The efficacy of anterior repositioning splint therapy studied by magnetic resonance imaging

D. Eberhard*, H.-P. Bantleon* and W. Steger**

*Department of Orthodontics, Dental School, University of Vienna, Austria, and
**Private Radiological Practice, Nuremberg, Germany

SUMMARY Magnetic resonance images (MRIs) were obtained of 52 temporomandibular joints (TMJs) of 30 patients with TMJ disease, before insertion of an anterior repositioning splint. Ten TMJs showed a normal disc–condyle relationship. Pathological findings were partial or complete anterior disc displacement with disc reduction (n = 18), without (n = 7), or with partial reduction (n = 4) or non-reducing joints combined with osteoarthrosis (n = 13). Associated clinical findings were joint clicking, painful TMJ movements with or without condyle limitation, deviation, or crepitus. The clinical evaluation when compared with the MRIs correlated in 75 per cent of cases.

Immediate post-insertion MRIs showed recapture of discs with a protrusive splint in 15 out of 18 reducing displacements. Recapture of the disc was seen in only two out of four joints with anterior disc displacement with partial disc reduction. There was no recapture in non-reducing joints. In severe cases of internal derangement with a wide range of disc displacement combined with changes of the osseous joint surfaces, the recapturing of the articular disc with an anterior repositioning appliance was unsuccessful (0 of 13). The follow-up for pain relief after one week showed a significant reduction of symptoms, despite the fact that recapture of the dislocated disc occurred in only 17 of the 42 pathological TMJs.

The possibility for disc recapture depends on the disc–condyle position and configuration, the integrity of the posterior attachment, and the degree of degenerative changes of the intra-articular structures, such as osteophytosis, condylar erosion, or flattening of the articular disc. This diagnostic information influences the method of treatment of TMJ disorders. In non-reducing joints or in the later stages of internal derangement of the TMJ, it is not possible to achieve a normal disc–condyle relationship using protrusive splints.

Introduction

An occlusal splint, which is specifically used to recapture a partial or complete anterior disc displacement, is called 'an anterior repositioning splint'. This appliance induces a therapeutic mandibular position, forward to the maximal intercuspation position of the patient and affects the physiological–topographical relationship of the disc–condyle complex (Moloney and Howard, 1986; Davies and Gray, 1997).

Different types of occlusal splints have been recommended in the treatment of temporomandibular joint (TMJ) disorders, masticatory muscle dysfunction, and bruxism (Greene and Laskin, 1972; Carraro and Caffesse, 1978; Schulte, 1988; Ash *et al*., 1990).

Occlusal splints may have an effect on masticatory forces, reduce tooth mobility and destruction, reduce bruxism and other oral pathological dysfunctions, be a therapy for muscular dysfunction and facial pain, and influence the anatomical relationships of the TMJs (McNeill, 1993).

Dental splints are often used as a short-term treatment during orthodontic management, before orthodontic therapy, or if TMJ disorders occur during dentofacial orthopaedic procedures.

The possibility to influence the topographical relationship of the intra-articular TMJ components is essential in the treatment of intra-capsular disorders caused by disc–condyle displacement. One reason for the multi-factorial aetiology of TMJ disorders is the internal derangement of the joint. Therefore, occlusal splints are used for rehabilitation of disc interference disorders. The aim of therapeutic intervention is to re-establish a correct disc–condyle relationship to achieve painless and functional mandibular movements (Lundh *et al.*, 1985; Clark, 1986; Santacatterina *et al.*, 1998).

A review of the literature to evaluate the evidence for diagnostic outcome of arthrography, computed tomography, and magnetic resonance imaging (MRI) in the assessment of TMJ disorders shows that MRI seems to be the method of choice for diagnosing disc position and configuration. The major advantage of the scans is the ability to distinguish various soft tissue structures from the TMJ (Miller *et al.*, 1985; Schelhas *et al.*, 1988; Katzberg, 1989; Palacios *et al.*, 1990; Liedberg *et al.*, 1996; Eberhard *et al.*, 2000).

The purpose of this study was to evaluate the ability to recapture an anteriorly located disc by an anterior repositioning splint. MRI and associated clinical findings were analysed.

Subjects and methods

MRIs of the TMJs from 30 patients with TMJ-related symptoms were obtained by means of a 1.5 Tesla Magnetom (Siemens, Erlangen, Germany). The unit was equipped with dedicated bilateral TMJ coils for simultaneous imaging of the left and right joints. Twenty-two patients underwent bilateral MRI scans of the TMJ and in eight patients unilateral scans only of the symptomatic joint.

Proton density spin-echo images with a repetition time (TR) of 600 ms and an echo time (TE) of 15 ms were used in 12 cases. The signal to noise ratio increases and provides superior contrast and improved anatomical detail, especially in visualizing disc position and configuration. Gradient echo sequences with a repetition time of 300 ms and an echo time of 10 ms were used in 18 investigations. Slice thickness for each series was 3 mm with no inter-slice gap and a matrix size of 256 × 256. The measurement time was 5 minutes 10 seconds for one scan using the spin-echo sequence with two acquisitions and 1 minute 19 seconds for the gradient echo sequence with one acquisition. An axial 5-mm localizing image indicated the sagittal orientation of the TMJ. The sagittal MRIs were performed at a right angle to the long axis of the condyle. Per sequence, a total of nine images in the sagittal orientation were obtained.

For interpretation three slices were used: lateral, medial, and central. At each slice the articular disc, condyle, and glenoid fossa with the articular eminence were visualized.

In 10 cases, following the sagittal series, coronal images were obtained to clearly identify medial–lateral displacements of the articular disc.

Initially, a closed mouth position in habitual occlusion was analysed to evaluate the disc–condyle–fossa relationship, then an open mouth position where the patient was able to open wide without significant discomfort, normally 2-cm inter-incisal distance. For stabilizing this mandibular position a bite block was used. In this position disc and condyle mobility and the presence of disc reduction were assessed. Lastly, MRI was performed with a protrusive splint in place, to investigate the topographical changes of the disc–condyle–fossa relationship caused by insertion of the occlusal splint in relation to the closed mouth position.

A standard clinical work-up following the guidelines of the German Association of Dento-maxillary Science (DGZMK) was obtained for all subjects. Eighty per cent were female, with the average age of all patients being 35 years. All 30 subjects experienced one or more of the following TMJ problems: joint sounds with clicking, popping, or crepitus, joint pain, decreased range of mandibular motion, degenerative condylar changes, or extra-capsular disorders. In all patients there was a clinical diagnosis of anterior disc displacement. Conservative treatment with a protrusive occlusal splint was indicated. The therapeutic mandibular position was determined through standard bimanual

techniques or by para-occlusal axiography. This mandibular position in which pain and symptoms should reduce and the dislocated disc should be recaptured was determined by checking the bite. The splints were manufactured with an occlusal relief. Following MRI the patient was instructed to use the splint day and night. After one week a follow-up clinical examination was undertaken to assess pain relief.

For interpretation of the MRI findings, the criteria of Drace and Enzmann (1990), Palacios *et al*. (1990), and Katzberg *et al*. (1986) were used. In a normal disc–condyle relationship in the closed mouth position the posterior band is situated above the uppermost portion of the condyle. It is considered normal for the condyle to be centrally located under the arch of the glenoid fossa. If disc reduction occurs, the thin central portion of the disc is situated at the highest point of the mandibular condyle. Disc recapture is regarded as successful if, through the insertion of the protrusive splint, the condyle passes under the meniscus and reaches a normal disc–condyle relationship.

Results

In sagittal MRIs the disc had a biconcave shape like a bow tie with a uniform low signal intensity in relation to the redundant synovium of the joint space. The anterior and posterior bands, such as the thin intermediate zone of the disc, could be clearly identified (Figure 1). The identification and differentiation of these anatomical structures was a diagnostic landmark for the integrity of disc morphology and was essential to the stability of recapturing the dislocated disc. The retro-discal structure showed a medium or high signal intensity. The bilaminar zone was attached to the posterior band of the disc and the superior and inferior fibres of the bilaminar zone were sometimes visible as two low signal lines posterior to the disc (Figure 1f).

On coronal images the disc was identified in sections through the posterior band in the closed mouth position. The thinner central position of the disc was poorly identified on coronal images. Twenty per cent of menisci showed medial–lateral displacements.

Degenerative changes in the meniscus initially showed a thickening of the anterior and/or posterior band of the disc (Figure 1a,b). In progressive stages of internal derangement of the TMJ, the articular disc was shortened and the intermediate zone could not be visualized (Figure 2). In all cases ($n = 52$), the disc was identified between the upper surface of the condyle and the inferior surface of the articular eminence. The disc position was determined in relation to the posterior band, which is normally situated above the uppermost portion of the condyle. Normal disc–condyle relationships were found in 10 TMJs. Partial displacement showed an anterior dislocation of the disc along the anterior articulating surface of the condyle (Figure 1a). At complete anterior disc displacement, the meniscus was totally in front of the condyle (Figures 1b and 2a). No cases of deformed disc without anterior displacement were found. The MRI findings of the 30 patients investigated are summarized in Table 1.

The clinical evaluation of partial anterior disc displacement with reduction ($n = 18$) showed joint sounds such as clicking and popping. Joint sounds occurred in different mandibular positions, initially or intermediately during excursive TMJ movements in 14 joints (14/18). In 12 subjects the range of TMJ motion was limited (12/18). Ten patients showed TMJ pain during condylar excursions (10/18). The partial reduction ($n = 4$) of anteriorly dislocated discs was not identified by clinical evaluation. It could only be diagnosed by MRI. At the open mouth position the pars posterior of the disc was at the top of the condyle and not the intermediate portion (Figure 1f).

An acute phase anterior disc displacement without reduction resulted in painful TMJ movements, and in five subjects open mouth movement was significantly limited. Straight deviation to the diseased joint during open mouth movement and limited mandibular excursion at the contralateral joint were observed. A higher intra-articular signal density in the MRI delineated inflammation.

In the chronic phase, 10 subjects showed no, or only a slight, limitation of mandibular movement (Figure 2c) and lateral excursion to the
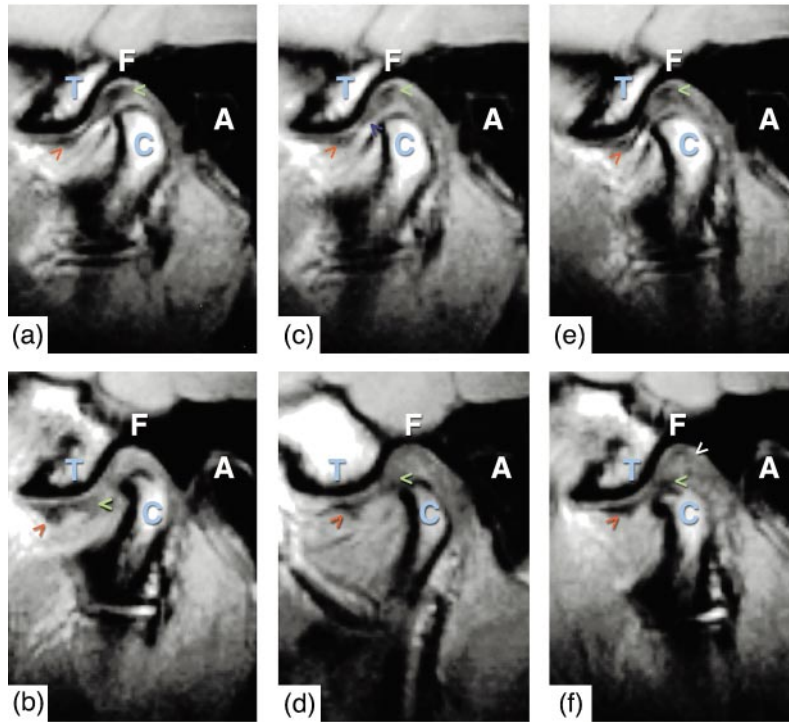
Figure 1 Bilateral synchronous MRI (TR/TE 600/15) of a 20-year-old female with partial and complete anterior disc displacement with reduction. The right and left sides are orientated in the same direction, all to the left. *Habitual occlusion.* (a) Left TMJ: slight anterior position of the disc since the posterior band is at the anterior edge of the condyle. The low signal area superior to the condyle and continuous with the disc probably represents fibrosis of the posterior attachment. (b) Right TMJ: complete anterior disc dislocation with mild deformation. Slight posterior condyle position and minimal remodelling of the condyle. *Post-insertion of the occlusal splint.* (c) Left TMJ: recapture of the disc with splint in place. (d) Right TMJ: slight distraction and anterior condyle positioning. Favourable disc–condyle relationship. Successful recapturing of the disc. *Open mouth position (2 cm inter-incisal distance).* (e) Left TMJ: physiological disc reduction. The condyle moves under the articular disc. (f) Right TMJ: partial disc reduction. A large part of the disc is in front of the condyle. Anterior band (red triangle); posterior attachment (green triangle); intermediate zone (blue triangle); bilaminar zone (white triangle); A, external auditory canal; C, condyle; T, eminence; F, glenoid fossa.

contralateral joint. No clicking was found and TMJ motion was mainly painless. Five subjects showed crepitus and in four cases the anterior disc displacement was combined with a posterior condyle position.

Clinical diagnosis was confirmed by MRI findings in 23 cases of anterior disc displacement with reduction or partial reduction; five were false positive. In 20 cases of non-reducing disc displacement, six were false positive versus MRI findings. Two joints were considered normal in clinical examination and showed partial disc displacement with reduction, detected by MRI without clinical signs and symptoms. The correlation of clinical and MRI findings was 39 of 52 cases, a total of 75 per cent.

The degree of disc displacement was a main factor in evaluating the possibility of disc recapture by means of a protrusive splint. The condyle was moved on average 1–3 mm anteriorly
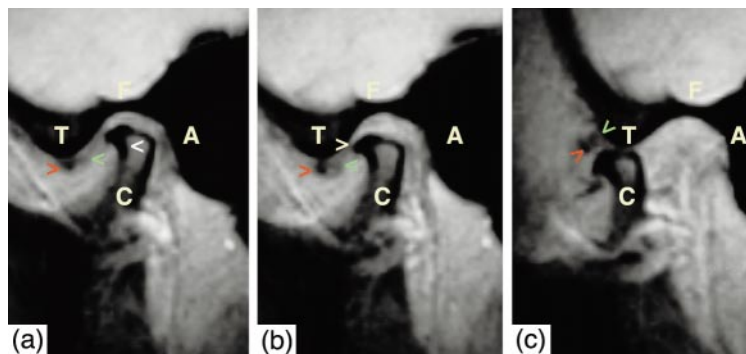
Figure 2 Unilateral MRI of the left TMJ (TR/TE 300/10) of a 27-year-old female with wide anterior disc displacement without reduction and marked degenerative changes of the condyle. (a) *Habitual occlusion*: folding deformity of the anteriorly dislocated disc, which is shortened and the intermediate zone cannot be identified. Sclerotic changes are present with distinctive remodelling of the condyle configuration. The low signal represents a large anterior osteophyte. (b) *Post-insertion of the occlusal splint*: recapturing of the disc by the appliance is not possible because of the degree of dislocation, and the progressive degenerative changes of disc form and condyle shape. (c) *Open mouth position (2 cm inter-incisal distance)*: non-reducing joint. The disc is further folded and anteriorly displaced. Condyle translation movement is uninhibited. Anterior band (red triangle); posterior band (green triangle); osteophyte and condyle remodelling (white and yellow triangle); C, condyle; A, external auditory canal; F, glenoid fossa; T, eminence.

Table 1 MRI findings of 52 'temporomandibular joints' in 30 patients.

Internal derangement of the TMJ	Disc recapture by means of an occlusal splint	
Normal joint	$n = 10$	
Anterior disc displacement		
Partial with disc reduction	$n = 18$	$n = 15$
Partial/complete with partially reducing disc	$n = 4$	$n = 2$
Partial/complete with non-reducing disc	$n = 7$	$n = 0$
Complete with non-reducing disc combined with osteoarthrosis	$n = 13$	$n = 0$

and caudally through insertion of the splint. With partial disc displacement (Figure 1a), the use of an anterior repositioning splint was indicated and was the method of choice in treating this type of internal derangement (Figure 1c). In complete anterior disc displacement (Figure 1b), recapturing of the disc can be successful (Figure 1d). Disc recapture with a splint in place was successful in 15 out of 18 subjects with reducing disc displacements and in two of four partially reducing joints. After successful disc recapture, mouth opening could be achieved without clicking or deviation. The therapeutic lower jaw position determined by the clinician was always anterior to maximal intercuspation of the patient.

The insertion of a protrusive splint effected a topographic change in disc and condyle position and there was a more favourable disc–condyle relationship (Figure 1c,d). The possibility of disc recapture depends on the range of disc displacement and the grade of disc distortion.

Post-insertion, MRI showed no recapture of the disc in non-reducing joints. The presence of disc reduction (Figure 1e) was essential in evaluating the possibility of disc recapture by means of a protrusive splint. Partial disc reduction (Figure 1f) showed moderate damage to the posterior attachment, but the disc recapture could in some cases be successful (Figure 1d). In

cases of partial disc reduction, the intermediate zone of the disc was not over the top of the condyle; most of the disc was in front of the superior aspect of the condyle. The range of disc reduction correlated significantly with the range of disc displacement in habitual occlusion. Severe internal derangement of the TMJ (found in 13 joints) caused progressive degenerative changes of articulating surfaces and morphological changes in the joint structures (Figure 2a). The recapture of the disc in patients with wide complete disc displacement with disc positions underneath the articular eminence combined with osteoarthrosis was in no case successful (Figure 2b). Condylar dislocations with joint space compression, osteophytosis, irregular condyle configuration with remodelling, and cortical erosion were found in subjects with advanced TMJ disease.

The evaluation of disc–condyle configuration and localization was undertaken in the closed mouth position. The open mouth position showed disc mobility, disc reduction, and the functionality and integrity of the posterior attachment, and yielded information concerning condylar translation. The stretched and elongated form of the disc reflected the tension of the disc and was a diagnostic criterion for the functional integrity of the posterior attachment. The presence of disc reduction was a sign of the integrity of the posterior attachment, especially of the superior stratum. No disc displacement occurred without damage to the inferior stratum or perforation of the bilaminar zone. Temporary disc displacement showed milder forms of disc degeneration than permanent displacement. The stability of the disc at reduction depended on the convexity of the posterior band and the functional integrity of the inferior stratum. In milder forms of dislocation, the reduction occurred during opening. In severe forms, at no point during opening did the condyle pass under the disc to obtain a normal relationship (Figure 2c). Insertion of the occlusal splint, in the presence of disc reduction, had a stabilizing effect on the disc–condyle relationship.

The follow-up after one week showed a significant reduction of TMJ pain and symptoms in 24 patients. In six subjects TMJ disease continued or worsened. The recapture of an anterior dislocated disc with a protrusive splint was successful only in 17 of 42 pathological joints.

Discussion

MRI following insertion of an anterior repositioning splint shows that the recapture of an anterior dislocated disc is most successful in cases of partial displacement with reduction (83.3 per cent). In cases of partially reducing discs, the possibility of successful disc recapture decreases to 50 per cent. Therefore, the functional integrity of the posterior disc attachment is responsible for the capability of disc reduction. In non-reducing joints with severe internal derangement of the TMJ with degenerative changes in disc and condyle shape combined with complete anterior disc displacement, the therapeutic aim of disc recapture, or a physiological disc–condyle relationship could not be achieved. The aim of therapeutic intervention is an adapted cranio-mandibular system, which allows the patient almost painless, functional, and unlimited TMJ movements.

The study involved MRI imaging of the TMJ immediately upon first insertion of an occlusal splint, to analyse the immediate effects through splint insertion to the intra-capsular joint components. The dental splint determines a therapeutic mandibular position in which the displaced disc should be located directly above the condyle. MRI was utilized to confirm that the resulting disc–condyle relationship was, in fact, correct. The fixed disc condyle position, which induces a correct disc–condyle relationship, was the primary requirement for the possibility of successful disc recapture and its stability.

Other studies (Simmons and Gibbs, 1995) showed recapture of discs in 25 out of 26 reducing displacements (96 per cent), but no recapture of partially reducing or non-reducing joints in 30 patients seeking treatment for painful TMJ. Treatment with anterior repositioning appliances provides effective pain relief, regardless of disc status. The findings of the present study are consistent with the results of Simmons and Gibbs (1995), who also found no recapture of disc in

non-reducing joints and a high success in reducing joints with varying degrees of disc dislocation with splint therapy.

Hosoki *et al*. (1995) reported, in one subject with post-insertion MRI, that the right TMJ disc changed within 18 months under the effect of an occlusal splint from an anterior position with reduction to a superior position. In the left TMJ the disc changed from an anterior position without reduction to an anterior position with reduction. The results reported by those authors, that a non-reducing joint changes into a reducing joint under the effect of occlusal splint therapy, cannot be confirmed from the findings of the present study.

Different types of occlusal splints are currently used in orthodontics. In the acute phase of TMJ disorders, stabilizing splints eliminate occlusal interferences and relaxation of masticatory muscles will be achieved, resulting in a significant relief of symptoms. The splint design shows vertical disclusion and sagittal protection, especially in the case of bruxism. Negative influences should be reduced to support adaptation capacity. In late phases of internal derangement with progressive degenerative changes of the disc, bilaminar zone and condyle, decompression, or slight distraction of the TMJ by means of an occlusal splint is recommended. In cases of permanent anterior disc displacement, this can be achieved with a positioning of the bilaminar zone on top of the condyle, causing increased pressure, and eventually a fibrosis within these tissues. Changes in signal intensity of the bilaminar zone visible on MRI could be interpreted as a 'pseudo disc' for functional substitution of the permanent anterior displaced disc. MRI can be very useful in finding or controlling a therapeutic mandibular position and its effects on the intra-articular function of the TMJ. The reduction of clinical signs and symptoms of TMJ dysfunction has been shown under dislocation therapy by Grimm and Gage (1991). In seven patients, MRI was used for diagnosis of TMJ displacement and for controlling the maxillary splint to distract the joint slightly, and place the condyle, disc, and fossa in a more favourable relationship. Each occlusal splint induces a slight vertical condylar distraction and eliminates the occlusal factor, which can be responsible for TMJ disturbances. This fact can help explain the relief of symptoms even if disc recapture does not occur.

In subjects with chronic disc dislocation with longstanding overstretching of the posterior attachment or adaptation of the bilaminar zone, the use of a repositioning splint is not indicated.

Another appliance used in normalizing disc position is the Herbst appliance, which is a fixed-functional appliance with a telescopic mechanism on either side of the jaw. The adaptive TMJ mechanism in adolescents and young adults treated with the Herbst appliance has been reported (Pancherz, 1982; Paulsen, 1997). In Class II subjects the Herbst appliance corrected the malocclusion by dental and skeletal changes. Herbst therapy has a possible stimulatory effect on mandibular growth, reclination of maxillary growth, mesial tooth movements in the mandible, and distal tooth movements of the maxilla. MRI has demonstrated condylar and glenoid fossa remodelling in patients with this appliance (Ruf and Pancherz, 1998a). At the start of treatment, the mandible is fixed anteriorly in an edge-to-edge position between the central or lateral incisors. In this way, the dental arches are placed in a Class I or over-corrected Class I relationship with the posterior teeth out of occlusion. Thus the condyles are displaced anteriorly out of the glenoid fossa and become positioned on top of the articular eminence. Ruf and Pancherz (1999) demonstrated cases of disc displacement with reduction present before treatment, which could be reduced by the Herbst. Two subjects exhibited a pre-treatment anterior disc displacement without reduction, which could not be reduced during treatment. After 6–12 weeks of therapy the condyles were partially relocated in the fossa with signs of condylar glenoid fossa remodelling detected by MRI. Herbst treatment did not result in any adverse changes in articular disc position (Pancherz *et al*., 1999) and the frequency of disc displacement after Herbst therapy was no higher than in asymptomatic populations. It does not appear to have an adverse long-term effect on the TMJs (Hansen *et al*., 1990; Ruf and Pancherz, 1998b).

Significant changes in the retro-discal tissues some weeks after occlusal therapy have been found. These are visualized as changes in signal intensity of the disc or the bilaminar zone and changes of disc configuration (Simmons and Gibbs, 1995; Bumann and Lotzmann, 2000). Summer and Westesson (1997) reported, using MRI, that 45 per cent of recaptured discs improved in shape 1–6 years after treatment. A pilot study performed by Chen *et al*. (1995) to correlate clinical and MRI diagnosis in seven symptomatic TMJ dysfunction patients was carried out in order to take into consideration the clinical improvement in signs and symptoms after the use of a maxillary stabilizing splint. At the 3-month follow-up MRI study, there were no signs of recapture of three anteriorly displaced discs despite evidence of improved jaw movement and remission of pain symptoms.

The accuracy of clinical examination and MRI findings in the diagnosis of TMJ disorders has been evaluated in several investigations. Raustia *et al*. (1994) in a study to evaluate and correlate clinical, MRI, and surgical findings in 47 patients with TMJ found the highest correlation in connection with the position of the disc in 88 per cent. The clinical diagnosis was confirmed by surgical findings in 75 per cent of the cases involving anterior dislocation of the disc with reduction and in 89 per cent involving anterior dislocation of the disc without reduction. Bone changes noted on MRIs were confirmed by surgery in 71 per cent. MRI was especially good in the visualization of disc position and changes in disc morphology.

Müller-Leisse *et al*. (1996) determined the value of MRI in TMJ disorders by correlating the cases of MRI-proven anterior disc dislocation without reduction with clinical history and data. MRI investigation revealed various abnormalities in 22 joints, five of which were without any pathological clinical findings. It was concluded that anterior disc displacement without reduction is difficult to diagnose with clinical methods alone. This is in agreement with the present study.

TMJ disorders influence the duration and method of orthodontic management. The therapy of Class II patients with partial or complete anterior disc displacement can be positively influenced by means of a protrusive splint or functional appliances (bionator, Herbst). It is essential that the applied biomechanical forces of orthodontic treatment support the therapy of TMJ disorders and are effective. In disc displacements a reduction could be achieved simultaneously to Class II correction. Isberg and Isacsson (1986) studied primates to show that forced retrusion of the condyles over a short period of six weeks may induce significant damage to the retro-discal tissue and the disc attachment.

Splint therapy eliminates oral parafunction, deleterious habits, and malocclusion in order to stabilize the occlusal relationship, and helps to achieve a functional static and dynamic occlusion. A compensated intra-capsular functional disorder or adapted system is the preferred plan of TMJ treatment in most cases. MRI screening for latent TMJ signs before orthodontic treatment may thus be useful (Solberg *et al*., 1979; Paesani *et al*., 1992; Katzberg *et al*., 1996).

Other studies show a high incidence of recurrent disc displacement (Okeson, 1988; Westesson and Lundh, 1988). Bauer *et al*. (1993) observed, in a follow-up study of occlusal splint therapy, joint clicking in 14 TMJs. Post-treatment examination revealed a stable repositioning of the TMJ disc in four joints with no relapse over a two-year period of observation. Further research is indicated to investigate the stability of disc recapture through insertion of an occlusal splint over a longer period.

Conclusions

Gradient echo MRI sequences permit more rapid pulse transmission and collection of data with shorter TEs and TRs. The resulting images are therefore obtained in a shorter period of time. This is particularly important on images taken with the patient in the open mouth position, as it limits the amount of discomfort and the potential for image-degrading motion. This fast imaging technique shows a good appearance of bony changes of the condyle, such as erosion, spurring, and remodelling, and results have often been obtained during incremental

mouth opening. In MRI of the TMJs the use of double coils is recommended for evaluation of the effect of the occlusal splint on the contralateral joint, to avoid unexpected TMJ responses in an asymptomatic joint that may be induced through the insertion of a dental splint.

MRI allows clear evaluation of the disc–condyle–fossa relationship in internal derangement of the TMJ. The recapturing of an anteriorly dislocated disc is only possible because of the anatomical and functional integrity of the soft and hard tissues of the TMJ through topographical improvement of disc and condyle position by means of an occlusal splint. The stability of disc recapture depends on the degree of degeneration of the joint components.

Address for correspondence

Dr Dieter Eberhard
Department of Orthodontics
Dental School
University of Vienna
Währinger Straße 25a
1090 Vienna
Austria

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