

REVIEW FOR THE GENERALIST

Temporomandibular joint pain in pediatrics: the clinical approach and differential diagnosis

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Abstract

Temporomandibular joint (TMJ) pain in children has a wide differential diagnosis. Causes include congenital abnormalities, temporomandibular disorders, infections, connective tissue disease (CTD) and others. This article reviews the clinical pathologies that affect this joint, discusses their management according to the diagnosis, and presents our experience with TMJ pain in children.

Introduction

Temporomandibular joint (TMJ) pain is an uncommon complaint in children. We present our experience with TMJ pain in children. The diagnosis of TMJ pain is challenging because the close proximity to other anatomic structures makes it difficult to pinpoint the origin of the pain. The aim of this paper is to review the anatomy of the TMJ and discuss the features and treatment of the main clinical pathologies that affect this joint.

Case series

The Day Care Department and Pediatric Rheumatology Unit of Schneider Children's Medical Center of Israel, a major tertiary, university-affiliated facility, has seen 10 children with TMJ pain in the last 5 years. Six had a known rheumatic disease. In line with findings in the literature, systemic or polyarticular JIA (2 patients each) was the most common cause, although one additional patient had

the oligoarticular form. The sixth patient with rheumatic disease had psoriatic arthritis with unilateral TMJ disease that caused abnormal growth of the mandible at the affected side. Of the remaining 4 children, 1 had hypermobility syndrome with subluxation of the TMJ and 3 had myofascial pain syndrome, with a history of gum chewing, bruxism or psychological stress. The characteristics of the patients and the clinical outcomes are shown in Table I below.

Table I: Diagnosis and outcome of patients with TMJ pain in Schneider Children's Medical Center of Israel 1999 – 2004

Diagnosis	No. of patients	Gender		Age at last follow-up	Outcome
		Male	Female		
Systemic JIA	2	-	2	30 yrs	Micro-retrognathia
				19 yrs	Minimal dysmorphism
Polyarticular JIA	2	1	1	10-12 yrs	Resolved
Oligoarticular JIA	1	1	-	12 yrs	Unilateral atrophy of mandible
Psoriatic arthritis	1	1	-	18 yrs	Unilateral atrophy of mandible
Hypermobility syndrome	1	1	-	16 yrs	Splint appliance at night
Myofascial pain syndrome	3	-	3	8-11 yrs	2 resolved

JIA - juvenile idiopathic arthritis

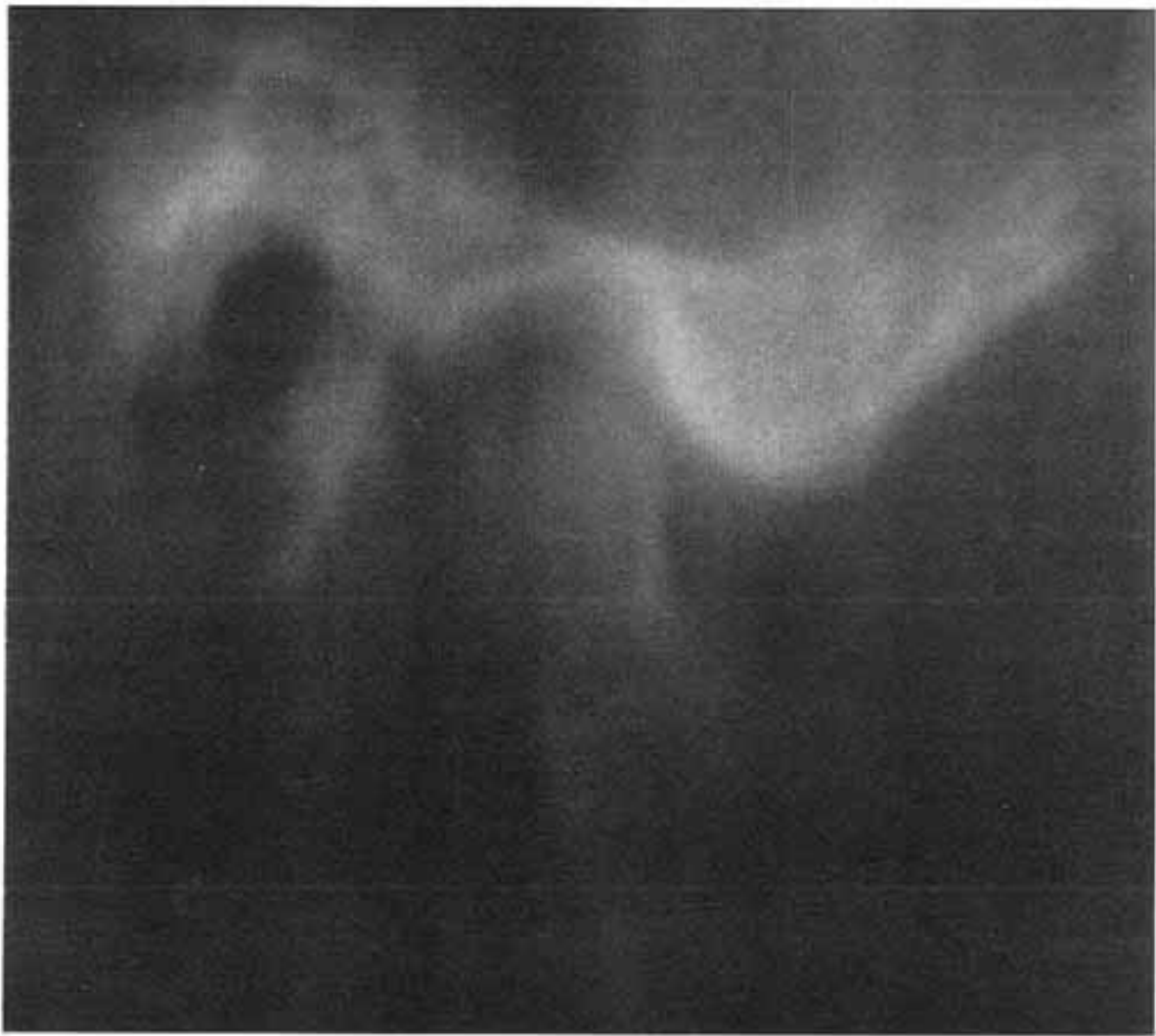
The following is a discussion of TMJ pain in children with and without arthritis.

Anatomy

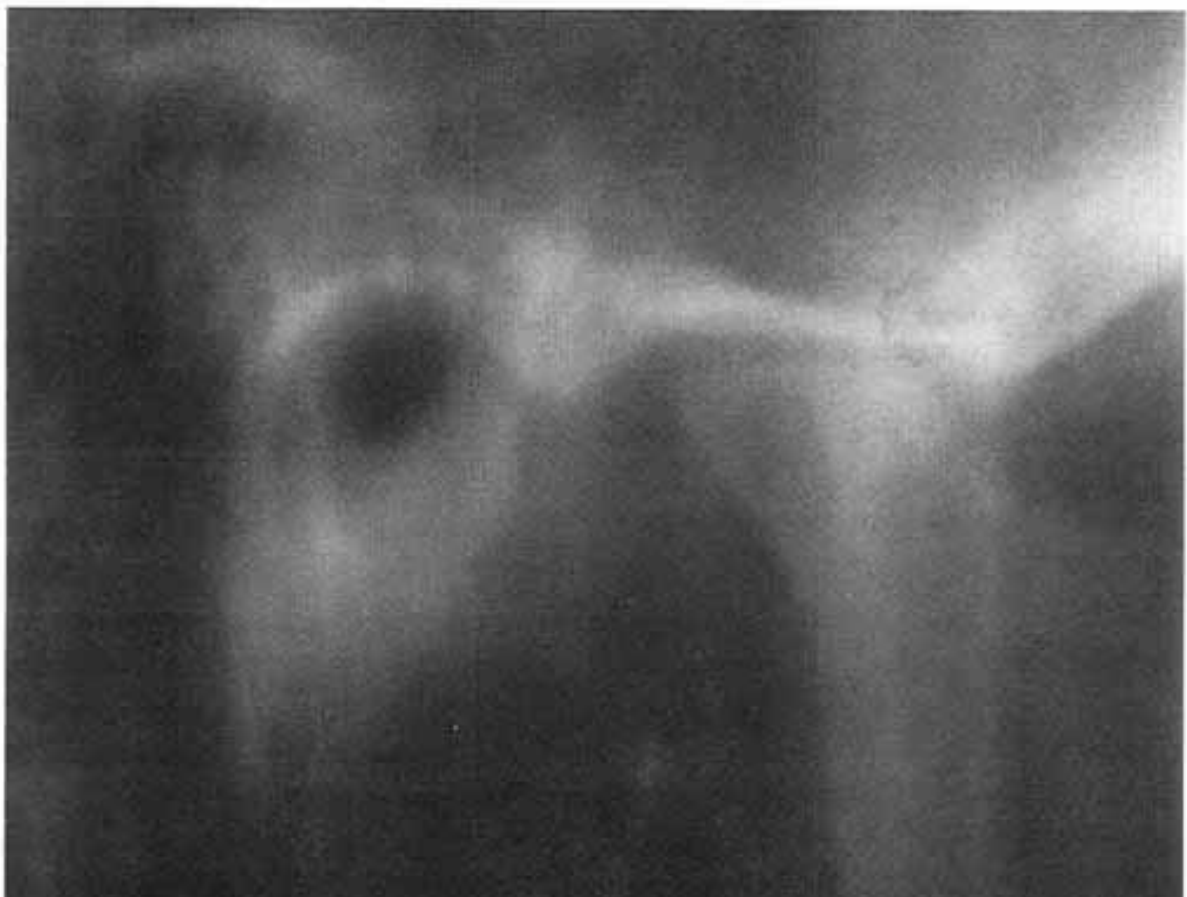
The TMJ consists of the mobile condyloid process of the mandible, which articulates within the glenoid fossae of the temporal bone. It is bordered by the external auditory canal posteriorly, the zygomatic process laterally, and the styloid process medially (Figure 1).

Figure 1A Panorex of a JIA patient with a normal TMJ

Figure 1B Panorex of a JIA patient with an abnormal TMJ with a flattened he



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The surface of the condylar and glenoid fossae is lined with fibrous connective tissue, which is primarily a layer of hyaline cartilage. This is an important growth center, and damage to it in a growing child can result in dysmorphism of the mandible. Between the condylar process and glenoid fossae is an interposed cartilaginous disc, which provides a stable platform for the rotational and gliding movements of the joint. It also acts as a shock absorber. An alteration in the normal position of the disc is known as an internal derangement. The ligaments and tendons of the masticatory muscles (temporalis, masseter, medial pterygoids and lateral pterygoids also play an important role in joint stability.

Painful disorders of the TMJ involve the trigeminal nerve, which divides into three main branches, the ophthalmic (V1), maxillary (V2) and mandibular (V3). The trigeminal ganglion serves as the synoptic junction for all three, which may explain why many patients with TMJ pathology have referred pain to the orbit, paranasal sinuses, tympanic membrane, oral cavity and teeth.

Signs and symptoms

The primary symptoms of TMJ disorders are often poorly localized. The more common ones are dull jaw pain that increases with chewing, limitation of mouth opening, and painful clicking and popping of the TMJ. Noise during joint movement in the absence of pain is of little clinical significance. Earache and headache are also quite frequent. The pain is usually unilateral, increasing over the course of the day, although patients with orthodontic and rheumatic disorders may complain of pain bilaterally. Some patients also have tinnitus and hearing loss or a burning sensation of the tongue. The medical history should include queries about trauma, bruxism and teeth clenching, as well as the presence of orthodontic and systemic disease. On physical examination, the physician should look for tenderness to palpation over the joint and palpable spasm of the facial muscles. There may be a limitation of jaw opening with clicking or popping of the joint, or lateral deviation of the mandible. Crepitus over the joint is a sign of long-standing disease.

Differential diagnosis

Congenital and developmental anomalies

Although anomalies of the TMJ are rare, early identification is important to prevent abnormal midface growth. Congenital anomalies include condylar agenesis, condylar hypoplasia, condylar hyperplasia, and hemifacial microsomia. The most common developmental anomaly in children is ankylosis of the TMJ that follows infection, fracture, or surgery or radiation to the joint. [1] Traumatic abnormal positioning of the jaw can occur in patients who use positioning devices to treat obstructive sleep apnea syndrome [2] or orthodontic problems. [3] Rarely, an acute injury to the joint can be inflicted during tooth extraction or endotracheal intubation.

Hypermobility syndrome is increased range of motion of the joints due to joint laxity. It is a common finding in young children. It can also be a part of a systemic disease such as Marfan's syndrome or Ehlers-Danlos syndrome. Children with hypermobility syndrome frequently present with joint pain, usually after physical activity. Some have a history of congenital hip dysplasia, recurrent

joint dislocations or subluxations, ligament or tendon rupture, easy bruising, fibromyalgia, or TMJ dysfunction. [4] Hypermobility syndrome is associated with recurrent dislocations of the TMJ.

Temporomandibular disorders

The three most common causes of TMJ pain in the general population are myofascial pain syndrome, internal derangement and osteoarthritis. [5] All are infrequent in the pediatric population.

Myofascial pain syndrome is a muscle disorder resulting from oral parafunctional habits such as clenching, bruxism, and even excessive gum chewing. One study of children and adolescents aged 12 to 18 years found myofascial pain to be significantly more common in girls than boys. [6] A severe form of myofascial dysfunction may be caused by hysterical trismus [7], although other etiologies, such as myositis, fibromyalgia and arthritis, should be taken into consideration. [8] The presence of pain in other muscles or trigger points and abnormal laboratory tests impacts this differential diagnosis.

Internal derangement is a TMJ arthropathy in which the articular disc is in an abnormal position, leading to mechanical interference and restriction of the normal range of mandibular movement. In severe cases it results in ankylosis. Internal derangement is usually due to malocclusion or direct trauma to the joint that leads to painful capsulitis.

Osteoarthritis is a localized degenerative disorder that affects mainly the articular cartilage of the TMJ. It may be either primary, as seen in the older population, or secondary to trauma, tumor, infection and chronic inflammation, as is seen more in children.

Rheumatic diseases

Juvenile idiopathic arthritis (JIA) is the most common inflammatory disease that involves the TMJ in children, with a reported incidence of 72% in patients presenting with polyarticular disease, and 50% in patients presenting with systemic juvenile idiopathic arthritis (JIA). [9] It occurs less often in association with oligoarticular disease and psoriatic disease. [10] In young patients, the disease damages the condylar growth plate of the joint and results in characteristic micro-retrognathia and abnormal dentofacial development.

Other rheumatic diseases that can involve the TMJ are psoriatic arthritis [11], systemic lupus erythematosus (SLE) [12], scleroderma [13] and Sjogren's syndrome. [14] In children, localized scleroderma of the face "en coup de sabre" can cause hemiatrophy of the mandible, and affect the TMJ. [15]

Reactive/inflammatory conditions

Lyme disease [16] and gout [17] may involve the TMJ. In childhood, gout is most often secondary to hyperuricemia during therapy for malignancy, dehydration, diuretic therapy, or renal shutdown, or associated with hereditary disorders such as familial juvenile gout, Lesch-Nyhan syndrome, and glycogen storage disease type 1.

Familial Mediterranean fever (FMF), a hereditary disease characterized by brief, self-limited attacks of fever, serositis, arthritis and erysipelas-like erythema. The arthritis is usually of the large joints, in more than 70% of cases. TMJ involvement, both in an acute and a protracted form [18], has been reported in FMF and may lead to residual changes. [19]

Other causes

Uncommon causes of TMJ disease are neoplasia and infection. Neoplasms of the TMJ are uncommon and usually benign. They include chondromas, osteomas and osteochondromas. Rarely, fibrous dysplasia, giant cell reparative granuloma and chondroblastoma are seen. Malignant tumors such as fibrosarcoma and chondrosarcoma are infrequent [20]. Infectious arthritis of the TMJ is uncommon, but it has to be ruled out when the TMJ is the sole joint involved. Peripharyngeal abscess is another infectious diagnosis that should be considered in the presence of symptoms related to the area. [21]

Evaluation by laboratory testing and radiologic assessment

Laboratory studies for evaluation should include complete blood count, erythrocyte sedimentation rate and C-reactive protein level to evaluate for the presence of infection or a systemic inflammatory condition. A comprehensive metabolic panel should be done as well as creatinine phosphokinase and aldolase to evaluate liver, kidney, and muscle function. Screening for rheumatic diseases should include rheumatoid factor and antinuclear antibodies. The inclusion of other laboratory tests depends on the specific systemic symptoms. In infectious arthritis, efforts should be made to isolate the causative organism by blood cultures and joint aspiration.

Radiology studies include plain X-ray films. These x-rays can identify a widened joint space due to increased intraarticular synovial fluid or synovial tissue, hemorrhage, degenerative changes such as flattening and lipping of the condyle, and narrowing of the joint space. A panoramic radiograph is used to identify possible dental problems and alterations in dentition and can also demonstrate joint and bone changes. Computed tomography (CT) is the most accurate means of evaluating the TMJ, as it can reveal bony deformities, osteophyte formation, and erosion of the articular surface of the condyle [22]. Magnetic resonance imaging (MRI), another noninvasive imaging technique, is the best tool for evaluating disc morphology and position [23].

Treatment

Treatment is directed at the specific pathology diagnosed. In patients with myofascial pain syndrome, treatment is divided into four phases.

1. Educating the patient to deter from teeth clenching and grinding, and avoid gum chewing, and introducing a soft diet. Nonsteroidal anti-inflammatory drugs (NSAIDs) are prescribed, with or without muscle relaxants. Half of all patients obtain significant relief in 2 - 4 weeks.
2. A bite appliance (splint) may be added to help prevent muscle overuse, including bruxism. The appliance is usually worn at night. Occlusal appliance therapy has been found to alleviate symptoms in 70% of patients [24]. Once relief is obtained, the medications can be discontinued.
3. Physical therapy of the muscle groups, including ultrasonic therapy, electrogalvanic stimulation or biofeedback, can be added [25]. Trigger point analgesic injections are occasionally necessary to relieve the pain.
4. Psychological counseling is advised to identify stress factors.

In patients with internal derangement, if repositioning with a splint fails, or the displacement is persistent, arthroscopic or open surgical repair should be considered. In patients with degenerative arthritis, surgery also has to be considered when conservative medical management fails.

The treatment of TMJ arthritis associated with systemic rheumatic disease and gout is similar to the treatment for other joints. Non-steroidal anti-inflammatory medications may be helpful. Methotrexate has been reported to minimize TMJ destruction and craniofacial dysmorphism in JIA [10]. Intraarticular injections of corticosteroids have been shown to be safe and effective in reducing inflammation, thereby preventing limitation of movement and mandibular growth impairment [26]. Intraarticular corticosteroid injections have also been successfully used for chronic involvement of the TMJ in FMF [27]. We described 2 unusual pediatric cases of FMF presenting as TMJ arthritis, one required recurrent intraarticular corticosteroid injections for the protracted arthritis [28].

Congenital and developmental anomalies of the TMJ warrant early treatment to limit the degree of deformity. Costochondral grafts, orthodontic surgery, and facial augmentation using plastic surgery techniques are the accepted procedures. In adults, ankylosis of the TMJ, when severe, is treated with a prosthetic condyle. In children, a costochondral graft is preferred over a prosthetic joint in order to preserve the condylar growth center [29].

Minimal trauma to the TMJ is treated with NSAIDs, application of heat, a soft diet, and temporary restriction of jaw movement. Treatment of fractures depends on their severity and type (intracapsular, high or low condylar neck fracture). In children, nonsurgical management of condylar fractures is preferred, but when there is severe displacement, intermaxillary fixation is the treatment of choice, along with early mobilization [30]. Repositioning of the condylar head may be necessary to reestablish normal midface growth.

Dislocation of the jaw is treated with reduction, usually supplemented by intravenous sedation, although general anesthesia may be required. Chronic recurrent dislocation usually requires an injection of sclerosing agents into the joint capsule to produce scarring and contracture of the ligaments [31]. Capsulorrhaphy, whereby the ligaments are shortened surgically, may be performed.

Conclusion

In summary, there are many possible causes of TMJ pain in children. The most common cause of TMJ pain is temporomandibular functional disorders, followed by chronic arthritis due to systemic disease (mainly JIA). Physicians should be familiar with the extensive differential diagnosis of TMJ pain. The patients presented here had mainly rheumatic diseases, since they were referred to a rheumatologic center. Although systemic onset and polyarticular JIA are the main JIA subtypes with TMJ involvement, it is important to stress the TMJ involvement in the oligoarticular type of JIA and also in other inflammatory diseases such as psoriatic arthritis and FMF. Early detection and aggressive treatment, including intraarticular steroid injections, may minimize TMJ limitation and prevent facial deformities in children and adolescents.

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