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# Oral Health Status and Temporomandibular Disorders in Multiple Sclerosis Patients

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## ABSTRACT

*Multiple sclerosis (MS) is an inflammatory disease of unknown etiology involving the central nervous system. Certain clinical manifestations affect the oro-facial region. Three in particular should be of interest to the dentist: trigeminal neuralgia, sensory neuropathy of the trigeminal nerve and facial palsy. The aim of this study was to determine the oral health status, the frequency of subjective symptoms and temporomandibular disorders (TMD) subtype according to Research diagnostic criteria for temporomandibular disorders (RDC/TMD) among MS patients. Examinees in this study were 50 patients suffering from MS, who were at least once treated during their disease in the Clinic Hospital Center, Rijeka, Clinic for Neurology. All examinees had to meet the diagnostic criteria for clinically and laboratory confirmed MS, according to Poser. The results show the difference in mean DMFT (decayed, missing, filled teeth) between MS and the control group. The number of decayed and missing teeth was higher, but the number of filled teeth was significantly lower in MS group. Eighty-two per cent of the subjects with MS had a least one symptom of dysfunction compared with 24% of the subjects in the healthy control group. In the present study, pain, the pain during mouth opening, the difficulty with mouth opening and temporomandibular joint (TMJ) sounds were more commonly reported in the MS group than in the control group. This study shows a statistically significant excess of dental caries and temporomandibular disorders among MS patients compared with the control group. These results suggest that MS is a possible etiological factor in temporomandibular disorders.*

**Key words:** multiple sclerosis, oral health, temporomandibular disorder, research diagnostic criteria

## Introduction

Multiple sclerosis (MS) is an inflammatory disease of unknown etiology involving the central nervous system<sup>1</sup>. It is characterized by either a relapsing-remitting or progressive course and a pathologic triad of inflammation, demyelination, and gliosis (scarring). MS is a chronic, frequently progressive disease that predominantly attacks the myelin sheath of the central nervous system (CNS – brain and spinal cord). Demyelination occurs, often with scarring at multiple sites throughout the CNS. It is hypothesized that an external »trigger« such as a virus may precipitate an autoimmune response in genetically susceptible individuals<sup>2–5</sup>. Lesions of MS are traditionally said to be disseminated in time and space. Manifestations of MS vary from a benign illness to a rapidly evolving and incapacitating disease requiring profound adjustments in life-style and goals for patients and their families. Complications from MS af-

fect multiple body systems; hence, a multidisciplinary approach is recommended to optimize the clinical care. Symptoms vary widely, but most commonly include: gait disturbances, sensory complaints (numbness, paresthesias, burning, feelings of constriction or pain), visual problems, fatigue, incoordination, bladder, bowel and sexual dysfunction, and partial or complete paralysis in severe cases<sup>6–9</sup>. Mild cognitive impairment occurs in many patients with MS, while a smaller proportion (about 10%) experience serious intellectual deterioration. The cause and cure are unknown, although symptomatic management is possible and certain immunoregulatory agents reduce the relapse rate and may prove to slow the disease progression. Since MS affects the whole body, orofacial aspects of the disease must be expected, particularly since loss of muscular coordination may result in a diminished ability to maintain oral

hygiene<sup>10,11</sup>. Certain clinical manifestations affect the oro-facial region. Three in particular should be of interest to the dentist: trigeminal neuralgia (tic douloureux), sensory neuropathy of the trigeminal nerve (parasthesia) and facial palsy<sup>12–14</sup>. Trigeminal neuralgia usually appears after the diagnosis of multiple sclerosis has been made and is present in about 1.9% of cases. It is, however, the first manifestation of the disease in 0.3% of cases<sup>15</sup>.

The aim of this study was to determine the oral health status, the frequency of subjective symptoms and TMD subtype according to RDC/TMD among MS patients.

## Subjects and Methods

Examinees in this study were 50 patients suffering from MS, who were treated during their disease for at least once in the University Hospital Center, Rijeka, Clinic for Neurology.

The examined group consisted of 37 male patients and 13 female patients, aged 20 to 60. All examinees had to meet diagnostic criteria for clinically and laboratory confirmed MS, according to Poser<sup>16</sup>. The control group was formed by individual matching method, which comprises one healthy individual per one patient of the same age and sex. All subjects submitted informed consent before participation.

The data were collected in two parts. The anamnestic examination was carried out prior to the clinical examination, and the examiner of the clinical examination was unaware of the results of the anamnestic examination.

Oral examination was performed in accordance with WHO diagnostic criteria to determine the number of decayed, missing, filled teeth (DMF), as well as the number of remaining teeth<sup>17</sup>.

The clinical examination of the stomatognathic system included the determination of the range of mandibular movements, the assessment of TMJ function, the recording of pain during movements and during palpation of TMJ and masticatory muscles. All examinations were performed according to the RDC/TMD<sup>18</sup>.

The history questionnaire/examination forms were implemented as electronic forms and input directly into computers using the program »GnatoBaza 1.2.« (School of Medicine, University of Rijeka). The program is written in Microsoft Visual Basic and Microsoft Access (Mi-

crosoft Corp, Redmond, Wash.). It consists of 4 main parts (anamnestic questionnaire, clinical card, data base and part for processing and forwarding data for statistical analysis) which facilitate the saving and analyzing of the obtained data.

Statistical analysis was performed using SPSS 12.0. Statistical package (SPSS Inc., Chicago, IL, USA). Student's t-test for independent samples was applied to test the significance of the difference between arithmetic means of certain parameters. For the variables whose values are expressed in categories the testing of the significance of the difference between groups was carried out by chi-square test.

## Results

Table 1. shows the number of DMF teeth in MS and control group. No significant difference was observed in the number of decayed teeth between the two groups ( $p=0.63$ ), but significantly more teeth were missing in the MS group ( $p=0.001$ ), and DMF teeth were significantly more numerous in the MS group. The control group had significantly more filled teeth than MS group ( $p=0.004$ ).

Table 2. shows the symptoms of TMJ disorders among MS and the control group. No difference was observed in TMJ sounds. Pain, the pain during mouth opening and difficulty with mouth opening were significantly more frequent in MS group.

Table 3. shows TMD diagnoses according to RDC/TMD criteria. MS group showed a much higher prevalence of all three groups RDC/TMD diagnoses. The highest difference between the two groups was in group I (myofascial pain) TMDs ( $p=0.001$ ).

**TABLE 1**  
DECAYED, MISSING, FILLED TEETH AND DMFT INDEX IN  
MULTIPLE SCLEROSIS AND CONTROL GROUP

Dental status	MS group		Control group		t	p
	X	SD	X	SD		
Decayed teeth	1.24	2.10	0.54	1.58	1.88	0.63
Missing teeth	7.04	3.89	3.94	2.74	4.61	0.001
Filled teeth	4.30	4.69	7.24	5.36	2.92	0.004
DMFT Index	12.58	6.32	11.72	5.75	0.72	0.478

MS – multiple sclerosis, DMFT – decayed, missing, filled teeth

**TABLE 2**  
SUBJECTIVE SYMPTOMS OF TEMPOROMANDIBULAR DISORDERS IN MULTIPLE SCLEROSIS AND CONTROL GROUP

TMD symptoms	MS group		Control group		$\chi^2$	p
	N	%	N	%		
Pain	27	54	5	10	2.22	0.001
Pain in front of the ear	6	12	1	2	3.84	0.05
Pain during mouth opening	5	10	1	2	2.84	0.092
Difficulty with mouth opening	11	22	0	0	12.36	0.001
TMJ sounds	15	30	5	10	6.25	0.12

TMD – temporomandibular disorders, TMJ – temporomandibular joint, MS – multiple sclerosis

**TABLE 3**  
RESEARCH DIAGNOSTIC CRITERIA FOR TEMPOROMANDIBULAR DISORDERS DIAGNOSES  
IN MULTIPLE SCLEROSIS AND CONTROL GROUP

RDC/TMD diagnoses	MS group		Control group		$\chi^2$	p
	N	%	N	%		
Group I diagnoses						
Myofascial pain	16	32	0	0	19.05	0.001
Myofascial pain with limited opening	0	0	0	0		
Number in Group I	34	68	50	100		
Group II diagnoses						
DD with reduction	6	12	2	4	2.17	0.14
DD without reduction, with limited opening	0	0	0	0		
DD without reduction, without limited opening	0	0	0	0		
Number in Group II	44	88	48	96		
Group III diagnoses						
Arthralgia	6	12	0	0	7.52	0.23
Osteoarthritis	0	0	0	0		
Osteoarthrosis	1	2	0	0		
Number in Group III	43	86	50	100		

RDC/TMD – research diagnostic criteria for temporomandibular disorders, MS – multiple sclerosis, DD – disc displacement

## Discussion

In this study oral health status, signs, symptoms and type of temporomandibular disorder were analyzed in 50 multiple sclerosis patients and 50 controls without multiple sclerosis who were the same age and sex. There was a difference in mean DMFT between MS and the control group. The number of decayed and missing teeth was higher, but the number of filled teeth was significantly lower in MS group. Symons et al. report no differences in the number of decayed, missing and filled teeth between MS patients and controls, but this preliminary study was carried out on only 22 MS patients<sup>11</sup>. Considering that the number of DMFT index of the control group corresponds with the research results of other studies, our results may suggest poor oral health among MS patients<sup>19–21</sup>.

Eighty-two per cent of the subjects with MS had a least one symptom of dysfunction compared with 24% of the subjects in the healthy control group. In the present study, pain, the pain during mouth opening, the difficulty with mouth opening and TMJ sounds were more commonly reported in the MS group than in the control group.

TMJ sounds were found in 30% of the MS group and 10% of the control group. The values obtained agree with the data from literature in which sounds in the TMJ are present in 11–36%<sup>22–25</sup>.

In Mercado's studies click was present in 29.16 % males and 30.72% females<sup>26</sup>. Dworkin established a difference between the appearance of sound in persons with and without TMD symptoms. In clinical examination the click was noticed in 43% examinees with TMD and 24% in control group<sup>27</sup>.

Doubt has been cast on the relevance of TMJ clicking for the TMD diagnostic criteria, and the presence of sounds to joint pathology remains uncertain<sup>28–30</sup>. Due to

these considerations, the clicking of the TMJs was not taken into account when classifying the subgroups of TMD in the clinical part of the study.

In the MS group facial pain was reported by 54% and TMJ pain (pain in front of the ear or during jaw movement) by 22% compared to the control group in which facial pain was reported by 10%, and TMJ pain 4% examinees. Salonen et al. found that TMJ pain during mandibular movement was reported by 7%, and head and/or facial pain by 11% subjects in the age group 30–39 years<sup>28</sup>. These results are also close to the results of Von Korff et al.<sup>31</sup>. Frequent or occasional pain in the jaws or face during chewing has been reported by as many as 44% of 35-year-old subjects<sup>32</sup>.

High prevalence of pain in MS group is in agreement with other studies that reported that pain is more prevalent among MS patients. Warnell found that 233 (64%) of the 364 patients with MS in his descriptive study had experienced pain at some time during their disease, and 40% of those patients reported that they were never pain-free<sup>33</sup>. Forty-nine percent of examinees with pain experienced difficulty in working, and 44% had difficulty in sleeping because of the pain. Stenager came to similar conclusions: only 35% of patients with MS in their study were pain-free<sup>34</sup>.

Muscle disorders and disc displacement with reduction were the most common TMD findings in MS group. The finding that over half of the patients belonged to the myogenous group is in agreement with the results of List and Dworkin who reported that approximately 76% of patients with TMD had a muscular disorder<sup>35</sup>. Rantala found similar results in nonpatient Finnish population<sup>36</sup>. Others found approximately equal proportions of myogenous vs. arthrogenous subgroups in patient and population-based samples<sup>37,38</sup>.

## Conclusion

This study shows a statistically significant excess of dental caries and temporomandibular disorders among

MS patients compared with the control group. These results suggest that MS is a possible etiological factor of temporomandibular disorders.

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## ORALNO ZDRAVLJE I TEMPOROMANDIBULARNA DISFUNKCIJA U BOLESNIKA S MULTIPLIM SKLEROZOM

## SAŽETAK

Multipla skleroza (MS) je upalna bolest nepoznate etiologije koja zahvaća središnji živčani sustav. Određene kliničke manifestacije zahvaćaju i orofacijalnu regiju od kojih su tri posebno interesantne stomatologu. To su neuralgija n. trigeminusa, senzorna neuropatija istog te pareza n. facialis. Cilj istraživanja bilo je odrediti oralni status, učestalost subjektivnih simptoma te vrstu disfunkcije prema RDC/TMD (research diagnostic criteria for temporomandibular disorders) protokolu u MS bolesnika. Ispitivana skupina sastojala se od 50 MS bolesnika koji su barem jednom tijekom svoje bolesti bili liječeni u Kliničko bolničkom centru Rijeka, Klinici za neurologiju. Svi ispitanici morali su imati kliničko i laboratorijski potvrđenu multiplu sklerozu, prema Poseru. Rezultati pokazuju statistički značajnu razliku DMFT (decayed, missing, filled teeth) indeksa između MS bolesnika i kontrolne skupine. Broj karioznih i ekstrahiranih zubi bio je veći, no broj zubi opskrbljenih ispunima značajno manji nego u kontrolne skupine. 82 % ispitanika s MS-om imalo je barem jedan simptom disfunkcije za razliku od 24 % ispitanika kontrolne skupine. Bol, bol pri otvaranju usta, otežano otvaranje usta i zvukovi u temporomandibularnog zgloba učestaliji su u MS bolesnika nego u kontrolnoj skupini. Ova studija pokazuje statistički značajnu prevalenciju karijesa i temporomandibularne disfunkcije među pacijentima s MS-om nego kod kontrolne skupine. Ovakvi rezultati potvrđuju da je MS mogući etiološki faktor temporomandibularnih disfunkcija.