The temporomandibular joint in juvenile rheumatoid arthritis: I. computed tomographic findings

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Abstract

The temporomandibular joints (TMJ) of children afflicted with juvenile rheumatoid arthritis (JRA) were evaluated with clinical examinations and computed tomography (CT). Thirty-seven consecutive patients (6–17 years old) from the Texas Scottish Rite Hospital arthritis clinic were studied to investigate morphological abnormalities in the TMJ by CT. Both qualitative and quantitative measures of TMJ morphology were made from axial CT scans. Ten children without JRA served as a control group. Various ANOVA and nonparametric statistical models were used for analysis. Evidence of TMJ abnormalities from the CTs was found in 62% of these JRA children. The TMJ pathosis indices for left and right joints were significantly higher in the JRA subjects than those in the control children ($P < 0.03$) *and joint spaces were narrower* ($P < 0.02$)*. These features are indicative of TMJ destruction. Thus, there is considerable risk for TMJ involvement and its debilitating and deforming sequelae in children afflicted with JRA. (Pediatr Dent 17:46–53, 1995)*

Juvenile rheumatoid arthritis (JRA) is a major chronic rheumatic disorder of childhood, affecting as many as a quarter million American children.[1,2] The cause of JRA remains unknown despite research on potential precipitant mechanisms such as infection, trauma, psychological factors, heredity, familial influences, and a host of immunologic phenomena.[1-3] The temporomandibular joint (TMJ), like other body joints, can be a site for chronic synovial inflammation in JRA,[4-6] particularly when the attack is severe and the disease progressive.[7] Although the TMJ can be involved in JRA, the extent of actual destruction to this joint requires further clarification. Computed tomography (CT) offers a promising means of detecting bony destruction that is not provided by traditional radiographic methods.

Rönning et al.[4] carried out a radiographic and clinical examination of the TMJs for 249 JRA children younger than 15 years old using 2,244 school children as controls. The TMJ lesions from panograms were found in 72 JRA subjects (67.9% girls and 32.1% boys), a prevalence of 28.9%. Karhulahti et al.[8] examined the TMJs of 121 JRA children by panoramic and lateral cephalometric radiographs, and found that 55% of these patients had radiographically detectable lesions. Many authors[9-13] have suggested that by using CT to examine the TMJ, it is possible to demonstrate fine bone changes undetectable by conventional radiography or tomography. Using the combination of panoramic, transcranial, and tomographic methods, Stabrun et al.[14] examined 103 JRA children and found more children with chin deviations and vertical differences between both mandibular angular regions in the group with radiographically detectable TMJ abnormalities than in those without such abnormalities.

Divergence of opinion exists concerning TMJ dysfunction and its manifestations in JRA patients. Various methods for diagnosing TMJ pathosis have been used, but little quantitative information is available. Computed tomography can contribute significantly to the diagnosis of TMJ dysfunction by revealing early pathologic changes of the TMJ such as narrowing of the joint space and condyle erosion.[15,16]

The purpose of this study was to do a detailed assessment of TMJ morphology in children with JRA using CT, and to compare those findings with those of relatively normal children.

Methods and materials

The 37 patients evaluated in this study included seven males and 30 females, ranging in age from 6 to 17 years. These children were the first 37 consecutive patients with definitive diagnoses of JRA attending the Arthritis Clinic at Texas Scottish Rite Hospital for Children in Dallas willing and able to participate in the study. Patients who had received orthodontic treatment, had spinal involvement, or had other medical problems that might affect the growth of the mandible were excluded from the study. A verbal and written explanation of the study was presented to the potential subjects and their parents by the first author. A form, approved by the institutional review boards of Texas Scottish Rite Hospital and the University of Texas Southwestern Medical Center at Dallas, was used to obtain consent from the children and their parents. Participants were thus informed of 1) the minimal but potential risk of radiation exposure from the CT and cephalogram, and 2) the potential benefit of early detection of problems in the TMJ. Patients were enrolled in the study over a 5-month period.

For each subject, age, and duration of the disease were determined. A thorough clinical examination of the TMJ, including lateral cephalograms also was performed on each child. The morphology of TMJ was assessed by CT. (The relationship between CT and other radiographic and clinical findings are reported in a second paper.[17]) The children were categorized and analyzed according to type of onset. These types are: 1) pauciarticular, in which at most four joints are involved; 2) polyarticular, in which more than four joints are involved; and 3) systemic, which is characterized by high fever, rheumatoid rash, generalized lymphadenopathy, hepatosplenomegaly, and cardiopulmonary involvement.

A control group was used to test whether the prevalence of TMJ abnormalities exceeds that found in non-JRA children (i.e., that rate due to chance or other unknown random factors). An ideal control group would be a large and completely randomized sample of healthy children (for whom there was no medical necessity for performing CT); however, since the study involves radiation exposure, it would have been unethical to assemble such a group. Therefore, control data used in the computed tomographic analysis of TMJ morphology were obtained retrospectively. Ten children between 4 and 17 years of age who had head scans for various diagnostic purposes were selected randomly

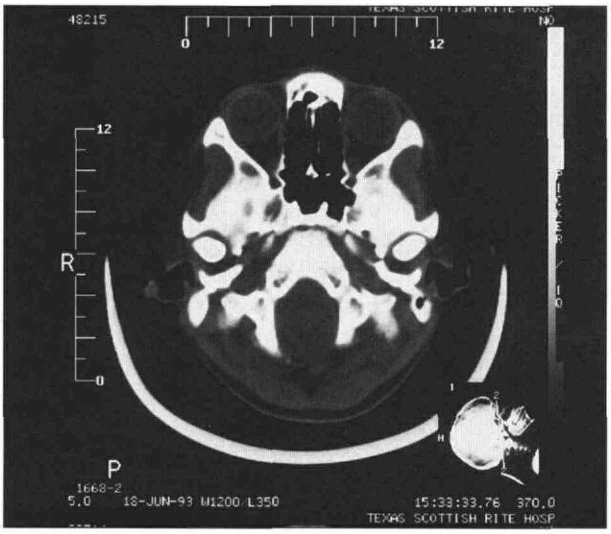

Fig 1. A CT scan of a subject from the control group. Note the regular-shaped outlines of the condyles and well-defined cortices.

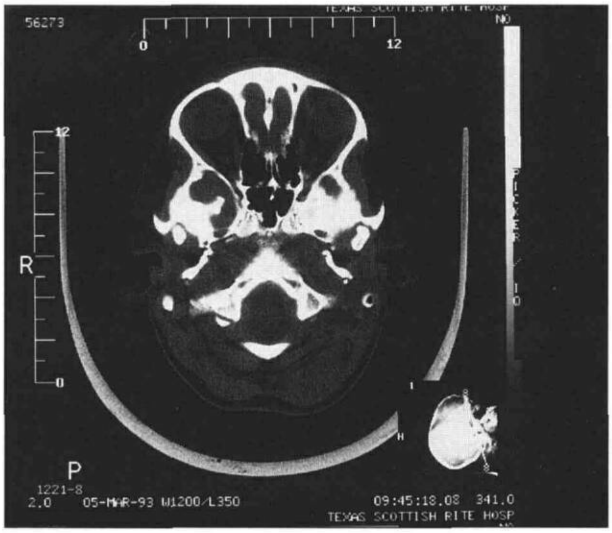

Fig 3. CT scan of a JRA patient showing the condyle in axial view with the largest condylar dimension. Note the reduced cross-sectional areas of the condyles and the ill-defined cortices.

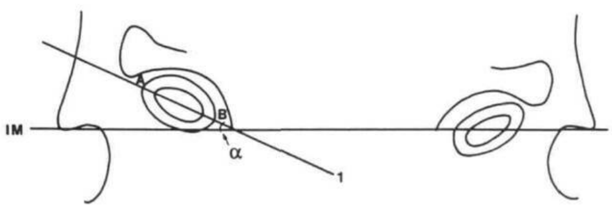

Fig 2. Measurements of the condyle in axial view shown on the tracing of a CT scan. Line IM: intermeatus line, line passes both external meatus, Line 1: line connects point A and B, Distance AB: largest condylar dimension; Angle : angle between line IM and line 1, measured from intermeatus line and the line passing the largest condylar dimension.

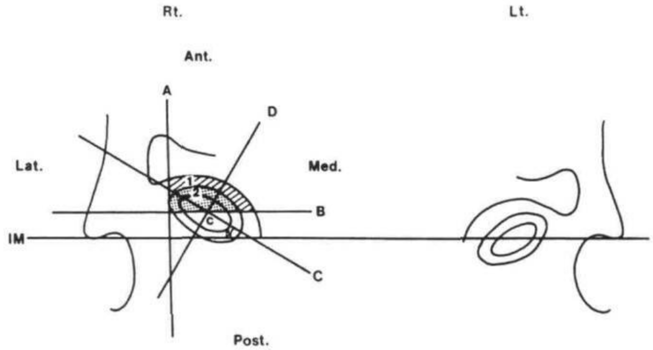

Fig 4. Measurements of temporomandibular joint space and condylar cross-sectional area. Area 1: constructed joint space of TMJ, Area 2: cross-sectional area of condyle, Point C: the centroid of condyle, Line IM: intermeatal line; line passes through both external meatus, Line A: tangent to lateral surface of condyle and perpendicular to line IM, Line B: line passes point C and parallels to line IM, Line C: long axis of the condyle, passes point C, Angle: the angle between line IM and line C; measured from intermeatus line and the long axis of the condyle.

from the files at Texas Scottish Rite Hospital for Children in Dallas. For inclusion in this group, the subjects required axial TMJ views (see CT scan in Fig 1) and had to be free from arthritic conditions, TMJ problems, bone diseases, or any other conditions that might affect craniofacial growth (e.g., hydrocephalus), joint structure, or function. However, some of these children were being examined for serious medical conditions (e.g., tumors), and may not have been ideal controls; they were, however, normal with regard to JRA or other conditions known to alter the skeletal structures involved, and therefore constitute an adequate control group.

Using a CT scanner (Picker Premier IQ), eight to 12 contiguous slices (2 mm thick), were made of each patient by one of two technicians supervised by the same radiologist. During the radiographic exposure, mandibular position registration was accomplished by having the patient bite in the most comfortable closure position with tooth contact. Rolled towels were put next to the cheeks to maintain stability during the scanning session. The axial CT scans were made above the condyle and caudally for 16 to 24 mm. The cuts were angled from above the orbit through the TMJ region so as to avoid exposure to the lens of the eye. The angulation of the slices for each patient was determined by the same supervising radiologist. The scan exposure setting for each patient was 130 KV, 45 mA, and 4 sec.

From the slices available for each patient, five consecutive slices containing views of the condyle (beginning with the superior-most slice in which it first appears), were selected for tracing on acetate tracing paper with a 0.3-mm mechanical pencil. From these tracings, the condylar dimensions were determined for the five slices. The slice or slices with the largest dimension (Fig 2) for each side was selected for further analysis. Measurements were made with electronic digital calipers, accurate to 0.01 mm. A constant enlargement factor of 2.86 (derived from the ratio of the CT film scale to the measured length) was used to compute the actual dimension of the condyle in millimeters. Tracing and measuring was done blindly (by YH) with respect to the identity or group membership of the subject.

The original axial CT film (Fig 3) was projected onto a white surface at a distance of 1.4 m and thus magnified 3.5 times. Using the slice with the largest condylar dimension, the condyle, fossa, and external meatus were traced on a 1-sq-mm grid paper. In the slices for five patients where the fossa did not appear, the position of the fossa was extrapolated from the adjacent slice containing the fossa. Reference lines for determining the dimensions of the joint space and condylar area were obtained from the intersection of the long and short axes of the condyle (lines C and D in Fig 4). The line passing through the centroid parallel to the intermeatal line was one reference line (line B); the line from the most lateral point of the condyle perpendicular to the intermeatal line was the other (line A).

Table 1. System for grading TMJ lesions*

Grade 0	Normal Bony joint surface of condyle has convex outline and is well defined
Grade 1	Slight abnormality Single, minor changes such as osteophytes, flattening, and sclerosis; includes joints with findings interpreted as uncertain
Grade 2	Definitive early abnormality Definite minor changes such as erosion and cysts
Grade 3	Moderate destructive abnormality Erosion and local change in form of either mandibular or temporal joint components, such as V-shaped tubercle
Grade 4	Severe destructive abnormality Extensive erosion of the condyle and temporal component extending through entire joint mediolaterally
Grade 5	Mutilating abnormality Total erosion of condyle with disappearance of articular surfaces or ankylosis

* (Modified from Rohlin and Petersson's 1989, Scheme for Conventional Tomograms)

The area surrounded by the fossa, condyle, and the two reference lines was defined as the constructed joint space (area 1 in Fig 4). The area surrounded by the condyle and the two reference lines was the cross-sectional area of the condyle (area 2). Both areas were measured by manually counting the squares on the grid paper. A constant factor of 0.78 (derived from square of the ratio of the magnified CT film scale to the measured length) was used to correct for magnification of projected images.

Muir and Goss'[18] descriptive terminology for TMJ radiographic morphology was used in this study. A grading system proposed by Rohlin and Petersson,[19] consisting of six levels, was modified and used to grade the CT films (axial view) of the TMJ for all subjects (Table 1). The radiographic features involved in this grading scheme include reduced joint space, osteophyte formation, articular cortical plate erosion, subcortical bone sclerosis, articular surface flattening, and the presence of subchondral cysts. Though originally described for the TMJ in sagittal view, these criteria for TMJ pathosis were adapted to the axial view in this study. Some of these abnormalities can be seen in Fig 3. Healthy joints in which the outlines of the condyles are regular in shape and have well-defined cortices are seen in the control subject shown in Fig 1.

A session was held to calibrate the grading of the first author to that of several individuals more experienced in TMJ morphology interpretation to ensure that the grading scheme was applied in a valid and reliable fashion. Films were reviewed and rated individually and then discussed; subsequent sets of films were rated until the first author was consistently in agreement with the others. A conservative approach was used in applying the grading scheme; evidence of abnormality had to be present in two contiguous slices in order to conclude the presence of deformity.

The coronal and sagittal reconstructions were performed for the slice with the largest dimension of each condyle. The morphological findings from the reconstruction were used for qualitative assessments only (e.g., flattening of articular surface). However, quantitative measurements derived from these reconstructions were not sufficiently reliable for further analysis.

Means and standard deviations for all these continuous variables were calculated for both the JRA sample and the control children. ANOVA with Tukey's tests were used to compare the differences among the three JRA groups, or in the case of non-normally distributed variables, Kruskal-Wallis tests were used. The Mann-Whitney test was employed to test for differences in means of TMJ grade between JRA and control groups. Student's *t*-test and ANOVA were used for continuous data from the CT measurements to compare the differences between and among groups, respectively. Analysis of covariance (ANCOVA) was used to adjust for age effects for differences in condylar length and joint space between the JRA and control groups. Spearman correlations were used to test for associations between pairs of ordinal variables (e.g., that between the grade of TMJ lesions and other variables). Pearson correlations were employed to analyze the relationships between continuous variables. All statistics were computed using SYSTAT Software System (Systat, Inc, Evanston, IL).

Table 2. Differences of Grades in TMJ Lesions from CT scans between JRA and control groups

	JRA Sample N = 37		*Control Sample* N = 10		
Variables	*Mean*	*SD*	*Mean*	*SD*	*P*
RGR	0.757	0.925	0.100	0.316	0.026*
LGR	0.730	0.962	0.000	0.000	0.007*
AGR	0.743	0.796	0.050	0.158	0.003*

* Probabilities from Mann-Whitney U test are shown ($P < 0.05$).

RGR = grade of right TMJ pathosis

LGR = grade of left TMJ pathosis

AGR = average grade of right and left TMJ pathosis

Table 3. Mean differences in CT measurements between JRA and control groups

	JRA Sample N = 37		*Control Sample* N = 10		
Variables	*Mean*	*SD*	*Mean*	*SD*	*P*
RCL	16.073	2.535	16.680	2.283	0.477
LCL	16.427	2.565	17.010	2.670	0.547
ACL	16.250	2.376	16.845	2.441	0.503
RJS	36.989	18.488	57.730	18.163	0.006*
LJS	43.262	23.264	66.000	30.705	0.050*
AJS	40.126	17.719	61.865	22.460	0.015*
RCA	93.986	25.888	83.160	18.081	0.144
LCA	97.673	31.156	94.190	15.891	0.631
ACA	95.830	24.943	88.675	15.492	0.274

* Probabilities of the Students *t*-test for the differences between JRA and control groups are shown ($P < 0.05$).

RCL = largest right condylar dimension

LCL = largest left condylar dimension

ACL = average condylar dimension

RJS = joint space of right TMJ

LJS = joint space of left TMJ

AJS = average joint space

RCA = cross-sectional area of right condyle

LCA = cross-sectional area of left condyle

ACA = average condylar cross-sectional area

Results

In this sample of 37 JRA patients, eight (21.6%) were diagnosed as having pauciarticular onset, 23 (62.2%) as polyarticular onset, and six (16.2%) as systemic onset JRA. The mean age was 11.2 years (SD = 3.3). The ratio of females to males in this sample was approximately 4.3:1 (30 females, seven males). Only five patients (13.5%) were rheumatoid factor (RF) positive and 14 patients (37.8%) were antinuclear acid (ANA) positive. The mean duration of disease in this JRA sample was 3.6 years. For the 10 control children, the mean age was 11.6 (SD = 4.0).

TMJ morphology — computed tomographic assessment

The qualitative measures (grades) of TMJ pathosis for the JRA and control groups, and statistical differences between them are summarized in Table 2; differences in quantitative measures of TMJ morphology are summarized in Table 3. Grades of TMJ lesions tended to be lowest in the pauciarticular, highest in the systemic, and intermediate in the polyarticular group (Table 2). However, differences only attained significance for the right joint ($P < 0.015$, Table 4). In 62.2% of the total JRA sample the grade was 1 for at least one joint and exhibited radiographically detectable lesions.

About 38% of the subjects in the pauciarticular group exhibited unilateral involvement of the TMJ (grade 1 or 2, left joints only); none of these cases exhibited lesions bilaterally. Of the polyarticular group, approximately 26% had unilateral lesions, and 44% had bilateral lesions. In the systemic group, 17% had unilateral lesions, whereas 50% exhibited abnormalities bilaterally. Overall, 27% of the JRA children exhibited TMJ abnormalities unilaterally, 35% were affected bilaterally, and 38% had no detectable lesions. Also, no significant difference in grade was found between the left and right TMJ. In the control group, 10% of the sample exhibited unilateral abnormalities. The remainder were normal.

There were no differences among the three JRA groups with regard to cross-sectional condylar area. Right and average joint spaces did differ, however, among the three JRA groups, as evidenced by ANOVA tests ($P < 0.013$ and 0.022, respectively; Table 4).

There were significant differences between the JRA and control groups in right, left, and the average grade of the TMJ as evidenced by Mann-Whitney U tests ($P <$ 0.026, 0.007, and 0.003, respectively; Table 2). Also, JRA subjects had significantly smaller right, left, and average joint spaces compared with the controls ($P < 0.006$, 0.050, and 0.015, respectively; Table 3). However, no significant difference in the condylar length and cross-sectional area between the JRA and control groups was found. ANCOVA was used to adjust for age in comparing CT measurements (condylar length and joint space) of the JRA and control groups. First, ANCOVAs were performed including the interaction terms, age and group (JRA group or control group). These analyses showed that the interaction term was insignificant for both variables, thus the effects of age on these two variables were constant across groups. These tests indicated that the two groups differed significantly from each other in joint space but not in condylar length after adjusting for age ($P \leq 0.014$).

There was a strong negative correlation between the average grade of the TMJ and the average largest condylar dimension as indicated by the Spearman correlation ($P < 0.05$; Table 5). There was a strong negative correlation between the average grade of the TMJ and average cross-sectional area of the condyle ($P < 0.05$). In addition, there was a relatively strong correlation between the diagnostic category of JRA (an indicator of the severity of the disease, where pauciarticular = 1, polyarticular = 2, and systemic = 3) and the grade of the right TMJ lesion as indicated by the Spearman correlation ($P < 0.05$). However, no associations between RF or ANA and average grade of the TMJ lesions could be found.

Discussion

This sample, recruited from the Arthritis Clinic at Texas Scottish Rite Hospital for Children, has a higher percentage of polyarticular and lower percentage of pauciarticular patients than that of the population-based estimates reported by Calabro.[2, 3] This finding may be attributable to more severely affected JRA patients being more likely to be referred to the Texas Scottish Rite Hospital and perhaps more willing to participate in the study than those with milder cases; individuals with mild pauciarticular cases and little or no joint destruction may be under-represented in this sample.

Table 4. Means and standard deviations for CT measurements of three JRA groups

	Pauciarticular N = 8		*Polyarticular* N = 23		*Systemic* N = 6		
Variables	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*P*
RGR	0.000	0.000	0.957	0.976	1.000	0.894	0.015*
LGR	0.625	0.916	0.739	1.010	0.833	0.983	0.887
AGR	0.313	0.458	0.848	0.832	0.917	0.917	0.208
RCL	16.625	1.185	15.852	2.980	16.183	2.122	0.764
LCL	15.988	2.092	16.383	2.921	17.183	1.639	0.714
ACL	16.306	1.490	16.117	2.774	16.683	1.833	0.877
RJS	31.138	9.942	42.683	20.168	22.967	9.650	0.013*
LJS	39.538	25.403	48.222	23.610	29.217	12.982	0.165
AJS	35.338	14.209	45.452	18.667	26.092	6.405	0.022*
RCA	97.250	11.564	92.396	31.543	95.733	15.094	0.566
LCA	93.713	27.333	96.939	34.884	105.767	21.968	0.536
ACA	95.481	16.648	94.667	29.542	100.750	14.693	0.627

* Probabilities for Kruskal-Wallis test for differences of RGR, LGR, and AGR among the three diagnostic groups are shown. ANOVA test was used for the other variables ($P < 0.05$).

Table 5. Matrix of Spearman correlations between the joint pathosis grades (from the CTs) and other characteristics of the JRA subjects

Variables	*AGR*	*RGR*	*LGR*
ACL	-0.589*	-0.378*	-0.600*
AJS	-0.019	-0.027	-0.030
ACA	-0.437*	-0.271	-0.425*
RCA	-0.401*	-0.395*	-0.285
LCA	-0.388*	-0.141	-0.480*
Dx	0.254	0.421*	0.116
Age	-0.053	0.025	-0.130
Dur	0.323*	0.280	0.255
RF	-0.120	-0.065	-0.114
ANA	-0.043	-0.145	0.011

* $P < 0.05$

Dx = diagnostic category of JRA; 1 = pauciarticular, 2 = polyarticular, 3 = systemic
Dur = duration of JRA
RF = rheumatoid factor; 0 = negative, 1= positive
ANA = antinuclear acid; 0 = negative, 1= positive
Age = chronologic age

The sex distribution of this sample consists of approximately 81% female and 19% male (sex ratio 4.3:1) and is intermediate between that reported by Garza[6] (5:1), Barriga et al.[20] (3:1), and Calabro[2] (2:1). In our sample, three patients (13%) were seropositive for rheumatoid factor in polyarticular group, which is very close to the 10% occurrence rate reported by Pachman and Poznanski[21] in their epidemiological study of JRA patients.

The rate of 62% TMJ involvement in this study is at the high end of the range of 5–65% reported in the literature on JRA.[4, 8, 14, 20, 22, 23, 25] However, our results agree with those of the most comprehensive and large-scale studies on JRA. These Norwegian and Finnish studies[8, 14, 26] used a variety of radiographic imaging techniques and evaluated more than 100 patients. Our study may overestimate the rate of involvement because of the disproportionately large group of polyarticular patients and small proportion of pauciarticular patients. Joint destruction was assumed to be present if the grade was at least 1. Since grade 1 also includes uncertain finding, this may have tended to overestimate the prevalence of TMJ lesions for this population. On the other hand, the only CT images that were useful for quantification in this study were made in the axial plane and this view is not ideal for revealing deformities in the superior aspect of the articular surface; lesions in this area may have gone undetected. These two sources of bias in opposite directions may have offset each other, yielding a value that is consistent with the previous large-scale studies (55% by Karhulahti et al.[8] and 63% by Stabrun et al.[14]). The value is, however, much greater than some of the earlier, smaller-scale studies[4, 20, 25] would suggest.

Morphological evidence of TMJ destruction

With regard to TMJ abnormalities revealed by CT in this study, the most common were reduced joint space and condylar size, condyle erosion, and condylar surface flattening (from the sagittal reconstruction). The majority of the erosion was observed in the lateral aspect of the condyles and erosion of the articular cortical plate mentioned by Muir and Goss[18] was also found in some subjects. However, erosion of the tubercle or ankylosis as reported by Rohlin and Petersson[19] could not be detected, perhaps due to the fuzzy nature of the sagittal reconstructions. In addition, only the left TMJ of one patient was graded 4, and none was graded 5 in this sample. According to Rohlin and Petersson,[19] their grade IV and V are more specific for inflammatory disease, extreme manifestations of which might be masked in these well-managed JRA patients, many of whom are taking nonsteroidal anti-inflammatory drugs.

The ANCOVA tests indicated that the JRA children differed significantly from the control children in joint space but not in condylar length after adjusting for age. ANCOVA allows us to exclude age differences between the JRA and control samples as the cause of differences in joint space; the reduced joint space in the JRA group can be attributed confidently to pathogenesis of JRA. On the other hand, the ANCOVA results, which take into account the minor age differences between the samples, confirm the unadjusted *t*-tests, which showed no differences in condylar length.

A moderately strong positive correlation was found between duration of the disease and the extent of joint destruction reflected by grade. This is consistent with the conclusion of Trenwith and Beale[27] the duration of arthritis was related to the extent of TMJ dysfunction. The strong negative correlation between the average grade of TMJ lesion and average condylar cross-sectional area could be due to the erosion/destruction of the condyles leading to reduction in condylar size. This may also explain the negative correlation between average grade and average condylar length.

The average grade of the TMJ lesions was highest in the systemic and lowest in pauciarticular group. This suggests that the extent of TMJ involvement is greatest in systemic, intermediate in the polyarticular, and least in the pauciarticular onset JRA. This trend agrees with Garza's findings;[6] however, his conclusion was based only upon clinical examination for symptoms/signs, such as maximal opening, joint pain, and joint noise.

According to Pachman and Poznanski,[21] polyarticular JRA children who are seropositive for rheumatoid factor have more severe joint destruction and erosion than seronegative children. Fink[28] also stated that the disease process is usually more active in this group. The inability to replicate this finding in our study may be due in part to the very small sample of seropositive JRA patients (N = 3). Stabrun et al.[14, 26] reported that long-standing JRA may increase the risk of TMJ involvement. This relationship was confirmed in our study by the significant correlation between the duration of JRA and the average grade of TMJ lesion.

The interpretation of TMJ pathosis was made primarily from axial CT scans, in contrast to previous radiographic studies in which conventional tomograms were used.[8, 13, 15, 17–19, 23, 29, 30] Those sagittal views are perhaps better for detecting lesions of the articular surfaces, but with the axial view, one is also able to evaluate the medial and lateral lesions of the condyles. High-quality, three-dimensional reconstructions of the axial slice data may have facilitated a more comprehensive assessment of morphological changes in the TMJ related to JRA (including reliable reconstructions in the sagittal plane). However these could not be produced on the system used here. Also, the configuration of the CT scanner and the reconstruction software used here was such that consistent orientation of the subjects' heads and slices was impossible — this was an unavoidable source of random error.

Improved CT software, which will permit the reconstructed slices to be oriented relative to known and reproducible anatomical planes, will obviate this problem in future studies. This improved three-dimensional reconstruction software, operating on the basic axial slices (similar to what was collected here), has the potential for allowing the examiner to visualize the hard tissues of the TMJ from all aspects (much as one can view a dry skull). Greatly improved capabilities for detecting (greater sensitivity) and monitoring the status of bony lesions on all aspects of the condyle and fossa are anticipated with this technology.

In contrast to previous studies of the TMJ in JRA children, the computed tomographic methods employed here did detect a very high prevalence of TMJ destruction, even though this JRA sample had a low prevalence of clinical symptoms and signs.[17] The prevalence of TMJ destruction in this sample of children was consistent with the highest rates reported in the literature — 60–65%. Although evidence of osteophytes, osteoporosis (by the pattern and density of trabeculae), or disc abnormalities could not be gleaned from these CT films, the prevalence of TMJ involvement in JRA is plausible as the grading procedure was quite conservative.

The TMJ is not a joint that routinely is given great attention by physicians. The results of this study suggest that it should be examined more thoroughly in all children with JRA, even though no definitive treatments currently exist for such TMJ problems. Under any circumstances, the bony abnormalities of the TMJ that have been observed in more than half of these children likely reflect pathological and/or adaptive remodeling processes that need to be monitored closely, especially when the deformity is severe. Additional attention to the TMJ in children afflicted with JRA is essential. As the major sites of mandibular lengthening,[31] the TMJs must be healthy for normal growth of the mandible and lower face, as well as for the performance of essential orofacial functions such as mastication. TMJ destruction in the growing child can have as its sequel the development of retrognathia, which when severe, can be functionally and emotionally handicapping and even life-threatening when it contributes to apnea. The dental community needs to play a leadership role in identifying TMJ problems in these children, and work toward the development of effective treatments.

Conclusions

1. The sex distribution in this juvenile rheumatoid arthritis sample, 81% females and 19% males, is consistent with other studies.
2. The distribution of onset-type of JRA in this sample — 22% pauciarticular, 62% polyarticular, and 16% systemic — has a higher percentage of polyarticular-onset children than reported in previous studies.
3. Radiographic evidence of TMJ pathosis (from CT scans) was evident in 62% of the subjects, which is in agreement with the highest prevalence of TMJ involvement in JRA reported in previous radiographic and clinical studies.
4. Based on the computed tomographic findings, the JRA subjects showed significantly higher grades of TMJ pathosis and narrower joint spaces than the control group.
5. There was a strong negative correlation between the average grade of TMJ lesions and the average largest condylar dimension, as well as the average cross-sectional area of the condyle. This can be explained by the more severe erosion of the condyle, making the condylar size smaller.

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From The Archives

Dr. West disparages gum-gardening in predentulates

In considering the rules by which you must direct the management of children when teething, it can scarcely be necessary to caution you against regarding all diseases that may come on during dentition as of necessity connected with that process, or with the general changes then going on in the organism: still less need I warn you against looking upon all ailments at that time as symptomatic of the local uneasiness which the child suffers in its mouth. Some persons, indeed, act as if they held both these notions to their fullest extent; and, following up in practice this coarsely mechanical theory, they lance the gums of every child who has not yet cut all of its teeth, almost or altogether irrespective of the nature from which it suffers. Such proceeding is nothing better than a piece of barbarous empiricism, which causes the infant much pain, and is useless or mischievous in a dozen instances for one in which it affords relief. Still less is the gum-lancet to be employed, merely with the view of expediting the process which nature is engaged in. The gradual protrusion of the teeth occasions the slow absorption of the superjacent gum, and for this process the division of the gum by the scalpel forms at best but a clumsy substitute.

in The Diseases of Infancy and Childhood, Charles West, 1874