

# Morphometric Study of the Dental Roots of Permanent Lower Anterior Teeth in Brazilian Individuals

Estudio Morfométrico de las Raíces Dentales de los Dientes Anteriores Inferiores Permanentes de Individuos Brasileños

Nilton Alves\*

---

ALVES, N. Morphometric study of the dental roots of permanent lower anterior teeth in Brazilian individuals. *Int. J. Morphol.*, 33(1):210-212, 2015.

**SUMMARY:** The knowledge of dental morphometry, especially of its radicular portion, is of great importance for certain dental specialties, such as, endodonty. Regarding the permanent lower anterior teeth we know that its morphology and root length, are variable. The aim of this study was to analyze the average length of the dental roots of permanent lower anterior teeth in Brazilian individuals. The average root length obtained in this study for the lower central incisors was 13.07 mm; to lower canines the value found was 15.81 mm; the average value for the radicular portion of lower lateral incisors was 13.08 mm. We conclude that the mean value for the length of the radicular portion of permanent lower central incisors is similar to that found for permanent lower lateral incisors, because they have similar anatomical features. Among the lower incisors and lower canines the discrepancy is greater because the lower canines are bulkier. Furthermore, we could conclude that the values obtained in our study may be used as a parameter to characterize the average length of the dental roots of permanent lower anterior teeth in Brazilian individuals.

**KEY WORDS:** Morphometry; Permanent lower anterior teeth; Dental roots.

---

## INTRODUCTION

The knowledge of dental morphometry, especially of its radicular portion, is of great importance for certain dental specialties, such as, the endodonty (Alves, 2010). The determination of the root canal length must be accurate and reliable since it is one of the most important conditions that influence the success of root canal treatments (Ricucci & Langeland, 1998).

Regarding the permanent lower anterior teeth we know that its morphology and root length, are variable. The dental radiography reveals radicular lengths close to the real. This information associated with theoretical knowledge determines the clinical procedures that must be employed in performing certain dental treatments. Thus, the knowledge of average length of the dental root helps a lot the professional, being a safe route to a successful treatment and to avoid unpleasant situations.

The aim of this study was to analyze the average length of the dental roots of permanent lower anterior teeth in Brazilian individuals.

## MATERIAL AND METHOD

Six Hundred and five human teeth extracted from Brazilian individuals were used in this study, distributed as follows: 150 permanent lower central incisors; 200 permanent lower lateral incisors and 255 permanent lower canines. All belonging to Department of Morphology, Faculty of Dentistry of Araraquara - UNESP, Brazil. The permanent lower anterior teeth were previously selected, have been included in the present study only those who had dental roots intact. The measurements were performed with the aid of a digital caliper, Mitutoyo CD-6 CS. The measurements were made considering as total length of the root the distance between the highest point of the cervical line of the tooth and the root apex.

## RESULTS

The results shown in Table I represent the maximum, minimum and average values obtained for the permanent lower anterior teeth. In Figure 1 we can observe that the

\*CIMA, Departamento de Odontología Integral, Universidad de La Frontera, Temuco, Chile.

highest average was found in lower canines, and the average of lower central incisor and lower lateral incisor are very close.

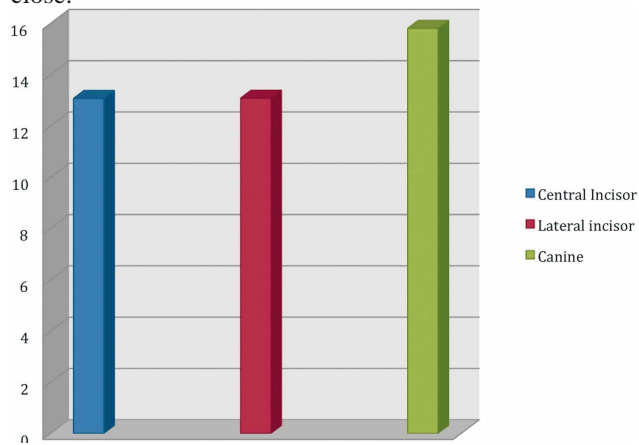


Fig. 1. Representation of the discrepancy existing between the average root lengths of permanent lower canines and permanent lower incisors.

Table I. Minimum, maximum and average values found in millimeters for the radicular portion of the permanent lower anterior teeth.

	Central Incisor	Lateral Incisor	Canine
Minimum	9.13	8.51	11.63
Maximum	17.24	17.31	23.55
Average	13.07	13.08	15.81

## DISCUSSION

The average root length obtained in this study for the lower central incisors was 13.07 mm. This value is relatively higher in relation to those observed by other authors, such as 11.80 mm by Black (1897); 11.90 mm by Figún & Garino (1988) and Aprile *et al.* (1975); 12 mm by Sicher & Tandler (1942) and Bouland & Lebourg (1932); 12.50 mm by Ash Jr. (1987). The closest values were found by Woelfel & Scheid (2000), which was 12.60 mm and Picosse (1977), which was 12.65 mm. Already Diamond (1930), found 15 mm, a value higher than those found by other authors.

To lower canines the value found was 15.81 mm, fairly similar to the values found by: Woelfel & Scheid which was 15.90 mm and Ash Jr. which was 16 mm. The value of 15.30 mm was coincidentally found by Black, Aprile *et al.*, Picosse and Figún & Garino, which were not significantly different to that obtained in this study. The major discrepancy was found in relation to the results obtained by Alves (1962) and Sicher & Tandler who found the value of 14 mm for the

lower canines. We also observed a lower value on the work developed by Bouland & Lebourg that found 15 mm. Among the authors surveyed, Diamond again had the highest average, which was 20 mm.

The average value for the radicular portion of lower lateral incisors was 13.08 mm, the same value to that obtained by Picosse, and close to those found by Woelfel & Scheid, which was 13.50 mm; Sicher & Tandler and Alves (1962) that found 13.30 mm. Some authors found values lower than ours: Aprile *et al.* and Figún & Garino obtained 12.50 mm, Black 12.70 mm and Bouland & Lebourg obtained 11.50 mm. The values above were: Diamond, who found 16 mm and Ash Jr., who found 14 mm.

The extreme values cannot be ignored, because it can be found in practice, even been very rare. It was also observed that the canines have longitudinal depressions on both sides of the root, which is often inclined to distal that happens also with the lateral incisors. Not so with the central incisors, which are smaller and have mesial and distal grooves very evident which are considered a risk factor for periodontal disease. In some cases they even separate the root into buccal and lingual portions.

In our study we could conclude that the mean value for the length of the radicular portion of permanent lower central incisors is similar to that found for permanent lower lateral incisors, because they have similar anatomical features. Among the lower incisors and lower canines the discrepancy is greater because the lower canines are bulkier. Furthermore, we could conclude that the values obtained in our study may be used as a parameter to characterize the average length of the dental roots of permanent lower anterior teeth in Brazilian individuals.

ALVES, N. Estudio morfométrico de las raíces dentales de los dientes anteriores inferiores permanentes de individuos brasileños. *Int. J. Morphol.*, 33(1):210-212, 2015.

**RESUMEN:** El conocimiento de la morfometría dental, especialmente de su porción radicular, es de gran importancia para determinadas especialidades odontológicas, tales como la endodoncia. En cuanto a los dientes anteriores inferiores permanentes se sabe que su morfología y longitud radicular son variables. El objetivo de este estudio fue analizar el valor promedio de la longitud de las raíces dentales de los dientes anteriores inferiores permanentes de individuos brasileños. El valor promedio de la longitud de la raíz obtenido para el incisivo central inferior fue el 13,07 mm; para el canino inferior el valor promedio encontrado fue el 15,81 mm; el valor promedio para la porción radicular del incisivo lateral inferior fue el 13,08 mm. Se concluye que el valor promedio de la longitud de la porción radicular de los incisivos centrales mandibulares permanentes es similar al valor encontra-

do para los incisivos laterales mandibulares permanentes, hecho que se debe a las características anatómicas similares existentes entre ellos. Entre los incisivos y caninos mandibulares la discrepancia es mayor porque los caninos mandibulares son más voluminosos. Adicionalmente, concluimos que se puede utilizar los valores promedios obtenidos en este estudio como parámetro para caracterizar la longitud promedio de las raíces dentales de los dientes anteriores mandibulares permanentes de individuos Brasileños.

**PALABRAS CLAVE: Morfometría; Dientes anteriores inferiores permanentes; Raíces dentales.**

---

## REFERENCES

- Alves, E. *Anatomia Odontológica*. Rio de Janeiro, Atheneu S. A., 1962.
- Alves, N. Morphometric and morphological study of the dental roots of the upper first premolars. *Int. J. Odontostomat.*, 4(2):111-5, 2010.
- Aprile, H.; Figun, M. E. & Garino, R. R. *Anatomia Odontológica Orocervicofacial*. 5ª ed. Buenos Aires, El Ateneo, 1975.
- Ash Jr., M. M. *Wheeler's Anatomia, Fisiologia e Oclusão Dental*. São Paulo, Santos, 1987.
- Black, G. V. *Descriptive Anatomy of the Human Teeth*. 4th ed. Philadelphia, S S. White Dental Manufac. Co., 1897.
- Bouland, A. & Lebourg, L. *Manuel de Dessin Dentaire*. 3rd ed. Paris, Masson, 1932.
- Diamond, M. Dental anatomy. A graphic representation of crown form, with technic for their reproduction. *J. Amer. Dent. Assoc.*, 17(3):470-85, 1930.
- Figún, M. E. & Garino, R. R. *Anatomia Odontológica funcional e aplicada*. São Paulo, Medicina Panamericana, 1988.
- Picosse, M. *Anatomia dentária*. 2ª ed. São Paulo, Sarvier, 1977.
- Ricucci, D. & Langeland, L. Apical limit of root canal instrumentation and obturation, part 2. A histologic study. *Int. Endod. J.*, 31(6):394-409, 1998.
- Sicher, H. & Tandler, J. *Anatomia para Dentistas*. Barcelona, Labor, 1942.
- Woelfel, J. B. & Scheid, R. C. *Anatomia dental (sua relevância para a Odontologia)*. 5ª ed. Rio de Janeiro, Guanabara Koogan, 2000.

Correspondence to:  
Nilton Alves  
CIMA Research Group  
Faculty of Dentistry  
Universidad de La Frontera  
Avda. Manuel Montt 112.  
Casilla 54-D  
Temuco  
CHILE

Email: nilton.alves@ufrontera.cl

Received: 08-07-2014

Accepted: 10-01-2015