



Temporomandibular Joint Involvement in a Juvenile Idiopathic Rheumatoid Arthritis Patient

Patterson CW*

Midwestern University College of Dental Medicine Illinois, USA

Abstract

Background: Juvenile idiopathic arthritis, formally known as juvenile rheumatoid arthritis, is the most common type of arthritis affecting children in the United States. There are 3 subtypes, each with their own characteristics. TMJ involvement varies from 25-70% depending on inclusion criteria. These patients may or may not be symptomatic as the course of the disease may be aggressive or go into remission.

Case Presentation: 9-year old female without current symptoms presented for a routine oral examination. After a medical history review, a panoramic image was taken, revealing resorption of both condyles. A conservative approach is being taken at this time, as she has been asymptomatic for several years with maintenance dose of 200mg/day naproxen sodium.

Practical Implications: This case underscores the value of a complete medical history and imaging to discover symptomless pathology and establish a future course of action.

Keywords: Rheumatoid arthritis; Juvenile; Temporomandibular joint

Introduction

Juvenile Idiopathic Arthritis (JIA), previously known as juvenile rheumatoid arthritis, is the most common type of arthritis affecting children (1 in 1000) in the United States under the age of 16 [1]. The majority of cases are rheumatoid factor negative and self-limiting. Initial symptoms include varying degrees of lethargy, poor appetite, flu-like symptoms and pain in the joints. JIA may be easily misdiagnosed at first. Females are more likely to develop JIA than males at all ages and there is a weak family link. A trend towards lower bone mineral density exists later in life for females [2].

There are three major types of JIA: oligoarticular, polyarticular, and systemic [3,4]. Oligoarticular JIA accounts for 50% of cases and affects 4 or fewer joints in the first 6 months of illness. It is usually not symmetrical and typically joints on one side of the body are affected. Early childhood onset patients are at risk for developing iridocyclitis; inflammation of the eyes. The polyarticular type, 40% of cases, affects 5 or more joints in the first 6 months and is usually exhibits a symmetrical presentation. These children are also at risk for iridocyclitis. These cases may be rheumatoid factor positive. Systemic JIA, 10% of cases, is the most serious type and may be accompanied by sporadic fevers and rashes on the trunk and proximal extremities. Organ involvement may include: hepatosplenomegaly and lymphadenopathy. Rheumatoid factor is rarely positive. A polymorphism in macrophage migration inhibitory factor has been associated with this condition [5]. Males and females are affected equally and the eyes are usually not involved.

Estimates of TMJ involvement in JIA range from 25-70% depending on the study and inclusion criteria [6-8]. Many children may be asymptomatic despite radiographic evidence of TMJ damage [9,10]. Due to its unique anatomy and biochemical composition, the temporomandibular joint is susceptible to arthritic damage. The mandibular growth plate is directly under a layer of fibrocartilage at the head of the condyle. Damage to this center before puberty may result in growth alterations [11]. Micrognathia is one of the most severe consequences of JIA [12]. Micrognathia prevalence rates vary widely, ranging from 5-100% depending on the study [11,13-15]. A short ramus, steep mandibular plane, decreased posterior facial height and an anterior open bite is often seen. A 2002 study assessed TMJ arthritic damage and its effects on craniofacial growth [16]. Condylar remodeling was present in 72 of 120 patients, despite only 12% of the total population complaining of symptoms. A similar study found that 62% of 169 JIA patients also exhibited condylar resorption [6]. In this study, earlier onsets were associated with higher prevalence rates. Condylar lesions may be considered the main etiologic factor for altered facial structure [17].

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*Correspondence:

Charles W. Patterson, Midwestern University College of Dental Medicine Illinois, 3450 Lacey Road, Downers Grove, IL 60515, USA, Tel: 630-536-7366;

E-mail: clucas1954@yahoo.com

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Figure 1: JIA patient.

The fibrocartilage found in the temporomandibular joint contains macromolecules not present in other connective tissues. JIA alters these macromolecules within the synovial fluid. There is an increase in the levels of oncostatin M, tumor necrosis factor alpha, and interleukin-6, contributing to degradation of the collagen matrix [18]. Differences also are found in rheumatoid arthritis patients in the synovial fluid ratio of chondroitin 6-sulfate to chondroitin 4-sulfate [19]. Increased production of matrix metalloproteinase-1 and tumor necrosis factor alpha within a diseased joint have been correlated with a decrease in articular cartilage type II collagen production and likely play a role in the pathologic process [20]. Matrix metalloproteinase-8 and 9 are also likely involved [21,22]. Finally, the molecular weight of hyaluronic acid in arthritic joints generally declines [23]. These changes set the stage for a transition from a reparative to a degradative state.

There have been great advances in the last decade regarding the treatment of JIA. Children are typically treated first with non-steroidal anti-inflammatory medications and occasional intra-articular corticosteroid injections into symptomatic joints. Methotrexate is frequently used in treating polyarthritis, and has been found to decrease TMJ destruction [14]. Recently developed drugs such as etanercept, a tumor necrosis factor alpha blocker, has been successfully used in JIA [13], but has not yet been evaluated for its effects on the TMJ. Systemic corticosteroids have little or no effect on the condyle [24].

Intra-articular injections have proven useful peripheral joint JIA therapy. However, there are significant risks associated with TMJ injections. Those risks include ankylosis [25], damage to the fibrous growth head of the condyle [26], and the re-initiation of a previous resorptive process that is in remission. Despite the risks, some cases may benefit from intra-articular injection therapy. The use of intra-articular sodium hyaluronate and glucocorticoids produced similar positive outcomes in several studies [27-29], with increased ranges-of-motion and decreased pain.

Symptoms warranting consideration of intra-articular therapy include loss of range-of-motion and significant pain on function. Radiographic evidence of damage alone is not itself an indicator for invasive therapies. An auriculotemporal nerve block is beneficial to determine the extent of the pain emanating from the joint itself, or is referred pain from the surrounding musculature. Invasion of the joint may re-initiate an arrested resorptive process. An anterior open bite may not be, by itself, an indicator for invasive therapy as the resorptive process is frequently self-limiting. Besides intra-articular injections, surgical interventions include arthrocentesis and open joint debridement if pannus is present.



Figure 2: Non-JIA patient.

Case Presentation

A 9-year old female presented without complaints for a routine complete oral evaluation. According to her medical history, she had been diagnosed with oligoarticular JIA (Rh-) at age 7. There was no family history of arthritis. At the time of diagnosis, she was experiencing mild pain in several joints: her left thumb, left knee, and both TMJs (left greater than right). Her mother reported that she had been lethargic with a poor appetite and general malaise. A pediatric rheumatologist placed her on naproxen sodium 200 mg/day. She responded well, for no further treatments have been recommended. Her symptoms quickly abated.

A panoramic radiograph revealed a developing mixed dentition (Figure 1). Her occlusion was class I with a normal facial profile. At presentation, the patient was not experiencing pain in her TMJs. There was no limitation of movement or pain on function, palpation, or manipulation. There were no joint sounds. The panoramic image also displayed resorption and flattening of both condylar heads (Figure 1). She never before had a panoramic image taken despite having had several "dental check-ups". Compare the illustration 1 panoramic image with that of a child the same age without JIA (Figure 2). The differences in condylar shapes are notable.

A decision was made not to pursue an additional imaging, as the child had already been subjected to numerous radiological surveys. A CT image would not likely provide any additional information that would alter the course of treatment at this time. MRI enhancement with gadolinium diethylene thiamine pentaacetic acid has shown usefulness in diagnosing early inflammatory changes within the joint [30]. Ultrasound imaging has not shown reliability in predicting inflammatory changes [31].

A conservative approach is being taken with this case based on a number of factors:

1. A normal facial profile, occlusion, and function
2. Lack of symptoms with minimal medication for several years
3. The possibility that the disease is in remission
4. The patient is about to enter a high growth period
5. Lack of previous radiographic images for comparison

The patient's developing dentition, profile, and occlusion will be carefully monitored. If a malocclusion begins to develop, an orthopedic functional appliance will be considered as these have proven useful [32-36] for correcting dento-facial abnormalities associated with JIA. A child entering a high growth period offers the best opportunity for success with functional appliances.

Conclusion

This JIA patient is fortunate that her treatment has not been escalated beyond that of simple NSAID therapy. Perhaps the disease is in remission, thus a conservative treatment approach is warranted. She is entering a critical period in her growth and development. Her dental team plays an integral role in ensuring that if any dentofacial complications arise, they are detected and treated early. This case also demonstrates the value of a complete medical history and panoramic imaging to discover underlying symptomless pathology.

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