



Dental Occlusion

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Editorial

Occlusion is the key element in all kinds of dental rehabilitation. The longevity of a restoration depends on occlusion and loading conditions. Earlier concepts of technical and biomechanical aspects of dental occlusion, have currently been combined with biological, behavioural and neural control of the stomatognathic system. Although dental occlusion has been the most questioned and complicated issue of dentistry; applying the basic principles and key factors bring success for the treatments. The essentials of gnathological concepts include centric relation, anterior guidance, occlusal vertical dimension, the intercuspal design and mandibular movements.

Current approach for centric relation can be defined as: “maxillomandibular relationship in which the condyles articulate with their respective disks with the complex in anterior-superior position against the shapes of the articular eminencies where zenith points of the condyles, disks and the fossa temporalis coincide in their most orthopaedic positions without any interferences. Centric Relation Occlusion (CRO) seldomly coincides with the maximal intercuspatation” [1]. This is important for observing pre- and post-treatment condylar positions where extensive oral rehabilitation is performed. In such a situation, occlusal vertical dimension and mandibular position with complex restorations and consequent occlusal and muscular re-programming occur to stabilize the Temporomandibular Joints (TMJ) to a reproducible position [2].

Anterior guidance defines to the protection of posterior teeth by the anterior teeth with their palatal inclinations in protrusive-retrusive and excursive mandibular movements and conversely protection of the anterior teeth by the posterior teeth in maximum intercuspal position without any occlusal interferences (mutually protected occlusion). The clinical significance of this situation is that with anterior guidance establishment in any dental rehabilitation, less wear on posterior teeth and less stress on TMJ in a long period would be generated [3]. Occlusal Vertical Dimension (OVD) is developed during maxillary and mandibular growth and eruption of the dentition accompanied by alveolar bone formation and this spatial relationship is measured by the interocclusal distance from the rest position to the mandibular incisal contact into the cingulum region of the maxillary incisors, evaluation of phonetics and facial-tooth esthetic profiling [4,5].

Resting vertical occlusal dimension may change due to the jaw relationship, alveolar bone resorption, emotion, postural and body positions and loss of natural teeth contacts and these may influence the determination of the OVD.

From a clinical perspective, OVD stabilization is important for the establishment of anterior guidance and further adaptation of the posterior determinants, especially where severely worn dentitions and/or patients with extensive missing teeth need a rehabilitation of their collapsed OVD to an appropriate level of functioning. The establishment of a reproducible and functional centric relation together with the mutually protected anterior guidance formation without any TMJ pathology facilitates subsequent posterior occlusal morphology determination. Posterior teeth that play the major role in mastication consist of positive and negative elements on their occlusal surfaces. Positive parts are cusp tips, triangular and marginal ridges, complementary ridges and cingulum while the fossae, sulci and complementary developmental sulci are the negative parts. Cusps and fossae are the major elements of occlusal morphology and vital for gnathological terms. Cusp tip and fossa depth are accepted as the main determinants of occlusal morphology. Cusp and fossa inside and outside inclinations are secondary determinants which help sliding of cusps along the fossa during eccentric movements. In a well functioning occlusion; posterior disclusion occurs with anterior guidance during protrusive and excursive mandibular movements, cusp-to-fossae (tripodism) relationship, centric (relation) occlusion, uniform centric contacts, axially transmitted occlusal loads take place with narrower occlusal table, efficient cusp heights and fossae depths (in accordance with the individual's steepness of the articular eminence) are achieved [6]. This prevents the possible development of induced occlusal interferences and related tooth pain

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and increased tooth mobility, muscular tonus changes and TMJ disturbances. Functional activity is mainly influenced by peripheral input (inhibitory) whereas parafunctional activity by central nervous system input (excitatory). An acute change in occlusal pattern will lead to protective muscle co-contraction mechanism precipitation and also an inhibitory effect on parafunctional activity would take place. The reaction of muscles would then be adaptive (alterations in the engrams of the muscles) to avoid the potentially damaging contact and fulfill the functioning task. When altered muscle engrams cannot adapt, successive muscle co-contraction over long periods may lead to muscular pain since such isometric activity inhibits normal blood flow within the muscle tissues creating lactic acid accumulation and fatigue, pain and spasms.

Another aspect has been reported to be the sensorimotor cortex's fundamental features, such as the ability to undergo neuroplastic changes (the brain's ability to undergo structural and functional changes throughout life for Central Nervous System (CNS) development, memory, motor skill acquisition, learning and adaptation following peripheral nerve trauma or other changes to sensory inputs to the CNS) allowing acquisition of new motor skills or adaptation to an altered intraoral environment. Therefore, in clinical situations, further effects of tooth form and other intraoral changes (i.e. extensive prosthetic rehabilitation) on somatosensory and face sensorimotor cortex related to masticatory control should be considered [7].

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