Craniomandibular disorders in rheumatoid arthritis, psoriatic arthritis, and ankylosing spondylitis

A clinical study

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Sixty-one subjects with rheumatoid arthritis, 61 with psoriatic arthritis, 61 with ankylosing spondylitis, and 61 healthy controls were examined with regard to subjective symptoms and clinical signs of craniomandibular disorders (CMD). The frequencies of most subjective and clinical variables were higher in all three disease groups than in the control group. Subjects with rheumatoid arthritis and psoriatic arthritis showed more frequent and severe signs and symptoms than subjects with ankylosing spondylitis. It is concluded that subjective symptoms and clinical signs of CMD are common in rheumatoid arthritis, psoriatic arthritis, and ankylosing spondylitis and are mainly caused by the respective general joint disease. None of the signs and symptoms is pathognomonic for rheumatoid arthritis, psoriatic arthritis, or ankylosing spondylitis. □ *Psoriatic arthritis; rheumatoid arthritis; spondylitis, ankylosing; temporomandibular joint diseases*

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The temporomandibular joint (TMJ) and the masticatory system may be affected by several inflammatory joint diseases (1). Involvement of the TMJ has been reported in patients with rheumatoid arthritis (RA), varying from 2% to 98% (2–4), in psoriatic arthritis (PA) from 31% to 63% (5–7), and in ankylosing spondylitis (AS) from 4% to 32% (8–10), depending on differences in populations, examination techniques, and criteria for diagnosing joint involvement. RA affects the TMJ more frequently than PA and AS with regard to radiographic changes in the mandibular condyle (11). RA also seems to give more symptoms and clinical findings in the masticatory system (12–17) than PA and AS, but no controlled studies comparing these diseases have yet been published.

The aim of this study was therefore to compare RA, PA, AS, and control subjects with regard to subjective symptoms and clinical findings in the masticatory system.

Materials and methods

The RA group

This group comprised 61 subjects with RA according to the ARA criteria (definite and classical) (18). They were randomly selected from patients attending the outpatient clinic at the Department of Rheumatology at the University Hospital of Göteborg, Sweden. Their median age was 58 years (range, 24–80 years), and 12% were men and 88% women (Table 1). The RA group is described elsewhere (A. Kallenberg, B. Wenneberg, G. E. Carlsson, M. Ahlmén, unpublished observations).

The PA group

This group comprised 61 subjects with PA according to the criteria of Moll & Wright (19). They were randomly selected from various parts of Finland to the Psoriasis Center in Helsinki for rehabilitation. Their

Table 1. Distribution of the subjects by sex and group*

	RA	PA	AS	C
Men	7	37	46	37
Women	54	24	15	24
Total	61	61	61	61

* RA = rheumatoid arthritis; PA = psoriatic arthritis; AS = ankylosing spondylitis; C = control.

median age was 51 years (range, 25–72 years), and 61% were men and 39% women (Table 1). The PA group has previously been described (14).

The AS group

This group comprised 61 subjects with AS, according to the Rome criteria (20). They were randomly selected from the Ankylosing Spondylitis Patient's Organization in Göteborg and/or attended the Department of Rheumatology, University Hospital of Göteborg, Sweden. Their median age was 43 years (range, 25–72 years), and 72% were men and 28% women (Table 1). The AS group has been described earlier (16).

The C group

The control group comprised 61 subjects with no known inflammatory joint or skin disease. This group was randomly selected from subjects attending the Dental Clinics, University of Helsinki, Finland, for restorative dental treatment. Their median age was 51 years (range, 21–72 years), and 66% were men and 34% women (Table 1).

Questionnaire

Subjective symptoms from the masticatory system were assessed by questionnaire. The same questionnaire was used in both Sweden and Finland. Questions were posed concerning stiffness/tiredness in the jaws, sounds from the TMJ, difficulties in wide mouth opening, pain in the face/jaws, headaches, pain in the face/jaws on opening wide and/or chewing, and TMJ locking/luxation. The anamnestic dysfunction index (Ai) of Helkimo was determined (21).

Clinical examination

Clinical findings from the masticatory system were recorded by routine examination procedures (22, 23). The examination included palpation of the masticatory muscles and the TMJ, maximal mouth opening capacity, pain on mandibular movements, and TMJ sounds. The occlusion was examined for interferences between the retruded position (RP) and the intercuspal position (IP) causing lateral displacement of the mandible ≥ 0.5 mm as measured in the incisal region. The sagittal and vertical distances between RP and IP was measured to the nearest millimeter. Interferences of the mediotrusion side within 3 mm of IP, as measured in the incisal region, were also recorded. The severity of the clinical signs

Table 2. Percentage distribution of symptoms from the masticatory system in the rheumatoid arthritis (RA), psoriatic arthritis (PA), ankylosing spondylitis (AS), and control (C) groups

Symptoms	RA ($n = 61$)	PA ($n = 61$)	AS ($n = 61$)	C ($n = 61$)
Morning stiffness/tiredness in the jaws	20**	22**	15*	3
Sounds from the TMJ†	61	57	44	46
Difficulties in wide mouth opening	33**	17	20*	5
Pain in the face/jaws headache at rest	33**	20*	12	2
Pain in the face/jaws on opening wide and/or chewing	25*	43**	13	5
TMJ locking/luxation	7	17	5	13

Statistical significance refer to separate tests between the C group and the RA, PA, and AS groups, respectively. * $p < 0.05$; ** $p < 0.01$.

† TMJ = temporomandibular joint.

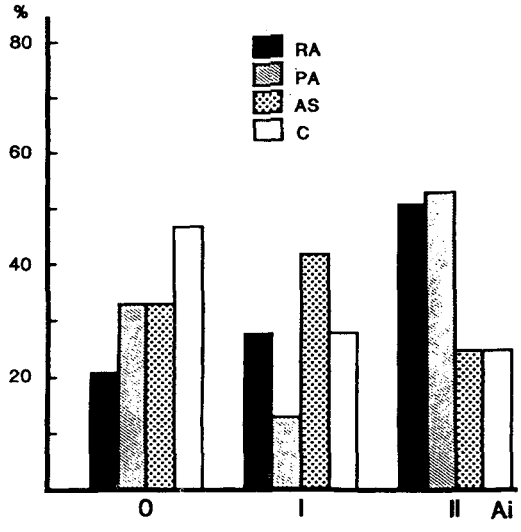

Fig. 1. Percentage distribution of the anamnestic dysfunction index in the rheumatoid arthritis (RA), psoriatic arthritis (PA), ankylosing spondylitis (AS), and control (C) groups.

was estimated by the clinical dysfunction index (Di) of Helkimo (21).

Statistics

Significance tests for differences between groups were performed with Pitman's permutation test (24). In tests for associations between variables Spearman's rank correlation coefficient (*Rs*) was used.

Results

Subjective symptoms

The distribution of subjective symptoms is given in Table 2. Stiffness/tiredness in the jaws and difficulties in wide mouth opening were commoner in all three disease groups than in the C group. Pain from the masticatory system was more often found in the RA and PA groups than in the C group. The anamnestic index was significantly higher in the RA ($p < 0.01$), PA ($p < 0.01$), and AS groups ($p < 0.05$) than in the C group (Fig. 1). Fifty-one per cent in the RA and 53% in the PA group had an Ai II compared with 25% in the AS and C groups. The severity of subjective symptoms was significantly higher in all three disease groups than in the C group ($p < 0.01$) (Fig. 2). No significant correlations to age and sex were found in any of the four groups with regard to individual symptoms. In the RA group the anamnestic index was negatively correlated to age ($Rs = -0.37$; $p = 0.004$).

Clinical findings

The distribution of clinical findings is given in Table 3. In general, higher frequencies of the clinical findings were seen in the RA, PA, and AS groups than in the C group. However, the RA group showed significantly less muscle tenderness than the PA, AS, and

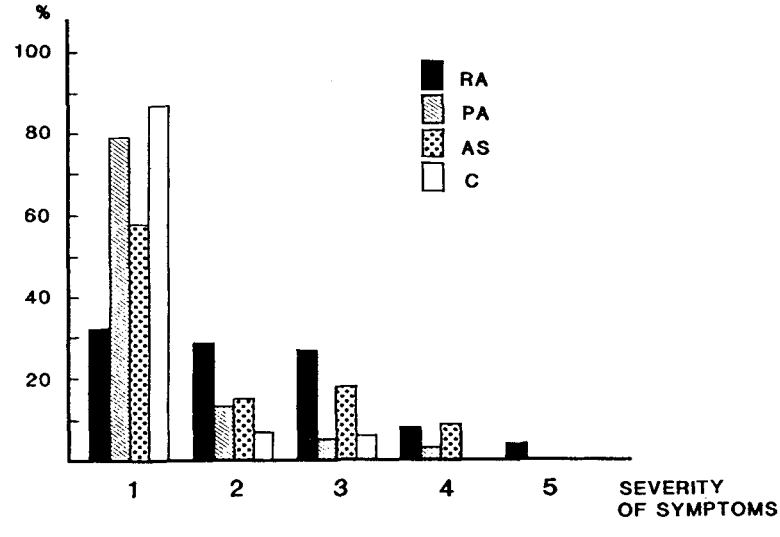

Fig. 2. Percentage distribution of the subjects' self-rated severity of subjective symptoms in the rheumatoid arthritis (RA), psoriatic arthritis (PA), ankylosing spondylitis (AS), and control (C) groups. 1 = no or minimal discomfort; 2 = slight discomfort; 3 = moderate discomfort; 4 = severe discomfort; and 5 = very severe discomfort.

Table 3. Percentage distribution, median value, and range in millimeteres, of clinical findings in the rheumatoid arthritis (RA), psoriatic arthritis (PA), ankylosing spondylitis (AS), and control (C) groups

Clinical findings†	RA ($n = 61$)	PA ($n = 61$)	AS ($n = 61$)	C ($n = 61$)
Tenderness to palpation of masticatory muscles	13**	67**	54	39
Tenderness to palpation of TMJ	20	48**	36*	15
Painful mandibular movements	18*	25**	13	5
TMJ clicking	20	48	25	30
TMJ crepitus	82**	65**	28	19
Maximal mouth opening	45** (26–61)	50** (36–67)	50** (29–67)	56 (42–68)
No. of occluding pairs of teeth	7 (0–15)	7 (0–14)	8 (0–16)	7 (0–14)
Sagittal distance RP–IP	1** (0–4)	0.5 (0–4)	1** (0–4)	0 (0–2)
Vertical distance RP–IP	1** (0–8)	1** (0–7)	1** (0–7)	0 (0–2)
Interference causing lateral gliding ≥0.5 mm between RP and IP	18	17	19	15
Mediotrusion side interferences	19*	11	18*	4

Statistical significance refer to separate tests between the C group and the RA, PA, and AS groups, respectively.
* $p < 0.05$; ** $p < 0.01$.
†TMJ = temporomandibular joint; RP = retruded position; IP = intercuspal position.

C groups ($p < 0.01$). The maximal mouth opening capacity was significantly less in the three groups than in the C group ($p < 0.01$). The occlusal support was similar in all four groups. The vertical and sagittal distances between RP and IP were significantly greater in the three disease groups than in the C group. Vertical distance RP–IP was negatively correlated to age in the AS group ($Rs = -0.40$; $p = 0.002$).

The estimation of the severity of the clinical findings according to the clinical dysfunction index showed significantly higher values in the RA and PA groups than in the C group ($p < 0.01$) but not in the AS group (Fig. 3).

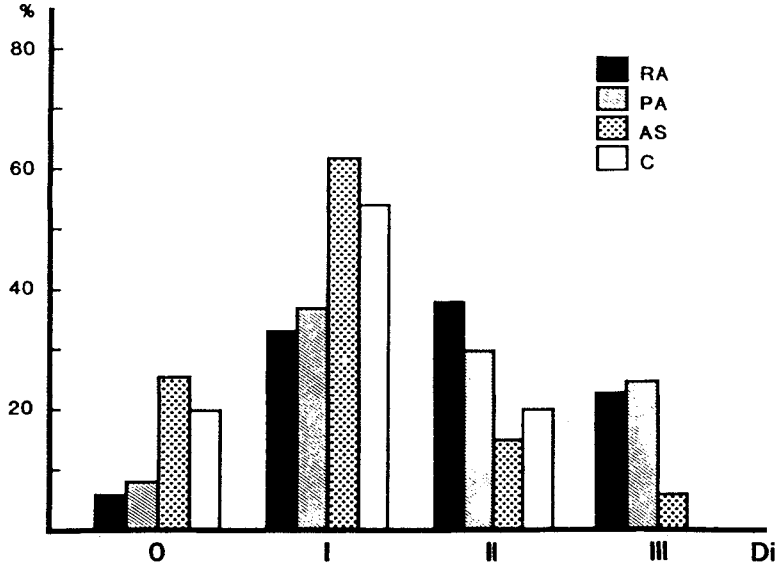

Fig. 3. Percentage distribution of the clinical dysfunction index in the rheumatoid arthritis (RA), psoriatic arthritis (PA), ankylosing spondylitis (AS), and control (C) groups.

Discussion

The groups included in the present study have been described earlier (11). The PA and AS groups were selected from patients' organizations, whereas the RA group was selected from patients seeking treatment at a clinic of rheumatology. It is therefore obvious that the RA patients had a more severe disease than can be found in unselected populations of RA (4). Although the patient samples are not representative of the whole spectrum of illness, they still can give an idea of the differences between signs and symptoms of craniomandibular disorders (CMD) in these diseases.

The reliability and reproducibility of questionnaires in assessing subjective symptoms from the stomatognathic system is satisfactory (25, 26). The methods used in clinical examination are routine and tested procedures in stomatognathic research and treatment in the Nordic countries (22, 23, 27, 28). The questionnaire used in the present study was also used in an earlier Swedish study (16), and great care was taken when it was translated into Finnish to avoid semantic problems. As the clinical assessment was performed by three examiners, there were probably observer variations. Therefore, to reduce the variation and to strengthen the validity of the results, Helkimo's clinical dysfunction index was used to classify the subjects by degree and severity of CMD (21, 27, 28).

The frequencies of most subjective symptoms and clinical signs of CMD were higher in the disease groups than in the control group. Further, patients with RA and PA showed more frequent and severe signs and symptoms from the stomatognathic system than patients with AS. Tegelberg & Kopp (12, 13) have reported even higher frequencies of symptoms and signs from the stomatognathic system for RA. In a previous paper we showed that radiographic signs in the condyle of the TMJ also were more frequent and severe in patients with RA and PA than in patients with AS (11). The findings in the present study corroborate the general view that RA is the most severe of these inflammatory diseases, followed by PA and AS (29, 30). The most frequent signs and symptoms in all three disease groups were pain and morning stiffness during jaw function, suggesting inflammatory involvement of the TMJ by the general joint disease, since joint pain and morning stiffness are characteristic features in these joint diseases (18–20). Subjects in the PA and AS groups more often had tenderness to palpation of the TMJs and masticatory muscles than subjects in the C group. This was probably also due to involvement of the TMJ, leading to impaired TMJ function, which often is associated with masticatory muscle pain and tenderness (31, 32). The high age in the RA group, the low frequency of TMJ and masticatory muscle tenderness, the high frequency of TMJ crepitus, and the frequent restriction of mouth opening suggest a late phase of involvement of the masticatory system with structural changes in the joints but no pain. The subjects in the RA group, who were attending for medical treatment at a clinic of rheumatology, frequently took medication against pain and inflammation, which might also have reduced the experience of pain and tenderness in the TMJs and masticatory muscles. This difference may also partly be due to interobserver variation (27, 28). Crepitus, which was the most characteristic TMJ sound in the PA group but not in the younger AS group, is considered to be an important sign of joint tissue destruction (33–37). Crepitus may also persist even though all other signs and symptoms including pain have disappeared (38, 39). Structural changes in the TMJ constitute the likely explanation of the higher frequency of mediotrusion side interferences and the greater distances between intercuspal and retruded contact position in the disease groups than in the control group. Reduced mouth opening capacity was most frequent in the RA group and more frequent in all disease groups than in the control group. In inflammatory joint disease, restriction can result from intra-articular fibrous adhesions or locking due to displacement of the disc. However, the restriction might also be due to pain and tenderness in the masticatory muscles or a combination of muscular and articular causes. None of the subjects had

a limitation of the mouth opening capacity indicating ankylosis.

To conclude, the present and earlier radiographic findings (11) in the same arthritis patients show that subjective symptoms and clinical signs of CMD are more frequent and severe in patients with inflammatory joint diseases than in controls without such diseases. The findings also suggest that the subjective symptoms and the clinical signs of CMD in RA, PA, and AS are caused mainly by the respective general joint diseases, which directly affect the masticatory system, especially the TMJ. Further, signs and symptoms of CMD are more frequent and severe in RA than in PA or AS. However, none of the signs or symptoms is pathognomonic for RA, PA, or AS.

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