MORPHOLOGY OF UPPER PREMOLARS

https://doi.org/10.56238/sevened2024.034-005

Ticiana Sidorenko de Oliveira Capote[1], Giovana Shiotani de Almeida[2], Leandro Henrique Correia da Silva[3], Lamis Meorin Nogueira[4], Marcela de Almeida Gonçalves[5], Marcelo Brito Conte[6] and François Isnaldo Dias Caldeira[7]

ABSTRACT

Despite the numerous books on dental anatomy, there are few scientific articles that cover a detailed study of the external morphology of teeth. The development of studies aimed at the morphological evaluation of upper premolars, mainly for differentiation between them, is quite relevant for the Discipline of Dental Anatomy, and, consequently, for Dentistry. The objective of this study was to analyze the morphology of upper premolars, highlighting the differences between them. Measurements were performed using a digital caliper, along with the visual analysis of some anatomical structures 100 first premolars (UFPM) and 100 second premolars (USPM) from a teaching collection. Since the data presented normal distribution, t-test and Chi-square test were performed. The results of this study demonstrate that UFPM and USPM exhibit measurements and features that facilitate their identification and differentiation. Some anatomical aspects are more frequent and uniform, while others show greater variability. It was concluded that the root is not a significant characteristic for distinguishing between them, as the majority of UFPM and USPM in our sample presented one root. The larger buccal cusp and the presence of a cervical depression on the mesial surface of UFPM, a short central groove and more frequent supplemental grooves in USPM, are important features for differentiating between upper premolars. For assisting in the identification of the side of extracted teeth, the lingual cusp mesially deviated is a frequent characteristic for both upper premolars. Understanding these characteristics favors the identification of teeth in Dental Anatomy classes.

Keywords: Dental anatomy. Premolar. Upper first premolar. Upper second premolar.

[1] PhD
Anatomy Professor
São Paulo State University (UNESP), School of Dentistry, Araraquara, SP, Brazil.
Humaita Street, 1680, Araraquara, SP, Brazil. CEP 14801-903.
E-mail: ticiana.capote@unesp.br
ORCID: https://orcid.org/0000-0003-0979-5826
[2] São Paulo State University (UNESP), School of Dentistry, Araraquara, SP, Brazil
[3] São Paulo State University (UNESP), School of Dentistry, Araraquara, SP, Brazil
[4] São Paulo State University (UNESP), School of Dentistry, Araraquara, SP, Brazil
[5] São Paulo State University (UNESP), School of Dentistry, Araraquara, SP, Brazil
[6] São Paulo State University (UNESP), School of Dentistry, Araraquara, SP, Brazil
[7] São Paulo State University (UNESP), School of Dentistry, Araraquara, SP, Brazil

INTRODUCTION

The discipline of Anatomy is typically taught during the first year of undergraduate Health Science programs. For Dentistry, Dental Anatomy is either integrated into the Anatomy course or offered as a separate discipline. Dental Anatomy represents the first opportunity within the Dentistry curriculum for students to develop and/or improve a more detailed perspective, preparing them for clinical disciplines.

An ideal dental restoration should restore the functions of the stomatognathic system, requiring an individual anatomical understanding of each tooth. It is essential for a Dentistry student to develop an aesthetic perception and be able to reconstruct the form and function of each tooth (Cruz et al., 2018; Pinheiro et al., 2020). Knowledge of dental morphology is fundamental to provide patients with the the best treatment, whether in restorative dentistry, endodontics, prosthodontics, periodontics, or other fields (Pinheiro et al., 2020).

Practical Dental Anatomy classes are conducted, in most programs, using natural extracted teeth. When studying upper premolars, errors in their identification and confusion between them are common. Knowledge of tooth anatomy highlights its importance in mastication and protection of periodontal tissues (Chun et al., 2009). Morphological variations of upper premolars are of great importance for successful endodontic treatment and for avoiding complications (Stosic et al., 2016; Elhejazi et al., 2021). In health science programs, such as Dentistry, there must always be a connection between clinical practice and basic sciences, which constitute the true foundation of learning (Buchaim et al., 2014).

The main differences observed between upper premolars are the pentagonal outline of the occlusal surface in the upper first premolar (UFPM) compared to the ovoid outline of the upper second premolar (USPM). This distinction is due to the absence of pronounced convergence of the proximal surfaces in USPM, since there is no significant discrepancy in the size of the buccal and lingual cusps. UFPM has a larger buccal cusp compared to the lingual cusp. The central groove of the UFPM is long, prominent, and shifted lingually, while in the USPM, it is shorter, less pronounced, and centrally located. Secondary grooves are rare in UFPM and more frequent in USPM. UFPM often present a groove crossing the mesial marginal ridge, which is almost always absent in USPM. Another structure commonly found in UFPM and almost always absent in USPM is a cervical depression in the mesial surface. UFPM is frequently biradicular, whereas USPM generally presents only one root (Della Serra & Ferreira, 1981; Woelfel & Scheid, 2000; Figún & Garino, 2003; Madeira & Rizzolo, 2016).

Although premolars do not exhibit as many anatomical variations as lateral incisors and third molars, such variations can occasionally occur. Taurodontism is an anomaly typically found in molars, however, in a study evaluating 379 premolars, three cases were identified in upper premolars (Llamas & Jimenez-Planas, 1993). When studying dental anatomy, it is evident that anatomical variations are more frequent in the roots compared to the crowns.

In a study using computed tomography of 404 patients, the majority (70.8%) of UFPM were biradicular, 28.2% had one root, and 1% had three roots, whereas 82.1% of USPM had one root and 17.8% had two roots (Bulut et al., 2015). A very similar percentage was observed in another study with computed tomography of 440 patients, with 70.22% and 29.32% with 1 root and 2 roots, respectively, in UFPM (Liu et al., 2021).

Despite the numerous books on Dental Anatomy, there are few scientific articles that cover a detailed study of the external anatomy of teeth. Developing studies focused on the morphological evaluation of upper premolars, mainly to differentiate between them, is highly relevant to the discipline of Dental Anatomy and, consequently, to Dentistry.

It is quite common for undergraduate Dentistry students to face challenges in identifying UFPM and USPM during practical Dental Anatomy classes. This study proposes a morphological analysis with quantitative and qualitative evaluations of UFPM and USPM.

This research aims to contribute to the existing literature, seeking to facilitate and improve the anatomical study of these teeth by highlighting their differences and improving the teaching of Dental Anatomy.

METHODOLOGY

This study was approved by the Research Ethics Committee of the School of Dentistry, UNESP, Araraquara, SP, Brazil (CAAE 69100723.3.0000.5416).

A total of 100 upper first maxillary premolars (UFPM) and 100 upper second maxillary premolars (USPM) from the teaching collection of the Anatomy Discipline of the School of Dentistry, UNESP, were evaluated.

The following measurements were performed using a digital caliper (Absolute AOS Digimatic - Mitutoyo® Sul Americana Ltda):

DENTAL CROWN

Buccal surface: cervical-occusal distance (CO-B); mesiodistal distance (MD-B)

Lingual surface: cervical-occusal distance (CO-L); mesiodistal distance (MD-L)

Mesial surface: cervical-occusal distance (CO-M)

Distal surface: cervical-occusal distance (CO-D)

Mesiodistal distance (MD-C)

Buccal-lingual distance (BL-C)

OCCLUSAL SURFACE

Buccal cusp: measurement of the mesial longitudinal ridge (MLR-BC); measurement of the distal longitudinal ridge (DLR-BC)

Lingual cusp: measurement of the mesial longitudinal ridge (MLR-LC); measurement of the distal longitudinal ridge (DLR-LC)

Central groove: mesiodistal measurement of the central groove (MD-CG); distance from the central groove to the buccal cusp tip (CG-BC) (measured with a dry-point compass); distance from the central groove to lingual cusp tip (CG-LC) (measured with a dry-point compass)

DENTAL ROOT

Cervical-apical distance of the dental root (CA-R): measurement from the cervical line to the root apex. For biradicular teeth, only the root with the greatest length were measured

Mesiodistal distance of the dental root (MD-R): measurement of the midpoint of the cervical line between the mesial and distal surfaces

Buccal-lingual distance of the dental root (BL-R): measurement between the cervical lines on the buccal and lingual surfaces

The following qualitative characteristics were evaluated:

Root apex (RA): straight (S), distal deviation (D), mesial deviation (M)

Number of roots

Biradicular teeth: fused roots (F), cervical bifurcation (CB), apical bifurcation (AB), middle third bifurcation (MTB)

Deeper root groove (RG): mesial (M) or distal (D)

Morphology of the buccal cusp (M-BC): pointed (P), obtuse (O), worn (W)

Morphology of the lingual cusp (M-LC): pointed (P), obtuse (O), worn (W)

Position of the buccal cusp (P-BC): centralized (C), mesially deviated (M), distally deviated (D)

Position of the lingual cusp (P-LC): centralized (C), mesially deviated (M), distally deviated (D)

Supplemental grooves on the occlusal slope of the buccal cusp (SS-B): absent (0), present: one (1), two (2), or three (3)

Supplemental groove(s) on the occlusal slope of the lingual cusp (SS-L): absent (0), present: one (1), two (2), or three (3)

Groove on the mesial marginal ridge (G-MMR): present (1) or absent (0)

Groove on the distal marginal ridge (G-DMR): present (1) or absent (0)

Groove on the mesial surface originating from the mesial marginal ridge (G-MS): present (1) or absent (0)

Groove on the distal surface originating from the distal marginal ridge (G-DS): present (1) or absent (0)

Groove on the buccal surface (G-BS): absent (0), present: one (1), two (2)

Cervical depression of the mesial surface (CD-MS): present (1) or absent (0)

Cervical depression of the distal surface (CD-DS): present (1) or absent (0)

The analyses were conducted by a qualified examiner. For reproducibility analysis, 10% of the sample was evaluated in duplicate, with a minimum interval of 7 days, randomly selected. Reproducibility was estimated using the intraclass correlation coefficient (ICC) for quantitative data and Kappa for qualitative data.

The data were statistically analyzed using the SPSS software, version 21.0 (SPSS Inc., Chicago, USA), with a significance level of 5%.

To analyze the data, normality was assessed using the Kolmogorov-Smirnov test. Descriptive statistics were performed to characterize the study sample (relative and absolute frequency). The comparison of quantitative measures was conducted using the Student's T-test for independent samples, for quantitative variables with normal distribution. For categorical variables, the Chi-Square test was applied, and when necessary, Fisher's exact correction was used.

RESULTS

The reproducibility analyses demonstrated excellent agreement according to the ICC and Kappa analyses.

Tables 1 and 2 present the quantitative measurements of the first and second maxillary premolars, respectively. The results of the qualitative analyses are shown in Table 3.

Table 1. Quantitative measurements of the 100 UFPM. Mean and Standard Deviation (SD).

Measurents	Side	N	Mean	(SD)	p-value
CO-B	14	50	8.25	±(0.764)	0.009
	24	50	8.65	±(0.709)	
MD-B	14	50	7.27	±(0.444)	0.791
	24	50	7.30	±(0.524)	
CO-L	14	50	7.21	±(0.671)	0.09
	24	50	7.43	±(0.621)	
MD-L	14	50	6.36	±(0.408)	0.797
	24	50	6.33	±(0.549)	
CO-M	14	50	5.05	±(0.596)	0.054
	24	50	5.28	±(0.568)	
CO-D	14	50	4.68	±(0.421)	0.584
	24	50	4.73	±(0.462)	
BL-C	14	50	9.18	±(0.506)	0.334
	24	50	9.29	±(0.663)	
MLR-BC	14	50	3.72	±(0.511)	0.005
	24	50	4.02	±(0.518)	
DLR-BC	14	50	3.55	±(0.479)	< .001
	24	50	3.94	±(0.502)	
MLR-LC	14	50	2.78	±(0.409)	0.165
	24	50	2.89	±(0.359)	
DLR-LC	14	50	3.42	±(0.456)	0.065
	24	50	3.61	±(0.551)	
MD-CG	14	50	2.95	±(0.646)	0.35
	24	50	3.07	±(0.581)	
CG-BC	14	50	3.88	±(0.392)	0.552
	24	50	3.93	±(0.447)	
CG-LC	14	50	3.25	±(0.441)	0.047
	24	50	3.01	±(0.326)	
CA-R	14	50	14.10	±(1.798)	0.836
	24	50	14.03	±(1.547)	
MD-R	14	50	4.60	±(0.42)	0.304
	24	50	4.69	±(0.362)	
BL-R	14	50	8.21	±(0.61)	0.730
	24	50	8.26	±(0.65)	

T-test for independent samples. p= 0.05

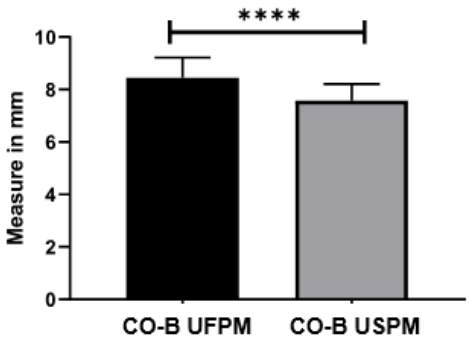
Table 2. Quantitative measurements of the 100 USPM. Mean and Standard Deviation (SD).

Measurements	Side	N	Mean	(SD)	p-value
CO-B	15	50	7.58	± (0.588)	0.155
	25	50	7.56	± (0.692)	
MD-B	15	50	6.71	± (0.379)	0.177
	25	50	6.72	± (0.328)	
CO-L	15	50	7.44	± (0.55)	0.444
	25	50	7.31	± (0.568)	
MD-L	15	50	6.11	± (0.57)	0.014
	25	50	6.30	± (0.407)	
CO-M	15	50	5.20	± (0.444)	0.802
	25	50	5.14	± (0.442)	
CO-D	15	50	4.94	± (0.386)	0.528
	25	50	4.83	± (0.402)	
BL-C	15	50	9.37	± (0.582)	0.742
	25	50	9.27	± (0.547)	
MLR-BC	15	50	3.10	± (0.313)	0.856
	25	50	3.15	± (0.325)	
DLR-BC	15	50	2.95	± (0.295)	0.870
	25	50	3.03	± (0.301)	

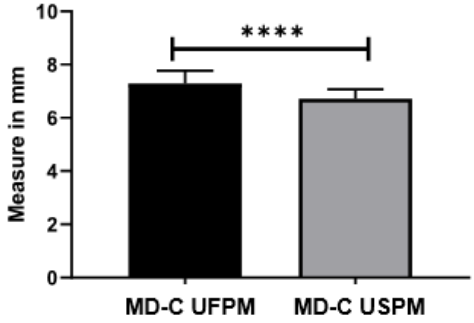
MLR-LC	15	50	2.34	± (0.338)	0.842
	25	50	2.33	± (0.325)	
DLR-LC	15	50	2.72	± (0.39)	0.223
	25	50	2.72	± (0.347)	
MD-CG	15	50	2.80	± (0.524)	0.941
	25	50	2.54	± (0.556)	
CG-BC	15	50	3.80	± (0.413)	0.0001
	25	50	3.76	± (0.252)	
CG-LC	15	50	3.43	± (0.306)	0.856
	25	50	3.13	± (0.316)	
CA-R	15	50	14.33	± (1.535)	0.157
	25	50	14.02	± (1.809)	
MD-R	15	50	4.83	± (0.276)	0.147
	25	50	4.69	± (0.362)	
BL-R	15	50	8.45	± (0.608)	0.203
	25	50	8.38	± (0.723)	

T-test for independent samples. p= 0.05

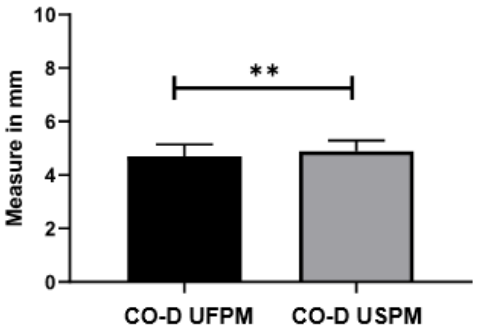
Graphs 1 to 12 show comparisons of measurements between the first and second upper premolars that demonstrated statistically significant differences.



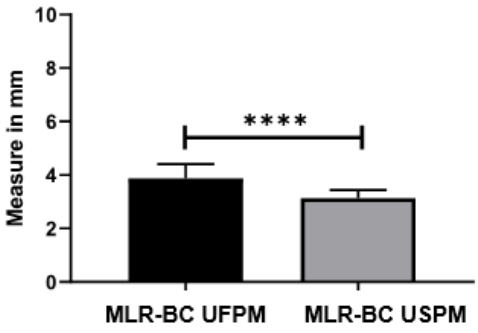
Graph 1. Mean value of cervical-occlusal distance of the buccal surface of the crown in first and second premolars. T-test. ****=p<0.00001.



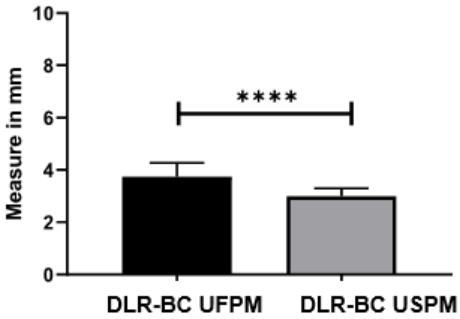
Graph 2. Mean value of mesiodistal distance of the crown in first and second premolars. T-test. ****=p<0.00001.



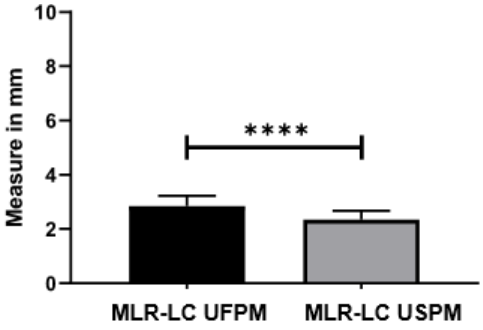
Graph 3. Mean value of cervical-occlusal distance of the distal surface of the crown in first and second premolars. T-test. **=p<0.001.



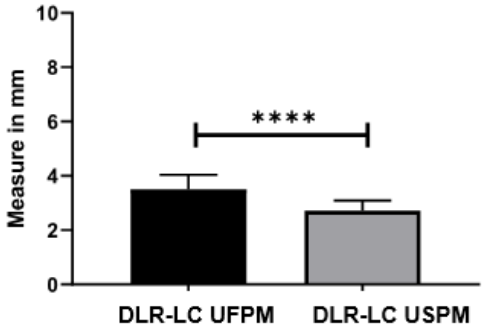
Graph 4. Mean value of measurement of the mesial longitudinal ridge of the buccal cusp in first and second premolars. T-test. ****=p<0.00001.



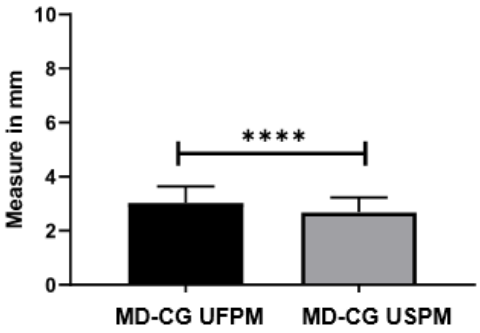
Graph 5. Mean value of measurement of the distal longitudinal ridge of the buccal cusp in first and second premolars.. T-test. ****=p<0.00001.



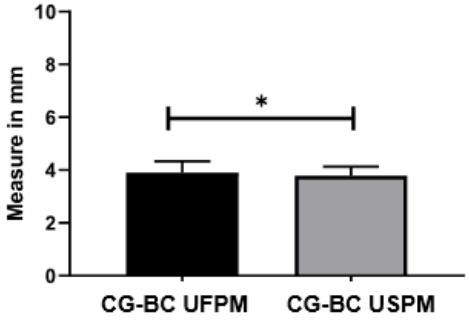
Graph 6. Mean value of measurement of the mesial longitudinal ridge of the lingual cusp in first and second premolars. T-test. ****=p<0.00001.



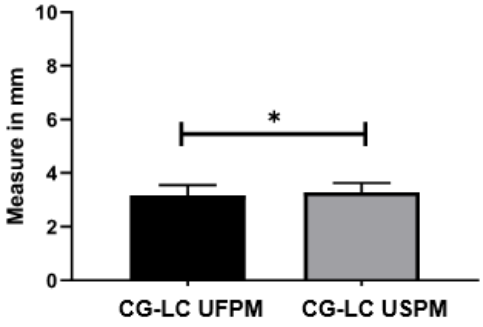
Graph 7. Mean value of measurement of the distal longitudinal ridge of the lingual cusp in first and second premolars. T-test. ****=p<0.00001.



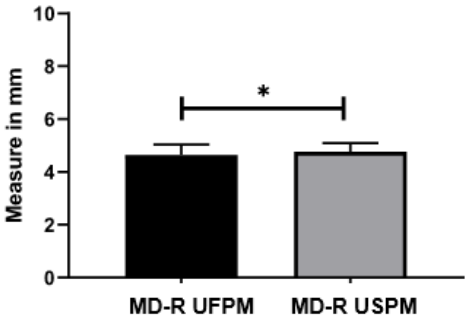
Graph 8. Mean value of mesiodistal measurement of the central groove in first and second premolars. T-test. ****=p<0.00001.



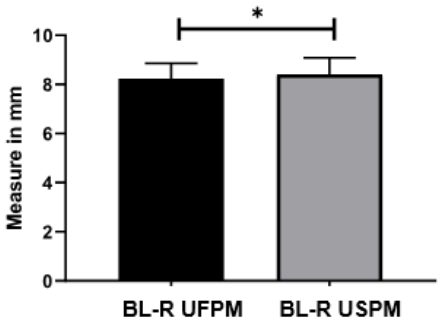
Graph 9. Mean value of distance from the central groove to the buccal cusp tip in first and second premolars. T-test. *=p<0.05.



Graph 10. Mean value of distance from the central groove to the lingual cusp tip in first and second premolars. T-test. *= p<0.05.



Graph 11. Mean value of mesiodistal distance of the dental root in first and second premolars. T-test. *=p<0.05.



Graph 12. Mean value of buccal-lingual distance of the dental root in first and second premolars. T-test. *=p<0.05.

Table 3. Qualitative measurements of the first and second premolars.

Feature		First premolar		Second premolar		
		N	(%)	N	(%)	p-value
Root apex	D	57	57.0%	46	46.0%	0.014*
	M	11	11.0%	4	4.0%	
	R	32	32.0%	50	50.0%	
Number of roots	1	61	61.0%	68	68.0%	0.301
	2	39	39.0%	32	32.0%	
Biradicular	AB	6	6.0%	14	14.0%	0.034*
	CB	2	2.0%	1	1.0%	
	MTB	10	10.0%	5	5.0%	
	F	23	23.0%	11	11.0%	
RG	0	20	20.0%	56	56.0%	<0.0001*
	D	11	11.0%	30	30.0%	
	M	69	69.0%	14	14.0%	
M-BC	W	14	14.0%	14	14.0%	0.109
	P	51	51.0%	64	64.0%	
	O	35	35.0%	22	22.0%	
M-LC	W	3	3.0%	6	6.0%	0.001*
	P	56	56.0%	77	77.0%	

	O	41	41.0%	17	17.0%	
P-BC	C	55	55.0%	91	91.0%	<0.0001*
	D	39	39.0%	3	3.0%	
	M	6	6.0%	6	6.0%	
P-LC	C	4	4.0%	11	11.0%	0.107
	M	96	96,0%	89	89.0%	
SS-B	0	9	9.0%	1	1.0%	<0.0001*
	1	20	20.0%	5	5.0%	
	2	37	37.0%	50	50.0%	
	3	25	25.0%	30	30.0%	
	4	9	9.0%	14	14.0%	
SS-L	0	18	18.0%	14	14.0%	0.176
	1	17	17.0%	18	18.0%	
	2	47	47.0%	59	59.0%	
	3	18	18.0%	9	9.0%	
G-MMR	0	36	36.0%	8	8.0%	<0.0001*
	1	64	64.0%	68	68.0%	
	2	0	0.0%	24	24.0%	
G-DMR	0	38	38.0%	8	8.0%	<0.0001*
	1	61	61.0%	66	66.0%	
	2	1	1.0%	26	26.0%	
G-MS	0	30	30.0%	60	60.0%	<0.0001*
	1	70	70.0%	34	34.0%	
	2	0	0.0%	6	6.0%	
G-DS	0	71	71.0%	61	61.0%	0.059
	1	29	29.0%	36	36.0%	
	2	0	0.0%	3	3.0%	
G-BS	0	32	32.0%	54	54.0%	0,002*
	1	48	48.0%	26	26.0%	
	2	20	20.0%	20	20.0%	
CD-MS	0	21	21.0%	96	96.0%	<0.0001*
	1	79	79.0%	4	4.0%	
CD-DS	0	89	89.0%	97	97.0%	0.052
	1	11	11.0%	3	3.0%	

Qui-square test. * = denotes values where a statistically significant difference was found using Fisher's Exact Test. p = 0.05

DISCUSSION

Regarding the crown dimensions of UFPM, the mean cervical-occlusal distance of the buccal surface was 8.45 mm, and the lingual surface measured 7.32 mm. The buccal cusp is typically about 1 mm higher than the lingual cusp (Fehrenbach & Popowics, 2022), which accounts for the differences in cervical-occlusal dimensions between the buccal and lingual surfaces of UFPM. The larger buccal cusp compared to the ligual cusp in UFPM is consistently described in Dental Anatomy textbooks (Della Serra & Ferreira, 1981; Picosse, 1983; Wolfel & Scheid, 2000; Scheid & Weiss, 2012; Madeira & Rizzolo, 2016). The mesiodistal distance of the buccal surface was 7.29 mm and 6.34 mm for the lingual surface. Similar values for cervical-occlusal (8.6 mm) and mesiodistal (7.1 mm) distances were reported by Wolfel & Scheid (2000).

Considering the quantitative results for the dental crown of USPM, the mean cervical-occlusal and mesiodistal distances of the buccal surface were 7.57 mm and 6.72

mm, respectively, and for lingual surface, the values were 7.38 mm and 6.20 mm. Similar measurements were reported by Wolfel & Scheid (2000), with 7.7 mm in length and 6.6 mm in mesiodistal width, and by Figún & Garino (2003), with 7.5 mm and 6.8 mm, respectively. We observed that the buccal surface is slightly larger than the lingual surface, consistent with descriptions found in Dental Anatomy textbooks (Della Serra & Ferreira, 1981; Wolfel & Scheid, 2000; Scheid & Weiss, 2012; Madeira & Rizzolo, 2016).

Comparing the crown height of the buccal surface between UFPM and USPM, a statistically significant difference was observed (Graph 1), highlighting that the more prominent buccal cusp of UFPM is a distinguishing characteristic that heps in differentiating the upper premolars.

According to the literature, the central groove of the USPM was positioned centrally on the occlusal surface, differing from the UFPM, which often present a groove displaced lingually due to the visibly larger size of the buccal cusp. The mean distance from the central groove to the buccal cusp of the UFPM was 3.9 mm and the mean distance to the lingual cusp was 3.17 mm.

The mean mesiodistal length of the central groove in USPM was 2.67 mm. Wolfel & Scheid (2000) reported an average length of the central groove of 2.1 mm. The short extent of the central groove in USPM is a striking feature that distinguishes it from UFPM (Figún & Garino, 2003; Scheid & Weiss, 2012; Madeira & Rizzolo, 2016). The mean central groove length for UFPM was 3.01 mm, showing a significant difference compared to USPM (Graph 8). This characteristic can be considered a reliable criterion to differentiate between UFPM and USPM.

We can also highlight other specific characteristics that are interesting for for the identification of the upper first premolars and differentiate them from the second ones. It is reported in the literature that UFPM typically have a cervical depression in the mesial (Wolfel & Scheid, 2000; Figún & Garino, 2003; Scheid & Weiss, 2012; Madeira & Rizzolo, 2016). Our results confirmed this statement, since this anatomical structure was observed in 79% of UFPM and only in 4% of USPM, with a significant difference between them. The depression on the distal surface is a rarer feature, being absent in 89% of UFPM and 97% of USPM.

A groove originating from the mesial marginal ridge that extends onto the mesial surface is another frequent feature in UFPM. Wolfel & Scheid (2000) observed this groove in 97% of UFPM; the groove crossing the distal marginal ridge was less frequent (39%). Our results showed that in 70% of UFPM, this groove was present; 29% exhibited a groove originating from the distal marginal ridge and extending onto the distal surface. In USPM,

the groove from the mesial marginal ridge was absent in 60% of the teeth and present in 34%.

In UFPM, the buccal cusp was centralized in 55% of the cases, distally deviated in 39%, and mesially deviated in 6%. For USPM, 91% presented a centralized buccal cusp, showing a significant difference compared to UFPM. This result, obtained through visual assessment, corresponds to the quantitative analysis of the longitudinal ridges, with the mean value of the mesial longitudinal ridge in USPM being 3.13 mm and 2.99 mm for the distal ridge. There was a statistically significant difference in the measurements of the mesial and distal longitudinal ridges of both the buccal and lingual cusps between UFPM and USPM (Graphs 4 to 7), with these measurements directly related to the position of the cusps.

The position of the lingual cusp was a more prevalent and homogeneous feature, being mesialized in 96% of UFPM and in 89% of USPM. This contrasts with Madeira & Rizzolo (2016), who reported that the lingual cusp is not mesialized. Our findings highlight an interesting aspect that can assist students during practical Dental Anatomy classes in determining which side the tooth belongs to. The lingual cusp displaced to the mesially is a characteristic that we frequently observe in upper premolars during practical classes, and this observation was confirmed by the results of this study. According to Scheid & Weiss (2012), this characteristic is excellent for differentiating left from right teeth.

It is reported in the literature that USPM present numerous supplemental grooves, giving the occlusal surface a wrinkled appearance (Madeira & Rizzolo, 2016; Wolfel & Scheid, 2000). Our results confirmed this assertion, as the presence of supplemental grooves on the buccal surface was observed in 99% of the teeth, with 50% exhibiting 2 grooves, 30% with 3 grooves, 14% with 4 grooves, and 5% with 1 groove. Regarding the lingual surface, only 14% of the teeth did not present this anatomical feature. A statistically significant difference was found in the frequency of supplemental grooves on the buccal cusp between UFPM and USPM, being more frequent in USPM.

Regarding the number of roots, 61% of UFPM presented one root. An identical result was reported by Elhejazi et al. (2021), with 39% of UFPM having two roots and 61% having one root. These findings differ from authors who state that UFPM usually have two roots (Picosse, 1983; Wolfel & Scheid, 2000; Figún & Garino, 2003; Scheid & Weiss, 2012; Madeira & Rizzolo, 2016; Fehrenbach & Popowics, 2022). Wolfel & Scheid (2000) reported a percentage of 61% with two roots, 38% with one root, and 1% with three roots. Bulut et al. (2015) found that 70.8% of the UFPM had two roots, 28.2% had one root, and 1% had three roots. A similar result was observed by Liu et al. (2021), with 70.22% being biradicular

and 29.32% with one root. Stošić et al. (2016) found a frequency of 46.3% with one root and 53.7% biradicular, demonstrating that UFPM not necessarily present two root in most cases. According to Madeira & Rizzolo (2016), roots may be fused with a clear demarcation line between them, and apical bifurcation may occur. In our study, roots were described as fused when this line was clearly visible, observed in 21% of the teeth. When bifurcated, 10% of the teeth presented bifurcation in the middle third, 6% apical bifurcation, and 2% cervical bifurcation.

Our results showed that 68% of USPM presented one root. According to Elhejazi et al. (2021), uniradicular USPM were observed more frequently (93%). Our results also differ from what is reported by Madeira & Rizzolo (2016) and Picosse (1983), who cite frequencies of 90% and 80% for uniradicular USPM, respectively. Bulut et al. (2015) reported a frequency of 82.1% of USPM with one root, and Stošić et al. (2016) of 89.6%. Figún & Garino (2003) stated that USPM always have one root. We disagree with this statement, since anatomical variation is possible in any organ of the human body, and anatomical variations are commonly present in teeth, especially in dental roots.

The root apex of the UFPM presented distal deviation in 57% of cases, and in USPM, it was straight in 50%, with no statistical difference between them. According to Woelfel & Scheid (2000), the root apex is often distally deviated (66% for UFPM and 58% for USPM).

There was a statistically significant difference in the evaluation of the root grooves between the UFPM and USPM. In the UFPM, the deepest root groove was present on the mesial surface (69%), in agreement with what was described by Woelfel & Scheid (2000). The higher frequency of a deeper root groove on the mesial surface of the UFPM is a characteristic that can help in identifying the mesial surface. Most of the USPM did not present any difference in the depth of the root grooves, and in 30%, the deepest root groove was found on the distal surface. This characteristic, therefore, does not represent a striking aspect and cannot be considered to identify the side to which the UFPM belongs during practical Dental Anatomy classes.

CONCLUSION

The results of this study demonstrate that UFPM and USPM exhibit measurements and features that facilitate their identification and differentiation. Some anatomical aspects are more frequent and uniform, while others show greater variability. It was concluded that the root is not a significant characteristic for distinguishing between them, as the majority of UFPM and USPM in our sample presented one root. The larger buccal cusp and the

presence of a cervical depression on the mesial surface of UFPM, a short central groove and more frequent supplemental grooves in USPM, are important features for differentiating between upper premolars. For assisting in the identification of the side of extracted teeth, the lingual cusp mesially deviated is a frequent characteristic for both upper premolars. Understanding these characteristics favors the identification of teeth in Dental Anatomy classes.

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