

Radiographic Signs in the Temporomandibular Joint in Reiter's Disease

Mauno Könönen, DDS, PhD

Professor
Institute of Dentistry
University of Helsinki
Helsinki University Central Hospital
Helsinki, Finland

Outi Kovero, DDS, PhD

Assistant Professor
Institute of Dentistry
University of Helsinki
Helsinki, Finland

Bengt Wenneberg, DDS, PhD

Associate Professor
Institute of Odontology
University of Göteborg
Göteborg, Sweden

Yrjö T. Konttinen, MD, PhD

Professor
Institute of Dentistry
University of Helsinki
Helsinki University Central Hospital
Helsinki, Finland

Correspondence to:

Dr Mauno Könönen
Department of Stomatognathic
Physiology and Prosthetic Dentistry
University of Helsinki
P.O. Box 41 (Mannerheimintie 172)
FIN-00014 Helsinki
Finland
Fax: +358 9 191 27509
E-mail: mauno.kononen@helsinki.fi

Aims: To investigate whether involvement of the temporomandibular joint (TMJ) can occur in men with Reiter's disease (RD). **Methods:** Forty-nine men with RD and 49 individually matched (gender, age and dentition type) controls with no known general joint disease were screened for findings in the TMJ by panoramic tomography. **Results:** Duration of subjective symptoms (eg, pain) in the masticatory system correlated with duration of RD ($P = .05$). In the RD group, severity of clinical signs or symptoms correlated with the progressive form of RD ($P = .01$), number of affected joints ($P = .0001$), and involvement of the cervical ($P = .0001$) and lumbar spine ($P = .05$). Patients with RD more frequently had radiographic findings (33%) in the condyle of the TMJ than did controls (10%) ($P = .002$). The most characteristic radiographic sign in the condyle in the RD group was unilateral erosion (12%). **Conclusion:** Patients with RD often have erosion causing pain and dysfunction in the TMJ. Potential masticatory system problems for such patients should be brought to the attention of dentists and physicians.

J OROFAC PAIN 2002;16:143-147.

Key words: temporomandibular joint, Reiter's disease, radiology

Reiter's disease (RD) or reactive arthritis can be defined as aseptic arthritis triggered by an infectious agent not present in the joint.¹ RD is one of the seronegative spondarthritides; other diseases in the family include ankylosing spondylitis, spondylitis associated with psoriasis, ulcerative colitis, and Crohn's disease with spondylitis.²⁻⁴ Because these diseases have similar and overlapping symptomatology, a definite diagnosis is sometimes difficult to achieve, ie, some patients may have features both of psoriatic arthritis and of RD. In addition to the 3 major components of urethritis, arthritis, and conjunctivitis, a variety of signs and symptoms such as balanitis circinata, vulvitis, stomatitis, keratoderma blennorrhagica, psoriasis-like skin disorder, nail disorder, carditis, and neurological symptoms may occur.^{5,6}

Ankylosing spondylitis and psoriatic arthritis can involve the masticatory system, and radiographically verified involvement of the temporomandibular joint (TMJ) occurs in patients with ankylosing spondylitis⁷ and psoriatic arthritis.⁸ It could, therefore, be reasonable to expect that in RD the TMJ might also be involved.

Clinically, RD patients show signs and symptoms such as pain during mandibular movements and tenderness to palpation of the TMJ, suggesting joint involvement.⁹ However, no controlled radiographic studies have been reported on TMJ involvement. The

main purpose of the present study was to investigate whether men with RD differ from individually matched controls with respect to radiographic signs in the condyle of the TMJ.

Materials and Methods

Patients

Of 52 consecutive male patients (mean age 39 years, range 21 to 65 years) with a medical diagnosis of RD (Helsinki University Central Hospital, Department of Venereology), 49 consented to panoramic tomography of the jaws. Although at the time of the study no generally accepted criteria for diagnosis existed, the patients received a medical diagnosis of RD in accordance with the criteria suggested by Calin.⁵ All patients in the RD group objectively displayed arthritis, and the following joint regions were self-reported to be involved: fingers (53%), toes (47%), wrists (43%), ankles (45%), knees (76%), shoulders (37%), neck (29%), back (29%), jaw (27%), and other regions (31%). On average, 4 joint regions were involved (range 1 to 11). The patients also had skin and mucous membrane symptoms such as urethritis (96%), conjunctivitis (76%), keratoderma blennorrhagica (20%), psoriasis-like skin disorders (47%), nail disorders (39%), and balanitis circinata (86%), and/or stomatitis (2%). In addition to arthritis, at least 1 of these other symptoms (active RD) had to be present at the time of the study. On average, 5 symptoms were present (range 2 to 7). Mean duration of RD was 9 years; the range being from some months to 40 years. Eighty-three percent of the men with RD were HLA-B 27 positive. Signs and symptoms progressed steadily in 24% of the patients. Serological evidence showed that the triggering factor was *Chlamydia trachomatis* in 50%, *Yersinia* spp. in 4%, *Shigella* spp. in 2%, and *Mycoplasma* spp. in 2%. In 42% of the patients, the triggering factor was unknown.

Controls

Individually matched male control subjects (n = 49, mean age 41 years, range 18 to 70) with no known general joint disease consented to join the study. The control group was individually matched to the RD group with respect to gender, age, and dentition type (number of occluding natural molar teeth). Controls were selected from among the subjects visiting the Institute of Dentistry, University of Helsinki, for restorative treatment.

The RD group and control group have been described earlier in more detail.⁹ Before radiographic examination, all subjects first answered a questionnaire which was checked after a clinical examination of the masticatory system. The questionnaire and clinical procedures have been described and results of the clinical investigation reported in a previous paper.⁹

Radiographic Evaluation

The radiographic examination of the TMJs was made by panoramic tomography using an Orthopantomograph (OP 3, Instrumentarium Co/Palomex) radiographic machine. The exposures were taken with the teeth in the incisal position, and if the condyles were not accurately imaged, another radiograph was taken with the mouth maximally opened. Radiographic signs in the condyle such as deviation in shape (flattening, osteophyte), changes in cortical outline (erosion, sclerosis), and changes in subcortical bone (demineralization, sclerosis) were recorded. Right and left condyles were evaluated separately. All radiographs were examined independently by 2 examiners. Radiographs were read in random order and without knowledge of the history and clinical findings. To estimate inter-examiner variation and intra-examiner reproducibility, kappa indices were calculated. For inter-examiner variation, the authors independently evaluated the radiographs. For intra-examiner (MK) reproducibility, the radiographs were read 3 months after their first evaluation. Kappa indices for inter- and intra-examiner variations for erosion in the condyle were 0.77 and 0.89, respectively. In cases of disagreement in interpretation, the radiographs were reviewed by both examiners together to achieve a final diagnosis.

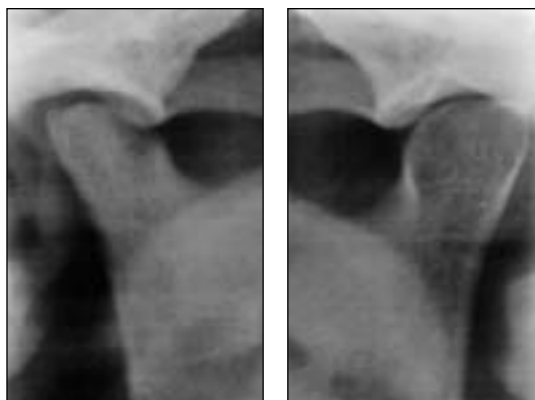
Statistical Analysis

Significance of differences between the groups was tested by the Wilcoxon matched-pairs signed-ranks test. Correlations of radiographic signs with subjective symptoms and clinical findings were based on Pearson's product moment correlation coefficient and Spearman's rank correlation coefficient. The level of statistical significance is given when $P = .05$, otherwise it is denoted not significant (NS).

Table 1 Percentage Distribution of Subjective Symptoms and Clinical Findings Related to TMJ Function in Reiter's Disease (RD) and Control Groups

| | RD (n = 49) | Control (n = 49) | P |
|-------------------------------------|----------------|---------------------|------|
| <i>Subjective symptoms</i> | | | |
| Morning stiffness/tiredness in jaws | 20 | 0 | .002 |
| Sounds from the TMJ | 44 | 29 | NS |
| Pain in the TMJ upon wide opening | 16 | 2 | .02 |
| Pain in the TMJ in chewing | 10 | 2 | NS |
| TMJ locking/luxation | 12 | 10 | NS |
| <i>Clinical findings</i> | | | |
| Tenderness to palpation | | | |
| Masticatory muscles | 46 | 25 | .015 |
| TMJ laterally | 27 | 8 | .011 |
| TMJ posteriorly | 4 | 0 | NS |
| TMJ clicking | 29 | 31 | NS |
| TMJ crepitation | 37 | 31 | NS |
| Painful mandibular movements | 15 | 2 | .017 |

Fig 1 A 34-year-old HLA-B27-positive man had Reiter's disease for 4 years and subjective TMJ involvement for 3 years. Panoramic tomography shows local erosion in the right condyle (left figure) but no signs in the left condyle (right figure). He had the classical triad of urethritis, arthritis, and conjunctivitis, and, in addition, nail disorder and balanitis circinata. Other joint regions involved were: fingers, toes, knees, and neck. Subjectively, he had restricted mouth opening, and clinically he had painful mandibular movements and tenderness to palpation of the masticatory muscles.



Results

Subjective Symptoms and Clinical Findings

Table 1 summarizes symptoms and clinical findings related to TMJ function of the present groups.

Radiographic Signs

Radiographic signs in the condyle of the TMJ were noted in 33% of the RD group and 10% of the

control group ($P = .002$). Cortical erosion (Fig 1) was discovered unilaterally in 12% of the patients with RD and in none of the controls ($P = .014$). Of the other radiographic signs in the RD and the control group, flattening was recorded in 14% and 4% ($P = NS$), osteophytes in 6% and 0% ($P = NS$), and cortical sclerosis in 18% and 8% ($P = NS$), respectively. Bilateral cortical sclerosis in the condyles was found in 2 subjects in each group. Flattening was bilateral in 2 patients in the RD group.

Table 2 Correlation of Erosion in the TMJ with Some Subjective Symptoms and Clinical Findings in the Masticatory System in Reiter's Disease Group

| Group | Erosion in the TMJ | |
|---|--------------------|----------|
| | <i>r</i> | <i>P</i> |
| <i>Subjective symptoms</i> | | |
| Restricted mouth opening | 0.34 | .05 |
| Pain in TMJ when chewing | 0.28 | .05 |
| Duration of symptoms | 0.44 | .01 |
| <i>Clinical findings</i> | | |
| Painful mouth opening | 0.43 | .01 |
| Painful passive retrusive movement | 0.42 | .01 |
| Number of painful movements | 0.35 | .05 |
| Number of masticatory muscles tender to palpation | 0.29 | .05 |

Correlations

Table 2 shows the correlation of erosion in the TMJ with some subjective symptoms and clinical findings in the masticatory system in RD patients.

Duration of subjective symptoms in the masticatory system correlated with duration of RD ($r = 0.28$, $P = .05$). Severity ($r = 0.59$, $P = .0001$) and number ($r = 0.41$, $P = .01$) of subjective symptoms in the masticatory system correlated with number of affected joints. Severity of clinical signs ($r = 0.43$, $P = .01$), number of masticatory muscles tender to palpation ($r = 0.51$, $P = .001$), and lateral tenderness of the TMJ ($r = 0.32$, $P = .05$) correlated with the number of affected joints. Severity of clinical signs ($r = 0.35$, $P = .01$), pain in the TMJ when opening the mouth ($r = 0.39$, $P = .01$), and TMJ clicking ($r = 0.40$, $P = .01$) correlated with the progressive form of RD. Severity of clinical signs correlated also with involvement of the cervical spine ($r = 0.53$, $P = .0001$), lumbar spine ($r = 0.29$, $P = .05$), wrists ($r = 0.36$, $P = .01$), and shoulders ($r = 0.31$, $P = .05$). Radiographic changes in the TMJ did not correlate significantly with any RD features.

Discussion

The disease spectrum of spondarthritides across different populations shows significant genetic and environmental fluctuation with regards to its onset and natural course.¹⁰ During the course of RD,

ankylosing spondylitis and psoriatic arthritis are the most common differential diagnoses, followed in frequency by those of other rheumatic diseases.¹¹ Usually, however, the diagnosis is easy to make. It has been reported that a high proportion of RD patients have tissue antigen HLA-B27, and therefore the occurrence of RD in the population seems to correlate with the frequency of the tissue antigen in the normal population. In Finland, its frequency (14%) is higher than in most Caucasian populations, and it has been calculated that in a Finnish population, B27-positive subjects have a 25-fold risk for developing RD as compared with B27-negative subjects.¹² It has been estimated that about 10% of patients with RD develop a chronic form of the disease.¹³ In the present study, about 25% of the men with RD had the steadily progressing form of the disease. Furthermore, it has been reported that the chronic progressive form seems to be typical for the post-venereal type of RD,¹³ which was the form present in the majority of these RD patients.

Our previous study found that both subjective symptoms and clinical signs of temporomandibular disorders were more frequent and severe in men with RD than in controls.⁹ In accordance with earlier findings in 2 other spondarthritides, ankylosing spondylitis⁷ and psoriatic arthritis,⁸ one of the most characteristic symptoms in the masticatory system in the RD group was pain in the TMJ during function. Stiffness/tiredness in the jaws in the morning (20% in the RD group) suggests an inflammatory joint disease. It has been reported, however, that only 3% of RD patients show clinical involvement of the TMJ.¹¹ This is probably an underestimate and may be mainly due to differing diagnostic criteria. Clinical manifestations regarding the involvement of the TMJ and other joints differ; for instance, in contrast to the distal limb joints, in inflammatory TMJ diseases, swelling over the joint is seldom found.^{7,8,14} In the RD group, the severity and extent of involvement of the masticatory system was associated with a number of affected joints and involvement of the larger and axial joints such as shoulders and wrists and the cervical and lumbar spine. This may also in part be explained by referred pain from the cervical region to the masticatory system, especially the TMJ region. Duration of subjective symptoms from the masticatory system correlated with duration of RD, further suggesting an association between RD and involvement of the masticatory system. In addition, the progressive form of the disease correlated with the severity of clinical findings, especially with TMJ pain and clicking.

The temporal component of the TMJ is poorly imaged by panoramic tomography, and so only the condyles were evaluated. Because of this and the well-known fact that tomography is best suited to evaluate hard-tissue changes in the TMJ, the frequency of radiographic signs in the TMJ reported in the present study is probably an underestimate. Nevertheless, panoramic tomography was chosen because it was considered unethical to use other radiological examinations of the TMJ, since many subjects in both groups were clinically asymptomatic as regards the masticatory system. Further, in screening radiography, panoramic tomography is useful in clinical practice for several reasons, and has been shown to be well suited for screening of TMJ disease in patients with psoriatic arthritis.¹⁵

Radiographic findings in RD overlap those of other inflammatory joint diseases, especially ankylosing spondylitis and psoriatic arthritis. In the present study, the frequency of signs in the condyle of the TMJ (33%) was about the same as that found in a recent study in ankylosing spondylitis (30%) and psoriatic arthritis (38%),¹⁶ in which cortical erosion was the most frequent (18%) radiographic change in the condyle of the TMJ in both diseases. In the present study, all radiographic signs were more frequent in RD patients than in controls, but the difference was statistically significant only for erosion of the condyle. As erosion in a joint is generally regarded as a significant sign of inflammatory reaction in the joint tissues, the cortical erosion found in the condyle in the RD group is therefore most likely caused by the general inflammatory joint disease. Furthermore, the significant correlations between cortical erosion and subjective symptoms and clinical signs associated mainly with pain during TMJ function support this assumption. It may be concluded that, compared with subjects without a general joint disease, patients with RD have a higher frequency of radiographic signs in the condyles of the TMJ. Additionally, in patients with RD the most characteristic radiographic sign in the condyle is unilateral erosion. Dentists and physicians should be aware of potential masticatory system involvement in these patients which may require specific assessment and treatment.

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