

Lingualized articulation with scissors effect

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ABSTRACT

The advantages of both the anatomical teeth (i.e. esthetic & chewing capacity) and the non-anatomical teeth (i.e. less horizontal forces) are maintained, particularly in patients with severe alveolar bone resorption. Lingualized articulation with scissors effect can be an alternative occlusal adjustment in severe alveolar bone resorption in edentulous patients.

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Introduction

The literature is filled with discussions of the various types of occlusal forms & posterior teeth arrangements. The search is going on for an ideal occlusion, which provides maximum denture stability & masticatory efficiency without compromising the health of the underlying bone. Concern about ridge resorption started a trend toward use of nonanatomic occlusal forms in the 1920's.

Posterior denture teeth may be obtained with occlusal morphologies varying from a monoplane form (0°), to a semianatomic form (10°-30°), to a completely anatomic form (30°-45°). Depending on the occlusal morphology of the tooth selected, differing occlusal articulations have been advocated ranging from multiple functional excursive contacts (balanced) to minimal excursive contacts (monoplane). The form of articulation termed lingualized occlusion has been advocated & is growing in popularity, particularly because of mandibular resorbed ridges. By definition, lingualized occlusion uses the maxillary lingual cusp as the dominant functional element, occluding against the corresponding portion of the mandibular tooth.[1]

Overview

In 1927, Sir Alfred Gysi of Switzerland introduced the concept of lingualized articulation. In 1941, S.H. Payne suggested the use of "Lingualized occlusion" concept, which was later imitated by many others. The aim of this concept was to combine the advantages of the anatomical posterior set up and the monoplantal set up. He reported on Farmer's posterior setup that used 30° cusp teeth that were selectively reshaped to fulfill the criteria & meet the individual requirements of edentulous patients.[2] Actually, E. Pound was the one who first used the term "Lingualized occlusion".

In 1974, G. S. Murrell described lingualized articulation as an approach to achieving success for patients with difficult lower

ridges. He also reported that patients experienced greater chewing efficiency with this occlusal scheme.[3] In 1983, Clough et al examined chewing efficiency of monoplane articulation versus lingualized articulation. They reported that 67% of the patients preferred the lingualized articulation.[4]

Lingualized occlusion should not be confused with placement of the mandibular teeth lingual to the ridge crest, as suggested by many. So, for clarity & a better understanding of the lingualized concept, Ortman suggested the term 'lingual cusp contact occlusion'. He believed that this might be a better way to describe the contact of the maxillary lingual cusp with the mandibular teeth.[5]

In this article, the practical implementation & principles of lingualised articulation has been described along with a case review.

Principals of the Lingualized Articulation

The temporomandibular joint dictates the movements of mandible during function. A good stability in the dentures can be obtained with a balanced occlusion concept.

This is achieved by arranging the teeth in such a way that on both the working side and the balancing side, there are simultaneous bilateral balancing contacts. Bite forces are thereby distributed over the largest possible area of the edentulous area. This means that during lateral movement both the buccal & lingual cusps of maxillary & mandibular denture come into contact on the working side, which means a large number of contacts during eccentric jaw movements.

Just as in natural dentition, there is therefore more than one contact per antagonist pair of teeth. In comparison with this conventional anatomical concept, the number of occlusal contacts is reduced considerably with the "lingualized" occlusion concept, only the lingual cusps of the posterior teeth in the maxillary denture make contact in centric relation in the central fossae of the mandibular posteriors. The buccal cusps are out of contact, therefore only one 'centric stop' is present between the maxillary & mandibular denture.

An esthetically pleasing result could be achieved by anatomically formed maxillary posterior teeth, while in the mandible

semi (or non) anatomical posteriors molars can be used to give mechanical benefits. Although any type of anatomically formed posteriors can be made suitable for the "lingualized articulation" by grinding.

Lingualized occlusion with "Scissors" effect

In 1950s, Dr. Gerber (Zurich) made an important modification to the lingualized occlusion concept. In order to obtain better chewing efficiency, the contact relation of the first premolar was changed in the sense that the cusp of the first mandibular premolar comes in contact with the mesial fossa of the first maxillary premolar. The result of this is that particularly during functioning, the cuspid and the first premolar guarantee a good "scissors" effect that improves chewing efficiency (Fig 1a, 1b).

The lingualized occlusion concept needs no special class or anterior teeth arrangement. It is always possible that the mandibular cuspids are arranged in a special way and a specific position before the arrangement of other anterior teeth and premolars (Fig. 2a, 2b).

During excursive movements in lingualized articulation concept, contact only occurs on the working side between the lingual cusps of the maxillary & mandibular posteriors with the exception of the first premolar. On the balancing side there is contact between the lingual cusps of the maxillary denture and the lingual inner curve of the buccal cusps of the mandibular denture, such as is normal with the "conventional" articulation concept.

In order to guarantee a balanced articulation, a compensation curve is arranged during the set-up of the mandibular posterior teeth. No posterior are placed in the ascending part of the mandible in order to prevent protrusive dislocation of the

mandibular denture. In most cases, this results in a reduction of the number of the teeth by leaving out the second premolar or molar, depending on the space available. Protrusive balanced contacts may only occur between the maxillary lingual cusps & the mandibular posteriors; in other words, even during functioning the anterior teeth are clear & not under pressure. If anterior interference occurs, either move or grind the lower offending anterior teeth slightly or increase the distal incline on the lower molars by increasing the compensating curve. In this way, a balanced occlusion in all directions is created from the centric stops of approximately 3mm freedom of centric. In order to ensure that the supporting upper lingual cusps move completely freely in the lower central fossae, the fossae of the lower posterior teeth must be broadened, mainly by means of the selective grinding.

The buccal cusps are out of contact, so they are ground when in contact to create buccal clearance. In this way the harmonizing of the working & balancing cusp contacts is simplified, since only the upper lingual cusp contacts the mandibular teeth.

There are no contraindications for the applications of the lingualized articulation concept. This concept is indicated for patients who place high esthetic requirements on their dentures & with whom normally an occlusion concept is indicated to minimize the horizontal component of force during mastication and parafunctional movements as a result of strong alveolar bone resorption, with flabby and knife edge ridges or abnormal jaw relation and a large interridge space.

Advantages

1. Always concerned with maintenance of alveolar bone
2. Cusp form is more natural in appearance compared to non anatomic tooth form.



Figure -1a : Left lateral incisor



Figure -1b : Right lateral incisor

Figure 1a, 1b : Photograph of a patient with severely resorbed ridges where denture with lingualized occlusion with scissors effect was delivered.



Figure -2a : Right lateral view



Figure -2b : Left lateral view

Figure 2a, 2b : Photograph of same patient with mandibular cusps arranged in special way before the other anterior teeth and premolars are arranged.

The use of lingualized articulation concept brings great comfort for this patient as a result of the modified posteriors in the lower jaw, where as esthetics are not a problem due to the use of anatomical posterior teeth in the upper jaw. This is due to the following:

As a result of advanced alveolar resorption, a discrepancy arises between the more narrow size of the upper arch in comparison with that of the lower jaw. Since the lingual supporting cusps are active and must be situated at the highest point of the alveolar crest, the upper posterior teeth can be set fairly close to the buccal side of the mandibular ridge. This has the following results:

1. The forces on the mandibular alveolar ridge are situated more centrally at the top, which increases the stability of the lower denture;
2. A 'cross-bite' can be avoided in almost all cases;
3. The facial muscles are well supported by the maxillary molars which increases the esthetic value even more.

Conclusion

The lingualized occlusion concept is an example of a bilaterally balanced occlusion concept. The premolars and molars are arranged and modified so that only the lingual cusps of upper posterior teeth make contact with the central fossa of lower posterior teeth. Exceptions are first premolars which are arranged in more

conventional way. The reason for this is that it enables the first mandibular premolar to perform more of the scissor function of the cuspid. The Buccal cusps of second mandibular premolar & molars do not make contact with their antagonists.

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