

# The effects of chronic pain on oral health related quality of life in patients with anterior disc displacement with reduction.

U. Karacayli<sup>1</sup>, G. Mumcu<sup>2</sup>, H. Cimilli<sup>3</sup>, N. Sisman<sup>2</sup>, H. Sur<sup>2</sup> and Y. Gunaydin<sup>1</sup>.

<sup>1</sup>Department of Oral and Maxillofacial Surgery, Gulhane School of Medicine. <sup>2</sup>Department of Health Management, Faculty of Health Sciences, Marmara University. <sup>3</sup>Department of Endodontics, Faculty of Dentistry, Marmara University

**Aim.** The aim of this study was to evaluate the effects of chronic pain on oral health related quality of life (oral QoL) in patients with anterior disc displacement with reduction (DDwR). **Material and methods.** Thirty-seven patients who had disc displacement with reduction (DDwR, F/M: 23/14, median age: 29, range: 23–49) were selected. These patients had chronic pain and had not been undergoing any treatment protocols for the previous six months. Age- and gender-matched healthy subjects healthy control, F/M: 23/14, mean age: 33.0±15.7 years) were used as a control group. Data were collected by means of a clinical examination and a questionnaire about pain status which included a jaw disability checklist RDC/TMD (Research Diagnostic Criteria for Temporomandibular Disorders). Pain status was scored between 0 (no pain) and 10 (poor pain status) by the patients. Oral health related quality of life (oral QoL) over the previous six months was evaluated by an oral health impact profile-14 (OHIP-14) questionnaire. **Results.** OHIP-14 score was significantly higher in patients with DDwR (median:17, min-max:6–39) than healthy controls (9, 0–18) ( $p=0.000$ ). The median duration of orofacial pain was 12 (range 7–120) months. Statistically significant correlations were observed between OHIP-14 score and the worst pain intensity in the past six months (7, 0–10) ( $r=0.5$   $p=0.007$ ) and average pain intensity in the past six months (5.5, 1–10) ( $r=0.4$   $p=0.018$ ). In addition, an increase in OHIP-14 score was observed in patients experiencing difficulty in smiling/laughing, cleaning their teeth or face, swallowing or talking, according to the jaw disability checklist ( $p=0.042$ ,  $p=0.001$ ,  $p=0.023$  and  $p=0.007$ , respectively). **Conclusion.** Poor oral QoL was related to chronic pain and limitations in jaw function in patients with DDwR.

**Key words:** Chronic pain, disc displacement with reduction, OHIP-14.

## Introduction

Oral health related quality of life (oral QoL) gives important information about the physical, social and psychological components of disease by allowing a new perspective. Moreover, it provides greater understanding of the impact of oral disease in the daily lives of patients. Oral QoL is a patient centred outcome measure in clinical practice (John *et al.*, 2004; John 2007; McGrath *et al.*, 2003; Naito *et al.*, 2006). Pain is an important factor in the limitation of oral functions and other everyday functions for patients. Oral health problems can result in pain and discomfort and lead to problems in eating, interpersonal relationships, appearance and the individual's positive self-image (Kang *et al.*, 2007; Winocur *et al.*, 2006). Oral health related quality of life measures provide an opportunity to summarise a variety of possible psychological impacts in relation to specific oral disease (John *et al.*, 2004; John 2007; McGrath *et al.*, 2003). Temporomandibular joint disorders (TMD) are a heterogeneous group of conditions with, as major subtypes, myofascial pain, disc displacements, joint pain and degenerative and inflammatory joint disease (John *et al.*, 2007; Poveda *et al.*, 2008; Reißmann *et al.*, 2007; John *et al.*, 2002; Segu *et al.*, 2005). Although the relationship between oral QoL and TMD disorders has been examined in previous studies (John *et al.*, 2007a; Reißmann *et al.*, 2007), risk factors for each patient group of TMD were not evaluated. It

is not known whether chronic low intensity pain affects oral QoL status in patients with anterior disc displacement with reduction (DDwR). The overall goal of the study was to evaluate the relationship between pain status, jaw disability and oral QoL in patients with DDwR and to examine the effects of pain in these patients who were not under any treatment protocol.

## Material and Methods

Thirty-seven consecutive patients with DDwR (F/M: 23/14, median age: 29, range: 23–49 years), diagnosed according to the Turkish form of research diagnostic criteria for temporomandibular disorders (Dworkin and LeResche, 1992), were selected at the Department of Oral and Maxillofacial Surgery at the Gulhane Medical School. Magnetic resonance imaging (MRI) was performed no more than 10 days after the clinical examination. The mean duration of temporomandibular disease (TMD) symptoms was 12 (7–120) months. They were age- and gender-matched with healthy controls (HC) (F/M: 23/14, median age: 30 yr, range 23–57 yr). Patients were selected with DDwR and HC had no symptoms of any dental or systemic disorder. The control group was selected randomly among healthy people who accompanied patients attending the oral and maxillofacial surgery department. Having no symptoms of any disorder and not being a close relative of any patient were the inclusion criteria for the control group.

Data were collected with the help of a questionnaire using research diagnostic criteria for TMD (RDC/TMD) (Dworkin and LeResche, 1992) and oral health impact profile (OHIP-14) (Slade, 1997) and a clinical examination by a dentist (U. Karacayli), qualified in TMJ disease and surgery procedures. A translated and validated Turkish version of RDC/TMD (Kurtoglu *et al.*, 2008) and OHIP-14 (Mumcu *et al.*, 2006) were used in the study. The jaw disability checklist in RDC/TMD was used in the evaluation of the functional status of the patients. The results of 12 items in the scale were coded as presence or absence of difficulty performing oral functions (Dworkin and LeResche, 1992).

Based on the RDC/TMD patient history questionnaire, the worst pain right now and the average pain experienced by patients over the past six months were coded for each patient on a scale (0=no pain, 10 = pain as bad as could be imagined).

- Characteristic pain intensity (range 0-100) was derived from the questions regarding pain right now, worst pain and average pain.
- Disability days was a measure of the loss of usual activities because of facial pain in last 6 months.
- Disability points, a derived score, collapses the Disability Score and the number of Disability Days and combines them into a single scale (0-6 points).
- Disability score (range 0 to 100) was derived from questions about daily, social and work activities.

According to the RDC/TMD chronic pain grade classification, the patients were in the Grade I group Low Disability/Low Intensity: Characteristic Pain Intensity<50, and fewer than 3 Disability Points) (Dworkin and LeResche, 1992).

### *Clinical and MRI findings of patients*

Magnetic resonance imaging (MRI) with the ability to detect the position of the joint disc was used. The findings were evaluated by two oral examiners (G. Mumcu and U. Karacayli) who were unaware of the clinical status of patients. The temporomandibular joint programme of orthopantomography was used to evaluate bone pathology related to pain.

When the condyle translated forward and moved into the intermediate zone of the disc, the disc was forced into MRI and there was a click or pop on opening in these patients. The posterior border of the disc was also thinned. No arthritic changes nor bone disease were seen in these patients. Reciprocal clicking in the TMJ is reproducible on two or three consecutive trials. Click in temporomandibular joint (TMJ) on both vertical ranges of motion (either opening or closing) is reproducible on two or three consecutive trials, and the clicking during lateral excursion and protrusion is reproducible on two or three consecutive trials. Click on both vertical opening and closing occurs when the interincisal distance is greater than 5mm and it is eliminated on protrusive opening (Dworkin and LeResche, 1992). In the present study, patients were diagnosed as having bilateral DDwR on the basis of both MRI and clinical findings.

### *Oral Health Related Quality of Life*

The OHIP-14 questionnaire (Slade, 1997) was used to evaluate oral health-related quality of life in patients and controls over the previous six months. Possible OHIP-14 scores ranged from 0 (no impact) to 56 (all of the oral health problems experienced very often). Low scores indicate a better quality of life. In our previous study, a Turkish version of the OHIP-14 was found to be a valid and reliable instrument (Mumcu *et al.*, 2006).

The inclusion criteria for patients with DDwR were as follows: having a clinical diagnosis of DDwR according to RDC/TMD axis I criteria and the presence of reciprocal click, confirmation of diagnosis with MRI, (Molinari *et al.*, 2007; Yatani *et al.*, 1998) and not having had a treatment protocol during past six months. Exclusion criteria were bone pathology such as fractures or arthritic changes, mental health disease, any systemic disorder, oral habits such as gum chewing, nail or foreign object biting, continuously resting the chin on the hand, bruxism, use of non-steroid anti-inflammatory medications within the previous six months and having undergone any treatment protocol.

A total of 50 patients with DDwR, diagnosed according to RDC/TMD criteria, were examined during a 6-month period. A total of 13 patients who were not in Grade I pain level were excluded from the study in accordance with the exclusion criteria, hence 37 DDwR patients participated.

The study was approved by the Ethics Research Committee of the Gulhane School of Medicine for clinical research in humans.

### *Statistical analysis.*

Data were analysed using the SPSS 11.5 statistic programme (SPSS Inc, Chicago, IL). The Mann-Whitney-U test and the Spearman correlation test were used since the distributions of data were non-normal. Internal reliabilities of OHIP-14 and jaw disability questionnaire were evaluated by Cronbach's alpha values. The scoring was 0.72 in patients with DDwR and 0.84 in HC. In addition, Cronbach's alpha value was found to be 0.74 in the jaw disability scale questionnaire in patients with DDwR. A p-value equal to or less than 0.05 was accepted as significant.

## **Results**

Patients with DDwR were persons who had not undergone any treatment protocols during the six months and were in the Grade I group. The mean disability score was 18.3 (range 10-67) and this was scored as '0' points. The number of disability days was '2 days' so it also was scored as '0' points. Thus the disability point was calculated as 0 points in patient with DDwR. The mean duration of orofacial pain was 12 (range 7-120) months. The worst pain intensity was 7 (0-10) in the past six months, pain right now was 2 (range 0-5) whereas average pain intensity was 5.5 (1-10) in patients with DDwR. In addition, characteristic pain intensity score was 26.6 (0-36.7) in the present study. A poor OHIP-14 score was observed in patients with DDwR (17, 6-39) compared with HC (9, 0-18) ( $p<0.001$ ) (Table 1). Statistically significant correlations were observed between the OHIP-14 score and the worst pain intensity in the past

**Table 1.** Oral health and quality of life in patients with DDWR and HC

	<i>Anterior Disc Displacement with Reduction</i>		<i>Healthy Control</i>		<i>p</i>
	<i>Median</i>	<i>Minimum- Maximum</i>	<i>Median</i>	<i>Minimum- Maximum</i>	
OHIP-14	17	6-39	9	0-18	<0.001 <sup>a</sup>
The worst pain status in the past six months	7	0-10			
Average pain status in the past six months	5.5	1-10			
Characteristic pain intensity score	26.6	0-36.7			

<sup>a</sup> Mann Whitney-U test was used in the analysis.

**Table 2:** OHIP-14 Score according to jaw disability checklist questionnaire

		<i>n</i>	<i>Median</i>	<i>Minimum-Maximum</i>	<i>p</i>
1 Chewing	No	5	10	6.0-26	0.140 <sup>a</sup>
	Yes	32	20	8.0-39	
2 Drinking	No	32	15,5	6.0-34	0.097 <sup>a</sup>
	Yes	5	33	27-39	
3 Exercing	No	25	15	6.0-39	0.267 <sup>a</sup>
	Yes	12	21	8.0-34	
4 Eating hard foods *	No	2	9,5	9.0-10	-
	Yes	35	18,5	6.0-39	
5 Eating soft foods	No	27	15	6.0-34	0.139 <sup>a</sup>
	Yes	10	21	13-39	
6 Smiling/ laughing	No	22	14	6.0-28	0.042 <sup>a</sup>
	Yes	15	23,5	8.0-39	
7 Sexual activity *	No	33	16	6.0-34	-
	Yes	4	39	39-39	
8 Cleaning teeth or face	No	23	13	6.0-28	0.001 <sup>a</sup>
	Yes	14	26	11.0-39	
9 Yawning *	No	4	14,5	11.0-20	-
	Yes	33	18	6.0-39	
10 Swallowing	No	30	15	6.0-30	0.023 <sup>a</sup>
	Yes	7	29,5	21-39	
11 Talking	No	24	14	6.0-28	0.007 <sup>a</sup>
	Yes	13	26,5	8.0-39	
12 Having your usual facial appearance	No	28	15,5	6.0-39	0.497 <sup>a</sup>
	Yes	9	20,5	8.0-30	

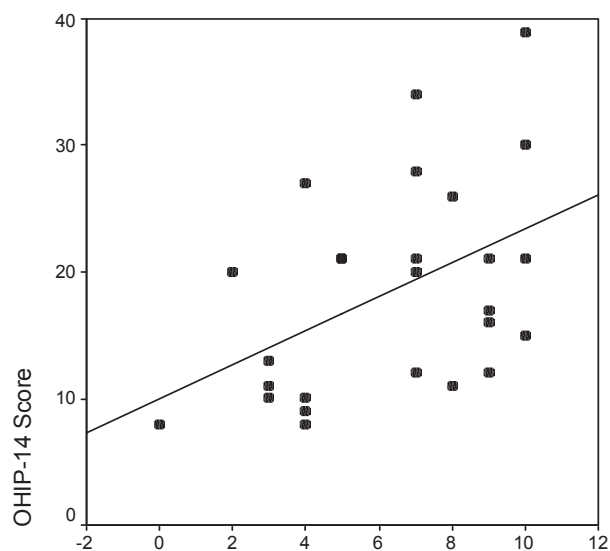
\*: statistical analysis was not done due to too few subjects.

<sup>a</sup>: Mann Whitney-U test was used in the analysis.

six months ( $r=0.5$   $p=0.007$ ) (Figure 1), average pain intensity in the past six months ( $r=0.4$   $p=0.018$ ) (Figure 2) and characteristic pain intensity score (Figure 3) ( $r=0.47$   $p=0.005$ ).

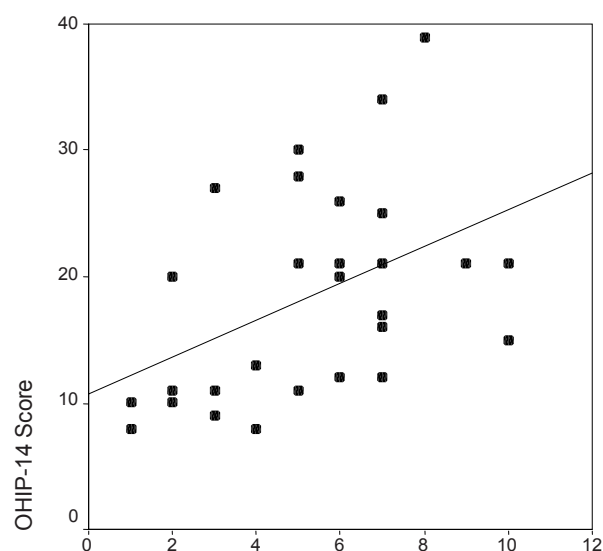
Moreover, a poor OHIP-14 score was observed in patients who had problems smiling/laughing, cleaning their teeth or face, swallowing and talking, according to the jaw disability checklist that assessed the extent to which TMD interfaces with mandibular functions ( $p=0.042$ ,  $p=0.001$ ,  $p=0.023$  and  $p=0.007$ , respectively) (Table 2).

The average pain intensity status in the past six months was significantly higher in patients who had problems swallowing (10, 7-10) than in patients without a swallowing problem (7, 0-10) ( $p=0.019$ ). Similarly, an increase in the worst pain status in the past six months was observed in patients with swallowing problems (8, 7-10) compared with that in patients without swallowing problems (5, 1-10) ( $p=0.042$ ). In addition, the item score “presence of painful aching in the mouth” (median:3,



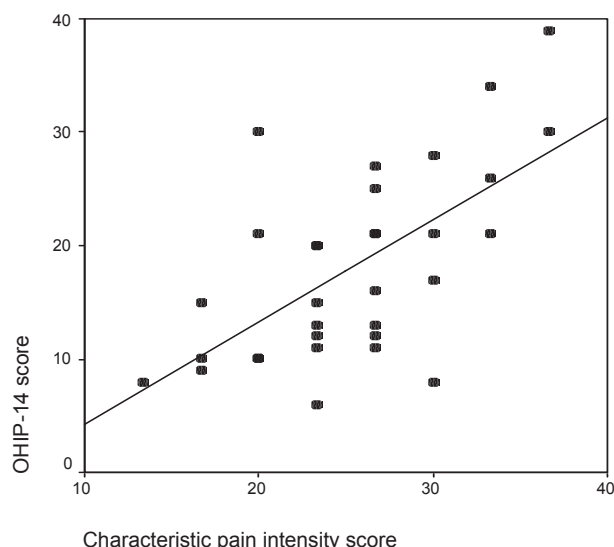
The worst pain intensity in the past six months

**Figure 1.** The relationship between OHIP-14 Score and the worst pain intensity in the past six months.  $r = 0.5$   $p = 0.007$



Average pain intensity in the past six months

**Figure 2.** The relationship between OHIP-14 score and average pain intensity in the past six months.  $r = 0.4$   $p = 0.018$



Characteristic pain intensity score

**Figure 3.** The relationship between OHIP-14 score and characteristic pain intensity score.  $r = 0.4$   $p = 0.005$

range=0-4) in OHIP-14 was significantly correlated with the characteristic pain intensity score ( $r = 0.48$   $p = 0.005$ ).

### Discussion

Temporomandibular disorder (TMD) is a general term that covers several painful and/or dysfunction conditions (Etöz and Ataoğlu, 2007). Due to the variation within their conditions, the clinical presentations and functional status of TMD patients can vary widely, and oral QoL status varies similarly according to the diagnosis (John *et al.*, 2007).

In this study, patients with DDwR and chronic pain without treatments were selected as the specific patient group. Although the oral QoL of patients with disc dis-

placement with reduction was less impaired compared with other TMD patients, the effects of chronic pain and poor jaw function on oral QoL were not evaluated in patients. In addition, patients who had not undergone any treatment over the previous six months were selected to participate in this study since treatments modify pain status and oral QoL.

Impaired oral QoL was found in DDwR compared with HC. This finding can be predicted due to the limitation of some oral functions. The median OHIP-14 score was 17 in the present study whereas mean OHIP-49 scores of 27.5 (Reißmann *et al.*, 2007) and 32.8 (John *et al.*, 2007) were found in previous studies. The difference between the score in the present study and those reported in the other studies can be ascribed to differences between the OHIP-14 and OHIP-49. According to these studies, poor oral QoL status was not prominent in DDwR compared with patients who had myofascial pain without opening among patients with TMD (John *et al.*, 2007; Reißmann *et al.*, 2007). We agree with these previous results but we would point out that the relationship between chronic pain and oral QoL status was not evaluated in these studies.

Interestingly, oral QoL was correlated with pain status over the six months before the study. This disorder is often not associated with severe pain but patients suffer from the clicking sensation in their jaws (Dworkin and LeResche, 1992; Molinari *et al.*, 2007). Pain, defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, is the most common complaint of patients with temporomandibular disorders (Winocur *et al.*, 2006). In the present study, the pain intensity scores recorded were not close to the upper limit whereas the duration of pain was over six months without treatment. Therefore, our patients had moderate level chronic pain, according to previous studies (Kafas and Leeson, 2006).

Poor quality of life included having problems in smiling/laughing, cleaning the teeth or face, swallowing and talking, according to the jaw disability checklist. In



addition, patients also had pain when swallowing and talking. As predicted, joint pain can increase with oral functions (Molinari *et al.*, 2007; Sato *et al.*, 2003). When chronic pain affects oral functions, enjoyment of life is decreased in an almost directly proportional manner (Kafas and Leeson, 2006), even though the pain status itself may be moderate. This explains the importance of both jaw function and pain status in the enjoyment of life.

The main shortcoming of the study was that limited numbers of the patients were included because only patients with DDwR with chronic pain, who were not under any treatment protocol, were included in the study. Consequently, pain intensity and jaw function were observed to be related with poor oral QoL in DDwR. Although the degree of oral QoL was not near the upper limit and an increase in pain intensity was not predicted in patients with DDwR, moderate pain status was associated with an impaired oral QoL. Therefore, we suggest that the elimination of chronic pain and improved jaw function are essential goals for better oral health related quality of life in DDwR.

## References

- Dworkin, S.F. and LeResche, L. (1992): Research diagnostic criteria for temporomandibular disorders: review criteria, examinations and specifications critique. *Journal of Cranio-mandibular Disorders* **6**, 301-355.
- Etöz, O.A. and Ataoğlu, H. (2007): Evaluation of pain perception in patients with temporomandibular disorders. *Journal of Oral and Maxillofacial Surgery* **65**, 2475-2478.
- John, M.T. Patric, D.L. and Slade, G.D. (2002): The German version of the oral health impact profile-translation and psychometric properties. *European Journal of Oral Science* **110**, 425-433.
- John, M.T. Hujoel, P. Miglioretti, D.L. LeResche, L. Koepsell, T.D. and Micheeli W (2004): Dimensions of Oral-health-related Quality of Life. *Journal of Dental Research* **83**, 956-960.
- John, M.T. (2007): Exploring dimensions of oral health-related quality of life using experts' opinions. *Quality of Life Research* **16**, 697-704.
- John, M.T. Reissmann, D.R. Schierz, O. and Wassell, R.W. (2007): Oral health-related quality of life in patients with temporomandibular disorders. *Journal of Orofacial Pain* **21**, 46-54.
- Kafas, P. and Leeson, R. (2006): Assessment of pain in temporomandibular disorders: the bio-psychosocial complexity. *International Journal of Oral and Maxillofacial Surgery* **35**, 145-149.
- Kang, S.C. Lee, D.G. Choi, J.H. Kim, S.T. Kim, Y.K. and Ahn H.J. (2007): Association between estrogen receptor polymorphism and pain susceptibility in female temporomandibular joint osteoarthritis patients. *International Journal of Oral and Maxillofacial Surgery* **36**, 391-394.
- Kurtoglu, C. Gur, O.H. Kurcu, M. Sertdemir, Y. Guler-Uysal, F. and Uysal, H. (2008): Effect of botulinum toxin-A in myofascial pain patients with or without functional disc displacement. *Journal of Oral and Maxillofacial Surgery* **66**, 1644-1651.
- McGrath, C. Hegarty, A.M. Hodgson, T.A. and Porter, S.R. (2003): Patient-centred outcome measures for oral mucosal disease are sensitive to treatment. *International Journal of Oral and Maxillofacial Surgery* **32**, 334-336.
- Molinari, F. Manicone, P.F. Raffaelli, L. Raffaelli, R. Pirroni, T. and Bonomo, L. (2007): Temporomandibular joint soft-tissue Pathology, I: Disc abnormalities. *Seminars in ultrasound, CT, and MR* **28**, 192-204.
- Mumcu, G. Inanc, N. Ergun, T. Ikiz, K. Gunes, M. Islek, U. Yavuz, S. Sur, H. Atalay, T. and Direskeneli, H. (2006): Oral health related quality of life is affected by disease activity in Behcet's disease. *Oral Disease* **12**, 145-151.
- Naito M, Yuasa H, Nomura Y, Nakayama, T. Hamajima, N. and Hanada, N. (2006): Oral health status and health-related quality of life: a systematic review. *Journal of Oral Science* **48**, 1-7.
- Poveda Roda, R. Díaz Fernández, J.M. Hernández Bazán, S. Jiménez Soriano, Y. Margaix, M. and Sarrión, G. (2008): A review of temporomandibular joint disease (TMJD). Part II: Clinical and radiological semiology. Morbidity processes. *Medicina Oral, Patología Oral Y Cirugía Bucal* **13**:E102-109.
- Reißmann, D. John, M.T. Schierz, O. and Wassell, R.W. (2007): Functional and psychosocial impact related to specific temporomandibular disorder diagnoses. *Journal of Dentistry* **35**, 643-650.
- Sato, S. Goto, S. Nasu, F. and Moteji, K. (2003): Natural course of disc displacement with reduction of the temporomandibular joint: Changes in clinical signs and symptoms. *Journal of Oral and Maxillofacial Surgery* **61**, 32-34.
- Segu, M. Collesano, V. Lobbia, S. and Rezzani, C. (2005): Cross-cultural validation of a short form of the oral health impact profile for temporomandibular disorders. *Community Dentistry Oral Epidemiology* **33**, 125-130.
- Slade, G.D. (1997): Derivation and validation of a short-form oral health impact profile. *Community Dentistry and Oral Epidemiology* **25**, 284-290.
- Winocur, E. Littner, D. Adams, I. and Gavish, A. (2006): Oral habits and their association with signs and symptoms of temporomandibular disorders in adolescents: a gender comparison. *Oral Surgery Oral Medicine Oral Pathology Oral Radiology Endodontics* **102**, 482-487.
- Yatani, H. Sonoyama, W. Kuboki, T. Matsuka, Y. Orsini, M.G. and Yamashita, A. (1998): The validity of clinical examination for diagnosing anterior disk displacement with reduction. *Oral Surgery Oral Medicine Oral Pathology Oral Radiology Endodontics* **85**, 647-653.