ISSN: 0975-3583,0976-2833 VOL10, ISSUE 04, 2019

Digital Occlusal Analysis to diagnose and treat patients with TMD by identifying problems with the occlusion-A simplified chairside technique.

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Abstract

Introduction: Temporomandibular disorders (TMD) is a multifactorial group of musculoskeletal disorders often with combined aetiologies that demand different treatment plans. While pain is the most common reason why patients decide to seek help, TMD is not always painful. Pain is often described by patients as a headache, prompting patients to seek the help of neurologists, surgeons, and ultimately dentists. Due to the unique characteristics of this anatomical area, appropriate diagnostic tools are needed, as well as therapeutic regimens to alleviate and/or eliminate the pain experienced by patients.

Aim of the Study: The aim of this study was to collect and organize information on the diagnosis and treatment of pain in TMD, through two types of clinical analysis: the Condylar Position Indicator (CPI) and T-Scan 2 system.

Material and methods: Twenty patients (mean age of 24.5 years) with TMJ problem and 10 healthy matched subjects (mean age: 25.4 years) were selected. Analysis of TMJ was performed on each patient by means of Condylar Position Indicator (CPI) and T-Scan System II tests.

Results: Eight patients presented vertical symmetrical condylar distraction greater than healthy subjects (P-value<0.001). T-Scan showed a difference of Percentage of Force (POF) not greater than 5%. Seven patients showed sagittal shift greater than healthy subject (P-value<0.001). T-Scan records showed a difference of POF greater than 5%. Five non-healthy subjects presented sagittal, vertical, transverse shift greater than healthy subjects (P-value<0.001). T-Scan records show a difference of POF greater than 5%.

Conclusion: the present clinical correlation presents a new method of analysis. CPI indicates discrepancy of the condyle position in CO from CR and T-Scan allows the operator to study all teeth contacts and occlusal forces taking place during dynamic jaw movement

Introduction

In recent years many authors have indicated the importance of the prevention and early diagnosis of conditions producing temporomandibular joint (TMJ) disease, in particular intracapsular TMJ disease that involves the condyle and its disc.Many authors have suggested that TMJ pathogenesis is multifactorial (perpetuating, predisposing and initiating factors) and its diagnosis is not easy. The temporomandibular joint (TMJ) may be affected by inflammatory, traumatic, infectious, congenital, developmental, and neoplastic diseases, as seen in other joints (Srivani et al., 2008). Patients with temporomandibular disorders present with pain that is often unilateral and referred to the ears, temporal and periorbital regions, the angle of the mandible, and frequently to the posterior neck; other symptoms include reduced or asymmetric mandibular motion, and the characteristic TMJ sound (Belfer and Kaban,

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1982, Gay et al., 1987, Kaplan et al., 1991). Joint sound is due to a disk or condyle displacement in the glenoid fossa.

Normal jaw opening is due to activation, in two phases of the supra hyoid muscles and lateral pterygoid muscles which induce a rotation and a translational movement of the condyle down and forward along the articular eminence of the glenoid fossa with the articular disk between the condyle and the articular eminence of the glenoid fossa. In TMJ there is a displacement of the TMJ disc from its normal position to pathologic position with its deformation. In TMJ disc displacement induces a joint sound in jaw opening movement (TMJ with disc reduction) or no joint sound in non-reduction pathology (de Leeuw et al., 1995, de Leeuw, 2008a, de Leeuw, 2008b) (Fig. 1).

Joint sounds may be early at the starting or at the ending of the jaw movement. It may be related to many factors such as bone changes, lateral ligament tension or disc alterations. Clinical difference is easy to find using the jaw opening compression test (Fig. 2).

The role of occlusion in the pathogenesis of TMJ is still a very controversial issue. Occlusion contacts may have an important role in the aetiology of intracapsular disease, but the relationships are not well understood. Crawford (Crawford, 1999), McNamara, Seligman and Okeson (McNamara, 1978, Okeson et al., 1982, Seligman and Pullinger, 1991, Okeson, 1993, McNamara et al., 1995, Okeson, 2007) explain that there is a lack of scientific and statistical correlations that explain if occlusion and muscle’s function have an influence on the condyle position in the pathogenesis of TMJ.

One problem is to find all dynamic functional contacts that there are in masticatory cycles on static casts. TMJ disease treatment starts with study and research of condylar Centric Relation (CR) in the glenoid fossa. For orthodontist and the dental practitioner, at the beginning of orthodontic and prosthetic treatment it is important to know the right condyle position, Centric Relation (CR) and the condyle position in Centric Occlusion (CO) (Roth, 1995b). Centric Relation (CR) is the position of condyle in glenoid fossa in the most anteriosuperior position against the eminentia with the articular disc properly interposed. The condyle position in maximum intercuspation of the dentition irrespective of the condyle position is called Centric Occlusion (CO). CR is related to the resultant vector of elevator muscles that may be directed anterosuperiorly and to the degree of relaxation of the inferior lateral pterygoid muscles (Dawson, 1979, Okeson et al., 1982, Okeson, 1993, Dawson, 1995, Okeson, 2007).

Many authors suggest that TMJ is associated to functional disorders that occurs mainly in women (Guralnick et al., 1978, Laskin, 2007, Laskin, 2008). Many tests and radiographs are necessary for its diagnosis and treatment. The panoramic radiograph (a single-cut tomogram of the entire jaw) is still the most useful screening tool (Berrett, 1983). Plain radiographs have been almost completely replaced by computed tomography (CT) for evaluation of bone morphology and pathology of the joint, mandibular ramus, and condyle (Cohen et al., 1985, Matteson et al., 1996). Many authors suggest CT is an unreliable method to study TMJ and condyle position alterations (Girardot, 1989, Roth, 1995a, Major et al., 1999).

Magnetic resonance imaging (MRI) has replaced other imaging methods for evaluation of soft-tissue abnormalities of the joint and surrounding region (Avrahami et al., 1986, Kircos et al., 1987, Weiss et al., 1988, Nakasato et al., 1991, Hayt et al., 2000).

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Kaya evaluated anterior disc displacement using ultrasonography (US) and MRI. The authors suggested that this technique was very reliable in determining the anterior disc displacement (Kaya et al., 2010).

MRI is being replaced by real dynamic MRI that allows clinicians to show pronounced disk changes but does not permit precise measurement because of the poor noise-to-signal ratio (Palla, 2009).

For this reason, patients are often discouraged and so untreated. An easy and more intuitive study of TMJ disease, based upon measurable clinical features, would, therefore, be of great use to the general dental practitioner, for the orthodontist and the surgeon. The use of Dignostic Criteria (DC) is a common approach to reducing the difficulty of developing a clinical diagnosis of TMJ and to select proper treatment. Recently Naeije et al. demonstrated how difficult is to develop specific criteria that can accurately separate the various type of TMJ (Naeije et al., 2009).

In this paper the authors describe two types of clinical analysis, the Condylar Position Indicator (CPI) and T-Scan 2 system, that allow the influence of occlusion and neuro-musculature on condyle position to be studied.

Materials and methods:

Twenty patients with a mean age of 24.5 years (range 17–30) with TMJ problems and 10 healthy matched subjects (mean age: 25.4 years; range: 20–30) were selected and enrolled in the study. Both patients and controls had no missing teeth or oral lesions. None was wearing orthodontic appliances of any type.

On each patient analysis of TMJ was done by means of the Condylar Position Indicator (CPI) and T-Scan System II tests. To reproduce condyle position on CO and CR, maxillary and mandibular

Results:

It has been suggested that, in healthy subjects, CPI measurements ≤1 mm in either sagittal (X) or vertical (Y) axis and ≤0.5 mm in the transverse (Z) axis should be considered normal (Utt et al., 1995). Bite force evaluated by T-Scan showed that in the control group there was a difference of POF not greater than 5%. At the same time in the control group COFT is always localized among the two central ellipses while in patients COFT were always outside the two central ellipses and moved towards the

Discussion:

The pathogenesis of intracapsular disease is a matter of great interest for dental practitioners, orthodontists, maxillo-facial surgeons and oral rehabilitators. Okeson suggests that temporomandibular disease research studies are of poor study design, lack of proper controls and have inadequate follow up. This condition generates the difficulty of developing clinical criteria that can separate the subcategories of TMD and producing a reliable and functional set of criteria for the many

ISSN: 0975-3583,0976-2833 VOL10, ISSUE 04, 2019

Conclusion:

Orthodontists consider centric relation the ideal condyle position for orthodontic treatment, TMJ rehabilitation and orthognathic surgical treatment. This position may be changed by many factors. Occlusion influences the condyle/disk position in the glenoid fossa. This clinical evaluation helps clinicians in the choice of TMJ treatment. CPI indicates discrepancy of the condyle position in CO from CR and T-Scan allows the operator to study all tooth contacts and occlusal forces taking place.

References:

1. Berrett. Radiology of the temporomandibular joint Dent Clin North Am (1983)
2. H. Cohen *et al.*Computerized tomography as a guide in the diagnosis of temporomandibular joint disease J Am Dent Assoc (1985)
3. P.E. DawsonCentric relation. Its effect on occluso-muscle harmony Dent Clin North Am (1979)
4. P.E. DawsonNew definition for relating occlusion to varying conditions of the temporomandibular joint J Prosthet Dent (1995)
5. R. de LeeuwInternal derangements of the temporomandibular joint Oral MaxillofacSurg Clin North Am (2008)
6. R. de Leeuw *et al.*TMJ articular disc position and configuration 30 years after initial diagnosis of internal derangement J Oral MaxillofacSurg (1995)
7. T. Gay *et al.*The acoustical characteristics of the normal and abnormal temporomandibular joint J Oral MaxillofacSurg (1987)
8. K. Kaya *et al.*Diagnostic value of ultrasonography in the evaluation of the temporomandibular joint anterior disc displacement J CraniomaxillofacSurg (2010)
9. R.B. Kerstein *et al.*Electromyographic and computer analyses of patients suffering from chronic myofascial pain-dysfunction syndrome: before and after treatment with immediate complete anterior guidance development J Prosthet Dent (1991)
10. L.T. Kircos *et al.*Magnetic resonance imaging of the TMJ disc in asymptomatic volunteers J Oral MaxillofacSurg (1987)

Conflict of interest

Authors had not financial relationships and conflict of interest with other people or organisations that inappropriately influence (bias) their work.

Funding source

Authors had support in form of grants provided by the Rama Research Foundation, Rama University, Mandhana, Kanpur, U.P., India.