

## Occlusal Screening as Basis for the Integration of Conjoint Gnato-Prosthetic Devices

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**ABSTRACT** The functional disorders of the masticator apparatus impose the accomplishment of a phased assessment protocol which should permit the marking out and prefigure the future treatment plan, at the same time. The association of clinical data with therapeutic options and last but not least with the patient's "expectations" represent a particularly important stage within the final occlusal and aesthetic integration. In order to analyse the data collected through examination various assessment systems are available nowadays which permit the correlation of symptoms identified with adequate diagnoses. The planning of the therapy on the basis of clinical registrations associated with the challenges of the bio-aesthetics shall impose a new conduct within the orofacial rehabilitation of patients.

**KEY WORDS** *occlusal dysfunction, functional clinical analysis, aesthetic analysis.*

### Introduction

The large number of clinical situations playing the role of forerunners within the pathology of the dental-maxillary apparatus was inappropriately assessed in the past and this situation extended nowadays. The establishing of medical diagnoses by the dentist is often completed subsequent to an evaluation of the dental status without including the dental and facial aspect through which the dysfunction and aesthetic issues interpenetrate. By observing the new requirements related to the orodental therapy with a preventive orientation a proper concept of diagnosis assessment shall be therefore presented. It includes, except for the basic diagnosis, guidelines regarding the detailed study of the clinical examination and the association, at the same time, for the purpose of elaborating an extended diagnosis which should include the options and the aesthetic reassessment.

### Subjects and Methods:

The clinical study was carried out within the Occlusology Clinic of Craiova University of Medicine and Pharmacy during the period 2009-2010 and was founded on the assessment of patients according to a proper clinical protocol which permitted the diagnosis and treatment as well as the final dental-facial reassessment. For an accurate determination of inter-maxillary relations the ultrasonic system has been used therein based on the measuring of the time traversed by sonic waves for a 3D measurement of mandibular movements in all 6 degrees.

The assessment of occlusal integration as regards prosthetic constructions has been carried out by means of Protar 7 articulator.

### Results and Discussions:

Deviations from normal craniomandibular relations encounter a complex aetiology and pathology which involves several factors acting at the level of different elements of the stomatognathic system resulting in the modification of common reference frames which actually defines these relations.

The dental occlusion accomplishes the role of stabilizing the mandible in its positions towards the cranium therefore participating at the fulfilment of some systemic functions. The occlusal disorders arise as a consequence of dental anomalies related to number, volume, position of coronary odontal lesions, dental migrations, edentation, modifications of occlusal parameters, inappropriate prosthetics but it may also result, within a subsidiary plane, due to muscular and articulatory dysfunctions.



Figure 1 –Dysfunction by incorrect prosthetics



**Figure 2 – Dysfunction by underdimensioning the prosthetic construction**



**Figure 3 – Dysfunction by edentation without prosthetics**



**Figure 4 – Dysfunction by overdimensioning of prosthetic construction)**

From a clinical point of view it is revealed under the form of premature contacts (which characterize the static stages of the occlusion), occlusal interferences (within the mandible dynamics with dental contact), localized abrasion (at the level of a tooth or of a group of teeth which take over the occlusal load) or generalized for the entire arch.

Occlusal contacts may occur in static positions and within the mandible dynamics. Any occlusal contact which prevents the uniform coaptation of support areas and of occlusal contact points is known as premature occlusal contact. The premature occlusal contact appears in static occlusion (at the end of the occlusion terminal trajectory), or in dynamic occlusion in the event the mandible movement trajectory interferes with dental contact.

The premature contact is always traumatogenic for the elements of the stomatognathic system. The traumatogenic capacity of a contact point depends on several factors such as: localization of the

contact point, the size of the contact point, the condition of the contact surfaces.

Therefore, the surface of a contact point is all the more extended as the friction force increases as well as its pathogen potential at the same time. A reduced contact point in terms of the surface involved but achieved between two rugous surfaces could be as traumatogenic as a contact point extended on a well polished surface due to the increased friction coefficient or it could even be capable of producing more injuries. Contacts could be multiple and symmetrical keeping the mandible in a close or almost identical position with the central relation or with the intercuspital position without causing anterior, posterior or side deviations. This happens very rarely as the presence of limited occlusion contacts creates a phenomenon known as occlusal instability.

The clinical assessment of the static and dynamic occlusion cannot be performed without a registration of craniomandibular relations. Therefore the registration permits the control, assessment and bringing out of premature contacts and occlusal interferences by means of study patterns.



**Figure 5- Tracking down premature contacts by means of study patterns**



**Figure 6- marking out of premature contacts on the study pattern).**

While trying to establish the maximum intercuspital contact (for patients with long-centric occlusion) or the centric occlusion (for point-centric patients), the mandible departs from the rest position rising towards the maxillary under the action of raiser muscles.

The trajectory completed by the mandible between the posture position and the maximal intercuspital position is known as terminal

posture trajectory and the closing trajectory in centric occlusion is called centric terminal trajectory. As far as the disorders of the stomatognathic system are concerned this trajectory is interfered, in its final part, by premature contacts or interference contacts or occlusal interferences.

During the clinical examination the stages regarding the assessing of muscular function, the presence of articular noises, the mandible mobility on vertical and horizontal planes should be included on a mandatory basis supplemented by signs generated by overstraining at the level of hard and mild tissues.

The marking overjet releases the mandible movements while the tight overjet is seen as an occlusal stress factor.

Within the craniomandibular malrelations the overbite frequently appears modified by the existence of a primary deep occlusion or acquired subsequent to the loss of side support. The overbite is all the more accentuated as the occlusion is more traumatic. The smaller the overjet the bigger the traumatogenic potential it bears. Various combinations of the two elements controlling the frontal occlusion may generate more or less traumatogenic effects.

The analysis of the dynamic occlusion is carried out within some test movements transmitted to the mandible as well as during mastication, phonation and deglutition movements. The analysis of test movements (retrusion, protrusion, right and left laterality) often reveals the presence of some occlusal blocks or of some traumatic sliding gradients.

The retrusion movement performed between the maximal intercuspidal position and the centric relation could be blocked by some premature contacts therefore impeding the path of the mandible towards the centric relation during deglutition.

During the protrusion movement the premature contact points from lateral area appear on distal gradients of mandibular lateral incisors and on mesial gradients of maxillary cuspids. The occlusal interference resulted on this path of the mandibular movement reveals an emphasized pathogen potential by the fact that the duration of occlusion contacts and the force intensity are extremely high. When there is a severe dysfunction the patient interposes his tongue between arches in order to reduce the occlusal trauma during deglutition process.

The protrusion might register premature contacts within the lateral zone which would further prevent the anterior guide of the occlusion

on the retroincisive gradient. The deeper is the occlusion the bigger the protrusion trajectory.

The premature contact points belonging to the anterior zone in the protrusion impede the balanced contact of the entire frontal group during teeth movement guide, therefore determining an overloading of the teeth which maintains the contact.

The disorders at the level of occlusal parameters characterized by the shortening and interruption of occlusal areas, their inappropriate artificial or mixed execution, discontinuities, incorrect reinstatements of the retroincisive gradient, modifications of the integrity and form of the support and guide cuspid teeth, changed occlusion curves, the subsided occlusal plane represent important factors of the occlusal dysfunction resulting in modifications of mandibular patterns related to dynamics with consequences at the level of muscular and articular system while taking into account the role of dental determinant within the achievement of mandibular dynamics.

The association of these data with deviations from appropriate statics and the functional disorders at the level of the axial skeleton, especially the of the cervical spine could generate functional errors of associated muscularity; it is accompanied, in turn, by errors related to the functionality of antagonist masticator muscles.

The assessment protocol of the aesthetic status has also included, besides the determination of the vertical symmetry axis of the horizontal planes and the bipupilar line (BP) the plane of commissures of the buccal orifice, the frontal occlusal plane and the facial profile.

Also, the locating and assessing of the contact points, contact surfaces, papillas and gingival level has also been taken into account. Besides the above mentioned, the study was also intended on the evaluation of dental morphology which comprised the determination of dental axes, the length and width of teeth as well as the determination of the specific chromatic spectrum for each tooth or groups of teeth. Their association with the facial study alongside with the assessment of the cosmetic status, imposed by the patient in this case but improvable or not through suggestions of the dentist, represents the completion of a thorough clinical examination and the commencement of a new protocol for assessment and prosthetic treatment.



Figure 7 Occlusal rebalance associated with aesthetic reassessment



Figure 8 idem



Figure 9 idem



Figure 10 idem

## Conclusions:

1. The registration of intermaxillary relations on a mandatory basis and their transfer on the articulator shall impose as a unique solution for the appropriate execution of gnato-prosthetic devices.
2. The premature contact is always traumatogenic for the elements of the stomatognathic system.

3. The modifications of the form of support and guide cuspid teeth, the occlusion curves and the occlusion plane represent important factors of the occlusal dysfunction resulting in modifications of mandibular patterns related to dynamics.
4. The deviations from normal statics and functional disorders at the level of axial skeleton especially of the cervical spine could generate functional errors of associated muscularity; it is accompanied, in turn, by errors related to the functionality of antagonist masticator muscles.
5. The association of the aesthetic examination to the clinical examination represents an essential condition with a view to achieve the functional reconstruction.

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