

9. Posterior teeth with cusps, fossae and grooves are the resultant form that follows the demands of function of the temporomandibular joint and incisal guidance.

10. The occlusion should not depend on the proprioceptive mechanism to an unreasonable extent for success. Just what is unreasonable is a moot point.

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Concepts of Occlusion

What Kind of Occlusion Should Recusped Teeth be Given?

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The purpose of this article is threefold: first, to state the problem; second, to describe and discuss the kind of occlusion the authors believe to be best for teeth; and third, to justify an acceptance of this pattern of occlusion.

THE PROBLEM

Putting prosthetic cusps upon injured or worn teeth so that the dentition will be restored to function is a difficult task. It is a serious problem to change the occlusion of a patient. The technique is tedious and exacting because the dentition must be well related to structures of the cranium, face, and neck. How the teeth close is important to the periodontium, to the mandibular joints, to the jaw and throat muscles, to the tongue, to the cheeks, to the lips, and to the nerves that help the muscles automate the many gnathic functions. The occlusion built should be such that it will make happy, healthy relations between the dentition and the rest of the gnathic organism. Much misery has come to patients whose restored occlusion was not organically fit for them. To have a good occlusion, the cusps must be workable yet allow the muscles of the gnathic organism to rest.

DESCRIPTION OF THE OCCLUSION RECOMMENDED

Prosthodontic thinking has made it necessary to treat occlusion as though it were a genus which has many species of closures. Balanced occlusion, functional occlusion, centric occlusion, eccentric occlusion,

etc., are specific closures. The early orthodontists used occlusion to mean the normal closure of teeth. If the closure was abnormal, they called it malocclusion. But today we must use an adjective with occlusion to give it meaning.

It is hard to give the kind of occlusion the writers are here recommending a specific or descriptive name; hence, it is necessary to list its main features below:

1. Each upper lingual cusp occludes in a fossa of its lower fellow. Each lower buccal cusp occludes in a fossa of its upper fellow. The lower cuspids and the lower incisors occlude in the fossae of upper cuspids and upper incisors, respectively.

2. All the lower teeth close evenly against the upper teeth at the same time about the transverse intercondylar axis when it is in its rearmost position.

3. In the lateral diagnostic positions of the jaw only the opposing cuspids make contacts. In the lateroprotrusive diagnostic test positions the lateral incisors may also enter into contacts along with the cuspids.

4. In the pure protrusive diagnostic closure the lower six anterior teeth make contacts with the upper incisors; and, the lower first premolars' buccal cusps may touch the tips of the upper cuspids.

5. The fit of the cusps in fossae should be such that the lower teeth reach centric closure and come to dead stops without any slidings beyond or without having skidded on opposing teeth on the way.

6. The plural cusped teeth make occlusal contacts in the centrally related closure but none in the eccentric jaw positions.

7. The multicusped teeth are arranged by occlusion and alignments so that the lower lingual marginal occlusal edges and the upper buccal marginal occlusal edges have no contacts in the centric closure or in the eccentric positions of the mandible during the chewing strokes.

PREVIOUS OBSERVATIONS ON OCCLUSAL DETAILS

Centrally related intercusping of teeth has been regarded essential in coordinating cusps. The ways cusps may deflect the direction of jaw closure were first demonstrated in mounted casts by Schuyler.¹¹

Cusp-fossa occlusion was described long ago by Black.⁶ The details of cusp-fossa occlusion were first well illustrated by Friel.⁹

The mechanical advantages of having all teeth make occlusal contacts in a mid-face closure but having few occlude in the eccentric jaw closures were first emphasized by Shaw.¹²

The belief that cuspids herd the closure of the rear teeth was stated by Balkwill in 1865. Balkwill alluded to cuspids as guideposts.⁴ The usualness with which cuspids were found obstructing lateral enmeshments of buccal cusps was noted even by von Spee.¹⁴ It seems that Shaw was first to declare

that cuspids should prevent lateral meshing of the buccal cusps. So far as the writers can learn, Spencer R. Atkinson (1925) was first to state and give proof that cuspids protect the other buccal cusps.²

Previous Ideas About Excursive Freedom

The belief that lower incisors in complete dentures should not make occlusal contacts in centric closure is old. This idea has been applied to incisors in natural dentitions when the occlusal vertical dimension has been increased. Leaving incisors out of centric contacts allows a protrusive excursion in the cusped teeth because the vertical overlap of the incisors has been negated. Similarly it is assumed that centrally occluded cuspids will do harm by "interlocking the bite."⁸ Leaving cuspids out of centric occlusal contacts negates their vertical overlap and permits lateral excursion of the cusped teeth before disclusion^o begins.

Negating the vertical overlap of cuspids and incisors to allow or accompany horizontal eccentric excursions is a remnant of the principles of von Spee. It is in line with the belief that chewing is a horizontal rubbing of food between the teeth. Therefore, to make the horizontal rubbing easier no most-closed position of the teeth is provided to match centric relation. But "zonal centrality" is provided. This fear of interlocking of cusps dates back to von Spee, who suggested grinding off the cuspids and incisors to make the excursion easier.

Before accurate mounting instruments were available and before the methods of taking interocclusal records were refined, the writers conceded that a centric zone of occlusion was allowable.¹⁹ Since the chewing cycle is vertical and since we can now mount casts accurately, a zonal centric is neither necessary nor advisable. The allowing of cusps to skate about before the cuspids and incisors compel disclusion was justified in the days of inaccuracy. The writers have held that each mandibular cusp should reach its highest closure at its own definite centric relation point. That is the end point of its chewing cycle. To commence a new chewing stroke the mandible will drop downward, then move laterally to rearrange the food.

To assure the mandible freedom the cusp points are set and shaped to run in grooves without contacts in the eccentric excursive movements. The eminences in front of the condyles compel and should compel disclusion of the rear teeth. These excursions, however, are used as diagnostic movements made in the mouth or on articulators.

In balancing an occlusion excursions were made to see that the multicusped teeth made contacts eccentrically. In the occlusion herein recommended the excursions are made to see that multicusped teeth make no contacts except in centric occlusion. This arrangement does not and cannot make an interlocked occlusion, because at the least lateral or protrusive movement of the mandible it opens.

^o *Disclusion* (Stallard). A separation of the teeth from occlusion; the opposite of occlusion. Chewing is a reciprocal motion consisting of occluding and discluding. *Morphologic disclusion* is synonymous with open bite. *Physiologic disclusion* is ordinary separation of the opposing teeth to admit food between the teeth.

