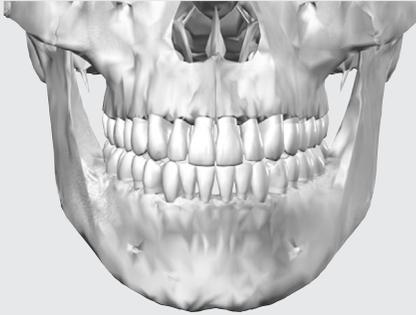


Thoughts on Occlusion



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The Significance of Cuspid Guided Occlusion

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Previously published papers have described the mechanical nature of human tooth function and the resultant architecture of the dental occlusal plane (1–4). Whether or not posterior teeth touch in dynamic motion (function) of the mandible is a continued debate in western dentistry and within the various philosophies of occlusal function (5).

Spee first described an occlusal arrangement in the form of an anterior-posterior concave curve that bears his name (6). This curve was modified and expanded by Wilson and Monson who recognized and incorporated the hypothetical four inch radius proposed by Bonwill in his “divinely inspired” equilateral triangle (7–11).

With Gysi’s invention of the adjustable articulator and the ensuing subsequent modifications, scientific inquiry moved from the biological study of the human occlusal environment to the mechanical study of the occlusal dynamics of the articulator (12). Much of current occlusal hypothesis, supposition or theory comes from studies conducted within the reference of the articulator.

Most early theory recognized and suggested group functional occlusion (13). However, the clinical complication of balancing (non-functional) occlusal design within the oral environment quickly changed the concepts toward cuspid protected (guarded) occlusion which separated the posterior teeth in excursive movements (14). Schuyler suggested the possibility of a group function on the working side but insisted on no non-functional (balancing) side contact (15). Beyron, using human subjects, discovered that most individuals did not have coincident anterior tooth contact with posterior teeth in maximal intercuspation (MIP), a fact that restricts the possibility of pure anterior guidance or cuspid protection (16–21). He also confirmed the absence of non-working side contact which he supposed to be pathologic. All current occlusal concepts reject the utility or health of non-functioning occlusal contact.

A review of the literature and a clinical investigation involving 28 arbitrarily selected dentists* demonstrates occlusal function different than generally expected and accepted. Le Gall and Lauret suggest a functional and sensory contribution made by the non-functional contact and a reduction in the expected contribution of anterior, cuspid and/or incisal guidance (5).

Each of the dentist participants was verbally coached, non-manipulated, into a comfortable posterior contact position from which lateral movements could easily be made. The initial discovery was, in contrast to Beyron and Posselt, that there were no coincident CR/MIP contact positions. Each participant had functional contact anterior to the CR arc of closure that required a shift or slide to produce MIP.

Beyron described a self-guided functional test with which he demonstrated a “segmental” occlusion, a progressive transition (shift) in group function from the posterior working cusps on one side through the anterior teeth to the working cusps on the posterior teeth of the opposite side. His subjects were instructed to contact in a comfortable position

* All subject dentists were mature clinical practitioners each with many years of occlusal study in variously different occlusal philosophies. All were very cooperative, but most were skeptical of the hypothesis that was presented immediately prior to the instructed physical tests.

and then to “slide out” in lateral, lateral protrusive and protrusive movements. With this passive “slide out” movement, only working inclines on cusps on posterior teeth and the anterior teeth were felt (perceived) by the subjects. Subsequently, Beyron wrote that non-functioning contact was not usually seen in the natural occlusion, a statement that supported all western occlusal philosophy.

In this study, there were two distinct motion patterns requested. In the first test, the subject was asked to lightly tap the teeth together to determine a position of maximum comfort and cuspal fit. From this position, excursive movements in direct lateral were made and a point about 1/3 the stroke length of the distance up the cuspid was determined (about 2 mm). At this point of support, the subject was questioned as to cuspid guide, group function (two or more teeth on the working side) and whether a balancing side contact was perceived. The results were: cuspid guide 37 (66%), group function 19 (34%), and balancing contacts 15 (27%).

The second test was initiated as the first. After the cuspid (or lateral) support was established, the subject was instructed to brace on that contact and then, with great force (effort) BITE back to maximal contact — a chewing type stroke and an active, not passive, activity. The subjects were asked to repeat the maneuver and then asked to report cuspid guidance, group function and the perception of non-functional (balancing) contacts. The results were: cuspid guide 25 (46%), group function 31 (54%), and balancing contact 41 (73%).

The participants were then asked to perform the forceful movements with occlusal silk marking ribbon (Madam Butterfly) interposed between all of the teeth. Of the 56 possible non-functional contacts, 56 showed contacts and 55 reported perception of the contact. Only one contact was questionable as to when the contact was felt and how close to MIP the perception was made. It was agreed that whether the perceived point of contact was 4 or 400µm from MIP was not significant. The proprioceptive control suggested by Le Gall and Lauret and proposed by Moss was in fact controlling the muscular function (5, 22), therefore, 100 percent of the participants displayed significant non-functional contacts, and cuspid protection as proposed by D’Amico was not an influencing factor in any of the subjects (23).

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