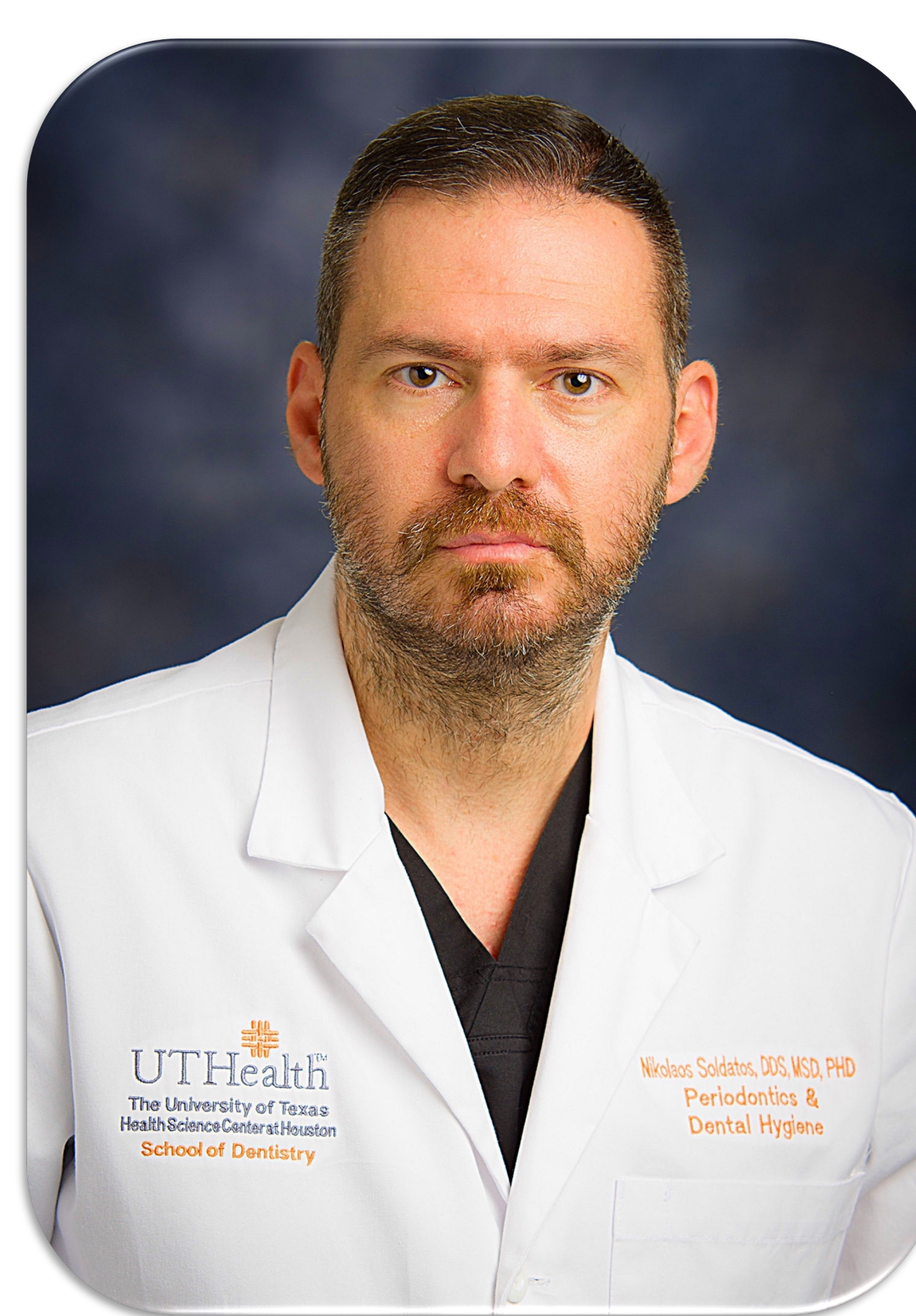
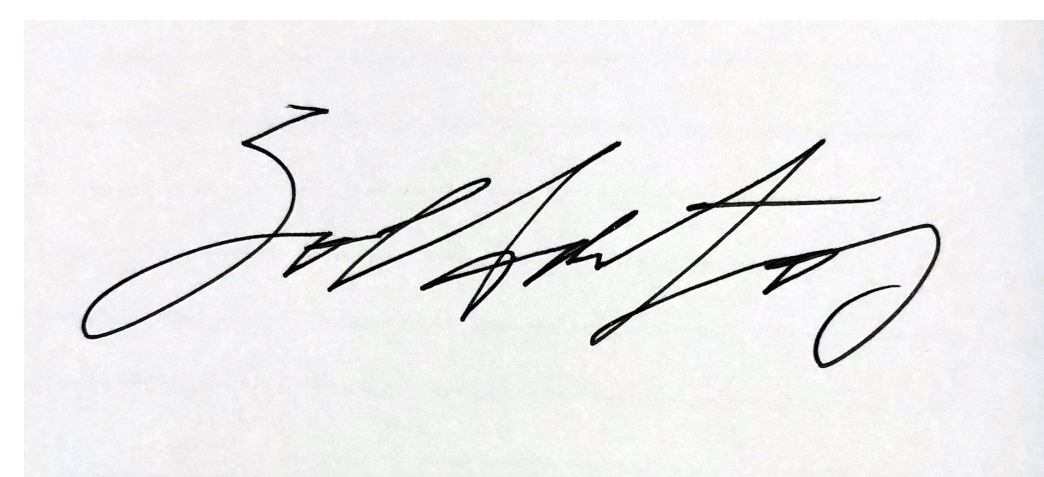


THE SURGICAL ANATOMY OF THE GREATER PALATINE ARTERY; A HUMAN CADAVER STUDY

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AIM

The aim of the present study was to determine the location of the GPA from the cementoenamel junction (CEJ) of the maxillary canine to second molar teeth and determine its relationship to the height of the palatal vault in Caucasian cadavers. Knowledge of the position of the GPA and its specific relationship to the PVH is of paramount importance to the clinician when planning SCTG procedures and other periodontal surgeries in the palatal region.

METHODS

A Colorado Multiple Institutional Review Board (COMIRB) approval was not required for the conduction of the study. A total of 35 embalmed fully or partially dentate Caucasian cadavers, donated to the Department of Anatomy, School of Medicine, University of Colorado, were dissected. This study was done in accordance with the Declaration of Helsinki on medical protocols and ethics. The inclusion criteria were as follows: (i) each quadrant had to have their canine through second molar (specimens with missing 1st premolars were excluded), and (ii) teeth were not supraerupted or misaligned in the arch. If there were multiple missing teeth or unidentifiable CEJ's, the specimens were excluded. The specimens consisted of 16 males (M) and 19 females (F) with an age range of 53 to 98 (mean age: 75.5 years).

Sectional cuts were made in the palate to visualize the artery and make measurements of the GPA's distance from the CEJ of the corresponding teeth. The distance of the GPA was measured to the nearest millimeter from the midpalatal CEJ region to the GPA, from canine to second molar, using a University of North Carolina 15 (UNC 15) probe (Hu-Friedy®).

The mean and standard deviation was calculated for these values. The PVH were measured vertically from the midpalatal suture to the level of the CEJ of the maxillary first molars using a custom stent fabricated for each specimen using 0.02 Raintree Essix material (Dentsply®). The UNC 15 probe was placed in the center of the custom stent to measure the height of the palatal vault.

Categorization of the palatal vault height was as follows: shallow (S) (9 to 11mm), average (A) (12 to 14mm), and high (H) ($\geq$ 15mm).

All statistical analyses were performed using R statistical software. A generalized linear model (GLM) formula analysis was performed. The variables of GPA, PVH, gender and age were tested individually along with their two-way and three-way interaction.

RESULTS

A total of 66 half palates were included in the study. Out of the 66 sections, 12 sections had shallow (S) PVH, 20 sections had average (A) PVH and 34 sections had a high (H) PVH. The palatal vault distribution based on gender was as follows: (S) M=2, F=10; (A) M=6, F=14; (H) M=22, F=12. There was no variation and no effect between the location of the GPA and the age of the cadavers.

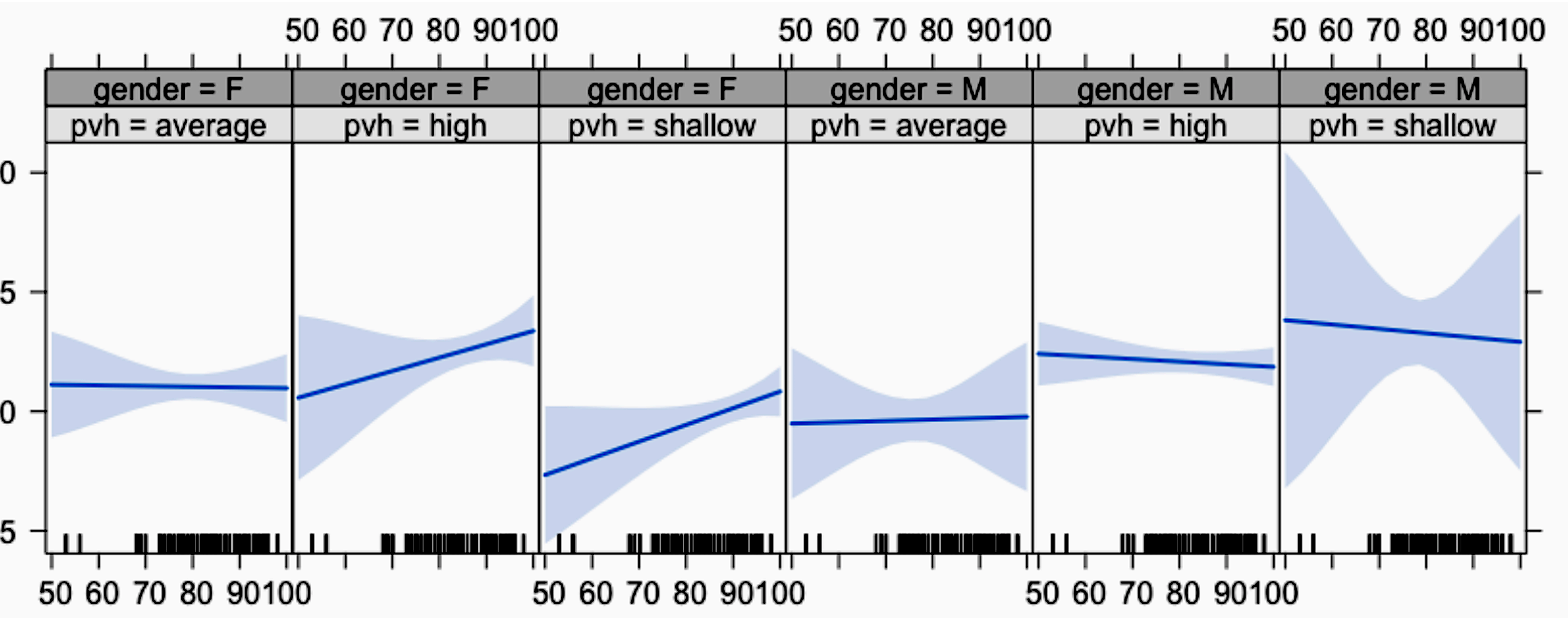
The location of the GPA based upon measured of the PVH is demonstrated in **Table 1**.

PVH	Teeth	Mean (mm)	SD	Minimum (mm)
Shallow (S)	canine	8.7	2.1	6
	1 st premolar	10.6	1.5	8
	2 nd premolar	11.3	2.6	8
	1 st molar	11.2	3.1	8
	2 nd molar	10.5	2.7	8
Average (A)	canine	8.6	1.3	6
	1 st premolar	9.7	1.2	8
	2 nd premolar	10.8	1.7	8
	1 st molar	12.2	1.8	8
	2 nd molar	11.6	1.9	8
High (H)	canine	9.7	1.3	6
	1 st premolar	10.9	1.2	9
	2 nd premolar	12.5	1.3	10
	1 st molar	13.8	1.1	12
	2 nd molar	14.5	1.3	12

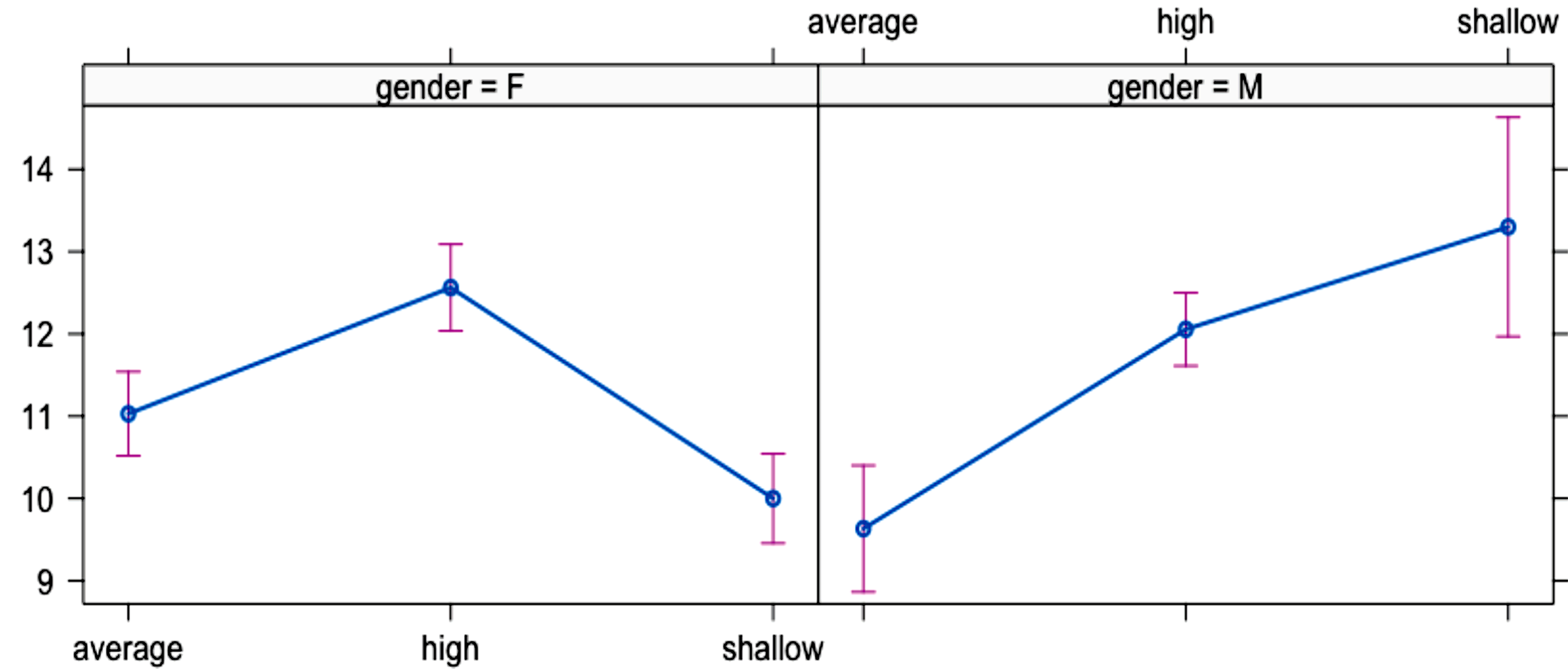
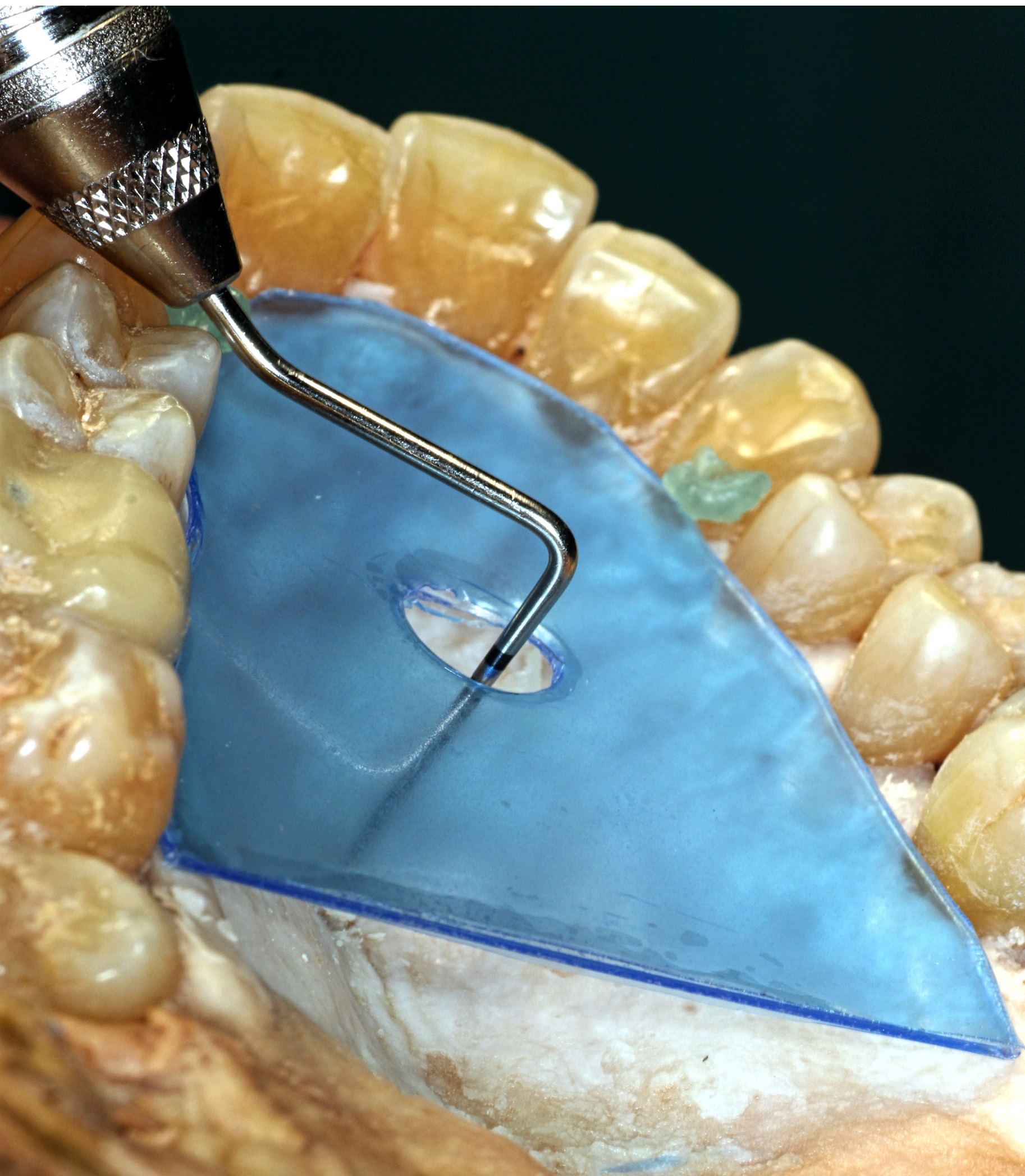
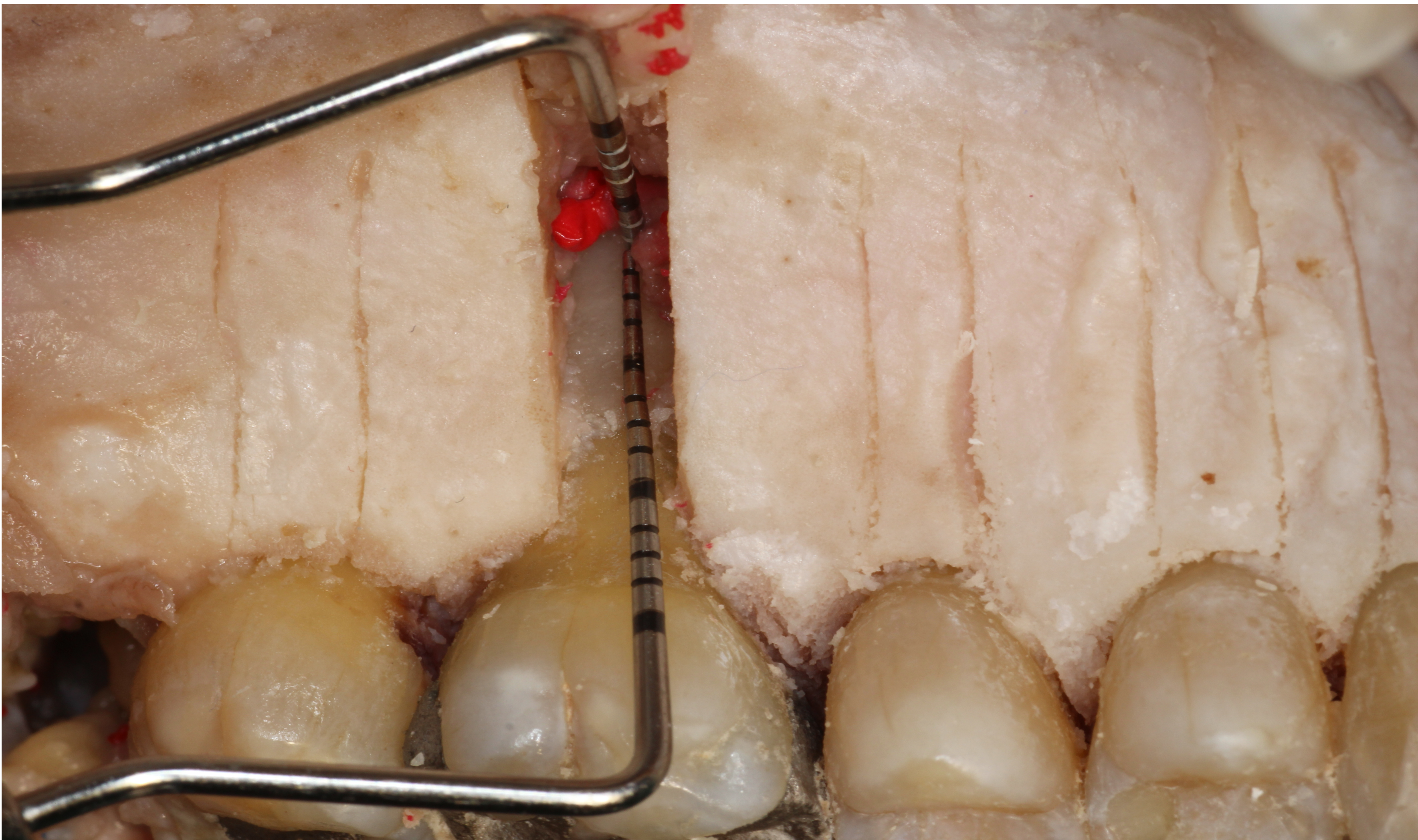
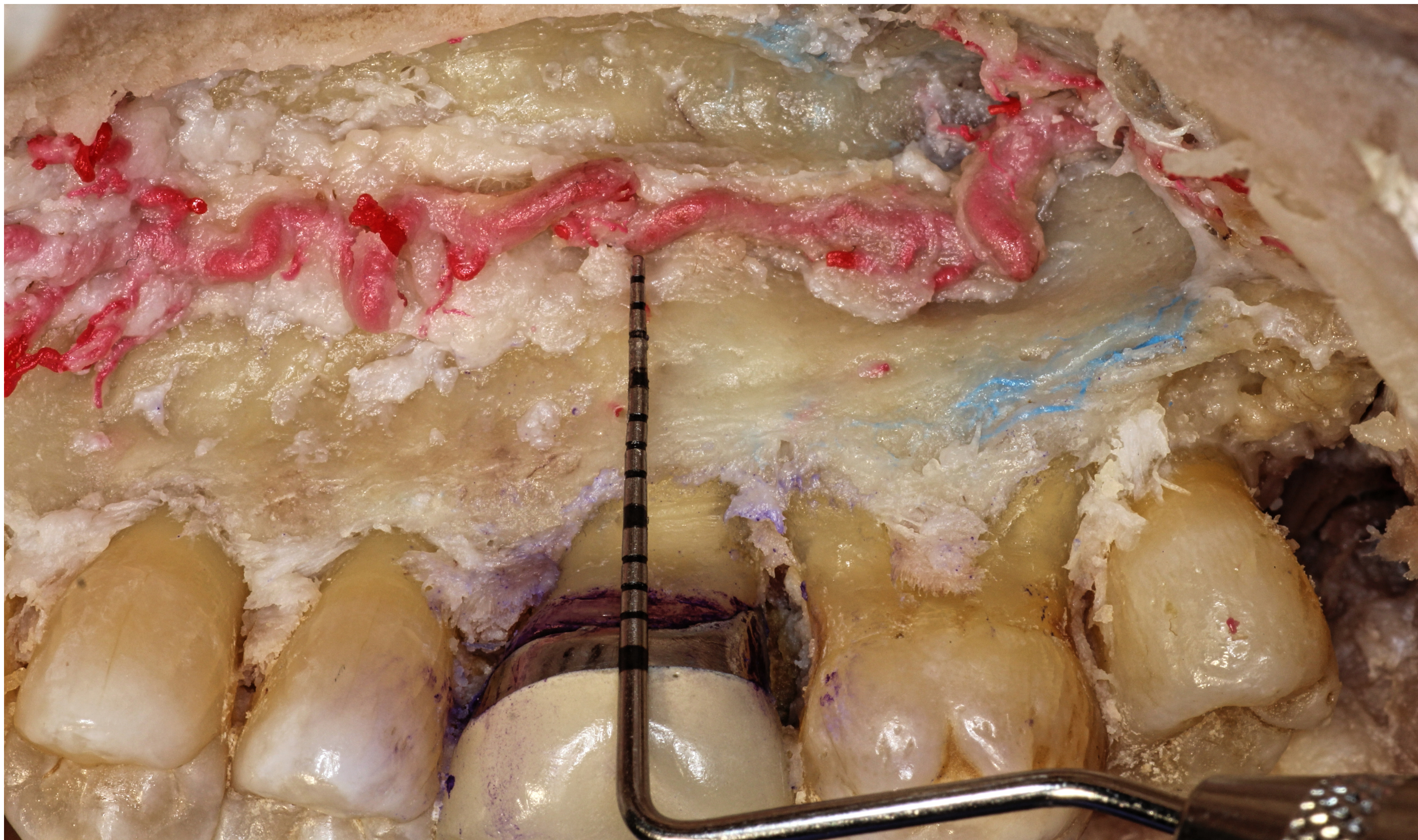
Table 2 shows the variables of PVH, gender and age and their two-way and three-way interaction with the GPA. There was no three-way interaction between PVH, gender and age with the location of GPA. On the contrary, there was a two-way interaction between the PVH and the gender of the cadavers with the location of the GPA. Specifically, for the shallow PVH there was a significant difference between male and female cadavers. The PVH only, as independent variable had a significant correlation with the location of GPA.

Variables	Chi sq.	df	P value
PVH	49.6	2	<0.001*
Gender	1.0	1	<0.3163
Age	0.4	1	<0.5475
PVH:Gender	32.4	2	<0.001*
PVH:Age	1.4	2	<0.4935
Gender:Age	1.3	1	<0.2621
PVH:Gender:Age	0.9	2	<0.6520

Graph 1 depicts the triple interaction between PVH, age and gender with the location of the GPA. The Y-axis shows the location of GPA (mm) and the X-axis shows the age (years) of the cadavers. The graph shows the significant difference between male and female cadavers and the location of the GPA, only in the shallow PVH.



Graph 2 excludes the age and shows the two-way interaction between the gender of the cadavers and the location of the GPA only at the shallow PVH.



CONCLUSIONS

The majority of PVH in this cadaver study was high (≥ 15 mm), with the maximum distance of the GPA from the CEJ ranging between 9.7 mm (mean) at the canine to a 14.5 mm (mean) at the second molar in this vault type. The gender was identified as a significant factor regarding the location of the GPA, especially on the shallow PVH.