Occasional Review

Neglected conditions producing preauricular and referred pain

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SUMMARY Various theories regarding temporomandibular joint symptoms are reviewed. Two hundred and forty six patients suffering from head, neck, or facial pain, or masticatory dysfunction were studied. In 108 of these patients, the diagnosis of temporomandibular joint synovitis, lateral pterygoid muscle dysfunction, or tenomyositis of the masseter muscle was made. Examination procedures, diagnosis, frequency of occurrence, and initial treatment of these conditions are described.

Certain conditions described extensively in the literature (maxillary sinusitis, otitis media, trigeminal neuralgia, and parotid gland disease) often produce preauricular pain. However, a few musculo-skeletal disorders of this region (temporomandibular joint synovitis, lateral pterygoid muscle dysfunctions, and tenomyositis of the masseter muscle at its attachment to the zygomatic arch) produce similar symptoms to these conditions, and are sometimes overlooked. These disorders centering about the ear, are part of a larger group involving other derangements of the temporomandibular joint and all the masticatory muscles.

Since 1934, when Costen's syndrome was introduced into the medical literature, and especially since 1937 when it reached the dental literature, clinicians began to classify many pains about the ear and face as "temporomandibular joint pains". Costen observed this syndrome of ear and sinus pains in a series of 11 cases. These patients had loss of posterior teeth or were completely edentulous, with resultant "collapsed bite" and mandibular overclosure. They were "cured" or "improved" by prosthetic dental bite opening techniques. Costen ascribed the symptoms to condylar pressure on underlying structures—such as the auriculotemporal and chorda tympani nerves. Over the next 10 to 15 years, many investigators, such as Sicher and Zimmerman, disagreed with Costen on anatomical grounds.

The concept of facial pain and dysfunction was introduced by Schwartz in the 1950s, who investigated 500 patients with temporomandibular joint pain. The temporomandibular pain-dysfunction syndrome that he described included the entire masticatory system and the patient's psychological status as well. Malocclusion was believed to be merely a contributing factor. The work started by Schwartz was expanded by Laskin, who in 1969 introduced the term myofascial pain dysfunction syndrome. This psychophysiologic theory relates muscle fatigue to psychologically motivated, persistent, tension relieving oral habits, as the prime factor in the aetiology of the signs and symptoms of this disorder. Diagnosis of the myofascial pain dysfunction syndrome requires the presence of one or more of the following signs: pain (unilateral, usually in the ear or preauricular area), masticatory muscle tenderness, clicking of the temporomandibular joint, limited opening or mandibular deviation during opening. Laskin attempted to rule out intrinsic joint disorders by requiring the absence of radiologic evidence of joint damage and lack of posterior joint tenderness. At the opposite end of the spectrum, many clini-
Oblique, using the terms temporomandibular joint dysfunction or craniofacial syndrome, believe that malocclusions are responsible for these disorders. This concept may have been introduced by Hippocrates, who described "a group of patients whose teeth are disposed irregularly, crowding one on the other and they are molested by headache and torrhea".10

The various theories so far described have one common denominator—temporomandibular joint complaints are viewed as a clinical entity described as an all-inclusive syndrome. This approach differs from that used to examine other synovial joints and associated musculature, and often leads to imprecise diagnosis and treatment. The fact that health professionals who treat synovial joints (those concerned with orthopedics, rheumatology, physiatrists, physical therapy) usually avoid the temporomandibular joint may explain the use of this different approach.

Examination of the temporomandibular joint and preauricular area frequently revealed specific musculo-skeletal disorders (temporomandibular joint synovitis, lateral pterygoid muscle dysfunction, and tenosynovitis of the masseter muscle at its attachment to the zygomatic arch). The patient may, in these cases, complain of pain or soreness relating to masticatory function. Sometimes, however, the pain may be referred as headache or earache.1 Since these symptoms may simulate or be produced by other pathological conditions, misdiagnosis may occur. The examination procedures, diagnosis, frequency of occurrence, and initial treatment of these conditions will be described in the present review.

**Materials and methods**

During the past 3 years, 246 patients complaining of head, neck, or facial pain, or jaw dysfunction (restricted open-openings, masticatory discomfort, or clicking of the temporomandibular joint) were studied; of these, 49 were male and 197 were female. The age ranged from 14 to 79 years. Forty of these patients had originally consulted a neurologist and 44 had initially consulted an otolaryngologist. The conditions to be described were diagnosed by posterior and lateral temporomandibular joint palpation, application of resistance to the lateral pterygoid muscles, and palpation and application of resistance to the masseter muscles.

We have found radiographs to be of limited use in evaluation of these disorders, or in correlating them with the patient's symptoms. These disorders involve radiolucent tissues—joint capsule, muscles, and tendinous insertions.11,12 The radiograph can be misleading even when hard tissues are involved. Since cartilage is radiolucent, osteoarthrosis of the temporomandibular joint, affecting the cartilage and disc, can exist for many years before bony changes are evident;13 by this time extensive damage to the joint may have occurred.

**Observations and description**

**TEMPOROMANDIBULAR JOINT SYNOVITIS**

Inflammation of the joint lining occurs in the temporomandibular joint, as it does in any synovial joint in the body. When temporomandibular joint synovitis occurs, pain or tenderness can be elicited by the examiner during lateral or posterior joint palpation, or both. The aetiology can be systemic inflammatory disease, osteoarthritis, infection, or a virus.13 Often, a localized synovitis of the posterior aspect of the joint, with effusion of fluid, occurs. This condition is called retrodiscitis14 or posterior capsulitis15 and often causes mandibular deviation, usually directly proportional to the amount of intracapsular oedema. To observe this deviation, the relation of the midlines of the upper and lower central incisors to each other with the teeth together (maximum intercuspation) is noted and compared to that when the mouth is opened. In posterior capsulitis, the mandible will deviate toward the affected side close to, or at, maximal opening.15 This occurs as the range of motion (forward translation) of the affected condyle is limited by the inflammation. In extreme cases, the mandible may also deviate toward the opposite side with the jaws at rest (separation between upper and lower teeth from 1–4 mm) as the intracapsular oedema prevents posterior condylar movement on the affected side.15

**Examination procedures**

**Inspection:** A visible swelling would indicate a rather severe pathology of this joint, often with systemic involvement. An acute infection of systemic inflammatory disease such as rheumatoid arthritis and its variants, particularly psoriatic arthritis, might be severe enough to cause significant swelling.13

**Lateral palpaton:** The area overlying the temporomandibular joint can be felt as a depression just anterior to the tragus of the ear—as the patient opens widely. If inflammation is present, the area will feel tender to palpation.16

**Posterior palpation:** The examiner places the tips of his little fingers in the patient's external auditory canals, bilaterally; the patient's head should be erect. Pressure is exerted anteriorly by the examiner, as the patient opens and closes his jaw several times. If the posterior aspect of the joint is inflamed, pain will be elicited when tissue is compressed against the examiner's finger with the posterior movement of the condyle during closure.1 In addition to inflammation, this phase of the examination may disclose a posteriorly positioned condyle or reciprocal clicking, a common type of disc dysfunction. Condylar malposition or reciprocal clicking, or both, commonly cause retrodiscal synovitis.
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Table Aetiology of temporomandibular joint synovitis

<table>
<thead>
<tr>
<th>Disease</th>
<th>Mechanism</th>
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<tbody>
<tr>
<td>Degenerative joint disease</td>
<td>Microtrauma, malocclusion, disc dysfunction, retrodisal synovitis, constitutional factors</td>
</tr>
<tr>
<td>Retrodisal synovitis</td>
<td>Posteriorly positioned condyle, prolonged opening, disc dysfunction, trauma</td>
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<tr>
<td>Inflammatory joint disease</td>
<td>Systemic inflammation or autoimmunity</td>
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<tr>
<td>Rheumatoid arthritis,</td>
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<td>juvenile rheumatoid arthritis,</td>
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<td>psoriatic arthritis, ankylosing</td>
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<tr>
<td>spondylitis, lupus erythematosis</td>
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<tr>
<td>Infections, bacterial</td>
<td>Local extension from chronic otitis, direct penetration or septicaemia</td>
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<tr>
<td>Infections, viral</td>
<td></td>
</tr>
<tr>
<td>measles, mumps, infectious</td>
<td></td>
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<tr>
<td>mononucleosis</td>
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It can be felt (and often heard) during mandibular movements. It is the result of abrupt condylar shifting as the articular disc slips on and off the condyle with the movements.18 Once the examiner has determined that synovitis exists, a search should be made for systemic disease (table). Degenerative joint disease is the most common primary joint disease of the temporomandibular joint and predisposes to temporomandibular joint synovitis—occurring as a secondary phenomenon of this disease. Degenerative joint disease is usually unilateral, occurring more frequently (by a ratio of 2 to 1) in women.15

If systemic disease or an infection is present, the ESR, alpha-2-globulin, and the serum fibrinogen are frequently elevated. If infection, with fluid in the joint, is suspected, arthrocentesis should be performed. The skin over the joint is cleansed and anaesthetised (1–2% xylocaine without epinephrine). The patient’s mouth is fully opened, and a 20 gauge needle is inserted and directed slightly posteriorly superiorly until fluid can be aspirated. Aspiration of the fluid is accomplished by gentle suction. Fluid obtained should be Gram stained and cultured.13

If synovitis is present, and physical and laboratory findings do not indicate systemic involvement, local causes should be considered. Condylar encroachment of the highly vascular retrodisal tissues is a common cause of synovitis in this area. An excessively posterior condylar position will be evident if the joint is correctly palpated. The loose joint capsule, non-limiting bony configuration, and constant use of the temporomandibular joint make it particularly vulnerable to shifts in condylar position. A posteriorly positioned condyle during maximum closure can be caused by any factor (posterior tooth or alveolar bone loss, caries, excessive tooth wear) causing a loss of vertical dimension between the jaws (bite collapse). In addition, interceptive tooth contacts during vertical closure or lateral movements may force the mandible posteriorly, as will certain orthodontic malocclusions. Another local cause of temporomandibular joint synovitis is trauma induced by prolonged stretching of the joint, as might occur during tonsillectomy or lengthy dental procedures in areas of difficult accessibility of the mouth. In these cases, the posterior attachment of the disc may be stretched or torn.

Initial treatment

The initial treatment of temporomandibular joint synovitis is similar to that prescribed for any inflamed joint. If the inflammation is severe, a soft diet, limited movement, and use of mild heat or cold will make the patient more comfortable. Aspirin or non-steroidal anti-inflammatory medications can be very effective in many cases. If the patient is allergic, intolerant, or unresponsive to these drugs, intra-articular instillation or corticosteroids may be indicated, provided the joint is not infected.19 After the patient is made comfortable, if the aetiology of the synovitis is judged to be an excessively posteriorly positioned condyle, dental treatment to reposition the condyle anteriorly may be required. In the case of a severe infection, the patient may require hospitalisation and the use of intra-venous antibiotics and surgical drainage.

In 53 of these patients (21%), temporomandibular joint synovitis was found. In 25 of these patients (10-2%), both temporomandibular joint synovitis and lateral pterygoid muscle dysfunction were found.

LATERAL PTERYGOID MUSCLE PATHOLOGY

The inferior heads of the lateral pterygoid, the main opening jaw muscles, insert on the neck of the mandibular condyle, close to the external ear. Pathology in these muscles usually results from a poor accommodation by the patient to a faulty occlusion and may produce symptoms similar to temporomandibular joint synovitis. These muscles are physically inaccessible for direct examination. When palpation is attempted, the tissue posterosilaterally to the maxillary tuberosity is compressed against the lateral pterygoid plate, and pain, often mistaken for evidence of pathology, can be elicited, even in a normal individual.20 21 On the other hand, when a pathological condition exists in these muscles, the absence of pain on active contraction may prove misleadingly negative. However, in these cases, pain will be experienced when the muscle is forced to contract.
against maximum resistance. Therefore, the examination must include muscle testing against resistance.  

The distinction between muscle dysfunction and temporomandibular joint synovitis is important for its treatment; synovitis requires anti-inflammatory treatment, while lateral pterygoid muscle dysfunction does not. Dental management (repositioning of the mandible) or muscle relaxant techniques or both, are indicated for this condition. Since excessive tension may cause or exaggerate this condition, psychiatric counselling may be indicated.

To test the lateral pterygoid muscles, the patient opens his mouth 1–2 cm and resists a strong closing force directed upward against the patient’s chin (fig 1). The force is gradually applied, in order to allow the patient time to recruit the maximum number of muscle fibres. If pathology exists, pain or other symptoms will be elicited during this test.  

This condition often causes an opening deviation away from the affected side. This deviation usually occurs early in the opening cycle as muscular spasm causes premature condylar translation. A deviation occurring later in the opening cycle may be caused by a muscular imbalance of the lateral pterygoid muscles. In this case, the stronger lateral pterygoid muscle would encourage earlier condylar translation, often causing a mid-opening cycle deviation toward the weaker side.

In 30 of these patients (12%), lateral pterygoid muscle dysfunction was found. As previously discussed, both lateral pterygoid muscle dysfunction and temporomandibular joint synovitis were found in 25 of these patients (10-2%).

**TENOMYOSITIS OF THE MASSETER MUSCLE**

The masseter muscle arises from the lower border of the zygomatic arch. Its attachment here is somewhat unusual—muscle fibres and layers of tendon alternate. Therefore, we describe inflammation in this area as tenomyositis. Symptoms of this disorder, masticatory pain and tenderness to palpation in the area of the zygomatic arch, tend to be more localised than in the previously described disorders.

The aetiology of the masseter muscle tenomyositis, affecting the proximal attachment of this muscle, can be either occlusomuscular in nature, or traumatic. In this latter case, a sudden overwide yawn or unexpected bite on a hard object can be the cause. The tendon or muscle can maintain an inflammation, originally traumatic, for long periods of time.

Contraction against resistance is applied to test this muscle (fig 2). The examiner applies a strong downward force to the biting surfaces of the lower anterior teeth as the patient resists. Pain or other symptoms indicates closing masticatory muscle dysfunction (masseter, medial pterygoid, temporalis). Palpation is used to corroborate the results of this muscle test; a positive response and tenderness to palpation in the region of the zygomatic arch indicates tenomyositis of the masseter muscle. The resistive closing muscle test just described will also aid in distinguishing between a pathologic condition of the masseter muscle and involvement of the parotid gland. The entire area may be tender to palpation. In the latter case, however, no increase in symptoms would be noted during contraction against resistance.

Muscle physiology is not affected whether the patient resists an applied force against the jaw, or attempts to move the jaw as the examiner resists. Practically, however, the force applied by the examiner can be better controlled, and the results evaluated more effectively.

If the aetiology of the tenomyositis was traumatic, anti-inflammatory treatment, similar to that for
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Neglected conditions producing preauricular and referred pain. Patient's forehead is supported during testing to prevent head flexion.

temporomandibular synovitis, is indicated. If the pathology was caused by occlusal factors, occlusal treatment simultaneously with anti-inflammatory medication will give optimum results.

In six of these cases (2.4%), tenomyositis of the masseter muscle was found.

Discussion and conclusions

The systemic inflammatory joint diseases (table 1) that may be responsible for temporomandibular joint synovitis require medical management. However, synovitis due to local causes, and the other conditions described in this paper often require dental evaluation and management by a suitably trained dental surgeon, often with assistance by the physician.

Dental treatment of these conditions often requires mandibular repositioning to correct a faulty tooth, jaw or condylar position. This is accomplished by selectively grinding interfering tooth surfaces or by building up the teeth by removable dental prosthesis (appliance therapy). This type of treatment is most often required in cases of masticatory muscle dysfunction, and sometimes required when temporomandibular joint synovitis is present. If the aetiology of the synovitis is ascribed to a posteriorly positioned condyle, appliance therapy can correct the situation after acute symptoms are relieved by anti-inflammatory treatment. Masseteric tenomyositis responds to anti-inflammatory treatment, as opposed to dysfunctions of the belly of the muscle, which do not. Dysfunctions of the lateral pterygoid muscle are often due to occlusal factors; dental removable appliances are commonly used to correct the situation. Some of these patients may require long-term dental treatment such as orthodontics or permanent restorative procedures, afterwards.

Standard techniques of muscle tests and joint and muscle palpation have been described and used to separate and distinguish certain musculo-skeletal disorders of the temporomandibular joint and adjacent musculature from the more general diagnosis of temporomandibular joint dysfunction.

We suggest that in those cases of preauricular pain, headache or earache, where the aetiology cannot be clearly ascribed to classical conditions like otitis media, maxillary sinusitis, parotid gland diseases, and trigeminal neuralgia, that the diagnosis of temporomandibular joint synovitis, lateral pterygoid muscle dysfunction, and masseteric tenomyositis be considered.

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References

3 Costen JB. Some features of the mandibular articulation as it pertains to medical diagnosis, especially in otolaryngology. J Am Dent Assoc 1937;24:1507–11.