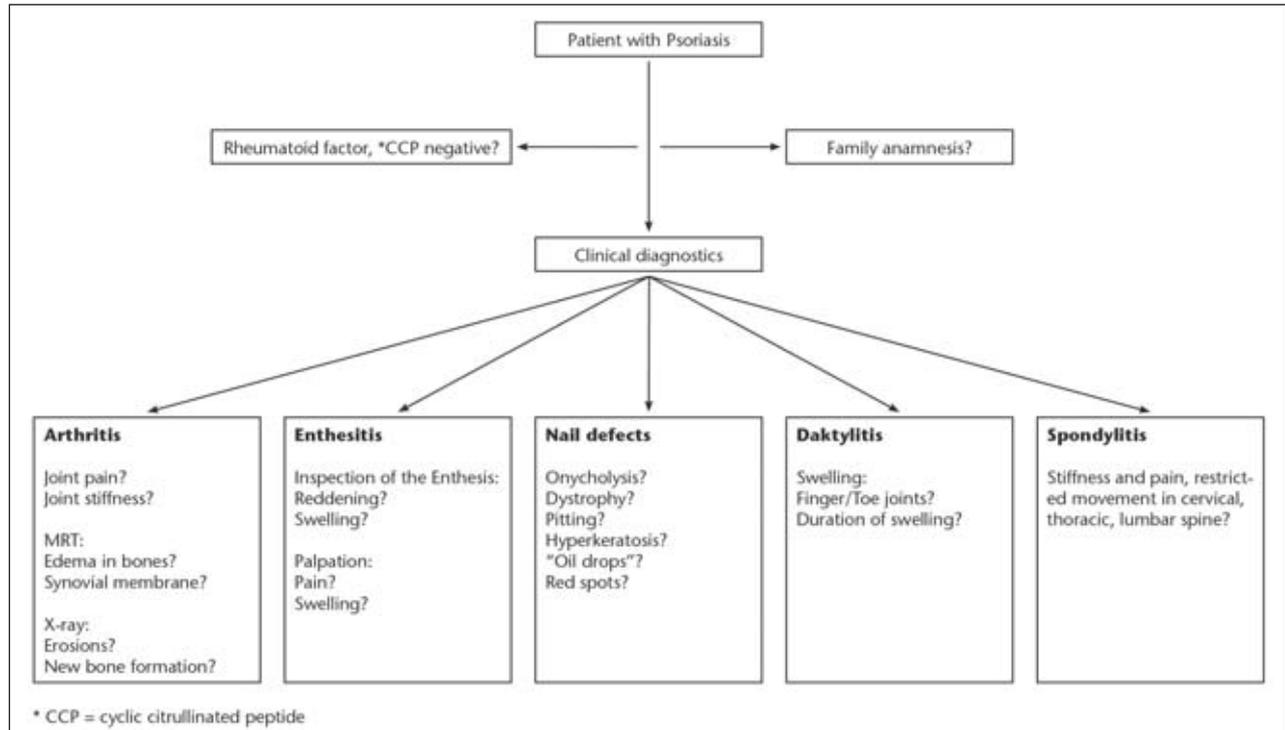


Figure 1 Multidimensional nature of the possible clinical symptoms of psoriatic disease



Figure 2 Typical skin and nail changes associated with psoriasis. In addition to the flaky, silvery patches of efflorescent cutis, the figure shows signs of dactylitis and, on the nails, signs of onycholysis and psoriatic onychodystrophy.



Figure 3 Lingua geographica. View from above

Skin/mucous membrane changes. Skin lesions appear in 80% of cases as raised, sharply and irregularly delimited, reddish plaques (plaque vulgaris) with silvery scaling (Fig. 2), which may bleed under light mechanical stress. In approximately 5% of cases, psoriasis appears as pustular, purulent efflorescence (pustular psoriasis, Barber type) [5].

In the oral cavity, psoriasis rarely occurs on the lips, and to a reduced

extent, on the oral mucosa. According to Hornstein [14], this is explained by the fact that there is a 5 to 7 times higher proliferation rate of the oral mucosa compared to the epidermis of the outer skin. Thus, the proliferation rate of the outer epidermis in psoriasis is approximately the same as that of the oral mucosa. Therefore, the effects of psoriatic disease virtually do not appear on the oral mucosa. On the dorsum of the

tongue, however, the conditions of keratinization are different. As a result, an erythematous tongue with pronounced exfoliation and pustule formation may occur in the marginal zones (geographic tongue) [18] (Fig. 3). The lingual papillae may be flattened and therefore distinguishable from the healthy papillae (Fig. 4).

Nail changes. About 80% of all patients with psoriatic arthritis devel-

	Psoriatic arthritis	Rheumatoid arthritis	Gout	SAPHO Syndrome	Crohn's disease/ Ulcerative colitis
Number of affected joints	Oligoarthritis	Polyarthritis	Monoarthritis	Oligoarthritis	Oligoarthritis
Typically affected joints	All joints, including the distal interphalangeal joints	Distal interphalangeal joints	Small joints of the lower extremity, metatarsophalangeal joint (podagra) or forefoot (tarsitis)	Sternoclavicular joints, sternocostal joints, temporomandibular joint	All joints, rarely the temporomandibular joint
Enthesitis	In 60–80% of cases	Not typical	Not typical	Not typical	Not typical
Daktylitis	In 30% of cases	Not typical	Tophi	Not typical	Not typical
Involvement of the spine	Axial spondyloarthritis	Erosive cervical findings	Not typical	Thoracic spine areas	Not typical
Skin/nails	In 80% of cases plaque vulgaris, pustular psoriasis, in 60% of cases onycholysis, psoriatic onychodystrophy	Not typical	Skin erythema, soft tissue swelling, gout, tophi, rarely gout, tophi in the ear helix ("gouty pearl").	Acne, pustular palma-plantar efflorescences, also pustular psoriasis	Cheilitis, aphthous, rarely fissural ulcerative changes of the oral mucosa
Serology	CCP (cyclic citrullinated peptide) and rheumatoid factor are negative	CCP and rheumatoid factor are positive	CCP and rheumatoid factor are negative, uric acid serum level elevated (> 360 mmol/l, microscopic uric acid crystals)	CCP and rheumatoid factor are negative, inflammatory parameters are elevated in hemogram	CCP and rheumatoid factor are negative, inflammatory parameters are elevated in hemogram
Radiological findings	Periosteal bone neoplasm (occurs only in the late stage)	Erosion and osteopenia (reduction of bone density)	Erosions and discontinuities of the joint surface	Osteosclerosis, hyperostosis, MRI: bone marrow edema	Scleroses

Table 1 Possible differential diagnoses of psoriatic arthritis [4, 7, 8, 23]

op changes in the nails (spotted nails), which are referred to as onycholysis and psoriatic onychodystrophy (Fig. 2). The changes affect the nail matrix as well as the nail bed [3]. The functional connection of the nails with the distal interphalangeal joints of the fingers, especially the extensor tendons (M. extensor digitorum communis and possibly M. extensor digitalis minimus, among others), may explain the frequent combined occurrence (80%) of joint and nail changes in psoriatic arthritis [2]. Affected nails show red spots, pitting, and scarring, as well as a friable structure of the nail surface. Toenails mostly show a yellowish-orange discoloration of the nail which is called the "oil drop" phenomenon [3]. The cause of these morphological changes is a disturbed keratinization of the nail. Character-

istic of nail psoriasis is subungual (located under the nail) hyperkeratosis, which distinguishes it from onychomycosis [1].

Enthesitis/daktylitis. The term "enthesitis" refers to the connective tissue which connects tendons, ligaments, capsules and fascia to bone or muscle tissue. This area is subject to intense mechanical stress. Enthesitis is closely connected with the synovial tissue of the joints. The two form the synovial-enthesal complex ("enthesitis organ") [15]. In case of increased mechanical stress, genetic predisposition and possible bacterial infections, genes are activated that encode proteins responsible for the immune response or tissue compatibility (histocompatibility, HLA-B27). Animal studies suggest that in psoriasis/psoriatic arthritis there is an auto-

immune reaction against proteoglycans and proteins of cartilage fibroblasts as well as against BMP (bone morphogenetic protein). As a result, interleukin-23 (IL-23) is released, which activates immune defense T-cells. These in turn release IL-17, IL-22 and TNF- α (tumor necrosis factor) [15]. Subsequently, an inflammation of the joint structures occurs.

In the case of daktylitis, tendosynovitis, edema of the peritendinous soft tissue („sausage finger“), enthesitis, and less frequently synovitis is present [20]. The pathogenesis of daktylitis is not clearly understood. However, animal studies suggest that IL-17, IL-22, and TNF- α as well as IL-6 and the Dickkopf-related protein 1 may play a role, [2].

Differential diagnoses. The differentiation of psoriatic arthritis

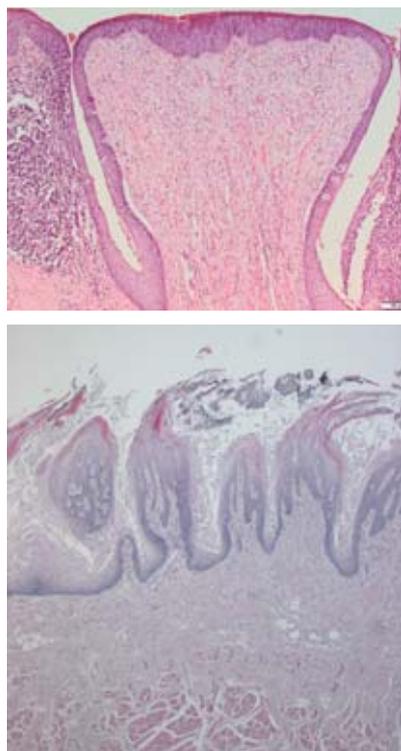


Figure 4 Normal human lingual papillae, HE stain. 4a: Papilla vallata, magnification 100 \times . 4b: Papillae filiformes, magnification 25 \times .

Fig. 4 (a/b): J. Fanghänel, B. Mielhe

of the temporomandibular joint from rheumatoid arthritis with skin lesions [7], temporomandibular joint arthritis associated with SAPHO syndrome [4], gout [8, 22], and arthritides associated with inflammatory bowel diseases such as Crohn's disease [6] is not always straightforward. An overview is provided in Table 1 (Tab. 1).

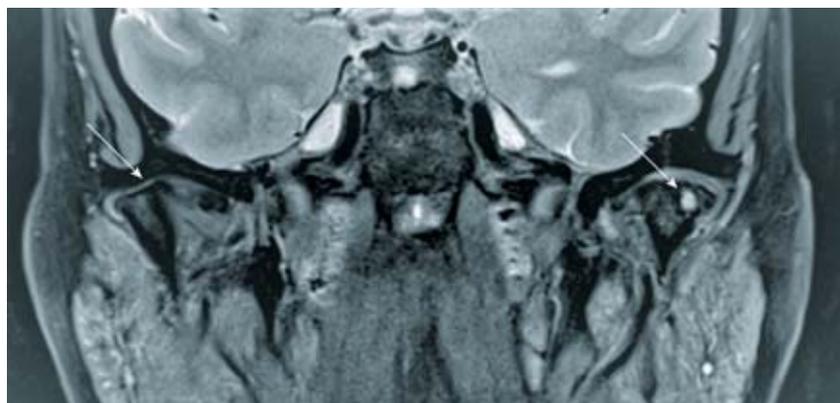


Figure 5 Magnetic resonance imaging of a patient with psoriatic arthritis in the axial view. The temporomandibular joint on the left shows new bone formation (arrow); the condyle of the right temporomandibular joint shows bone cysts (arrow). The signal-intensive areas (white) indicate inflammatory zones.

Imaging. X-ray imaging shows erosions and irregular bone contours as well as new bone formation. Radiopaque calcifications are found in soft tissues. However, conventional x-rays are not considered the optimal imaging modality for psoriasis. The characteristic soft tissue changes with enthesitis, changes in the joint capsule, focal soft tissue thickening as well as soft tissue and bone edema can be visualized better using magnetic resonance imaging. In cases of dactylitis and enthesitis, ultrasound examinations are also recommended, but these are usually not relevant for dental diagnosis.

Orthopantomograms and magnetic resonance imaging are particularly useful for diagnosing psoriatic arthritis of the temporomandibular joint in dentistry. Erosions, irregular bone contours as well as new bone formation are usually well represented on X-rays. Magnetic resonance imaging also shows active inflammatory processes in the soft tissues as well as cystic changes in the region of the mandibular condyle (Fig. 5, Fig. 6).

Treatment. Therapy is primarily administered by rheumatologists and dermatologists. Non-steroidal anti-inflammatory drugs and corticosteroids remain in use as initial treatment for acute symptoms. Since psoriatic arthritis is not a benign disease but is associated with increasing irreparable joint destruction, the early use of immunomodulators is indicated. These include TNF- α inhibitors (e.g., adalimumab,

infliximab, golimumab) and substances that affect interleukins such as IL-12/23 (e.g., guselkumab, tildrakizumab, risankizumab, ustekinumab) or IL-17 (e.g., ixekizumab, bosalumab, secukinumab). Other available therapies are Janus kinase inhibitors (tofacitinib) and PDE4 inhibitors (apremilast). These therapeutic concepts are individually adapted to each patient's case. Corresponding therapy guidelines have been published by professional societies such as the *European League Against Rheumatism* (EULAR) and the *Group for Research and Assessment of Psoriasis and Psoriatic Arthritis* (GRAPPA) [12, 22].

The main objective of the dentist is to check the occlusion and to rebuild it at least provisionally in case of a loss of supporting zones. Adjustable bite splints such as the Michigan splint, in combination with physiotherapy, can help to relax the muscles and to prevent possible loadings of the joints. Splints with an anterior jig are contraindicated. Furthermore, a key responsibility of the dentist is to inquire whether or not patients have already presented themselves to a rheumatologist, so that an immunomodulatory therapy can be initiated promptly. Numerous patients with psoriasis, who have not commenced treatment, or have not been treated adequately, continue to be identified. Since psoriatic arthritis is a progressive destructive joint disease, the timely initiation of immunomodulatory therapy can largely prevent or at least limit joint destruc-



Figure 6 Magnetic resonance imaging of a patient with psoriatic arthritis in the sagittal view. The signal-intensive areas (white) indicate inflammatory zones in the area of the enthesion organ.

tion. This improves the quality of life of patients considerably [7, 13].

Statement:

Knowledge of psoriasis/psoriatic arthritis disease is important for the dentist due to the following reasons:

- Patients with psoriasis have multiple comorbidities; these can include cardiovascular disease, hypertension, pulmonary disease, renal and liver disease, diabetes, higher risk of stroke, and eye disease. Such comorbidities can result in complications during routine dental treatment [5].
- Patients with psoriasis/psoriatic arthritis who are undergoing therapy at a rheumatologist or dermatologist usually take immunomodulatory drugs. This may decrease the patient's immune response.
- In nearly half of patients with psoriasis, the temporomandibular joint and the tongue are also affected [7].
- Psoriatic arthritis is a disease which destroys the joint progressively; its early diagnosis and treatment may significantly improve the patient's quality of life [13]. Thus, the dentist has the responsibility of referring patients, who have not been treated previously or who have been inadequately treated, to appropriate specialists such as rheumatologists or dermatologists.

Conflict of interest

The authors declare that there are no conflicts of interest as defined by the guidelines of the International Committee of Medical Journal Editors.

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**PROF. DR. MED. DENT.
MICHAEL BEHR**

University of Regensburg
Faculty of Medicine
Franz-Josef-Strauß-Allee 11
93053 Regensburg

michael.behr@klinik.uni-regensburg.de