

# Symptoms, Signs, and Clinical Diagnoses According to the Research Diagnostic Criteria for Temporomandibular Disorders Among Finnish Multiprofessional Media Personnel

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**Aims:** To apply the Finnish version of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) Axis I to assess the occurrence of symptoms, signs, and specific subgroups of TMD, and to study the associations between the most common diagnoses and categoric demographic characteristics (gender, age group, marital status, type of work). **Methods:** All 30- to 55-year-old employees of the Finnish Broadcasting Company with at least 5 years at their current employment received postal questionnaires ( $n = 1784$ ). Of the 1339 respondents (75%), a randomly selected one fifth were clinically examined according to the RDC/TMD Axis I ( $n = 241$ , males 48%). **Results:** Pain symptoms in the face or jaw regions were perceived by 14.9% and pain with 1 or more jaw movements by 9.1%. Diagnoses by the RDC/TMD criteria were: Group I: myofascial pain in 12.9%, myofascial pain with limited opening in 0.4%; Group II: disc displacement with reduction in the right temporomandibular joint (TMJ) in 9.1% and in the left TMJ in 10.8%; Group III: arthralgia in 0.4% and 0.8%, osteoarthritis in 0% and 0.4%, and osteoarthrosis in 1.2% and 1.2%, respectively, in the right and left TMJs. The most common diagnoses were found more often among women than among men. No TMD diagnosis based on the RDC/TMD was obtained in 73% of the subjects. **Conclusion:** The RDC/TMD appear to be of benefit in diagnosing TMD among these multiprofessional media personnel and thus may be suggested for use among nonpatient populations. *J OROFAC PAIN* 2003;17:311–316.

**Key words:** nonpatient, prevalence, RDC/TMD, temporomandibular disorders, working population

**B**y definition, temporomandibular disorders (TMD) is “a collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joints (TMJs) and associated structures, or both.”<sup>1</sup> TMD are a common cause of orofacial pain conditions,<sup>2</sup> and pain is the most common symptom of TMD.<sup>3</sup>

The prevalence of TMD symptoms and signs in nonpatient populations is high,<sup>3–9</sup> but the prevalence of clinically significant TMD is estimated to be only 5%.<sup>10</sup> The prevalence of TMD symptoms has been found to vary from 6% to 93% and the prevalence of signs from 0% to 93%, mostly due to the different criteria and populations studied<sup>11</sup> and also perhaps due to the fluctuating nature of these disorders.<sup>12,13</sup> The prevalence of TMD is highest among those around 40 years of age and it is proposed that studies should be aimed especially toward adult populations.<sup>14</sup>

Several methods have been introduced for assessing and classifying TMD.<sup>1,15-20</sup> The Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) were developed for research purposes.<sup>19</sup> Axis I of the RDC/TMD contains clear, detailed criteria for the most common forms of TMD, which are divided into three groups: Group I, muscle disorders; Group II, disc displacements; and Group III, arthralgia, arthritis, and arthrosis. The RDC/TMD permits multiple diagnoses for each subject and has as second axis for psychosocial issues (Axis II). The RDC/TMD has been found to be reliable in the United States and Scandinavia and has been used for several patient populations<sup>21-29</sup> and in studies of children and adolescents.<sup>30,31</sup> The RDC/TMD also appear to be useful for assessing the prevalence of the most common forms of TMD in nonpatient populations. To the authors' knowledge, no previous studies exist in the dental literature that have used the present form of the RDC/TMD in an adult nonpatient population.

Among populations of working people, many physical problems and symptoms are thought to be initiated and perpetuated by stressors in the workplace, and the psychosocial loading of work has become an integral part of modern life.<sup>32</sup> Thus, working-age populations are most likely to experience stress-related symptoms, including TMD. As a part of a comprehensive study on stress and related factors in radio and TV work, the authors examined employees of the Finnish Broadcasting Company (YLE). The aims of the present study were to apply the Finnish version of the RDC/TMD Axis I to assess the occurrence of symptoms, signs, and specific subgroups of TMD, and to study the associations between the most common diagnoses and categoric demographic characteristics (gender, age group, marital status, type of work) among a nonpatient population.

## Methods

In March 1999, a standardized questionnaire was mailed to all 30- to 55-year-old employees of the Finnish Broadcasting Company whose current employment in the Helsinki area had lasted for at least 5 years ( $n = 1784$ ). The mean age ( $\pm$  SD) of the respondents ( $n = 1339$ , 75%) was  $46 \pm 7$  years for both genders (males 51%).<sup>33</sup> Of the 1,339 respondents, one fifth ( $n = 241$ , males 48%) were randomly selected to be subjects and were clinically examined. Mean age of the examined subjects was also  $46 \pm 7$  years.

The type of work of the media personnel clinically studied included management (13%), journalism (24%), program production (22%), planning and development (13%), maintenance (17%), administration (9%), and others (2%); and 26% of the sample worked in shifts. Of these subjects, 73% were married or cohabiting; 15% single; and 12% divorced, separated, or widowed. Mean duration of education was  $15 \pm 4$  years and weekly working hours were, as a mean,  $40 \pm 6$ .

All subjects were interviewed about TMD-related pain symptoms included in the RDC/TMD Axis I. Then, all were clinically examined in a conventional dental chair at the company's dental clinic by the same calibrated dentist (MR). Examinations were performed according to the RDC/TMD.<sup>19</sup> The Finnish version of the RDC/TMD was translated from the original one and has been used in pilot calibration examinations conducted by 3 examiners on 16 subjects to confirm that the Finnish version is understandable and acceptable. Before and after these examinations, the translated version was checked for clarity by the experienced researchers. However, no back translation was performed to confirm the validity of the translation used. Ethical approval was obtained from the University of Helsinki, Institute of Dentistry Ethics Committee.

## Statistical Methods

The chi-square test was used to study associations between the most common diagnoses and categoric demographic characteristics (gender, age group, marital status, type of work). The level of significance was set at  $P < .05$ . All analyses were performed with SPSS statistical software, version 10.0.

## Results

Pain symptoms in the face or jaw regions were reported at the interview by 14.9% of the subjects. Painful sites were: muscles (11.6%), TMJ (1.7%), or both (2.5%); these were verified by clinical examination if the location was uncertain. Pain in one or more jaw movements was found in 9.1% of the subjects (opening 6.1%, lateral movements 3.7%, protrusion 2.9%).

The mean vertical maximal unassisted opening was  $51.5 \pm 7.0$  mm and maximal assisted opening  $53.6 \pm 7.2$  mm, measured as interincisal distance not including the vertical overlap (mean  $3.6 \pm 2.2$  mm). Palpatory muscle pain was found in at least 1 muscle site in 68%, in 3 muscle sites in 50%,

and in 4 muscle sites in 45%. Intraoral muscle sites were more often painful to palpation than were extraoral muscle sites. Table 1 summarizes the complete set of Axis I measures presented in the RDC/TMD examination form.

Based on the RDC/TMD, 73% of the subjects did not reach any TMD diagnosis (males 84%, females 62%,  $P < .001$ ). The most common diagnoses were myofascial pain (12.9%) and disc displacement with reduction in the right TMJ (9.1%) or in the left joint (10.8%) (Table 2). Disc displacement with reduction in one or in both joints occurred in 15.8% of the subjects (males 9.5%, females 21.6%,  $P = .01$ ). Myofascial pain was not associated with either right or left disc displacement. The most common TMD diagnoses were found more often in women than in men (Fig 1). No significant associations emerged between TMD diagnoses and other categorical demographic variables.

## Discussion

The RDC/TMD are reportedly a reliable tool for research to classify subjects into specific TMD subgroups and also to assess the psychosocial aspects of TMD, and therefore evaluate more accurately the entire nature of TMD.<sup>21,34-36</sup> According to the Finnish version of the RDC/TMD, the occurrence of TMD symptoms, signs, and diagnoses in a Finnish working population seems to be quite similar to those that earlier studies have suggested among adult nonpatient populations,<sup>8,11</sup> although exact comparisons are difficult due to the different methods used in previous studies.<sup>11,37</sup> Muscle disorders and disc displacement with reduction have been considered the most common TMD findings while disc displacement without reduction, arthralgia, arthritis, and arthrosis have been rare. This was also seen in the present study. The other diagnoses included in the RDC/TMD have been found to be rare even with patient populations.

The prevalence of muscle pain on palpation was relatively high and in accordance with that seen earlier.<sup>3,9</sup> Yet, the prevalence figures of the diagnoses were unlikely to be overestimated because of the criterion that the subjects had to report concomitant pain symptoms in order to fit a diagnosis. Further, perceived pain seems to be a critical point in diagnosing TMD, and at least myofascial pain with limited opening and arthralgia seems to occur differently among patients and nonpatients.<sup>21,27</sup> The RDC/TMD includes these most common diagnoses and also other subtypes of TMD and thus may be applied to study nonpatients.

Pain symptoms most often involved muscles in both sides of the face. An opening pattern with uncorrected lateral deviation occurred more often on the left side. Total figures, however, are in accordance with earlier findings.<sup>3</sup> Uncorrected deviation is one sign of disc dislocation without reduction, and the present prevalences do not explain this discrepancy between right and left side. Further, right-side midline deviation clearly was seen more often; the explanation for this is also unclear.

Female gender was significantly associated with myofascial pain, in accordance with earlier studies of TMD and also other chronic pain conditions.<sup>9,38,39</sup> In our study, disc displacement with reduction was also more prevalent among women than men, although a statistically significant difference was not seen in the right TMJ. Agerberg and Bergenholtz<sup>40</sup> and Agerberg and Inkapööl<sup>9</sup> also found in their studies, with quite similar populations to ours, that the TMJ sounds were more prevalent among women than among men. In the present study, myofascial pain was not associated with disc displacement with reduction in the right or in the left TMJ.

Our interest was in investigating TMD among multiprofessional personnel with relatively low levels of environmental risk factors at work but with presumably high psychosocial loading (deadlines, teamwork, changing technology, demands on productivity, ongoing competition, resource management). A recent study of this same population revealed stress-related biopsychosocial symptoms and interpersonal reactivity, which may be linked with this demanding work environment.<sup>33</sup> No significant associations were found between TMD diagnoses and demographic characteristics other than gender: age-group, marital status, or type of work. Underlying psychosocial and intrapersonal factors known to affect the symptomatology of TMD patients need further analysis among nonpatient populations.

## Conclusions

The RDC/TMD appeared to be of benefit in diagnosing TMD among these multiprofessional media personnel and thus may be suggested for use among nonpatient populations for research purposes.

**Table 1** Signs and Symptoms of TMD, and Measurements of Jaw Movements Presented in the RDC/TMD Examination Form (n = 241)

1. Do you have pain on the right side of your face, the left side, or both sides? (%)	None	Right	Left	Both						
	85.1	2.5	1.2	11.2						
2. Could you point to the areas where you feel pain? (%)		Right	Left							
	None	86.6	87.2							
	Jaw joint	1.7	0.8							
	Muscles	10.0	9.5							
	Both	1.7	2.5							
3. Opening pattern (%)	Straight				75.6					
	Right lateral deviation (uncorrected)				0.8					
	Right corrected "S" deviation				3.7					
	Left lateral deviation (uncorrected)				9.5					
	Left corrected "S" deviation				7.1					
	Other				3.3					
4. Vertical range of motion (mm)	Mean	SD								
a. Unassisted opening without pain	51.2	7.0								
b. Maximum unassisted opening	51.5	7.0								
c. Maximum assisted opening	53.6	7.2								
d. Vertical incisal overlap	3.6	2.2								
			Pain (%)			Joint (%)				
			None	Right	Left	Both	Yes	No	NA	
Maximum unassisted opening			93.9	0.8	1.2	4.1	1.7	4.6	93.7	
Maximum assisted opening			83.0	2.5	2.5	12.0	3.3	13.7	83.0	
5. Joint sounds (palpation)			Opening (%)		Closing (%)		Reciprocal click, eliminated on protrusive opening (%)			
			Right	Left	Right	Left		Right	Left	
None			81.8	74.2	79.7	73.4	No	2.1	1.2	
Click			11.2	13.7	10.0	11.6	Yes	6.6	7.1	
Coarse crepitus			0.4	0.8	1.2	1.7	NA	91.3	91.7	
Fine crepitus			6.6	11.3	9.1	13.3				
6. Excursions (mm)	Mean	SD					Midline deviation			
a. Right lateral excursion	11.3	2.5					No	Right	Left	
b. Left lateral excursion	11.6	2.9					39.4	42.3	18.3	
c. Protrusion	9.7	2.2								
d. Midline deviation	1.2	1.4								
			Pain (%)				Joint (%)			
			None	Right	Left	Both	Yes	No	NA	
Right			98.4	0.4	0.4	0.8	0	1.7	98.3	
Left			96.7	2.1	0.4	0.8	0	3.3	96.7	
Protrusion			97.1	1.7	0.4	0.8	0.8	2.1	97.1	
7. Joint sounds on excursions with palpation (%)			Right sounds				Left sounds			
			None	Click	Coarse crepitus	Fine crepitus	None	Click	Coarse crepitus	Fine crepitus
Excursion right			92.6	6.6	0	0.8	95.9	3.7	0	0.4
Excursion left			96.7	2.9	0	0.4	94.6	4.6	0.4	0.4
Protrusion			93.8	4.1	0	2.1	94.2	5.0	0	0.8
8. Extraoral muscle pain with palpation (%)*			Right				Left			
			0	1	2	3	0	1	2	3
a. Temporalis (posterior)			98.8	1.2	0	0	98.8	0.8	0.4	0
b. Temporalis (middle)			96.7	3.3	0	0	96.3	3.3	0.4	0
c. Temporalis (anterior)			85.1	12.4	2.5	0	83.4	13.3	3.3	0
d. Masseter (origin)			89.2	10.0	0.8	0	92.6	6.2	1.2	0
e. Masseter (body)			81.3	14.1	4.6	0	78.0	18.7	2.9	0.4
f. Masseter (insertion)			86.3	12.0	1.7	0	89.2	9.1	1.7	0
g. Posterior mandibular region			95.0	4.6	0.4	0	95.5	4.1	0.4	0
h. Submandibular region			96.7	2.9	0.4	0	97.9	1.7	0.4	0
9. Joint pain with palpation (%)*			Right				Left			
			0	1	2	3	0	1	2	3
a. Lateral pole			97.9	1.7	0.4	0	97.5	2.5	0	0
b. Posterior attachment			97.5	2.5	0	0	96.3	3.7	0	0
10. Intraoral muscle pain with palpation (%)*			Right				Left			
			0	1	2	3	0	1	2	3
a. Lateral pterygoid area			50.2	33.6	14.1	2.1	45.6	36.1	16.2	2.1
b. Tendon of temporalis			59.0	31.5	8.3	1.2	55.5	35.3	7.5	1.7

\*0 = no pain/pressure only; 1 = mild pain; 2 = moderate pain; 3 = severe pain.

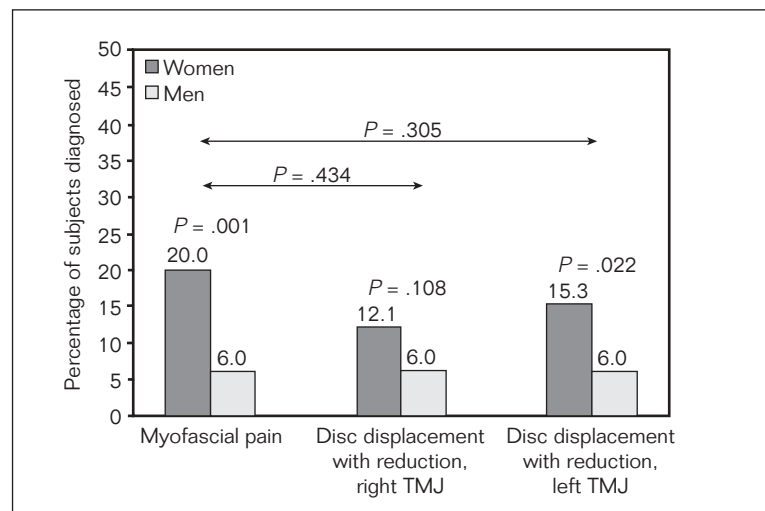


Fig 1 Percentage distribution of the most common TMD diagnoses according to gender. Statistical evaluation for associations between diagnoses in women (n = 125) and men (n = 116), and also between myofascial pain and right and left disc displacement with reduction (chi-square test).

**Table 2** TMD Diagnoses Among Finnish Media Personnel According to RDC/TMD (n = 241)

	Total (%)	Right (%)	Left (%)
Group I. Muscle disorders			
a. Myofascial pain	12.9	–	–
b. Myofascial pain with limited opening	0.4	–	–
c. No Group I	86.7	–	–
Group II. Disc displacements			
a. Disc displacement with reduction	15.8	9.1	10.8
b. Disc displacement without reduction, with limited opening	0	0	0
c. Disc displacement without reduction, without limited opening	0	0	0
d. No Group II	84.2	90.9	89.2
Group III. Arthralgia, arthritis, arthrosis			
a. Arthralgia	1.2	0.4	0.8
b. Osteoarthritis of the TMJ	0.4	0	0.4
c. Osteoarthrosis of the TMJ	2.4	1.2	1.2
d. No Group III	96.0	98.4	97.6

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