

# Temporomandibular Joint Disorder in a Patient with Multiple Sclerosis – Review of Literature with a Clinical Report

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## ABSTRACT

*Temporomandibular disorders are a form of musculoskeletal disorders, which reduce the function of stomatognathic system and they are related to some other diseases causing painful conditions and disorders of oral function. The aim of this paper is to describe a one year follow up clinical case of a female patient with comorbid multiple sclerosis and a relatively rare form of articular disc disorder. Primary clinical diagnostics encompassed manual methods of TMJ examination. Definite diagnosis included radiologic examination. Clinical hyperextensive condyle position was palpated bilaterally and subsequently confirmed by a functional panoramic radiograph of TMJ. The anterior displacement of disc with reduction was diagnosed by magnetic resonance and in the right joint there was a disc displacement upon excursive movement. From relevant literature, the relationship of a number of diseases that can be related to functional disorder of the orofacial system, such as multiple sclerosis, has been described from many aspects. Also, apart from the standard classification of one form of anterior displacement of the disc, made primarily by magnetic resonance, cases of disc displacement upon excursive mandibular movement can rarely be found in literature.*

**Key words:** temporomandibular disorder; disc displacement, multiple sclerosis, magnetic resonance imaging

## Introduction

The current decade (2000–2010) has been dedicated to bone and joint illnesses by World Health Organisation, therefore, full attention should be given to specific musculoskeletal changes in the stomatognathic system under the term »temporomandibular disorders« (TMDs)<sup>1</sup>. TMD consists of masticatory muscles disorder and/or a disorder of temporomandibular joint (TMJ). Arthrogenous disorder is divided in two separated subgroups: osteoarthritis and disc disorder. The most frequent form of disc disorder is a variation of anterior disc displacement (DD). Pain is the most important symptom and a clinical sign of myogenous and arthrogenous form of TMDs. Both of these conditions are represented with pathological noise in the TMJ and painful TMJ with loss of function. Limited mouth opening is also a very important clinical sign of TMDs<sup>2,3</sup>.

Some dysfunctional conditions of TMJs are close to TMDs, such as subluxation or painless sporadic clicking. However, it is commonly not included in clinical picture related to TMDs and it is not included in the most applied classification system – research diagnostic criteria (RDC)/TMD<sup>4-6</sup>. Additionally, in the field of TMDs, specific manual techniques of clinical examination have further improved the basic diagnostics<sup>7,8</sup>. Clinical diagnostics indicates to the use of some radiological methods. In TMJ diagnostics, magnetic resonance imaging (MRI) primarily improved the diagnostics of disc disorders, and it is accepted as the gold diagnostic standard without exposure to x-ray radiation and is very useful in the examination of asymptomatic subjects<sup>9,10</sup>.

Multiple sclerosis (MS) is a chronic, unpredictable disease of the central nervous system mostly affecting

younger adults and substantially decreasing their working and living abilities<sup>11</sup>. Some clinical aspects of MS were previously reported in many studies of the Croatian population<sup>12–20</sup>. A study conducted on the sample of TMD patients is particularly important to this paper<sup>20</sup>.

The aim of this paper is a review of literature on MS related to TMD pathology and to describe a clinical report of a female patient who had comorbidity of MS and bilaterally different types of articular disc disorder with one-year follow up.

### Case Report

A 42 year old female patient was referred to the Prosthodontic Department, School of Dental Medicine, Zagreb University by her dentist for treatment of acute TMJ disorder. The patient suffered from pain in the left TMJ, which had appeared two weeks before, although she had experienced clicking during mouth opening in both TMJs for many years. Furthermore, she had a luxation («open lock») of the left TMJ during the longer dentist appointments five-six years ago. Her dentist had bimanually placed the joint in the physiological position. After that she did not have any signs or symptoms of dysfunction. Present symptoms related to left TMJ are pain in the joint region upon chewing, yawning, and sleeping on the painful left side of the face.

MS was diagnosed many years ago, and she has used many various supportive treatment modalities (for example natural cell-signalling interferons) to improve her general functional status. Although she is retired, she still remains a mobile person.

### Clinical examination

The patient had a good dental status, and the following teeth were not prosthodontically replaced: 26, 36 and 46. She exhibited a mandibular teeth abrasion caused by fixed partial denture (crowns and three-unit bridge in the maxilla). Both laterotrusive movements were guided by canine teeth and without balance on the nonworking sides. The following active movements were measured: opening 45 mm, laterotrusion right 9.5 mm, and painful laterotrusion left 4 mm. Passive opening (passive stretching) amounted to 55 mm with pain in the left TMJ. Pain intensity was rated on a visual-analogue scale (VAS=7).

The following static occlusal factors were observed: Angle class II, division 1, the horizontal overlap was 6 mm, and the vertical overlap of the upper central incisor over the labial surface of the lower incisor was 4 mm.

Clinical diagnosis of the patient was made according to criteria of RDC/TMD Axis I and by using manual examination techniques<sup>5,21</sup>. Bilateral clicking in the final stage of mouth opening was observed by dynamic compressions. Even stronger pain occurred in the course of dynamic compression than before manipulation in the left TMJ, and there was also a slight pain in the right TMJ. The left joint was palpatory more hypermobile during the movement to maximal open mouth position.

### Radiological examination

Definite diagnostics includes radiological examination techniques. Hyperextension of both condyles in the mouth opening position was confirmed by means of functional panoramic radiographs of TMJ; it had been previously detected during palpation in the joint region. Condylar heads in both joints were situated around 1 cm over the zenith of the articular eminence.

Furthermore, MRI diagnostics was used as a part of prospective open study of TMJ disorders (Magnetom Harmony, Siemens; field force 1 T; T1 and T2 weighted images, Spin Echo technique SE 700/40 msec). Two different types of disc DD were found based on the analysis of TMJs in the position of maximal intercuspation and maximally open mouth: anterior DD with reduction is in the left joint and uncommon DD during excursive movements in the right joint<sup>20</sup>. Subluxation with pronounced anterior movement of both condyles could be seen in the open mouth position. In both joints, discrete degenerative changes with subchondral sclerosis in the region of articular surfaces and deplanned right condylar head were observed (Figures 1 and 2).

### Psychological testing

The patient was tested for anxiety due to interaction of psychological factors and pain which lasted for a longer period of time and a possible etiopathogenetic basis for development of chronic pain, which was confirmed by State-Trait Anxiety Inventory (STAI), a psychological measuring instrument<sup>22</sup>. STAI 1 test results (related to anxiety as a subjective and transitory condition, patient's mood in the last week including the day of testing) and STAI 2 test results (related to anxiety as a relatively permanent individual trait generally throughout a lifetime) showed higher anxiety scores (STAI 1=43 and STAI 2=51) than the mean reference scores for this age and gender amounting to 36.17 for STAI 1 and 36.15 for STAI 2, respectively. After one-year follow up, the patient

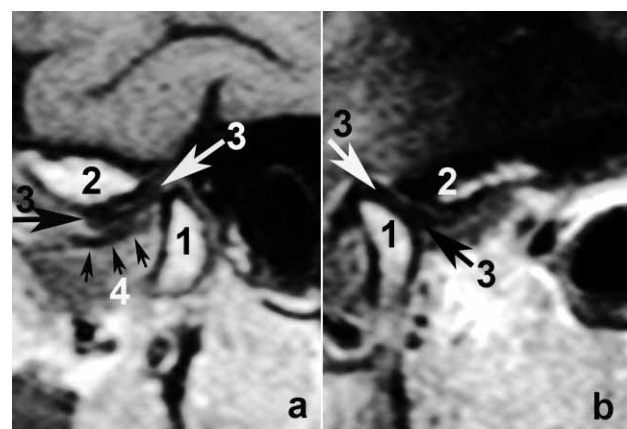


Fig. 1. MRI showing left TMJ with disc displacement (a, closed mouth) with reduction and with condylar hypermobility (b, open mouth) (1, condyle; 2, articular eminence; 3, disc; 4, musculus pterygoideus lateralis).

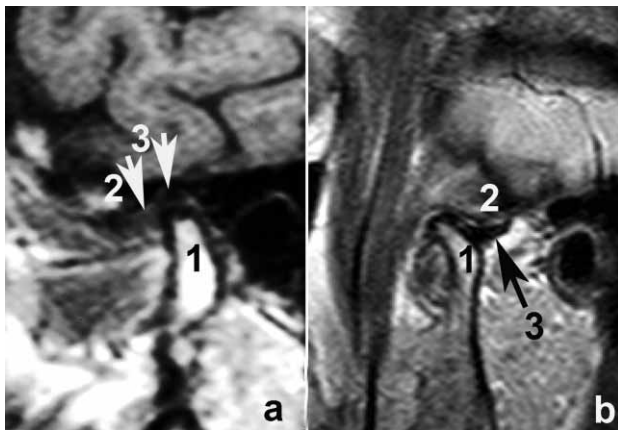


Fig. 2. MRI showing right TMJ with disc in physiological position (a, closed mouth). In the open mouth position (b) condyle is extremely anterior and hypermobile and disc is more posteriorly positioned on the articular eminence than the condyle (1, condyle; 2, articular eminence; 3, disc).

still exhibited a higher level of anxiety which was measured on both scales (STAI 1=38 and STAI 2=49).

#### Natural course of disorder

After the visit to the dentist and complete diagnostics of stomatognathic system, described previously in this paper, the patient asked for help of alternative practitioners for bioenergy treatment. Three months later, she had significantly larger capacity of active mouth opening, which was 53 mm and painless. A year later, at first recall-appointment, there was still some clicking in the left TMJ at subluxation position of the condyle. Meanwhile, the right joint showed less hypermobility during mouth opening compared to left joint.

#### Discussion

MS has an unpredictable course and affects each patient differently, making a strategy of management of symptoms very difficult. However, at least 75% of patients with diagnosed MS will never be disabled regardless of the neurological impairment, and a normal living age is expected. The purpose of the treatment, including interferons, is, at best, only to slow the disease progression and mitigate symptoms. Effective symptom management requires a multidisciplinary team approach<sup>23,24</sup>.

There are two issues regarding the interaction between MS and function status of stomatognathic system: trigeminal neuralgia-like orofacial pain and irregular joint mobility due to affected masticatory muscles<sup>25,26</sup>. Nevertheless, in the literature, there has been a clinical report on a misdiagnosed TMJ disturbance, after that it was correctly attributed to MS<sup>27</sup>. Some authors described interaction of progressive course of MS on trigeminal nerve area, with result of manifestation of combination syndromes; trigeminal neuralgia in the orofacial region. Other different neurological entities in the orofacial re-

gion are parasthesia of trigeminal nerve and palsy of facial musculature (including mimic muscles as well)<sup>25,26,28</sup>. Other papers described that TMJ hypermobility, contrary to facial palsy, was caused due to changes in the equilibrium of the masticatory muscles related to manifestation of MS<sup>29–31</sup>.

Condylar hypermobility or subluxation is a functional disturbance which does not belong to the primary field of TMDs study. There is relative pathophysiological relationship between TMJ disorder and subluxation: the hypermobile condyle can cause a painless choking in TMJs in as many as 70% of the population<sup>32</sup>. In a previous study of patients with TMJ disorder analysed by MRI, contrary to the results of some other studies, a relatively high frequency rate of limited translation of the condyle (hypomobility) was found<sup>33</sup>. Another study showed that there is no significant difference between the hypermobile and non-hypermobile individuals whose DD has been analysed on MRI images<sup>34</sup>. It is important, regardless of possible comorbidity with MS or other functional disturbances such as general joints laxity, to clinically differentiate subluxation-related clicking from the symptoms of painless DD<sup>35,36</sup>.

Kovač et al.<sup>20</sup> observed significantly more pain during mouth opening in the group of patients with MS than in healthy controls. According to RDC/TMD diagnostics, there was a higher prevalence of myogenous (group I) and arthrogeous (groups II and III) diagnoses in patients with MS.

Some authors reported about patients with luxation of TMJ, also called mandibular dislocation. Luxation is usually managed by manually pressing the mandible downward and after this interposition backward to relocate the condyle in the space of glenoid fossa. Surgical treatment is accepted as invasive and more definite modality, with various interventions in some masticatory muscles and structures of joint capsule. Comorbidity with orofacial dyskinesia is a possible cause of recurrent luxation of the TMJ<sup>37</sup>. Daelen et al.<sup>30</sup> called this status »neurogenic dislocation of the TMJ«. A nonsurgical modality is to manage masticatory muscles with injections of type A botulinum toxin. This treatment is applied to patients who have myofascial pain with or without functional DD. Regardless of variable action potentials of the masseter muscles during 28 days follow up, the patients exhibited less pain and better psychological status<sup>31</sup>.

MRI is a noninvasive diagnostic method for the analysis of arthrogeous TMDs that enables a qualitative as well as a quantitative analysis of the structures within the joint; also, it is the gold standard in soft tissue diagnostics, particularly in disc disorder diagnostics<sup>9,10</sup>. The anterior DD is the most frequent form of disc malpositioning of TMJ. DD can only occur in the intercuspal occlusion position (DD with reduction) or during condyle movements when opening the mouth (DD without reduction). An anchored disc phenomenon is, in MRI, the disc stuck on the articular eminence and the condylar movement is usually restricted. Often, a sudden and very lim-



ited mouth opening due to fixed disc is clinically observed<sup>38,39</sup>.

In the presented clinical case, a rare DD during excursive movements was diagnosed by MRI, which was described by Bumann and Lotzmann<sup>21</sup> on the basis of an extensive MRI diagnostics. In the mouth opening position, the disc should be in a more posterior position on the articular eminence than the condyle. On the contrary, in anterior DD with reduction, the disc-condyle complex is in the physiological position at closed mouth.

Regardless of the absence of clinical symptoms, in the population of asymptomatic individuals a prevalence of 20–33% of anterior DD in healthy volunteers' TMJs<sup>40,41</sup> was shown by MRI. The evidence suggests that this is an anatomic variant, and the natural course between various types of DD is still not clear, especially regarding to causes of temporomandibular pain.

The cure for MS has not been found yet. Because of this, patients often seek complementary and alternative treatments and the most treated disease symptoms are pain, fatigue and stress. There is a need for further research to evaluate the effectiveness of complementary and alternative medicines with MS patients and their application by occupational therapists. Because MS could be characterised a relapsing-remitting course, the patients believe that alternative treatments could improve their general health status<sup>42</sup>.

TMDs are accepted as a musculoskeletal condition with unclear ethiopathogenesis, and a conservative treatment is required more than surgical options. Because the possible causes of disorder are unknown, no therapy is also required. The prognosis of TMDs is good, according to the age prevalence, which is higher in the middle aged

female patients and is decreasing with age. There was spontaneous improvement in some patients. Also, a longitudinal study of TMDs showed great fluctuation of symptoms, including pain. The main goal of any modalities of TMD treatment is to achieve painless and more effective function of stomatognathic system by means of reversible and non invasive methods. However, from the scientific point of view, it is very difficult to believe that bioenergy can be the therapy of choice in treatment of TMDs<sup>43–45</sup>.

Psychological condition is related to many functional disturbances, for example anxiety due to MS and TMDs. In this case, the relationship between the patients' psychological condition and their reaction to experiencing pain is very important, as well as the pathophysiological mechanisms of chronic pain where its intensity is often independent of the clinical findings. In this paper, an easy to use Spielberger's STAI test was utilized, and it is not covered by RDC/TMD diagnostics system<sup>46–48</sup>.

## Conclusion

In conclusion, this paper presented literature review with a clinical report, and showed that some orofacial symptoms of trigeminal neuralgia such as pain and TMJ disorder (especially condylar hypermobility) may be manifested in MS patients. A very rare variation of disc disorder named DD during excursive movements was described after TMJs pathology has been studied by MRI. Within this relatively wide area of interest, TMJ disorders should be considered as possible orofacial symptoms in MS patient population.

## REFERENCES

1. PEĆINA M, *Acta Med Croatica*, 61 (2007) 3. — 2. DURHAM J, *Oral Surgery*, 1 (2008) 60. — 3. HUGGER A, SCHINDLER HJ, BÖHNER W, NILGES P, SOMMER C, TÜRP JC, HUGGER S, *Schmerz*, 21 (2007) 116. — 4. MIKIĆ V, GRŽIĆ R, KOVAČEVIĆ PAVIČIĆ D, ANTONIĆ R, FUGOŠIĆ V, *Medicina*, 42 (2006) 237. — 5. DWORKIN SF, LE RESCHE L, *J Craniomandibular Disord Fac Pain*, (1992) 301. — 6. LAJNERT V, GRŽIĆ R, KOVAČEVIĆ PAVIČIĆ D, BAKARČIĆ D, BADEL T, PETRIČEVIĆ N, *Medicina*, 45 (2009) 56 — 7. DULČIĆ N, PANDURIĆ J, KRALJEVIĆ S, BADEL T, ČELIĆ R, *Coll Antropol*, 27 (2003) 61 — 8. DULČIĆ N, PANDURIĆ J, KRALJEVIĆ S, BADEL T, ČELIĆ R, *Eur J Med Res*, 8 (2003) 465. — 9. LEWIS EL, DOLWICK MF, ABRAMOWICZ S, REEDER SL, *Dent Clin North Am*, 52 (2008) 875 — 10. LARHEIM TA, *Cells Tissues Organs*, 180 (2005) 6. — 11. NAMAKA M, TURCOTTE D, LEONG C, GROSSBERNT A, KLASSEN D, *Consult Pharm*, 23 (2008) 886. — 12. BOJIĆ L, ROGOSIĆ V, IVANIŠEVIĆ M, MATIJIĆ M, LUSIĆ I, PINTARIĆ I, VREBALOV-CINDRO V, RACIĆ G, *Coll Antropol*, 31 (2007) 557. — 13. TITLIĆ M, ERCEG I, KOVAČEVIĆ T, GABRIĆ N, KARAMAN K, ZULJAN I, ORSOLIĆ K, KALAJZIĆ J, *Coll Antropol*, 29 (2005) 633 — 14. CEROVSKI B, VIDANOVIĆ T, PETRICEK I, POPOVIĆ-SUIĆ S, KORDIĆ R, BOJNIĆ L, CEROVSKI J, KOVAČEVIĆ S, *Coll Antropol*, 29 (2005) 153. — 15. VIDOVIĆ T, CEROVSKI B, VIDOVIĆ DH, CEROVSKI J, NOVAK-LAUS K, *Coll Antropol*, 29 (2005) 67. — 16. BRINAR V, BRZOVIĆ Z, PAPA J, MALOJČIĆ B, DAWIDOWSKY K, *Coll Antropol*, 21 (1997) 493. — 17. SUPE S, MILIČIĆ J, PAVIČEVIĆ R, *Coll Antropol*, 21 (1997) 319. — 18. TILITIĆ M, MATIJIĆ M, MAROVIĆ A, LUSIĆ I, TONKIĆ A, JUKIĆ I, KARACIĆ S, CAPKUN V, *Acta Med Croatica*, 61 (2007) 355. — 19. MATERLJAN E, MATERLJAN M, MATERLJAN B, VLAČIĆ H, BARIČEV-NOVAKOVIĆ Z, SEPIĆIĆ J, *Coll Antropol*, 33

- (2009) 539. 20. KOVAČ Z, UHAČ I, BUKOVIĆ D, CABOV T, KOVAČEVIĆ D, GRŽIĆ R, *Coll Antropol*, 29 (2005) 441. — 20. BUMANN A, LOTZMANN U, *Funktionsdiagnostik und Therapieprinzipien* (Thieme Verlag, Stuttgart, 2000). — 21. SPIELBERGER CD, *State-Trait Anxiety Inventory for Adults (Form Y)* (Naklada Slap, Jastrebarsko, 2000). — 22. MURRAY TJ, *J Neurol Sci*, 277 (2009) S3. — 23. WEINER HL, *Ann Neurol*, 65 (2009) 239. — 24. BENOLEI R, HEIR GM, ELIAV E, *Neuropathic orofacial pain*. In: SHARAV Y, BENOLEI R (Eds) *Orofacial Pain & Headache* (Mosby, Elsevier Edinburgh, 2008). — 25. OSTERBERG A, BOIVIE J, THUOMAS KA, *Eur J Pain*, 9 (2005) 531. — 26. TWEEDLE JA, MORRISSEY JB, RANKOW RM, *J Oral Surg*, 28 (1970) 785. — 27. SYMONS AL, BORTOLANZA M, GODDEN S, SEYMOUR G, *Spec Care Dentist*, 13 (1993) 96. — 28. DAELEN B, THORWIRTH V, KOCH A, *Int J Oral Maxillofac Surg*, 26 (1997) 458. — 29. DAELEN B, THORWIRTH V, KOCH A, *Nervenarzt*, 68 (1997) 346. — 30. KURTOGUL C, GUR OH, KURKCU M, SERTDEMIR Y, GULER-UYSAL F, UYSAL H, *Oral Maxillofac Surg*, 66 (2008) 1644. — 31. SHOREY CW, CAMPBELL JH, *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, 89 (2000) 662. — 32. BADEL T, MAROTTI M, KEROS J, KERN J, KROLO I, *Coll Antropol*, 33 (2009) 455 — 33. KALAYKOVA S, NAEIJE M, HUDDLESTON SLATER JJR, *J Oral Rehabil*, 33 (2006) 349. — 34. KAVUNCU V, SAHIN S, KKAMANLI A, KARAN A, AKSOY C, *Rheumatol Int*, 26 (2006) 257. — 35. HIRSCH C, JOHN MT, STANG A, *Eur J Oral Sci*, 116 (2008) 525. — 36. GÜVEN O, *J Craniomaxillofac Surg*, 37 (2009) 24. — 37. KANEYAMA K, SEGAMI N, SHIN-ICH T, FUJIMURA K, SATO J, NAGAO T, *Br J Oral Maxillofac Surg*, 45 (2007) 279. — 38. NITZAN DW, KREINER B, ZELTSER R, *Compend Contin Educ Dent*, 25 (2004) 437. — 39. BADEL T, PANDURIĆ J, MAROTTI M, KERN J, KROLO I, *Acta Med Croat*, 62 (2008) 455. —

40. EL-EESSAWY MT, AL-NAKSHABANDI NA, AL-BOUKAI AA, Saudi Med J, 29 (2008) 1448. — 41. OLSEN SA, Occup Ther Int, 16 (2009) 57. — 42. HAMPTON T, J Am Med Assoc, 299 (2008) 1119. — 43. GRAFF-RADFORD SB, Curr Pain Headache Rep, 11 (2007) 75. — 44. SHARAV Y, BENOLIEL R, Complementary and alternative medicine. In: SHARAV Y, BENOLIEL R (Eds) Orofacial Pain & Headache (Mosby, Elsevier Edinburgh, 2008) — 45. DWORKIN SF, Psychological and Psychosocial Assessment. In: LASKIN DM, GREEN CS, HYLANDER WL (Eds) Temporomandibular disorders. An Evidence-Based Approach to Diagnosis and Treatment (Quintessence, Chicago, 2006) — 46. GAMEIRO GH, DA SILVA ANDRADE A, NOUER DF, FERRAZ DE ARRUDA VEIGA MC, Clin Oral Investig, 10 (2006) 261. — 47. ČELIĆ R, JEROLIMOV V, PANDURIĆ J, HABAN V, Acta Stomatol Croat, 40 (2006) 35.

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## **TEMPOROMANDIBULARNI POREMĆAJI U PACIJENTICE S MULTIPLO SKLEROZOM – PRIKAZ BOLESNICE S PREGLEDOM LITERATURE**

### **SAŽETAK**

Poremećaj temporomandibularnog zgloba su oblik muskuloskeletalnog poremećaja, koji smanjuje funkciju stomatognatnog sustava te može biti povezan s drugim bolestima koje uzrokuju bolna stanja i poremećaje oralne funkcije. Svrha ovog rada je opisati klinički slučaj pacijentice koja ima komorbiditet multiple skeroze te relativno rijetkog oblika poremećaja zglobnog diska tijekom jednogodišnjeg praćenja. Primarna klinička dijagnostika obuhvaćala je metode manualne metode pretrage TMZ-a. Definitivna dijagnostika obuhvaćala je radiološke metode pretrage. Funkcijskim ortopantomogramom TMZ-a potvrđen je klinički palpatoran hiperekstenzijski položaj kondila obostrano. Magnetskom rezonancijom utvrđen je u lijevom zglobu anterioni pomak diska s redukcijom, te u desnom zglobu rijedak slučaj pomaka diska pri ekscurzivnoj kretnji mandibule. U je literaturi s mnogih aspekata opisivana povezanost više bolesti koje mogu biti povezane s poremećajem funkcijskog stanja orofacijalnog sustava, kao npr. multipla skleroza. Također, osim standardnog klasificiranja oblika anterionog pomaka diska i to napose magnetskom rezonancijom, u literaturi se rijetko spominje pomak diska pri ekscurzivnoj kretnji madibule.