

Reliable Dental Rehabilitation Starts from Dental Occlusion Management

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Restoration of patient dental occlusion, defined as osseous and dental static and dynamic relationships, may be needed for several reasons. Severe tooth wear, crowding, loss of masticatory units and oncologic surgical resections are the most common situations that require reconstruction of dental and/or skeletal occlusal relationships. Basically any dental work that changes the occlusal surfaces and/or the tooth position could potentially modify oral proprioception. Kogawa, et al. [1] demonstrate how the interdental perception threshold in healthy subjects is less than 2 hundredths of a millimeter. It is very likely that dental treatments involving occlusal surfaces could change oral proprioception forcing neuromuscular patterns to develop functional adaptations. It has been clearly demonstrated how dental afferents play a role in the masticatory muscles recruitment. Occlusal modifications could change masticatory muscles global contraction intensity but also their functional relationship [2]. Indeed muscle imbalances may originate from several factors including a higher number of contacts, interference in the working or balancing side and loss of posterior vertical support [3]. Moreover, it has been demonstrated how proprioceptive dental alterations due to iatrogenic occlusal disturbances (200 µm thick) may require also neck muscles functional adaptations [4]. The role of occlusal-related functional abnormalities in the pathophysiology of Temporomandibular Disorders is still not clear; to date no scientific evidence-based conclusions are widely shared [5]. The relationship between abnormal muscle recruitment and symptoms such as pain or signs of dysfunction like movement limitation does not appear linear, underlining that a great number of subjects has a wide functional adaptability. The absence of clinical symptoms (mainly pain) following an occlusal intervention does not correspond directly to a procedure free from imperfections and/or anomalies. The muscles and nervous tissue adaptability to new oral conditions (without causing symptoms such as pain) [6] could “mask” changes in other structures, for example, teeth, bones and joints. Occlusal proprioception requiring (asymptomatic) muscle adaptations could cause changes in the distribution of the occlusal forces causing the following major complications:

- a. Biological. Mechanical forces act on bone biology; the bone apposition and resorption mechanisms are implemented by chemical processes initiated by mechanical stimuli. It has been verified how the bone modifies in order to support functional loading needs.
- b. Mechanical. The prosthetic (crowns and implants) reliability is the result of the tension developed in artificial products.
- c. Functional. The adaptation ability is not constant between individuals (some patients may develop symptoms as a result of altered occlusion) and over time.

In this context the use of masticatory function instrumental evaluations (before and after therapies that modify dental occlusion) are recommended to support the clinician to quantify the impact of occlusal changes on the oral biology. In fact, the biomechanical studies demonstrate that each muscle has its own specific action vectors (or more than one conferring redundancy features to the stomatognathic apparatus) and that alterations in the muscle forces distribution cause transformations of the mechanical stresses on the hard structures [7]. In conclusion, a reliable dental treatment must include a precise masticatory functional evaluation, not only to avoid the symptoms onset but also to ensure greater reliability and durability of homogeneously stressed oral rehabilitations.

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