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Interpreting TMJ Pain Beyond Conventional TMD Etiologies Running title:Misdiagnosed TMJ Pain Revealing Systemic Disease

Abstract:
Temporomandibular joint (TMJ) pain is frequently encountered in oral medicine and is commonly attributed to primary temporomandibular disorders (TMDs). However, inflammatory arthropathies may involve the TMJ and present with orofacial symptoms, leading to misdiagnosis and delayed referral. Ankylosing spondylitis (AS), a seronegative spondyloarthropathy mainly affecting the axial skeleton, rarely presents with TMJ involvement, especially in young females.A young female presented with chronic TMJ pain accompanied by fatigue and functional limitation. Clinical evaluation suggested inflammatory TMJ arthritis rather than mechanical TMD. She also reported inflammatory low back pain with prolonged morning stiffness and reduced spinal mobility. Laboratory evaluation revealed HLA-B27 positivity, with negative rheumatoid factor and antinuclear antibody results.Imaging supported inflammatory TMJ involvement, leading to a diagnosis of ankylosing spondylitis in collaboration with rheumatology.TMJ pain may be an early manifestation of systemic inflammatory disease, requiring thorough evaluation and multidisciplinary referral for timely diagnosis and management.

Key-words: Temporomandibular joint; Ankylosing spondylitis; Temporomandibular disorders; Human leukocyte antigen B27; Orofacial pain.

Introduction:

Spondyloarthritis is a group of inflammatory disorders primarily affecting the axial skeleton and peripheral joints, including ankylosing spondylitis and psoriatic arthritis. Ankylosing spondylitis is a rheumatoid factor–negative condition characterized by chronic inflammation and sacroiliitis, with a higher prevalence in males.[1,2] It typically presents in early adulthood with insidious inflammatory low back pain, stiffness, and progressive spinal mobility restriction. An immunogenetic association with human leukocyte antigen B27 is observed in over ninety percent of affected individuals. Temporomandibular joint involvement is an underrecognized yet clinically relevant manifestation of ankylosing spondylitis.[3,4]

Case Presentation:

A 26-year-old female presented with right-sided temporomandibular joint (TMJ) pain, clicking, and difficulty in jaw movements. Clinical examination revealed tenderness of the right masseter, trapezius, and sternocleidomastoid muscles,while during intraoral examination, the patient exhibited normal overjet and overbite, with no evidence of dental attrition and no occlusal discrepancies (Figure-1) , initially suggestive of myofascial pain. However, detailed history taking revealed a one-year progression of multisite musculoskeletal pain, beginning with sudden onset right knee pain and subsequently involving the right waist, occipital region, and lower back. The patient reported morning stiffness lasting longer than one hour and restricted lumbar mobility—features atypical of isolated TMJ disorders..

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Disease activity assessment revealed a Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) score of 4(Figure 2). TMJ imaging demonstrated degenerative changes involving the right condylar head (Figure 3) Laboratory investigations, as summarized in Table 1, revealed positivity for human leukocyte antigen B27 (HLA-B27), with negative rheumatoid factor (RF) and antinuclear antibody (ANA). Serum alkaline phosphatase, calcium, and vitamin D levels (50 ng/mL) were within normal limits, while vitamin B12 was borderline low. Pain also extended to the right shoulder and hemicranial region. The patient additionally reported cognitive and emotional symptoms, including crying spells, poor concentration, and reduced motivation. Based on the combined clinical, laboratory, and radiological findings—including TMJ degenerative arthritis, inflammatory axial symptoms, multisite peripheral involvement, elevated disease activity, and HLA-B27 positivity—ankylosing spondylitis was suspected by the oral physician, leading to timely referral to rheumatology, where the diagnosis was subsequently confirmed. The diagnostic evaluation and referral strategy were aligned with the 2017 Assessment of Spondyloarthritis International Society (ASAS) and EULAR recommendations, which emphasize early identification of inflammatory back pain, peripheral joint involvement, and extra-axial manifestations.

Discussion:

Ankylosing spondylitis (AS) is a chronic immune-mediated inflammatory disease within the spondyloarthritis spectrum that predominantly affects the axial skeleton, with potential involvement of peripheral and extra-axial joints. Although historically regarded as a male-predominant condition, with a reported prevalence of 9–30 per 10,000 individuals and a male-to-female ratio of approximately 3:1, recent epidemiological data demonstrate increasing recognition of AS in female patients, in whom atypical clinical presentations and less pronounced radiographic changes frequently contribute to diagnostic delay.[2,6,7]Temporomandibular joint (TMJ) involvement is an underrecognized manifestation of AS and other spondyloarthropathies. Reported prevalence rates vary widely, ranging from 4% to over 50%, reflecting differences in disease duration, study design, and imaging modalities employed.[2,4,8,9]Clinically, TMJ involvement may manifest as pain, stiffness, clicking, restricted mandibular movement, or, in advanced cases, ankylosis, often mimicking primary temporomandibular disorders and leading to misdiagnosis.[8]The pathogenesis of TMJ involvement in AS is thought to parallel that of other synovial joints, with inflammatory synovitis, capsular involvement, and entheseal inflammation driving progressive cartilage degradation, subchondral bone erosion, and pathological new bone formation.[2,9] Advanced imaging modalities, including cone-beam computed tomography and magnetic resonance imaging, are therefore essential for accurate identification of inflammatory and degenerative TMJ changes and for differentiation from isolated myofascial or mechanical disorders.[4,9]In the present case, TMJ degenerative changes occurring alongside inflammatory axial symptoms, multisite peripheral musculoskeletal involvement, elevated disease activity, and HLA-B27 positivity—with negative rheumatoid factor and antinuclear antibody—are consistent with a diagnosis within the seronegative spondyloarthritis spectrum. Similar patterns of TMJ involvement in AS have been documented in observational and scoping studies, reinforcing the systemic nature of the disease.[4,7] Although TMJ ankylosis remains rare, isolated cases have been reported, underscoring the importance of early recognition to prevent irreversible joint damage[10]. This case illustrates the critical role of oral physicians in identifying inflammatory red-flag features suggestive of systemic rheumatologic disease and initiating appropriate referral pathways in accordance with ASAS and EULAR recommendations..[6]

Conclusion:

HLA-B27–associated temporomandibular joint arthritis represents an uncommon but clinically significant manifestation of ankylosing spondylitis, particularly in young female patients in whom atypical presentations may delay diagnosis. This case highlights the importance of considering inflammatory spondyloarthritis as a potential underlying diagnosis in patients presenting with temporomandibular joint symptoms accompanied by axial and peripheral musculoskeletal features. Early imaging, heightened clinical suspicion, and multidisciplinary collaboration between oral medicine specialists and rheumatologists are essential to optimize diagnostic accuracy and patient outcomes.

Figure1:Intra-oral examination revealed normal overjet and overbite with no occlusal discrepancies.

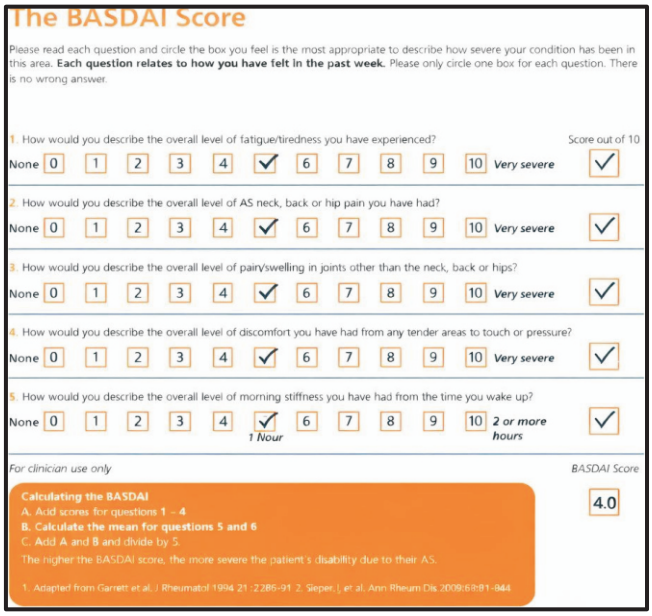

Figure2- Disease activity assessment revealed a Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) score of 4

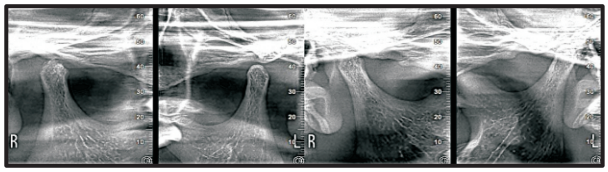

Figure3 :Temporomandibular joint imaging showing degenerative changes involving the right condylar head

Table no.1: Laboratory Parameters and Patient Values **.**

Laboratory Parameter	Patient Value
Human leukocyte antigen B27 (HLA B27)	Positive
Rheumatoid Factor (RF)	Negative
Alkaline Phosphatase (ALP)	Within normal limits
Vitamin D (25-hydroxy)	50 ng/mL (Within normal limits)
Serum Calcium	Within normal limits
Vitamin B12	Borderline

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