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Review

Clinical issues in occlusion – Part II

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ABSTRACT

Occlusal diagnosis plays an important role in the planning and subsequent delivery of predictable functional and aesthetic restorations and prostheses. Once an occlusal problem is identified there are a number of techniques and materials that can be utilised to record occlusal relationships, subsequently analyse them and incorporate information obtained into the delivery of tooth restoration or replacement. This paper discusses the clinical and technical aspects of occlusal examination and analysis outlining contemporary and traditional techniques in their utilisation. Aspects of occlusal examination will be revisited; the identification and recording of centric occlusion as well as subsequent articulation will be discussed. The requirement for occlusal splint provision will also be discussed and illustrated.

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Introduction

In the first paper of this two part series a variety of occlusal issues that a general dental practitioner would commonly encounter in clinical practice were discussed [1]. The incorrect diagnosis of an occlusal condition and subsequent mismanagement may impact clinical outcome in terms of affecting the prognosis of the existing dentition and restorations whilst restricting general occlusal function which are not beneficial for the patient. It is the intention of these papers to guide the clinician to be able to implement a broad diagnostic strategy for occlusal management that can be applied in general practice. The following account will provide the clinician with a systematic method of approaching the examination and diagnosis of common occlusal issues within restorative dentistry and prosthodontics as described in Part I.

Occlusal examination

A thorough medical, dental and social history of the patient and a pain questionnaire should be completed before the examination of the patient is undertaken. The occlusal examination will be utilised to not only inspect the intra-oral tooth to tooth relationships, but also to take note of the extra-oral position of how the mandible relates to the maxilla without the influence of the dentition. Not all patients require a full comprehensive occlusal examination and it is the opinion of the authors that the depth and extent of occlusal examination and investigation undertaken for any patient should stay relevant to the specific occlusal complaints of the clinical situation.

A comprehensive occlusal examination should start with an extra-oral examination including an assessment of symmetry; the muscles of mastication and the skeletal base pattern. The extra-oral examination can then develop further to the inspection and palpation of the temporomandibular joint and associated orofacial musculature. The palpation techniques of the elevator and depressor muscles of mastication are beyond the remit of this article, however can be found described in other relevant texts [2].

The details of intra-oral occlusal examination should commence from as basic as possible and be in respect to what is deemed appropriate by the existing requirements for the patient in order to manage their presenting occlusal condition. The examination of a new patient at the initial consultation will require at least an inspection of the occlusal surfaces of the teeth, a recording of the incisal angle and molar relationships, and the nature of the tooth related mandibular guidance in both protrusive and lateral excursive movements. These observations can be identified and documented. An occlusal examination that is more exhaustive will include the diagnosis of centric occlusion (CO) which can be made by manipulating the patient's mandible using chin point guidance, but more favourably by a bimanual mandibular manipulation technique as described by Dawson [3]. If it proves challenging to carry this out due to resistance by the patient, the use of a Lucia jig as an adjunct for this purpose is favoured by the authors. A Lucia jig is a removable custom made anterior flat plane bite platform deprogrammer first published by Lucia in 1964. It works by breaking the natural neuroceptive engram of the patient's habitual closure into maximal intercuspal position (MIP) [4]. It can be made of a variety of materials, commonly acrylic resin is used (e.g. Trim, Bosworth Company, U.S.A).

CO to MIP relationship

The CO to MIP relationship maybe easier to diagnose in some patients than others due to the ability to manipulate the patient's mandible into the hinge axis position. The difficulty may be exacerbated by the existing level of parafunction and occlusal disharmony present. The diagnosis of CO may not be possible at the initial appointment and therefore it may be prudent to construct a removable occlusal appliance to allow a period of neuromuscular deprogramming before the diagnostic occlusal examination can be carried out at a later date. Occlusal appliances for this use could include a Lucia jig as a short term measure, or for a longer term period a removable occlusal splint may be used [4,5].

The diagnosis of CO is made when the mandible is manipulated into the hinge axis and the arch of rotation of the mandible occurs without anterior translation of the condyles occurring, this will take place as the condyles are seated and braced in their most superior anterior position within the glenoid fossa. As the mandible is closed towards the maxilla the identification of the first point of tooth contact can be confirmed by the patient as to which side it occurs, and the exact tooth to tooth contact can be marked using occlusal indicating paper. The majority of patients (approximately 90%) may demonstrate a discrepancy between the CO and habitual MIP [6], where MIP may lie anterior and superior to the CO by approximately 1.25 ± 1 mm [7]. The exact descriptive nature of the CO to MIP centric slide is not needed at this stage, but can be clinically assessed and a record of which can be detailed by means of clinical photographs or completion of an occlusal chart diagram, and confirmed later on a set of articulated diagnostic study casts. The use of GHM occlusal indicating paper (Hanel-GMHDental GMBH, Nurtingen, Germany) of different colours (black and red) and Shimstock bite foil (Hanel-GMHDental GMBH, Nurtingen, Germany) handled using Miller forceps and Artery forceps respectively, may be used to record this discrepancy.

The centric slide if present may exhibit three directional components, vertical (superior/inferior) and horizontal (anterior/posterior and medial/lateral). These components will vary in their degree and an attempt must be made to identify which is the most dominant component if adjustments are made to the CO. This relationship may be fully assessed and confirmed on a set of articulated study casts so that effects to mandibular movement are investigated which may have an impact upon the anatomical occlusal design of both posterior and anterior restorations.

For patients where the CO to MIP relationship has been diagnosed as being the identical, one may assume that either this has not been diagnosed correctly or the centric slide may