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Why Dental Restorations Should Have Cusps

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May I say, at the outset, that I'm not here to seek agreement on anything except, perhaps, some basic concepts or principles. I'm not here to discuss techniques. They are only incidental. They are often transitory. A technique is but the "HOW" of doing the "WHAT" that a reasoning mind thinks proper — what a thoughtful dentist thinks will ultimately determine what he will do technically.

I didn't come to present a jaw-motion examining instrument, for it is but an extension of the senses found in our eyes and fingers. It was made to gather such data as knowledgeable minds may think necessary for making diagnoses and treatments. Nor have I come to proclaim the value of a newly-made jaw-recorder. Such a relations-recorder is but little more than a set of gauges put together to act as a faithful substitute for the patient's mouth and to help our skills do more easily and more exactly what our best thinking and our most mature judgment direct.

What we want most to do is to restore the dentition we treat to the best form and to the best health with a minimum of violence. We want to take from the oral organ all those factors that are injuring it and return to it those relations which we have found to be more healthful. If the patient

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has periodontitis, we want to remove the exciting causes, also any predisposing causes. If the oral organ has lost some of its tools and supports, we want to replace them without causing this semi-voluntary organ to make new accommodations and adaptations. We want the treatment to leave the mouth in the best biomechanical conditions possible.

My lifetime professional associates and I have been compelled by experiences and experiments to conclude that we can do this by relating cusps and condyles through treatment so that neither the one set of factors nor the other become tyrants. They should be cooperants. Furthermore, we regard a tooth without cusps as crippled, a leg without a foot. Of course, a person can live without either feet or cusps, but I would not choose to do so, if he could prevent it.

I value the oral organ so highly that I have disciplined myself to subscribe cheerfully to the accuracy that is required to restore cusps to teeth. I take the greatest pains to treat my patients' teeth so that they may keep them in function throughout life. I have adopted cusps, because I do not know how to restore occlusion, or how to organize it, or how to make it useful, or how to guarantee its harmlessness, or how to relate the anterior teeth to the molars and bicuspids without them. Cusps need to be properly placed in the interalveolar space and must be properly graded in heights and sizes to be organizable to suit the movements of the mandible. They are the basic units of most of the occlusion. They have to be properly related to their opponents and to the jaw motions to be units of organized occlusion.

The best mouths I have ever found in

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People past sixty years of age are those which have had such cuspal organizations that the cusps are still almost intact. Their periodontiums are well preserved. And, their intercuspations are in centric relation. Of course, they would have no such cusps at all at advanced ages, had they had an off-centric interdentation. I have not yet found in the living any dentition that has benefited from excessive wear. Very few of the worn dentitions that come to me for treatment have extra good periodontiums. How, then, why the collected Esquimaux skulls have been found to have such dense alveolar bone I cannot explain, except perhaps, they were prematurely worn in people who died before reaching old age.

In the practice of restoring cusps, the dentist has to examine most carefully all the factors that are related to cuspal organization in the patient about to be treated. These essential factors have to be ascertained: The rear-most position of the opening-closing axis of the mandible; the slant and the character of each condyle path; the amount, the commencement, and the direction of the side-shift of the mandible; the protrusive paths of the condyles; the slant of the occlusal plane; and other odonto-condylar relations.

Such data must be recorded uncompromisingly accurately in an instrument upon which accurate casts have been mounted, so that an accurate diagnosis can be made. The teeth must be prepared with due regard to the position, heights and sizes of the cusps. Therefore, the surgery upon the teeth has to be carried out exactly and with a view to helping the establishment of coordinated cusps.

After the remedies have been prescribed both by the conditions found and according to the aims of restorations held by the operator, the casts of the prepared teeth may be attached to the articulator in place of the diagnostic casts and the restorations can then be pre-made in wax.

There are principles to be followed in pre-forming restorations in wax. The waxed tooth forms can be made to grow step-by-step upon the models much like tooth crowns develop embryologically within the undeveloped jaws. In the undeveloped jaw, each multiple cuspid tooth starts from a

group of isolated cones that grow into lobes which finally coalesce into a single crown. A few years after being formed, they erupt into the oral cavity and work their way into occlusion. The cusps may help or hinder proper interlocking of the teeth, depending upon how well the growth of each jaw is paced.

The chief principle in pre-forming restorations is to place the cusp cones of wax so that, like stalactites, the upper ones hang down at proper intervals among the cones made to arise from the lower tooth preparations. In the buccal, lingual, anteroposterior, or any other mandibular motion, the upper and lower lobes should by-pass their opposites without collisions or contacts.

The lobes of each tooth and its opponent are coalesced by waxing on the marginal ridges which gives beginning contour to each crown. The passage-ways of the conical taps of the lobes are again tested in the various jaw movements to determine if they still provide full freedom for travel.

Finally, the triangular crosstooth ridges and the oblique ridges are made to connect the lobes. During this step, fossae come naturally into being in the upper teeth to receive the lower buccal cusps in centric closure; and fossae are provided in the lower teeth to receive the upper lingual cusps in centric closure. But the tips of the cusps are kept free from closure contacts; each cusp lobe makes point contacts with the perimeter of the fossa. Its summit is not made to reach the bottom of the fossa.

When the cusps of the molars and bicuspids have been fully pre-formed in wax, careful attention should be given to the cuspids. They should be restored well — never neglected. Their closure should be in centric relation. Their antagonistic relation should be such that, when the mandible is deflected beyond the chewing cycle, they prevent the meshing of the buccal cusps; when the mandible is in protrusive incisive closure, the upper cuspid should strike the buccal surface of the lower bicuspid, the lower cuspid should engage the upper lateral incisor, and at the same time the posterior teeth should be separated.

There is a mutual protective relation between the posterior teeth and the anterior teeth. The posterior teeth should interlock

so that they prevent overloading the anterior teeth. In all lateral over-deflections of the mandible and in all over-cyclic incision, the anterior teeth should prevent the posterior cusps from knocking off their tips. At centric related intercusping the bodies of the jaws are closest together and any departure therefrom would entail a separation of the jaws. In other words, the rear terminal hinge intercusping position will be the most closed position of the mandible.

It is natural, I believe, to attend to the cuspids after the molars and bicuspid have been formed, for, in the natural development of occlusion, the cuspids of the maxillae descend into occlusion sometime after the bicuspid and the first and second molars are well interlocked.

When the mutuality of protection between the posterior and anterior teeth is fully accepted as a principle, we will cease denying the importance of cusps to occlusion. There can be given to the teeth no restraints against wear, except through cusps. By cusps and cusps alone in their centric-fossa relation, can we stop and prevent the lateral stresses. We can't restore occlusion well by working only upon the posterior teeth, or by just reinstating good cuspid relations, or by leaving the anterior teeth out of centric occlusal contacts, or by dolling up the anterior teeth. The restorations must be so integrated that nothing is left undone.

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