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CANINE GUIDED OCCLUSION AND BILATERAL BALANCED OCCLUSION IN COMPLETE DENTURES - A REVIEW

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ABSTRACT
There is no agreement on what could be the most appropriate occlusal scheme for making complete dentures. Thus, the purpose of this study was to compare Canine Guided Occlusion with Bilateral Balanced Occlusion. Comparison was done on the basis of quality of life and masticatory forces. The study was done based on comprehensive search of studies from various platforms like PubMed/MEDLINE, Scopus, and Cochrane Library databases. The focused question of the review was: In conventional complete denture, is bilateral balanced occlusion better than, canine guidance occlusion in terms of patient satisfaction, quality of life, and masticatory performance.
The present review indicated that balanced occlusion had adequate quality when it comes to masticatory performance while canine guided occlusion can be used to reduce muscular activity.

Keywords: Bilateral Balanced Occlusion, Canine Guided Occlusion, Masticatory Forces

INTRODUCTION
Complete dentures are used to restore a patient's masticatory function and speaking ability, resulting in improved facial appearance and social interaction (1,2). The proper masticatory function is critical since it affects food digestion and overall quality of life. Because the release of gastric juice naturally decreases with age, proper preparation of the food bolus in the mouth is critical (3). Because it is linked to the physical characteristics of load transfer, denture retention, and stability, occlusion is a crucial part of the technical process in complete denture construction. The occlusal scheme controls the pattern of occlusal contacts between opposing teeth during centric relation and functional mandibular motions. The form and arrangement of occlusal contacts in natural and artificial dentition is referred to as the occlusal scheme (4). Because it affects muscle activity during the mastication process, an ideal occlusal scheme is a vital and critical aspect in the design of complete dentures prosthesis. Various occlusion and articulation approaches, such as bilateral balanced, neutrocentric, lingualized, monoplane, and canine guided occlusion, have been recommended for the construction of complete dentures for much of the last 100 years. The most extensively employed occlusal concept for edentulous patients has been balanced articulation, which includes the bilateral simultaneous contacting of the maxillary and mandibular teeth in the posterior and anterior occlusal regions in centric and eccentric orientations (5). Because this sort of occlusion provides more grinding surface in contact with every centric and

eccentric movement, it is needed to encourage improved masticatory function. It helps to distribute the occlusal load evenly and therefore helps to improve the stability of dentures during centric, eccentric or parafunctional movements.

Aside from these standard approaches, several authors have provided anterior canine guidance for entire denture manufacturing. By vertically and horizontally overlapping the canines, the canine guiding occlusal scheme disengages the posterior teeth during all eccentric mandibular movements. During protrusive and lateral excursive mandibular motions, the canine guided occlusion idea is thought to minimize muscle activation. Known advantages of the canine guided occlusion concept include posterior tooth disclusion during lateral movements as well as significantly better aesthetic approval and acceptance (6–8). Our team has extensive knowledge and research experience that has translated into high quality publications(9–28).
Canine-guided complete dentures reduced muscle activity while increasing masticatory efficiency, with no evidence of decreased masticatory effectiveness, poorer lateral stability, or higher resorption rates. However, supporters of bilateral balanced occlusion believe that this occlusion scheme stabilized entire dentures and focused stresses on the residual ridge, preventing resorption of the alveolar ridge.

CANINE GUIDED OCCLUSION.

Canine guided occlusion is also known as organic occlusion or mutually protected occlusion. The basic idea behind canine-protected function is that when the mandible keeps moving laterally, only the canine contacts and therefore protects the remaining dentition from unfavorable occlusal torsional forces to and from centric relation and centric occlusion.In many dentition with healthy periodontal tissues and limited wear, the teeth were arranged so that the overlap of the anterior teeth prevented the posterior teeth from making any interaction on either the working or non-working sides during mandibular excursions (29–31). The separation from occlusion was termed as disocclusion. During maximum intercuspation, all posterior teeth are in communication with forces aimed directly along their long axis. The anterior teeth are either lightly in communication or very fractionally out of contact, relieving them of obliquely directed forces. The posterior teeth are dis occluded during excursive movement, having left only the anterior teeth in contact. As a result, the anterior teeth protect the posterior teeth throughout all mandibular excursions, and the posterior teeth protect the anterior teeth at the intercuspal position, giving rise to the term mutually protected occlusion. A mutually protected occlusion cannot be used in a particular instance of reverse occlusion or crossbite, in which the buccal cusps of the maxillary and mandibular teeth interact with each other in a working side excursion (32). The tendency of anterior guidance to exclude posterior teeth on protrusion and lateral excursions is helpful for optimal occlusion. Adverse anterior guidance can result in bone loss, tooth mobility, and restricted mandibular movement in the front (33,34). When the maxillary and mandibular canines are worn out at the incisal surface, the mandible protrudes or moves in a lateral excursion, and the palatal slopes of the canine direct the mandible downward or forward. As a result, steeper inclines can be used for single crown restoration of maxillary or mandibular canines, enabling the mandible to return to its normal position when protruded or brought into lateral excursion (33,35).

During eccentric excursions, shock contact of the upper cuspids by opposing mandibular teeth creates transfer of periodontal proprioceptive impulses to the mesenchyme root of the fifth cranial nerve, which alters motor impulses transmitted to the musculature. This involuntary action lessens musculature tension, reducing the amplitude of the forces applied (36). The natural vertical and horizontal overlap

of the upper cuspids prevents contacts that could develop horizontal vectors, causing premature periodontal fatigue or restoration failure. When this canine protection is eliminated, muscles stay operational, resulting in clenching, teeth grinding, abfraction, and gingival recession (37).

TOOTH LOADING

The forces are directed in the axial direction by limiting the contact of the posterior teeth's support cusps to their opposing fossae at or near their intercuspal position. Mastication is attained through a pounding motion similar to that of a meat maul. Well-formed marginal ridges, triangular ridges, grooves, and fossae could indeed increase functional efficiency by allowing the occluding cusps to quickly enter fibrous food in a shredding, chopping manner. Canines are placed and inclined so that, while allowing full contact of all teeth in centric occlusion, they force the jaw open as the upper and lower canines slide over each other, disengaging all cusps of teeth as the person begins to grind side to side, a phenomenon known as cuspid rise. The reason for redirecting load applied is that anterior teeth are situated far from the TMJ and have more leverage to compensate.

The horizontal force is limited further by reducing the mediolateral cusp angle. Guidance is established that is so ineffective for mastication that a patient will indeed only use it for guidance instead of grinding food (38,39). For several reasons, the canine is better suited for this role.

- The canine has a favorable crown to root ratio.
- Canines are the last teeth in the dentition to be lost.
- Canines have a relatively larger root which in turn results in a larger crown root ratio.
- Canines have good proprioception.

In comparison to the relevant published artificial occlusal schemes, canine guided occlusion is a reliable occlusal scheme for the arrangement of complete denture teeth. Canine guided occlusion is favored over other occlusal schemes due to the simplicity and ease of fabrication (40). Canine guided occlusion, the posterior teeth disengage during all mandibular excursive movements, with the canine teeth overlapping vertically and horizontally. Superior functional efficiency for chewing/mastication has been reported using anterior teeth group function or the canine-guided occlusal scheme. According to the literature review, differences in patients ' satisfaction were noted in relation to various factors such as stability, function, muscle activity, aesthetics, and retention (41). According to several researchers, canine guided occlusion was preferred over other artificial occlusal schemes in terms of function and stability (5,42,43).

BILATERAL BALANCED OCCLUSION.

The simultaneous contacting of the maxillary and mandibular teeth on the right and left sides, as well as in the posterior and anterior occlusal areas, in centric and eccentric positions, developed to decrease or limit tipping or rotating of the denture bases in relation to the supporting structures. Balanced occlusion is the placement of the teeth such that they establish simultaneous contact in a centric relationship and give a smooth sliding motion to an eccentric position. Balanced occlusal contacts provide a few advantages, but they also have some drawbacks. The advantages of occlusal balance include the retention of complete denture stability, improved chewing performance, and a decrease in active loading of supporting tissue and edentulous ridge. One downside of placing teeth in a balanced

occlusal arrangement is that denture wearers must change their chewing behavior, which increases the period of adaptation to complete dentures (44,45).

IMPORTANCE OF BALANCED OCCLUSION

Balanced occlusion is one of the major components that affects the stability of the denture. In the absence of occlusal balance, the denture will then be pushed during mandibular movement.

A typical person makes masticatory tooth contact for only 10 minutes in one entire day, and 4 hours of total tooth contact during other functions. So, throughout these 4 hours of tooth contact, balanced occlusion is crucial to ensuring denture stability. As a result, balanced occlusion is more crucial during parafunctional movement.

Occlusal balance or balanced occlusion are mainly of 4 types.

- Unilateral balanced occlusion
- Bilateral balanced occlusion
- Protrusive balanced occlusion
- Lateral balanced occlusion

Balanced Occlusion is one of the earliest occlusion concepts advocated for the construction of complete dentures, so it involves maintaining as many maxillary and mandibular artificial teeth as possible at the centric relation, as well as all eccentric mandibular movements. Dentures made with balanced occlusion, according to supporters, are more stable, with multiple point contacts in all excursive movements, particularly for edentulous patients with compromised ridges and neuromuscular skills (46).

MASTICATORY PERFORMANCE

Masticatory performance includes two important criteria, “masticatory efficiency” and “masticatory ability”. Masticatory Efficiency is defined as the ability of the denture to crush the food during mastication (47). The results of previous studies done shows that there was no significant difference in the masticatory efficiency between both the types of occlusal schemes (48,49).

Masticatory ability is defined as the individual's own assessment on his or her masticatory function. The link between masticatory efficiency and subjective chewing experience is weak. Thus, the masticatory function must be assessed in both methods, especially in edentulous patients, since the psychological aspect is critical to the success of CD rehabilitation (50,51). Previous authors' studies found no relationship between masticatory efficiency and chewing rating. Moreover, there was no significant change in patient satisfaction. As a result, canine guidance appears to be a viable approach because it is easier for dentists and dental technicians to achieve and does not compromise function.

BILATERAL VS CANINE GUIDED OCCLUSION.

The included studies found that the balanced occlusal scheme seemed to have higher muscular activity than the canine guided occlusal scheme. According to a few authors, trigeminal inversion takes place in cases of loss of teeth and therefore is concentrated in the anterior region of the upper and lower residual ridge; thereby, there really is no change in the neurophysiological control of mastication. As a result, canine guided dentures decrease elevator muscle activity in edentulous patients, preventing parafunction activities. However, it must be emphasized that all these studies did not perform

evaluation of masticatory performance Moreover, masticatory performance is related not only to occlusal scheme, but also to age, gender, systemic disease, pathology, and pain within facial musculature. In fact, these factors can have a much larger effect on masticatory performance than the occlusal scheme (8,52,53).

Balanced occlusion is not associated with higher levels of satisfaction or masticatory performance when compared to other occlusal schemes. As a result, it is not considered as the ideal occlusal scheme for an effective complete denture. Building dentures with bilateral occlusion is more challenging and time-consuming than with canine guided occlusion which can be completed in lesser time and simple occlusal adjustments (54). None of the included studies compared the impact of the four occlusal types on the same patient, and the significant number of prospective studies should also be considered a limitation. As a result, furthermore cross-over RCTs with longer follow-up periods are needed to determine the best occlusal scheme in complete dentures.

CONCLUSION:

With the limitations of this review, the current study found that balanced occlusion does not enhance patient satisfaction or masticatory performance muscle activity. Canine guidance occlusion can be used to reduce muscular activity in patients with parafunctional activity. Although there was no difference in masticatory performance. Because canine guidance is easier and faster to implement, it is reasonable to advocate this occlusal concept for mandibular excursive movements in complete denture wearers until future research can address this question.Furthermore, cross-over RCTs with longer follow-up periods are needed to determine the best occlusal scheme in complete dentures.

CONFLICTS OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

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