The transverse occlusal plane (TOP) when viewed from a frontal perspective should be parallel to the facial horizontal reference lines such as the interpupillary line (IL) and the commissure line (CL) to maintain facial harmony.1-5 Song et al6 found that 54.7% of 1282 participants presented angulations under 1 degree between IL and CL. However, these authors found no references studying the impact a “canted” commissural line can have on a smile’s integration relative to the overall face.

Lack of parallelism among the TOP, CL, and IL can be attributed to different causes. The presence of an elevated labial commissure at rest or alar base on one side is often an indication of vertical skeletal asymmetry. Conditions for each patient should be individually diagnosed; sometimes orthognathic surgery combined with orthodontic treatment is necessary to treat these discrepancies.3,7-8

Restorative treatment alone can also be a solution depending on a particular situation and the patient’s individual needs.6 Assessment of dentofacial asymmetries and other discrepancies that can affect the

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**ABSTRACT**

**Statement of problem.** Facial asymmetries in features such as lip commissure and interpupillary plane canting have been described as common conditions affecting smile esthetics. When presented with these asymmetries, the clinician must choose the reference line with which to orient the transverse occlusal plane of the planned dental restorations.

**Purpose.** The purpose of the online survey described in this study was to determine lay preferences regarding the transverse occlusal plane orientation in faces that display a cant of the commissure line viewed from the frontal perspective.

**Material and methods.** From a digitally created symmetrical facial model with the transverse occlusal plane and commissure line parallel to the interpupillary line (horizontal) and a model constructed in a previous study (control), a new facial model was created with 3 degrees of cant of the commissure line. Three digital tooth mountings were designed with different transverse occlusal plane orientations: parallel to the interpupillary line (A), parallel to the commissure line (B), and the mean angulation plane formed between the interpupillary and commissure line (C), resulting in a total of 4 images. All images, including the control, were organized into 6 pairs and evaluated by 247 selected laypersons through an online Web site survey. Each participant was asked to choose the more attractive face from each of the 6 pairs of images.

**Results.** The control image was preferred by 72.9% to 74.5% of the participants compared with the other 3 images, all of which represented a commissure line cant. Among the 3 pairs which represent a commissure line cant, 59.1% to 61.1% preferred a transverse plane of occlusion (B and C) compared with a plane of occlusion parallel to the interpupillary line, and 61.1% preferred a plane of occlusion parallel to the commissure line (B) compared with the mean angulation plane (C).

**Conclusions.** Laypeople prefer faces with a commissure line and transverse occlusal plane parallel to the horizontal plane or horizon. When faces present a commissure line cant, laypeople prefer a transverse occlusal plane with a similar and coincident cant. (J Prosthet Dent 2016;:–:–)
horizontal reference lines should be considered initially as a part of the esthetic diagnosis.9,10

Using image analysis, Ferrario et al11 concluded that the angulation of the TOP in healthy dental students can reach a mean of between 2.15 and 2.90 degrees.

Jiménez-Castellanos et al12 observed some inclination of the TOP in 25.9% of a southern Europe population. The inclination exceeded 2 degrees in all participants.

Silva et al13 studied the esthetic impact of different facial and dental discrepancies and concluded that 3 degrees of occlusal plane cant would be detected by the majority of laypeople. The results of other studies have shown that deviations in cant are not noticeable unless they exceed between 2 and 4 degrees.10,14,15

Asymmetry, even among esthetically pleasing faces, is a typical finding.16 Some variations of facial asymmetry are not considered an esthetic liability, despite the absence of objective criteria scientifically defined as differentiating normal and abnormal asymmetries.13

Therefore, the purpose of this online survey was to determine lay preferences regarding TOP orientation in faces which possess a cant of the commissural line or plane.

MATERIAL AND METHODS

A cohort of 247 laypeople (126 women and 121 men) were selected from a pool of patients who visited 3 different dental practices between January and July 2013 to perform an online internet-based survey. The survey was performed using survey software (SurveyGizmo; Widgix, LLC). Inclusion criteria were included in the survey questions; participants were more than 18 years of age, and their occupation could not be related to any dental health care profession. Ethnicity and educational background were also noted.

Beginning with a symmetric (control) face model (Fig. 1) wherein the TOP, CL, and IL were all parallel, a new face model was created with 3 degrees of CL cant (Fig. 2).13 Three digital dentition “mountings” were then designed with different transverse occlusal line or transverse plane orientations: parallel to the IL/plane (Fig. 3), parallel to the adjusted CL/plane (Fig. 4), and the mean between the angle of the interpupillary plane and commissure plane equivalent to 1.5 degrees (Fig. 5C), resulting in a total of 4 images. Image manipulation software (Photoshop [Adobe Systems] CS3 Extended for Macintosh [Apple Inc]) was used for all image editing.

All images, including the control image, were organized into 6 pairs so that each different image could be directly compared, 2 forced choices. Participants were asked, “Which face is more attractive?” A single answer was accepted for each pair of images viewed, thereby allowing direct comparisons between the 4 images: pair 1: control and A; pair 2: Control and B; pair 3: Control and C; pair 4: A and B; pair 5: A and C; pair 6: B and C.

These paired arrangements of the 4 different images allowed direct comparison to measure and establish subjective lay preferences. All 6 pairs of images were shown to each participant through the online Web site survey, with the software randomizing the order in which each participant viewed each pair.

Once all the questionnaires were completed, the data were collected in a spreadsheet table (Excel 2010; Microsoft Corp) and statistical analysis was performed with software (IBM SPSS Statistics v22; IBM Corp). The chi-squared test (Pearson and/or Fisher exact test) was performed to determine that participant sex was not a factor (P<.05). Ethnicity and educational background data were not statistically analyzed, since some subgroups presented too low an n value for evaluation.

Clinical Implications

Laypeople prefer some degree of transverse occlusal plane inclination in patients who present a lip commissure line cant. The acceptable degree of canting should be assessed on an individual patient basis.
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