

SHORT COMMUNICATION

Evaluation of Tooth Brushing in Slovak Patients with Sclerosis Multiplex

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Abstract

Objective: To analyse issue of teeth brushing according to age, gender and length in Slovak patients with multiple sclerosis disease (MS). **Material and Methods:** In this descriptive study, the questionnaires were collected in neurologists from December 2016 until September 2017. The study sample consisted of 103 MS patients (44.7% of men) in a mean age of 38.4 ± 9.95 years. The study sample of MS patients was divided into two sub-groups. The first sub-group consisted of MS patients who were restricted in teeth brushing ($n=56$) and the second group of MS patients, which had no restrictions in teeth brushing ($n=47$). Descriptive statistics were used to calculate the absolute and relative frequencies, mean and standard deviation. A two-sample t-test was used to compare of the proportion between sub-groups with restrictions and sub-group no restrictions in teeth brushing. The statistically significant level was determined at $p<0.05$. **Results:** The significant higher mean age (40.4 ± 10.8 years) was found in MS patients who had restrictions in teeth brushing ($p=0.043$). Females described often no restrictions in teeth brushing than males (59.6% vs. 40.4%; $p<0.05$). Length in MS disease (≤ 3 years) has significant impact on patients in who were not found restrictions in teeth brushing (31.9%; $p=0.037$). **Conclusion:** We recommend individual doctor approach to MS patients in older age and using of electric toothbrushes in MS patients who have hand functioning restrictions.

Keywords: Nervous System Diseases; Multiple Sclerosis; Oral Hygiene; Toothbrushing.

Introduction

Multiple sclerosis (MS) is immune demyelinating disorder of the brain and spinal cord (CNS) [1]. Relapsing-remitting multiple sclerosis was found in 85–90% of patients. In this MS clinical subtype was found the first manifestations in the form of spinal-cord symptoms, optic neuritis, brainstem and pyramidal tract symptoms [2].

The highest MS prevalence is in North America and Europe. On higher MS prevalence impact European migration, as in the case of Brazil (European contribution in Southern Brazil was 77%), Argentina, Uruguay and other countries of Latin America [3]. The MS prevalence is 17.5/100,000 population and MS incidence is 7.5/100,000 population in the Slovak Republic [4] and MS prevalence is 5.0–20.0 in Brazil [3].

Lots of medications used in MS treatment can cause dry mouth what can influence on others oral disease [5]. Physical status in MS patients is in accordance to their daily dental care. In order to prevent fatigue of MS patients is recommended sitting down when they teeth brush. Patients of MS often have difficulty grasping the toothbrush [6].

Dental caries are associated not only with tooth brushing [7], socioeconomic factors [8], but also with different diseases for example MS [9]. A previous study with 51 MS patients (18–50 years) revealed that these patients suffered more common carious teeth than control and 85% MS patients had progressive paradontopathics [9].

In one of the first studies published in 1978, it was observed that the rates of death due to MS in Australian states are linearly related to the numbers of decayed, missing, and filled teeth (DMFT index) in individuals from those states [10]. Probably significant association between dental caries and MS, and also association between dental caries severity and incidence of MS incidence was previously described [11].

In this study it was analysed issue of teeth brushing according to age, gender and length in sclerosis multiplex's disease in Slovak patients with sclerosis multiplex.

Material and Methods

Study Design

In this descriptive study, the questionnaire survey was performed and the questionnaires were collected from neurologists from December 2016 until September 2017. The selection criteria for patients' inclusion was diagnosed MS. The study sample consisted of 103 MS patients (44.7% were male) in a mean age of 38.4 ± 9.95 years. Majority of MS patients was in the age group of >40 years (40.8%), females (55.3%) with length in sclerosis multiplex's disease ≥ 8 years (55.3%). The study sample of MS patients was divided into two sub-groups. The first sub-group consisted of MS patients who were restricted in teeth brushing ($n=56$) and the second group of MS had no restrictions in teeth brushing ($n=47$).

Statistical Analysis

Data were analyzed using IBM SPSS Statistics for Windows Software, version 24 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to calculate the absolute and relative frequencies, mean and standard deviation. A two-sample t-test was used to compare of the proportion between sub-groups with restrictions and sub-group no restrictions in teeth brushing. The statistically significant level was determined at $p < 0.05$.

Ethical Aspects

This research project was approved by the Ethics Research Committee of the Faculty of Medicine, Comenius University and University Hospital in Bratislava.

Results

Issue of teeth brushing according to age, gender and length in sclerosis multiplex's disease in Slovak patients with MS can be seen in the Table 1. The significant higher mean age (40.4 ± 10.8 years) was found in MS patients who had restrictions in teeth brushing ($p = 0.043$). The higher non-significant proportion of restrictions in teeth brushing was observed in age categories 31-40 years and >40 years. Females described often no restrictions in teeth brushing than males (59.6% vs. 40.4%; $p < 0.05$). Length in MS disease (≤ 3 years) has significant impact on patients in who were not found restrictions in teeth brushing (31.9%; $p = 0.037$). The higher non-significant proportions of restrictions in teeth brushing was observed in patients with length in sclerosis multiplex's disease >4 years (Table 1).

Table 1. Issue of teeth brushing in Slovak patients with MS.

Variables	Teeth Brushing		p-value
	Restrictions (N=56)	No Restrictions (N=47)	
	N (%)	N (%)	
Age (Years)			
≤30	11 (19.6)	15 (31.9)	0.162
31 to 40	20 (35.7)	15 (31.9)	0.688
>40	25 (44.6)	17 (36.2)	0.387
Mean (SD)	40.4 ± 10.8	36.4 ± 9.1	0.043
Gender			
Male	27 (48.2)	19 (40.4)	0.432
Female	29 (51.8)	28 (59.6)*	0.851
Length in MS Disease (Years)			
≤3	8 (14.3)	15 (31.9)	0.037
4 to 7	13 (23.2)	10 (21.3)	0.815
≥8	35 (62.5)	22 (46.8)	0.114
Mean (SD)	7.1 ± 4.3	8.4 ± 6.5	0.229

* $p < 0.05$; significant difference between male and female in sub-group no restriction in teeth brushing.

Discussion

Our results have been difficult to compare with other dental studies analysing issue of teeth brushing in MS patients because it was found only one article in PubMed database for keywords

"teeth brushing" AND "multiple sclerosis" and only five articles for keywords "teeth brushing" AND "systemic sclerosis".

Certain MS clinical manifestations impact on the oro-facial region (trigeminal neuralgia, facial palsy and trigeminal nerve sensory neuropathy) [6]. In a previous study the pain during mouth opening and the difficulty with mouth opening were commonly reported in the MS patients [6]. In this research was found dental caries significant excess and temporomandibular disorders in MS patients and DMFT index was higher (12.58) in MS patients than in control (11.72) (decayed teeth: 1.24 vs. 0.54; missing teeth: 7.04 vs. 3.94; filled teeth: 4.3 vs. 7.24) [6]. A previous study that evaluated 400 patients with MS was found facial and demonstrated oral symptoms (89.2%) [12].

One of the most frequent MS symptoms, which were observed on a sample of 36 000 MS patients (1996-2011) were problems with hand function, eyesight, problems with mobility and sensory perception, painful, depression and tremor [13]. These problems could probably to cause limitations with teeth brushing on the MS patients.

Impaired functioning of hand function and arm assessment can have an impact on daily activities in MS patients [14]. Fatigue has negative impact on daily living activities, ability to work, quality of life and social life in MS patients [15]. In a previous study with British patients, 85.7% with MS reported spasticity. It was found association between spasticity and depression, pain, fatigue, anxiety and bladder problems in MS patients [16].

The higher proportion of teeth brushing restrictions was observed in MS patients with length in MS disease >4 years, it can be explained by the development of the most common MS symptoms (hand function, spasticity, and tremor).

Conclusion

It was found significant negative impact of higher mean age on teeth brushing restriction and significant positive impact of shorter length in Sclerosis Multiplex's Disease in patients who declared no restriction. We recommend individual doctor approach to MS patients in older age and using of electric toothbrushes in MS patients who have restrictions in hand functioning.

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Conflict of Interest: The authors declare no conflicts of interest.

References

- [1] Dorotta IR, Schubert A. Multiple sclerosis and anesthetic implications. *Curr Opin Anaesthesiol* 2002; 15(3):365-70.
- [2] Nazish S, Shahid R, Zafar A, Alshamrani F, Sulaiman AA, Alabdali M, Aljaafari D, et al. Clinical presentations and phenotypic spectrum of multiple sclerosis at a University Hospital in Saudi Arabia. *J Clin Neurol* 2018; 14(3):359-65. <https://doi.org/10.3988/jcn.2018.14.3.359>
- [3] Correa E, Paredes V, Martínez B. Prevalence of multiple sclerosis in Latin America and its relationship with European migration. *Mult Scler J Exp Transl Clin* 2016; 2:2055217316666407. <https://doi.org/10.1177/2055217316666407>

- [4] Ondrusova M, Psenkova M, Donath V. Health care resource use and cost of multiple sclerosis in Slovakia: Results from the National Cross-Sectional Study. *Value Health* 2014; 17(7):A396-7. <https://doi.org/10.1016/j.jval.2014.08.891>
- [5] Fiske J, Griffiths J, Thompson S. Multiple sclerosis and oral care. *Dent Update* 2002; 29(6):273-83.
- [6] Kovac Z, Uhac I, Buković D, Cabov T, Kovacević D, Grzić R. Oral health status and temporomandibular disorders in multiple sclerosis patients. *Coll Antropol* 2005; 29(2):441-4.
- [7] Queiroz BM, Alencar NA, Requejo MEP, Antonio AG, Maia LC. Risk factors, perception of caregivers and impact of early childhood caries on quality of life related to oral health of preschool children and their families. *Pesqui Bras Odontopediatria Clin Integr* 2015; 15(1):85-94. <https://doi.org/10.4034/PBOCI.2015.151.10>
- [8] Dadalto ECV, Andrade KS, Gomes AMM, Sarmiento LC, Rosa EM. Behavior during toothbrushing in the home environment in preterm and full-term infants. *Pesqui Bras Odontopediatria Clin Integr* 2017; 17(1):e3181. <https://doi.org/10.4034/PBOCI.2017.171.42>
- [9] Firnhaber W, Orth H. Über die pathogenetische Bedeutung von Zahnerkrankungen und Zahnbehandlungen bei der Multiplen Sklerose. *J Neurol* 1977; 215(2):141-9. [Article in German]
- [10] Craelius W. Comparative epidemiology of multiple sclerosis and dental caries. *J Epidemiol Community Health* 1978; 32(3):155-65.
- [11] McGrother CW, Dugmore C, Phillips MJ, Raymond NT, Garrick P, Baird WO. Multiple sclerosis, dental caries and fillings: A case-control study. *Br Dent J* 1999; 187(5):261-4.
- [12] Lassemi E, Sahraian MA, Motamedi MHK, Valayi N, Moradi N, Lasemi R. Oral and facial manifestations of patients with multiple sclerosis. *Dentistry* 2014; 4(2):1-3. <https://doi.org/10.4172/2161-1122.1000194>
- [13] Kister I, Bacon TE, Chamot E, Salter AR, Cutter GR, Kalina JT, Herbert J. Natural history of multiple sclerosis symptoms. *Int J MS Care* 2013; 15(3):146-58. <https://doi.org/10.7224/1537-2073.2012-053>
- [14] Luijten MA, Eekhout I, D'Hooghe M, Uitdehaag BM, Mokkink LB. Development of the Arm Function in Multiple Sclerosis Questionnaire-Short Form (AMSQ-SF): A static 10-item version. *Mult Scler* 2018;1352458518808197. <https://doi.org/10.1177/1352458518808197>
- [15] Khan F, Amatya B, Galea M. Management of fatigue in persons with multiple sclerosis. *Front Neurol* 2014; 5:177. <https://doi.org/10.3389/fneur.2014.00177>
- [16] Milinis K, Tennant A, Young CA. Spasticity in multiple sclerosis: Associations with impairments and overall quality of life. *Mult Scler Relat Disord* 2016; 5:34-9. <https://doi.org/10.1016/j.msard.2015.10.007>