Overlap of the Upper Anterior Teeth and its Determinants

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INTRODUCTION

The bucco-lingual relations of posterior teeth must be changed to correct any cross bite if we are to have stable relations and the dento-labial relations also may be changed by orthodontics or by prosthodontic means to provide proper disclusion. The patient should look well and speak well and this is a most important determinant of anterior relations.

The vertical dimension of the occlusion is many times altered to provide a more propitious overlap of the anterior teeth and to make room for the restoration of a good part of the worn off tooth structure in reconstructing badly worn dentitions.

The horizontal and vertical overlap of the anterior teeth is off-times changed to provide better appearance, better speaking and better disclusive potentialities. This is accomplished usually by orthodontics or restorative dentistry and even by surgical interventions.

We put teeth together in a cusp-fossa arrangement on the posterior teeth. But, there are no skid ways for the cusps to enter and leave the fossa. We use flight ways or glide paths and there is no contact as the cusp leaves the fossa in an eccentric empty mouth diagnostic test by passing the mandibular teeth under the maxillary teeth in lateral and protrusive movements.

We also have a cusp fossa arrangement of the anterior teeth. These fossae differ from those of the buccal teeth in that skidways are provided to stop the mandibular closure in the extra cyclic empty mouth diagnostic test. In any eccentric closure of the mandible the anterior teeth stop the closure and the posterior teeth are

Editor's Note: This paper represents the last scientific article written by Dr. Charles E. Stuart.
denied contact until the centric relation closure is reached. The slopes and curvatures of these lingual or palatal contours of the upper anterior teeth provide for sliding in concert with the sliding of the condyles down the eminence. This provides a ratio device that allows the anterior part of the mandible to descend or lower at an even ratio with the descent of the posterior part of the mandible. This provides for two kinds of lowering of the mandible for disclusion of the teeth in tests and in allowing the teeth to work in their specialized groupings.

**DISCUSSION**

FIRST: The posterior disclusion comes about by the condyles descending down the eminence on the idling side when active chewing is taking place on the opposite side. This involves more or less unicondy lar protrusions of the idling or orbiting condyle while the working or rotating condyle remains near its rearmost location.

SECOND: In the incisive relations a more or less bicondy lar protrusion takes place and the anterior teeth stop the closure of the hinge axis at the incisive positions. That is, the overlap of the anterior teeth provides the anterior disclusion by stopping the closure of the hinge axis at any eccentric mandibular position. Of course, at the centric closure the posterior teeth stop the closure which we would desire to be in centric relation. But, in this total closure the anterior teeth are close but do not strike or contact. In cyclic chewing the mandibular posterior teeth come to rest in this same position.

In neutral occlusion the lower canine slides in the mesial fossa of the upper canine in lateral empty mouth tests on the working side and its direction of movement is a resultant of rotation around the near or working condyle. However, its slope is geared to the descent of the orbiting condyle. Always remember that these are extra cyclic empty mouth diagnostic tests and not chewing motions. They are outside of the functional range or envelope. But these built in slideways of the anterior teeth give us the necessary disclusion of the posterior teeth in eccentric movements by stopping the closure.

There is an environmental effect of the tongue and lips on the arcing of the lingual concavity — the factors are — the strong retaining effects of the upper lip, stretched in front of the upper anteriors the resting of the upper anteriors on the wet line of the lower lip and the bracing effect of the tongue on the lingual arcing of the upper anteriors. Of course, there is the lower arch arcing stabilized by the lower anteriors resting on the under surface of the anterior edge of the tongue and the lower lip resting in front of the lower incisors.

In effect this arcing makes of the six upper anterior teeth a large fossa into which the lower six anterior teeth work as a large cusp. So, we have many factors to consider: (1). The lingual contour of
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each tooth, (2). The anterior posterior slant of the long axis of the teeth, (3) The rotation of each tooth, (4) The collective arcing of the anterior teeth on the horizontal plane, (5) The horizontal overlap of the anterior teeth and (6) The vertical overlap.

If you will study the upper anterior lingual surfaces you will find many with pronounced lingual fossae and prominent mesial and distal marginal ridges. Some have a very prominent cingulum. They may be classified as: (1). Shovel shaped (mongolian), (2) Spoon shaped, (3) Navicular (like a boat), (4) Ladle shaped, (5) Without prominent fossae and (6) Those having a strong central ridge.

It becomes plainly evident that when restoring the anterior teeth we must be influenced by the movement of the jaws. The condyles are like the lower cusps in an upper fossa and they have slideways, inward and outward. Therefore, the anterior lingual contours should be a resultant contour to provide harmonious sliding with the jaw joint. Of course, the joint is well lubricated with some ability to repair and exchange cellular structures while the teeth only have saliva as a lubricant with no chance of repair of any destructive abrasion. The condyles and its fossae do not wear or change with adequate occlusal protection but destructive changes take place in the joints in the absence of occlusal protection.

The restorative material used on the contacting surfaces should be gold in so far as possible, because it is the most resistive to wear and gold to gold bearing is best. Porcelain against porcelain is the most self-destructive.

The assembling of the anterior teeth with their empty mouth slideways is a most difficult problem, but by applying the output of a computer, along with a feeling of smooth action and with good judgement, a respectable job of reestablishing the proper lingual contours and arcing can be done.

The concave nature of the palatal contours must be constantly kept in mind and, in so far as possible, adapted to the given horizontal and vertical overlap of the anterior teeth.

In waxing, the first aim is to establish the third stage of disclusion which would be the maximum opening produced by the overlap of the front teeth. The opposing incisal edges should be arranged so that the canines laterals or centrals may be allowed contact individually without contacting posterior teeth or other anterior teeth. This allows freedom to bite on any pair of upper and lower anterior teeth as desired without simultaneous contact on other teeth. This incisive protrusive and lateral protrusive contact should disclude the posterior teeth by at least one millimeter.

Second, the first stage of disclusion is organized by gearing the opening induced by contact of the lower incisors and canine teeth in the protrusive and lateral excursions within the first millimeter of
movement of the mandible or the first degree of rotation. There must be some opening provided in this first stage even when there is practically no opening induced posteriorly by the border or intermediate condylar movements. This first stage of disclusion is of utmost importance in providing immediate disclusion of the posterior cusps and if immediate descent of the condyles does not provide opening, opening will be supplied by the opening component in the anterior sloping of the lingual surface of the anterior teeth. The disclusion of the posterior teeth must be effected quickly in the eccentric diagnostic test, otherwise, we would have a so-called “long centric” or “short protrusive” or “wide centric.”

Third, the intermediate second stage of disclusion is built on the marginal ridges and lingual surface of the upper anterior teeth to supply an easy transit from the initial first stage of disclusion to the third or maximum disclusion. In this contour the agreement of descent of the condyles with the front end opening operate with good concert in a near one to one ratio.

In actual technique the waxed up overlap with its three stages of disclusion is registered on a generated anterior stop block to disallow wearing off of the wax or stone cast teeth in testing eccentric relations while waxing up the posterior teeth. This generated stop block is fashioned in plastic while still moldable and is later corrected by grindings or additions of more plastic.

We want to establish our anterior disclusion before waxing the posterior teeth because the posterior teeth are the resultant between the condyle descent and the opening induced by the overlap of the upper anterior teeth.

It is plain to see that if you are supplied with the determinants of the overlap of the upper anterior teeth and the structures are properly instituted in accordance with these determinants we will not talk about anterior guidance or generated paths. There is full evidence of the principles of natures, (geometry, physics and mechanics) that can be measured and used in intelligent assemblage of these important parts of the gnathic system.

We admit to the great amount that we do not know and how much still remains to be learned. A further study of the spiral organization of the cusps and its transition from the buccal teeth to the cuspids and anterior teeth in the upper arch can be used to assess to some extent if the anterior teeth are over-coupled or under-coupled. In over coupling, the disclusion by the anterior teeth would be excessive in ratio to the disclusion offered by the descent of the condyles beneath the eminence resulting in wear of the anterior teeth which invade the cyclic chewing and expression envelop. This is also evidenced by burnishing when the lingual of the upper incisor and canines are straight contoured or convex instead of the natural concavity. In under-coupling the anterior overlap is not sufficient and anterior disclusion is absent, resulting
in worn facets on the posterior teeth and in many instances a bruxing pattern is evident. The patterns of bruxing vary. With insufficient anterior disclusion the path is off-times anterior-posterior and with eccentric lateral interferences on the buccal teeth. The pathway is many times to the side. They are always attempts by the patient to self-correct the inequities between the occlusion of the teeth and the condylar movements. But, this self-correction is not selective and the uneven wear continues to destroy the tooth structure and strains the periodontium and the joints. The induced malocclusion always becomes worse — it never gets better unless remedial means are applied.

CONCLUSION

Determinants of the Ratio of the Horizontal with the Vertical Overlap of the Anterior Teeth:
A. Angle of the eminentia-sagittal plane
   1. The lower the angle of the eminentia the greater should be the horizontal overlap of the upper anterior teeth in relation to the vertical overlap.
   2. The steeper the angle of the eminentia the more vertical overlap of the upper anterior teeth may be in relation to the horizontal overlap.

B. Transtrusion or side shift of the mandible-horizontal plane
   1. The greater the side shift of the mandible the greater should be the horizontal overlap of the upper anterior teeth in relation to the vertical overlap.
   2. The less the side shift the more the vertical overlap may be in relation to the horizontal overlap.

C. The intercondylar radius or intercondylar distance — Horizontal Plane.
   1. The greater the intercondylar distance the greater should be the horizontal overlap of the upper anterior teeth in relation to the vertical overlap.
   2. The lesser the intercondylar radius the greater may be the vertical overlap in relation to the horizontal overlap.

D. The facial position of the anterior teeth — Horizontal Plane.
   1. The nearer are the anterior teeth to rotation centers (dynamic centers) the greater should be the horizontal overlap in relation to the vertical overlap.
   2. The farther anteriorly are the anterior teeth from the dynamic centers the greater may be the vertical overlap in relation to the horizontal overlap.

E. Vertical laterotrusion — Coronal Plane.
   1. Laterotrusion upward — Laterosurtrusion — the more the horizontal overlap should be in relation to the vertical overlap.
   2. Laterotrusion downward — Laterodetrusion — the more the laterodetrusion the greater the vertical overlap may be in relation to the horizontal overlap.

F. Horizontal laterotrusion — Horizontal Plane.
1. Laterotrusion forward — Lateroprotrusion — the more the lateroprotrusion the greater *should be* the horizontal overlap of the upper anterior teeth in relation to the vertical overlap.

2. Laterotrusion backward — Lateroretrusion — the more the vertical overlap of the upper anterior teeth *may be* in relation to the horizontal overlap.

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