

Thoughts on Occlusion



Cusped Teeth — An Anthropological Anachronism

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Although dentistry has been practiced for thousands of years, its scientific and technical evolution has exploded in the very recent past. Dental material sciences began significant improvement in the mid 19th century and the basic concepts that evolved into the practice of dentistry that we know today were articulated in the early 20th century.

In western cultures with diets of soft, refined foods and economies based in intellectual endeavor, cusped teeth were recognized to have a functional significance in the mid 20th century. The shape and form of cusps became a topic of intense study on the East and West coast of America and, in some circles, cusps came to be revered. Extant expressions of these philosophies suggest an anthropological basis for full cusp form of steep angulation, long steep guidance in the incisors and the prediction that in "harmonious function" teeth should not wear. Some "cuspologists" suggest a natural design with several discreet point to incline plane contacts per tooth to provide proper function.



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The hypothesis of this paper is that, from an anthropological perspective, the human dentition is designed to function in more strenuous environments, to withstand significant stress, to endure extensive wear and to compensate for all these seemingly deleterious events to maintain a fully operable stomatognathic system.

First, and most importantly, there are no archeological artifacts depicting unworn human dentitions. In cultures representing the path of human evolution, tooth wear is the norm. Where diets are more natural — fibrous, course, and less refined — the compensatory responses of muscles, bone and connective tissue maintain the proper function of the stomatognathic system as the wear of the teeth occurs and progresses.

The interpretation supporting cusped teeth is based on observations made within recent times (a few centuries if not decades) in societies and cultures that consume highly refined, non-natural foods. That teeth in modern societies do not usually wear to any great extent is a function of the culture, not the design of nature and is anachronistic. We need only to refer to rural communities in the Americas to find a more natural anthropological representation of tooth function and design in strenuous use and heavy wear.

In more normal use, tooth cusps wear quickly to participate in the fully balanced

function of the stomatognathic system. Wear is common in children where deciduous teeth are worn flat before the eruption of the permanent teeth. As posterior teeth erupt in the mixed dentition, they too wear rapidly and the cusp angles become less steep. They are the only steep angled teeth in the posterior of the mouth and at this stage of development and tooth eruption there is no steep incisal guidance to protect them from lateral excursive movements and forces. Interestingly, these more basic cultures do not suffer our more common dental diseases — caries, periodontal disease, occlusal issues, TMD, and cracked tooth syndrome. They require far less interventive dental care.

What then is the function of the cusped tooth with its intricate design of ridges, grooves, fossae, fissures, and sharp tips? If the cusp is not a highly sophisticated, intricately designed tool that should never wear in proper function, what is it?

Studies conducted in aboriginal populations in Australia, studies of skulls from Asia and the central areas of the United States, and studies of functioning teeth in rural America indicate that cusps serve a significant primordial purpose — albeit a most important and complex one.

The cusps of teeth are designed to guide the teeth to the appropriate position, rotation and angulation for proper arch formation as the teeth erupt into oppositional position. After the teeth are properly located in the arch and with an oppositional neighbor, they begin to wear as they function. Appropriate function begins a process in which the teeth maintain a “balanced” relationship in the stomatognathic system. As wear progresses the dental pulp, periodontal ligament, alveolar bone, acellular cementum, muscular alignment, and TM architecture adapt to maintain a balance and utility of function of the system. In this model, each individual has a unique occlusal scheme that is maintained by an ongoing adaptive process. Occlusal form and function is not “frozen” at some idealized, predictable point, position or design.

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In recent years we (dentists) have altered the perception of tooth design and function and have, with significant chauvinism, declared the tooth to be other than it is. We have in this endeavor been forced to observe the many complications of para-normal function that evidences in degradation of the system as a whole with untold discomfort and pain. These signs and symptoms are the basis of modern dental practice which continues to expand its scope of need as the function of the teeth and system are altered by culture, diet, and dental theory.

Maybe it is appropriate to recognize the archeological and anthropological function of teeth and cusps and let them wear as designed by nature. Where the culture and diet impede such wear, we should be opening and freeing tooth contact to reduce stress and increase function.

There is no implied suggestion that we should not deal with cusped teeth. The reality is that most of our dental population will have cusps on their teeth throughout their life span. The issue, however, is not to treat the fully formed cusped tooth as the “optimal,” but as the “anachronistic,” and support the normal adaptive processes that accrue through normal wear of the dentition.