The Commissure Line of the Mouth for Orienting the Occlusal Plane

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This study investigated the positional relation of the commissure line of the mouth to the maxillary first molars. Thirty-five volunteers, 20 to 40 years old, with normal natural dentitions were recruited. Maxillary casts with marks locating the commissure were digitally scanned to measure the vertical distance from the tip to the base of the mesiofacial cusp (CO) and from the tip to the mark (CM). There was no significant difference (*t* test; $P > .05$) between the CO (1.61 ± 0.41 mm) and CM (1.14 ± 0.68 mm). The mean distance of the commissure mark from the occlusal plane was 0.78 mm. *Int J Prosthodont 2015;28:243–245. doi: 10.11607/ijp.4176*

The prosthodontic literature identifies numerous dental landmarks to help determine the occlusal plane, which is regarded as playing an important esthetic and functional role.[1–5] However, the positional relation of the commissures to the occlusal plane also may be a useful guide, although it has not been investigated scientifically. This clinical study was conducted to *(1)* test the null hypothesis of no statistically significant difference between the commissure line and occlusal plane at the maxillary first molar level and *(2)* consider the validity of the use of the commissures for orienting the occlusal plane.

Materials and Methods

A convenience sample of 35 volunteers (16 men, 19 women; 28 Caucasian, 7 Asian), 20 to 40 years old, with intact, healthy dentitions presenting a canine-guided relationship with minimal occlusal wear and absent third molars, were recruited (Institutional Review Board approval: HUM00063365, University of Michigan, Ann Arbor, Michigan, USA) for this preliminary clinical study. Exclusion criteria included a history of orthodontic treatment, high smile line (> 2 mm above the marginal gingiva of the maxillary central incisors), and awareness of parafunctional activities.

A silicone index (Blu-Bite, Henry Schein) was made with the mouth closed in the maximum intercuspal position and to present a flat surface on the facial surface. The commissure was pulled backward by the thumb toward the middle finger secured in the external auditory meatus (Fig 1). This process formed a triangle at the commissure with the apex pointing posteriorly, and the location of the apex was marked on the silicone index with a sharp-ended wax spatula (no. 7). The right-sided, unilateral commissure mark was then transferred to the maxillary cast by means of the index with a sharp blade (Fig 2).

The casts were digitized using a laser scanner (NobelProcera 4.9, Nobel Biocare) and NobelProcera 4.9 computer software and cross sectioned along the mesiofacial cusp toward the fossa of the maxillary first molar. A virtual caliper (NobelProcera 4.9) was used to measure the vertical distances on a computer screen, as follows: *(1)* from the cusp tip to the base (CO), *(2)* from the cusp tip to the mark (CM), and *(3)* from the base of the cusp to the mark (OM), in either a gingival or occlusal direction (Figs 3 and 4).

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Fig 1 Commissure line marked on the silicone index with the corner of the mouth pulled backward by the thumb with the middle finger placed in the external auditory meatus.

Fig 2 Silicone index positioned against the maxillary cast, indicating the mark of the commissure line.

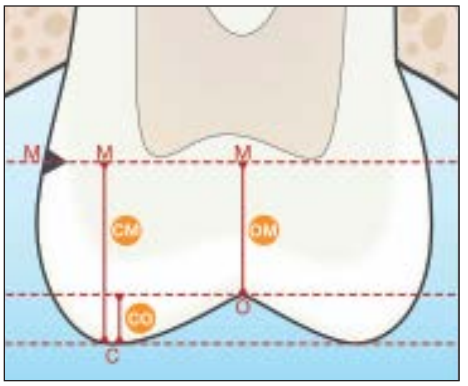

Fig 3 Graphical illustration of the relationship of the mark (M) to the base of the fossa (O) and the tip of the cusp (C). CO = distance from the cusp tip to the base; CM = distance from the cusp tip to the mark; OM = distance from the mark to the base of the cusp.

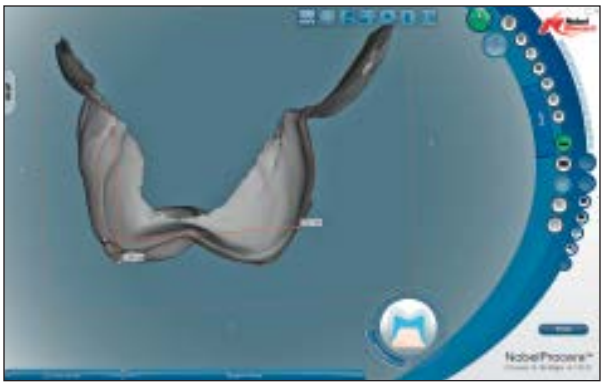

Fig 4 Digital image of the maxillary first molar cross-sectioned along the mesiofacial cusp toward the fossa. Note the digital vertical and horizontal rulers measuring the distance of the mark from the cusp tip.

A *t* test ($P < .05$) was performed to investigate the difference between the CO and CM.

Results

The null hypothesis was accepted. There was no statistically significant difference in the mean values between the CO (1.61 ± 0.41 mm) and CM (1.14 ± 0.68 mm) (*t* test; $P > .05$). The degree of mismatch of the commissure line to the occlusal plane as indicated by the OM was within the range of 0.2 to 1.3 mm with a mean value of 0.78 mm (SD: 0.54 mm), where 80% of the marks were identified as occlusal to the base of the cusp and 20% as gingival.

Discussion

The commissure line is a dynamic one when compared to other stationary anatomical landmarks such as the retromolar pad and ala-tragus line.[1–5] The commissure was pulled directly toward the external auditory meatus without exerting an unnatural upward or downward direction, and the dynamic relationship was found to be consistent in this study. However, variables were also noted when using stationary introral and facial anatomical landmarks, and the difference was significant. These considerations underscore the importance of the care that needs to be taken to avoid an error when implementing a method of orienting the occlusal plane.

Within the limits of this study, most of the marks (80%) were located occlusal to the base of the maxillary mesiofacial cusp. This may suggest that the commissure line could slightly overestimate the amount of posterior tooth display while smiling. However, all volunteers reported their satisfaction with the display of their natural teeth, and the range of mismatch (OM) was small with the maximum value of 1.3 mm. Thus, the commissure line appears to indicate a physiologic and esthetic orientation of the occlusal plane. Further study is needed to verify the validity of this method for the construction of complete dentures.

Conclusions

The commissure line of the mouth may be used to mark the orientation of the occlusal plane. The degree of mismatch of this dynamic landmark to the occlusal plane was within the range of 0.2 to 1.3 mm. The validity of this observation in the construction of complete dentures is still to be determined.

Acknowledgments

The authors reported no conflicts of interest related to this study.

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Literature Abstract

Newly identified pathogens associated with periodontitis: A systematic review

This systematic review focused on the weight of evidence for newly identified periodontal pathogens based on the results of "association" studies according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. This review is especially important given that independent-culture diagnostic methods introduced about a decade ago have pointed to the existence of new periodontal pathogens, but the data of these studies have not been evaluated together. Searches were done on MEDLINE, EMBASE, and Cochrane databases, and included studies up to September 2013. Studies that fit the criteria of *(1)* comparison of microbial data of subgingival plaque samples collected from subjects with periodontitis and periodontal health and *(2)* evaluation at least one microorganism other than the already-known periodontal pathogens were identified. In total, 1,450 papers were identified, with 41 studies being eligible for inclusion. The datasets were extracted and registered in predefined piloted forms. The results of the systematic review revealed moderate evidence (3 to 5 studies) in the literature to support the association of 17 species from the phyla Bacteroidetes, Candidatus Saccharibacteria, Firmicutes, Proteobacteria, Spirochaetes, and Synergistetes. The phylum Candidatus Saccharibacteria and the Archaea domain also seemed to have an association with periodontal disease. The data from this systematic review points out the importance of previously unidentified species in the etiology of periodontitis and might guide future elimination studies (reduction or elimination of the bacteria would be accompanied by clinical improvements) on the actual role of these suspected new pathogens in the onset and progression of periodontitis. It is important to note that this current evidence is based on association studies (higher levels and/or proportions of the species in cases rather than in controls) and the identified bacterial species should not be interpreted as causative of periodontal disease.

Pérez-Chaparro PJ, Gonçalves C, Figueiredo LC, et al. *J Dent Res* 2014;93:846–858. **References:** 60. **Reprints:** M. Feres, Department of Periodontology, Dental Research Division, Guarulhos University, Guarulhos, São Paulo, Brazil. Email: mferes@ung.br—*Loke Weiqiang, Singapore*