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Review

Clinical issues in occlusion – Part I[☆]



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ABSTRACT

Good occlusal practise provides an important cornerstone to optimal patient care. Occlusal problems can manifest in different areas of dentistry but these are more apparent when there are restorative aspects to the patient's problem. This review highlights areas of restorative dentistry where the appreciation of occlusal aspects can optimise diagnosis and follow up care.

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Introduction

The Glossary of Prosthodontic Terms defines Occlusion as ‘the act or process of closure or of being closed or shut off’ or ‘the static relationship between the incising or masticating surfaces of the maxillary or mandibular teeth or tooth analogues’ [1].

However, it is both static and dynamic relationships between different components of the masticatory system that are usually

considered simultaneously when occlusion is examined or recorded. In essence, this describes the relationship between the opposing masticating surfaces of teeth and the movements of the mandible dictated by way of the temporomandibular joint and associated orofacial musculature. Therefore, occlusion represents a spectrum of anatomical and physiological principles varying in their complexity and intricacies. These principles can lack robust evidence to advocate their usage and as such,

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confusion and uncertainty can result. Recreating the occlusal relationships inaccurately outside of the mouth can result in frustration for the dentist, technician and most importantly the patient. In contrast there may be situations (with appropriate planning) where restorations may be cemented at an increased vertical dimension which may otherwise be considered unconventional.

The awareness of occlusal aspects when examining a patient as well as associating these with signs and symptoms provides information for optimal management. This ethos should be considered on a backdrop of changes in patient demographics, social pressures and increased patient expectations. The first part in this series will look at specific occlusal problems and their aetiology and diagnosis. The second part will illustrate occlusal registration techniques and subsequent management.

Occlusion and tooth surface loss (TSL)

Attrition results from tooth-to-tooth contact resulting in well-defined wear facets on the occluding surfaces of teeth which correspond between the maxilla and the mandible (Fig. 1). Physiological tooth wear is expected to a certain level when taking into account the age of the patient. Pathological toothwear (where the rate is greater than that expected physiologically) as a result of parafunctional activity results in the accelerated loss of tooth tissue, threatens pulp health and can result in axial tooth movement that will make future restorative management difficult due to changes in interocclusal relationships, potential differential tooth movement and loss of interocclusal space. In its mildest form faceting within enamel may provide early signs of attrition. In the latter stages tooth tissue may become significantly damaged resulting in difficulties in restoration and pulpal involvement (Table 1). The key in these situations is to identify patients with parafunctional activity, recognising this at the planning stages of any procedure and protecting tooth structure and restorations by way of individual design characteristics or considerations for long term appliance therapy. If such parafunctional activity is allowed to progress the prognosis for survival of teeth and their associated restorations is likely to diminish (Table 2).



Fig. 1 – A 28 year old patient presenting with attrition, amelogenesis and hypodontia.

One notable risk factor for parafunctional activity is psychological stress [2]. Current research shows that psychological stress is increasing in the general population and this is more often than not associated with vocation related pressures [3]. In such cases a thorough social history is likely to inform the treatment planning process and aide delivery of care. Other much cited risk factors include occlusal relationships such as the retruded contact-, intercuspal position slide and lateral guidance pathways such as canine or group function [4,5]. There is no evidence to suggest that any occlusal relationship will result in a greater likelihood of parafunction or indeed temporomandibular dysfunction [4,5].

General conservative management of attrition type TSL would be the provision of a stabilisation splint in the first instance in order to prevent further hard tissue surface loss. Parafunction against the splint would lead to favourable attrition of the acrylic splint material [6]. A upper soft bite guard could be made in acute cases as a quick urgent way of relief.

Occlusion and restoring/increasing the occlusal vertical dimension (OVD)

In cases of severe TSL due to a combination of attritive or erosive processes there may be extensive loss of the dental hard tissues, and commonly the teeth appear to look grossly shorter in clinical crown height from gingival aspect to the incisal edge or occlusal surface. It could appear that there is a loss of OVD here, however in most cases in dentate patients this is not the case due to physiological dentoalveolar compensation that occurs [7]. The compensatory mechanism is noticeable due to the varied position of the gingival zeniths of the anterior segment (Fig. 1). If the rate of tooth destruction occurs at a faster rate than compensation, an open bite can occur.

In cases where compensation has occurred there is a loss of interocclusal space, increasing the existing OVD is a treatment strategy that may be considered. Other more drastic treatment methods have been proposed such as elective extraction, surgical crown lengthening and orthodontic intrusion. These techniques vary in their invasiveness and as such irreversible damage. Although considered invasive and damaging to sound tooth tissue and supporting structures these techniques can still be considered with appropriate care and planning. A technique routinely utilised in the UK is increasing the OVD using a method modelled on a concept first illustrated by Dahl [8]. Dahl and colleagues were the first to discover this phenomenon in the 1970s by utilising a removable cobalt chromium intrusion appliance with a bite platform anteriorly. This concept was developed further in the 1990s in the UK by utilising composite resin to restore worn teeth (Fig. 2). This involves the placement of composite restorations at an increased OVD on anterior teeth leaving posterior teeth with no occlusal contacts. A period of occlusal adaptation results with a combination of intrusion of the anterior teeth and vertical migration of posterior teeth resulting in the relinquishing of contacts over time.

This treatment modality shows good short to medium term results although the requirement for maintenance maybe high [9]. Despite this, the advent of placement of

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