IRAQI Academic Scientific Journals
العراقية المجلات الأكاديمية العلمية
**ISSN:1813-1638**
***The Medical Journal of Tikrit University***
**Journal Homepage:** http://mjtu.tu.edu.iq
**MJTU**
**The Medical Journal of Tikrit University**

# Radiological Study for Premolar Teeth of Adult Humans in Salah Al-Din Governorate

**Hader Ahmed Rajab[1], Mohammad Ahmad Abdalla[2], Ilham M. Mahmood[2]**
[1] Dentist, College of Dentistry, Tikrit University, Salah Al-Din, Iraq
[2] Human Anatomy Department, College of Medicine, Tikrit University, Tikrit, Salah Al-Din, Iraq

[*]*Corresponding author*: E-mail: dentist.hadeer@gmail.com

**Received:** 00/00/2024
**Revising:** 00/00/2024
**Proofreading:** 00/00/2024
**Accepted:** 00/00/2024
**Available:online:**31/12/2024

**KEY WORDS:**
cone beam computed tomography, permanent premolar teeth, tooth measurements.

**ABSTRACT**
Cone-beam computed tomography (CBCT) is a rapid, easy, and noninvasive technique that allows dentists to assess the anatomical characteristics of a specific tooth efficiently.
CBCT images of 42 patients of two genders, aged between 20 and 40 years old in Salah Al-Din Governorate were selected. These cases were gathered from September 2023 to April 2024.
The results of this study revealed that tooth length, crown length, and root length measurements were longer in males than females and those above 30 longer than those below 30. Bucco-palatal diameter and bucco-palatal diameter at the cervix length were longer in males than females but those above 30 were shorter than those below 30. The mesiodistal and mesiodistal diameters at the cervix were longer in those below 30 than above 30.
In conclusion, the mean of TL, CL, and RL measurements were significantly longer in males than females and those above 30 longer than those below 30. The mean of BP and BPC diameters were longer in males than females but those above 30 were shorter than those below 30. Still, the mean of MD and MDC diameters were longer in those below 30 than above 30.

DOI: http://doi.org/10.25130/mjotu.00.00.00



## INTRODUCTION

Cone beam computed tomography (CBCT) is a cutting-edge imaging technique that is used to generate three-dimensional representations of objects or individuals that allows for the observation of both hard and soft tissues in the maxillofacial area. In clinical practice, CBCT pictures enable clinicians to see the limits of caries, periapical

disease, bone disease, impacted tooth, sinus, and inferior alveolar nerve [1].

CBCT has the advantages of high picture quality, volumetric analysis, quick scan periods, and comparatively lower radiation exposure compared to traditional medical CT have led to its widespread use as an imaging technique in all areas of dentistry. Various professions, like orthodontics, oral surgery, implant dentistry, periodontics, and endodontics, benefit from the distinct usefulness of the three-dimensional reconstructions offered by CBCT [2].

Enamel is the highly mineralized and hence extremely radiopaque outer layer of the tooth's crown. The cementum is the mineralized layer that covers the roots. The cementoenamel junction is the genuine anatomic boundary between the crown and the roots. Dentin, a calcified matrix, is located under the enamel and cementum in both the crown and roots. Dentin is less mineralized than enamel, making it somewhat less radiopaque, but it is equally mineralized and is attenuated to cementum. The pulp is the most radiolucent portion of the tooth, located deep in the dentin. [3].

## MATERIAL

This study was conducted using CBCT images of 42 patients of two genders, aged between 20 and 40 years old, selected from the Dentistry Collage of Tikrit University in Iraq that assesses tooth measurements. CBCT is used to measure the maxillary and mandibular premolar teeth as following:

**1. Length of the Premolar Tooth (TL)**

Measurement: taken from the highest point of the cusp to the highest point (apex).

**2. Length of Crown (Buccal) of the Premolar Tooth (CL)**

Measurement: taken from the highest point of the cusp to the point where the curvature begins at the junction of the cementum and enamel.

**3. Length of Root of the Premolar Tooth (RL)**

Measurement: Distance from the highest point (apex) to the highest point of curvature (crest) at the crown of the cervix.

**4. Bucco-Palatal or Bucco-lingual Diameter of Crown of the Premolar Tooth (BP or BL)**

Measurement: Distance from the highest point on the tooth's outer surface to the highest point on the inside surface of the tooth (palatal for upper and lingual for lower).

**5. Bucco-Palatal or Bucco-lingual Diameter of Crown at the Cervix of the Premolar Tooth (BPC or BLC)**

Measurement: Intersection of the crown and root on the outer surface to intersection of the crown and root on the inner surface (palatal for upper and lingual for lower).

**6. Mesiodistal Diameter of Crown of the Premolar Tooth (MD)**

Measurement: The highest point of curvature on the mesial contact area to the highest point of curvature on the distal contact area.

**7. Mesiodistal Diameter of Crown at the Cervix of the Premolar Tooth (MDC)**

Measurement: Intersection of the crown and root on the mesial surface to intersection of the crown and root on the distal surface.

The CBCT images below demonstrate the parameters used for measuring the premolar teeth as shown in (Figure 1).

## RESULTS

The results were classified according to variables (Tooth Length TL, Crown Length CL, Root Length RL, Bucco-Palatal or Bucco-Lingual diameter of crown BP, Mesio-Distal diameter of crown MD, Bucco-Palatal or Bucco-Lingual diameter of crown at Cervix BPC, and Mesio-Distal diameter of crown at Cervix MDC). The radiological measurements for each variable were tabled, and each table includes a comparison between males and females and a comparison between two different age groups.

### 1. Tooth Length (TL)

There was a significant difference between the upper first and second premolar tooth length in which males were longer than females in both teeth.

There was a significant difference between upper first premolar teeth in which those above 30 years old were longer than those below 30 years old (Figure 2) (table 1).

There was a significant difference between Lower first premolar tooth length in which males were longer than females (Figure 3) (table 2).

Table 1: Comparison between Tooth Length (TL) of Upper Premolar Teeth According to Gender and Age Differences

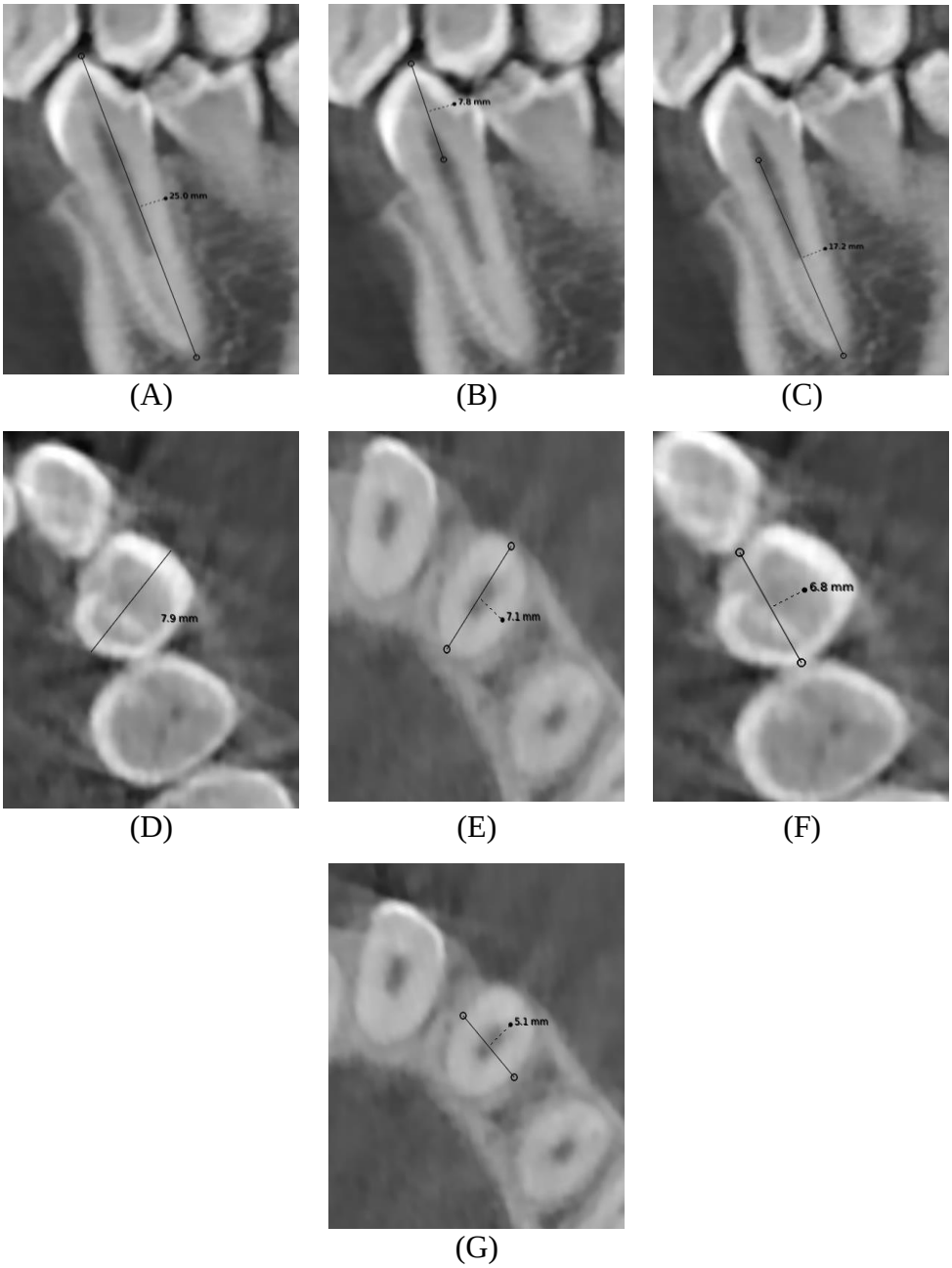
| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 36 | 21.72 | 1.3 | 34 | 20.75 | 1.5 | 0.002* |
| SP | 30 | 21.43 | 2.3 | 32 | 20.45 | 1.7 | 0.03* |
| | (30-39 years old) | | | (20-29 years old) | | | |
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 28 | 21.68 | 1.6 | 42 | 20.96 | 1.2 | 0.03* |
| SP | 20 | 20.68 | 2.8 | 42 | 21.04 | 1.6 | 0.3 |

* Significant at p-value<0.05

Table 2: Comparison between Tooth Length (TL) of Lower Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean** | **SD** | **P** |
| FP | 40 | 22.41 | 1.5 | 41 | 21.51 | 1.6 | 0.007* |
| SP | 37 | 22.24 | 3.7 | 36 | 21.56 | 1.8 | 0.16 |
| | **(30-39 years old)** | | | **(20-29 years old)** | | | |
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 35 | 22.04 | 1.9 | 46 | 21.89 | 1.4 | 0.35 |
| SP | 31 | 22.48 | 2.0 | 42 | 21.48 | 3.4 | 0.06 |

* Significant at p-value<0.05




(A) (B) (C)

(D) (E) (F)

(G)

Figure 1: The Measurements of Premolar Tooth on CBCT; (A) – Tooth Length, (B) – Crown Length, (C) – Root Length, (D) – Bucco-Palatal or Bucco-lingual Diameter of the Crown, (E) – Bucco-Palatal or Bucco-lingual Diameter of the Crown at Cervix, (F) – Mesiodistal Diameter of the Crown, (G) – Mesiodistal Diameter of the Crown at Cervix

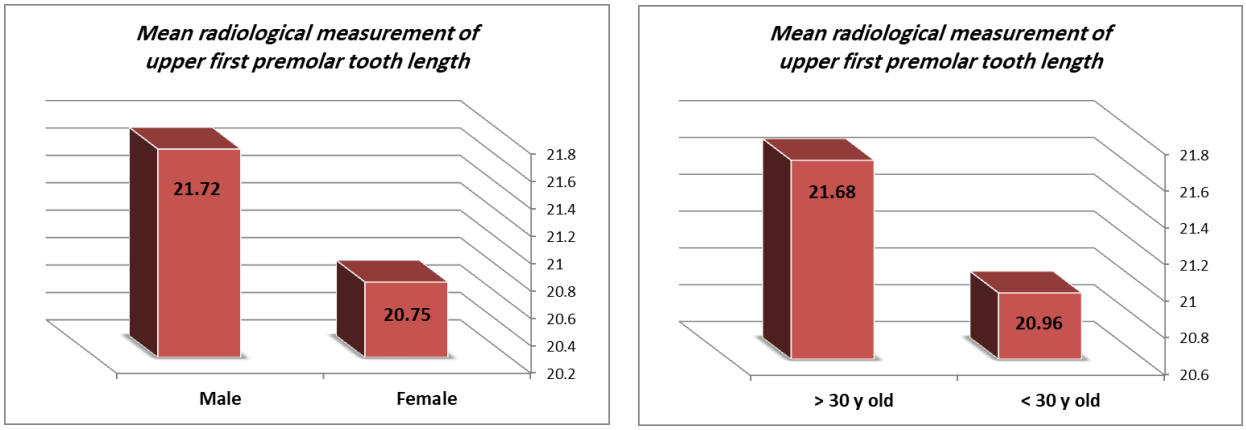



Figure 2: Comparison between Tooth Length (TL) of Upper Premolar Teeth According to Gender and Age Differences

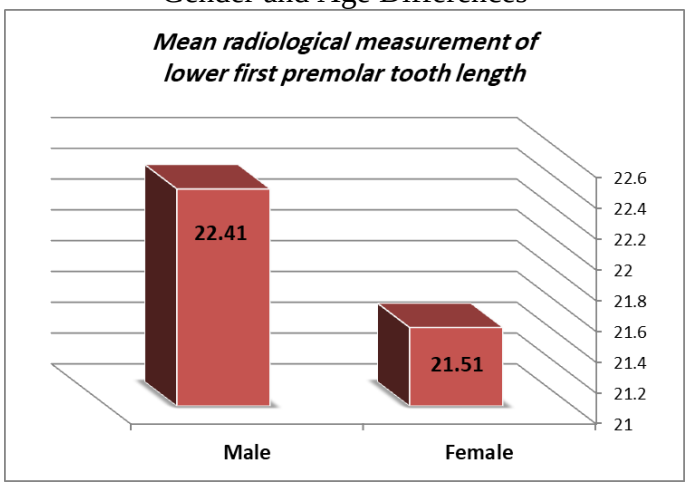



Figure 3: Comparison between Tooth Length (TL) of Lower Premolar Teeth According to Gender and Age Differences

**2. Crown Length (CL)**

There was a significant difference between upper second premolar crown length in which males were longer than females (Figure 4) (table 3)

There was a significant difference between lower first and second premolar crown length in which those below 30 years old were longer than those above 30 years old (Figure 5) (table 4).

**3. Root Length (RL)**

There was a significant difference between the upper first and second premolar root length in which males were longer than females.

There was a highly significant difference between upper first premolar teeth in which those above 30 years old were longer than those below 30 years old (Figure 6) (table 5).

There was a significant difference between lower first and second premolar root length in which males were longer than females.

There was a significant difference between lower second premolar root lengths in which those above 30 years old were longer than those below 30 years old (Figure 7) (table 6).

Table 3: Comparison between Crown Length (CL)of Upper Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean** | **SD** | **P** |
| FP | 36 | 6.45 | 0.6 | 34 | 6.26 | 0.7 | 0.14 |
| SP | 30 | 6.36 | 0.5 | 32 | 5.96 | 0.6 | 0.006* |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 28 | 6.21 | 0.7 | 42 | 6.45 | 0.6 | 0.09 |
| SP | 20 | 6.06 | 0.6 | 42 | 6.20 | 0.6 | 0.21 |

* Significant at p-value<0.05

Table 4: Comparison between Crown Length (CL) of Lower Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean** | **SD** | **P** |
| FP | 40 | 6.42 | 0.9 | 41 | 6.41 | 0.8 | 0.48 |
| SP | 37 | 6.30 | 0.6 | 36 | 6.16 | 0.8 | 0.21 |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 35 | 6.22 | 0.9 | 46 | 6.57 | 0.8 | 0.04* |
| SP | 31 | 6.00 | 0.7 | 42 | 6.40 | 0.7 | 0.01* |

* Significant at p-value<0.05

Table 5: Comparison between Root Length (RL) of Upper Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean** | **SD** | **P** |
| FP | 36 | 15.28 | 1.2 | 34 | 14.57 | 1.1 | 0.008* |
| SP | 30 | 15.37 | 1.4 | 32 | 14.47 | 1.4 | 0.01* |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 28 | 15.55 | 1.1 | 42 | 14.53 | 1.1 | 0.0003* |
| SP | 20 | 15.06 | 1.6 | 42 | 14.83 | 1.4 | 0.29 |

* Significant at p-value<0.05 ** highly significant at p-value<0.001

Table 6: Comparison between Root Length (RL) of Lower Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean** | **SD** | **P** |
| FP | 40 | 15.73 | 1.6 | 41 | 15.09 | 1.2 | 0.02* |
| SP | 37 | 16.42 | 1.7 | 36 | 15.40 | 1.6 | 0.005* |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 35 | 15.53 | 1.7 | 46 | 15.31 | 1.1 | 0.27 |
| SP | 31 | 16.47 | 1.6 | 42 | 15.50 | 1.6 | 0.008* |

* Significant at p-value<0.05

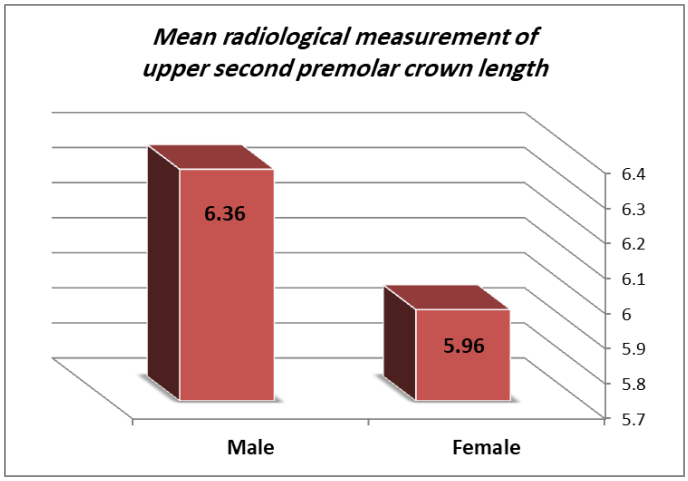



Figure 4: Comparison between Crown Length (CL)of Upper Premolar Teeth According to Gender and Age Differences

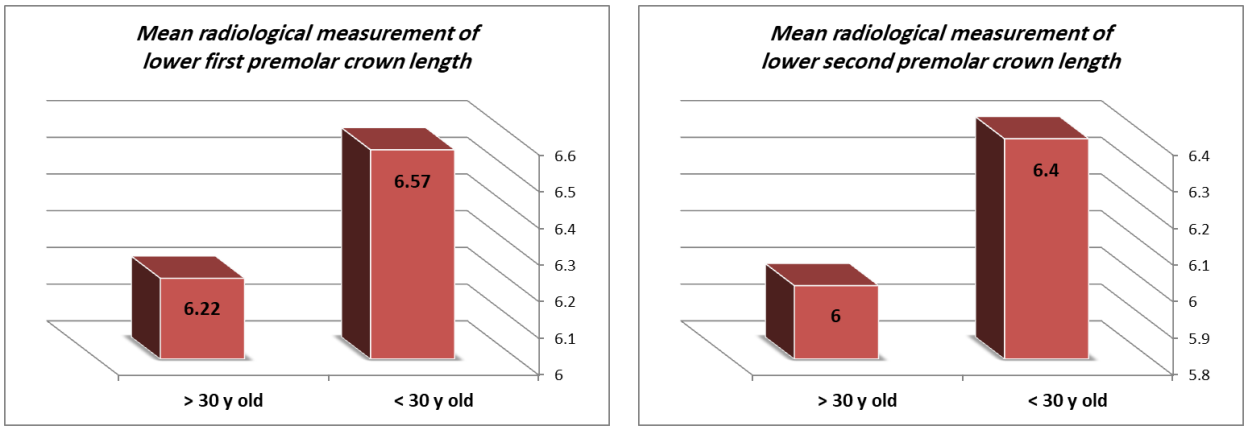
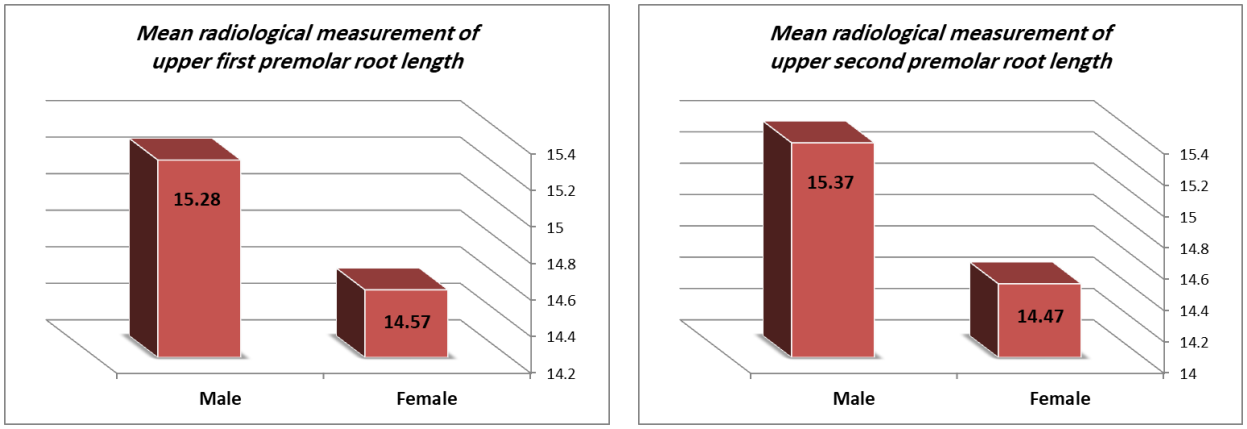



Figure 5: Comparison between Crown Length (CL) of Lower Premolar Teeth According to Gender and Age Differences



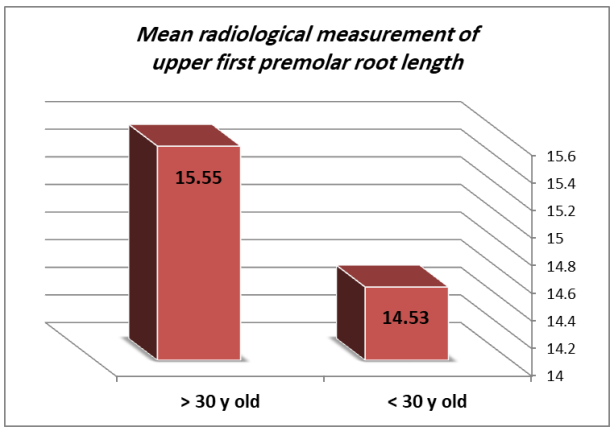




Figure 6: Comparison between Root Length (RL) of Upper Premolar Teeth According to Gender and Age Differences

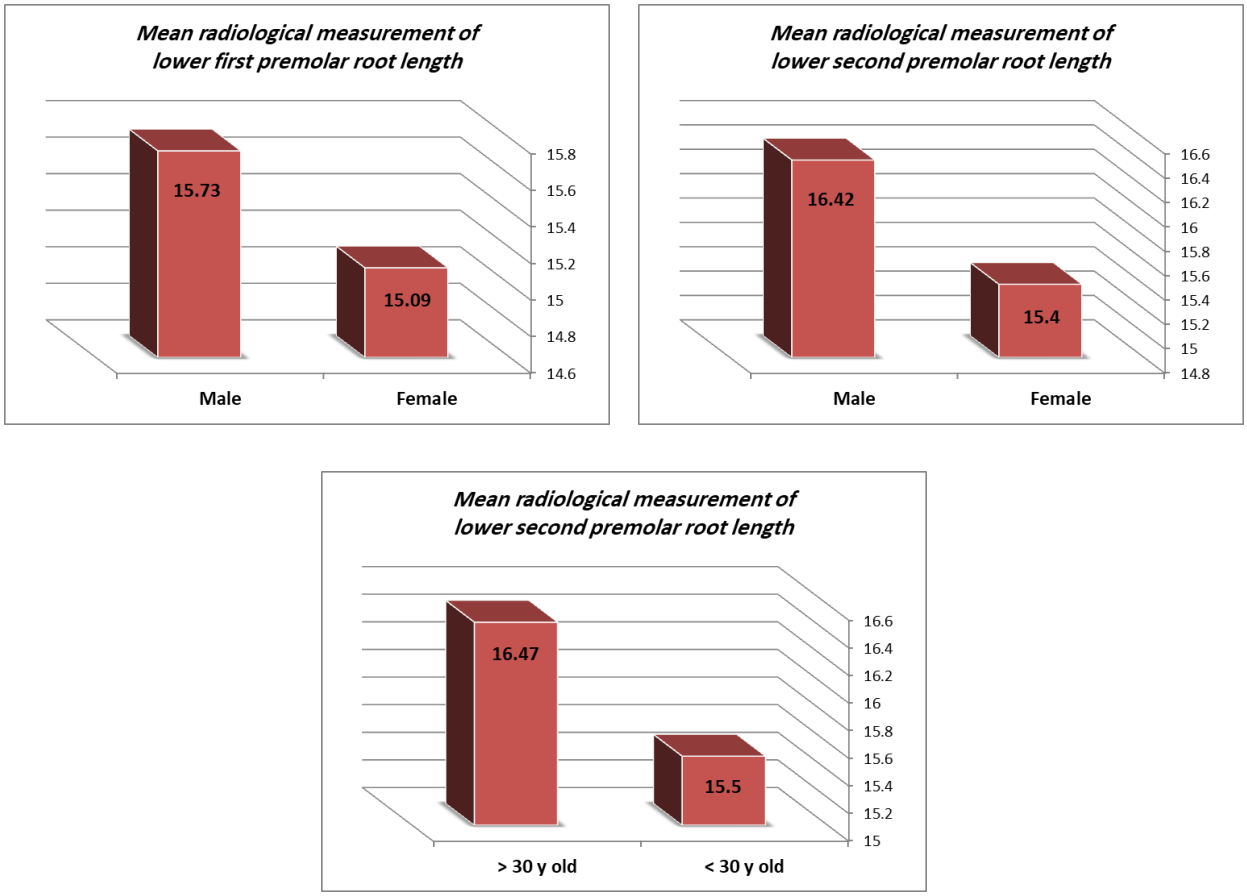



Figure 7: Comparison between Root Length (RL) of Lower Premolar Teeth According to Gender and Age Differences

**4. Bucco-Palatal or Bucco-Lingual Diameter of Crown (BP or BL)**

There was a significant difference between the upper second premolar Bucco-palatal Diameter of the Crown (BP) in which those above 30 years old were longer than those below 30 years old (Figure 8) (table 7).

There was a significant difference between the lower first premolar Bucco-Lingual Diameter of the Crown (BL) in which males were longer than females. There was a significant difference between the lower first premolar Bucco-Lingual Diameter of the Crown (BL) in which those below 30 years old were longer than those above 30 years old.

There was a highly significant difference between lower second premolar Bucco-Lingual Diameter of Crown (BL in which those below 30 years old were longer than those above 30 years old (Figure 9) (table 8).

Table 7: Comparison between Bucco-Palatal Diameter of Crown (BP) of Upper Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean** | **SD** | **P** |
| FP | 36 | 9.06 | 0.6 | 34 | 9.17 | 0.5 | 0.29 |
| SP | 30 | 9.34 | 0.7 | 32 | 9.29 | 0.7 | 0.38 |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 28 | 8.98 | 0.6 | 42 | 9.20 | 0.6 | 0.06 |
| SP | 20 | 9.04 | 0.8 | 42 | 9.44 | 0.6 | 0.02* |

* Significant at p-value<0.05

Table 8: Comparison between Bucco-Lingual Diameter of Crown (BL) of Lower Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean** | **SD** | **P** |
| FP | 40 | 7.69 | 0.5 | 41 | 7.42 | 0.7 | 0.03* |
| SP | 37 | 8.44 | 0.7 | 36 | 8.35 | 0.9 | 0.31 |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 35 | 7.32 | 0.6 | 46 | 7.73 | 0.6 | 0.002* |
| SP | 31 | 7.98 | 0.6 | 42 | 8.71 | 0.7 | 0.00003** |

* Significant at p-value<0.05 ** highly significant at p-value<0.001

Table 9: Comparison between Mesio-Distal Diameter of Crown (MD) of Upper Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean** | **SD** | **P** |
| FP | 36 | 6.71 | 0.7 | 34 | 6.81 | 0.5 | 0.20 |
| SP | 30 | 6.62 | 0.4 | 32 | 6.62 | 0.3 | 0.49 |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 28 | 6.66 | 0.4 | 42 | 6.83 | 0.7 | 0.11 |
| SP | 20 | 6.57 | 0.4 | 42 | 6.64 | 0.3 | 0.25 |

* Significant at p-value<0.05

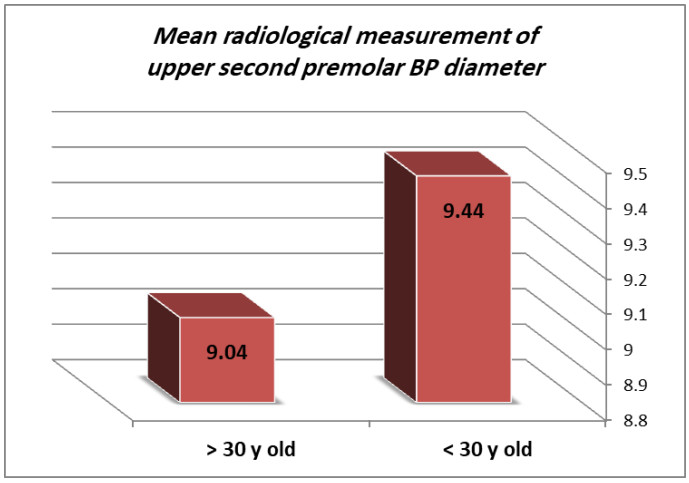
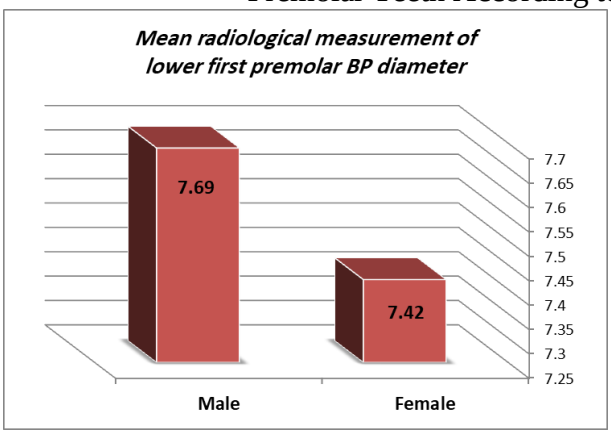
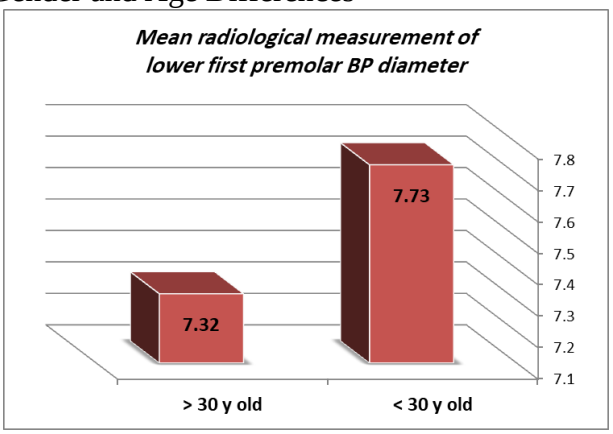



Figure 8: Comparison between Bucco-Palatal Diameter of Crown (BP) of Upper Premolar Teeth According to Gender and Age Differences



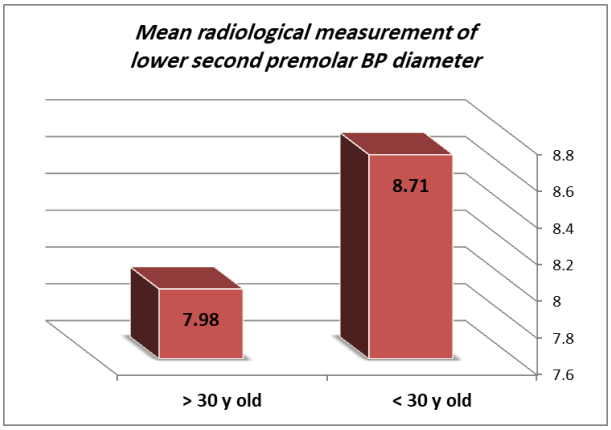




Figure 9: Comparison between Bucco-Lingual Diameter of Crown (BL) of Lower Premolar Teeth According to Gender and Age Differences

**5. Mesio-Distal Diameter of Crown (MD)**

There was no significant difference between the upper first and second premolar Mesio-Distal Diameter of the Crown (MD) (table 9).

There was a significant difference between the lower first and second

premolar Mesio-Distal Diameter of the Crown (MD) in which those below 30 years old were longer than those above 30 years old (Figure 10) (table 10).

**6. Bucco-Palatal or Bucco-Lingual Diameter of Crown at Cervix (BPC or BLC)**

There was a significant difference between the upper first and second premolar Bucco-Palatal Diameter of the Crown at the cervix (BPC) in which those below 30 years old were longer than those above 30 years old (Figure 11) (table 11).
There was a significant difference between the lower first and second premolar Bucco-Lingual Diameter of the Crown at the cervix (BLC) in which males were longer than females. There was a significant difference between the lower first and highly significant second premolar Bucco-Lingual Diameter of the Crown at the cervix (BLC) in which those below 30 years old were longer than those above 30 years old (Figure 12) (table 12).

**7. Mesio-Distal Diameter of Crown at Cervix (MDC)**

There was a significant difference between the upper first and second premolar Mesio-Distal Diameter of the Crown at the cervix (MDC) in which those below 30 years old were longer than those above 30 years old (Figure 13) (table 13).
There was a significant difference between the lower first and second premolar Mesio-Distal Diameter of the Crown at the cervix (MDC) in which those below 30 years old were longer than those above 30 years old (Figure 14) (table 14).

Table 10: Comparison between Mesio-Distal Diameter of Crown (MD) of Lower Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 40 | 6.82 | 0.5 | 41 | 6.77 | 0.6 | 0.36 |
| SP | 37 | 7.16 | 0.5 | 36 | 7.11 | 0.6 | 0.34 |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 35 | 6.64 | 0.6 | 46 | 6.91 | 0.5 | 0.02* |
| SP | 31 | 6.94 | 0.5 | 42 | 7.27 | 0.5 | 0.007* |

* Significant at p-value<0.05

Table 11: Comparison between Bucco-Palatal Diameter of Crown at Cervix (BPC) of Upper Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 36 | 8.51 | 0.8 | 34 | 8.47 | 0.5 | 0.40 |
| SP | 30 | 8.72 | 0.8 | 32 | 8.57 | 0.5 | 0.22 |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 28 | 8.31 | 0.6 | 42 | 8.60 | 0.6 | 0.04* |
| SP | 20 | 8.26 | 0.9 | 42 | 8.83 | 0.5 | 0.009* |

* Significant at p-value<0.05

Table 12: Comparison between Bucco-Lingual Diameter of Crown at Cervix (BLC) of Lower Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 40 | 7.24 | 0.5 | 41 | 6.97 | 0.6 | 0.02* |
| SP | 37 | 7.71 | 0.6 | 36 | 7.41 | 0.7 | 0.03* |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 35 | 6.88 | 0.6 | 46 | 7.27 | 0.5 | 0.002* |
| SP | 31 | 7.20 | 0.5 | 42 | 7.84 | 0.7 | 0.00001** |

* Significant at p-value<0.05 ** highly significant at p-value<0.001

Table 13: Comparison between Mesio-Distal Diameter of Crown at Cervix (MDC) of Upper Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 36 | 5.15 | 0.6 | 34 | 4.91 | 0.5 | 0.05 |
| SP | 30 | 5.27 | 0.5 | 32 | 5.20 | 0.7 | 0.33 |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 28 | 4.83 | 0.3 | 42 | 5.17 | 0.7 | 0.01* |
| SP | 20 | 4.99 | 0.4 | 42 | 5.35 | 0.7 | 0.008* |

* Significant at p-value<0.05

Table 14: Comparison between Mesio-Distal Diameter of Crown at Cervix (MDC) of Lower Premolar Teeth According to Gender and Age Differences

| | Male | | | Female | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 40 | 5.22 | 0.7 | 41 | 5.19 | 0.7 | 0.41 |
| SP | 37 | 5.52 | 0.8 | 36 | 5.53 | 0.7 | 0.48 |

| | (30-39 years old) | | | (20-29 years old) | | | |
|---|---|---|---|---|---|---|---|
| **Tooth** | **n.** | **Mean(mm)** | **SD** | **n.** | **Mean(mm)** | **SD** | **P** |
| FP | 35 | 5.02 | 0.4 | 46 | 5.34 | 0.9 | 0.02* |
| SP | 31 | 5.29 | 0.5 | 42 | 5.70 | 0.9 | 0.009* |

* Significant at p-value<0.05

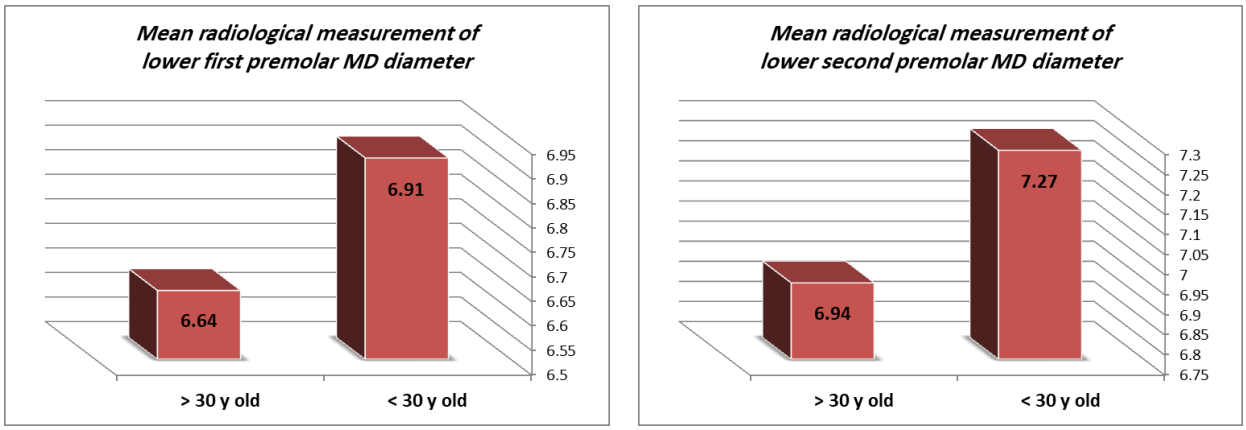



Figure 10: Comparison between Mesio-Distal Diameter of Crown (MD) of Lower Premolar Teeth According to Gender and Age Differences

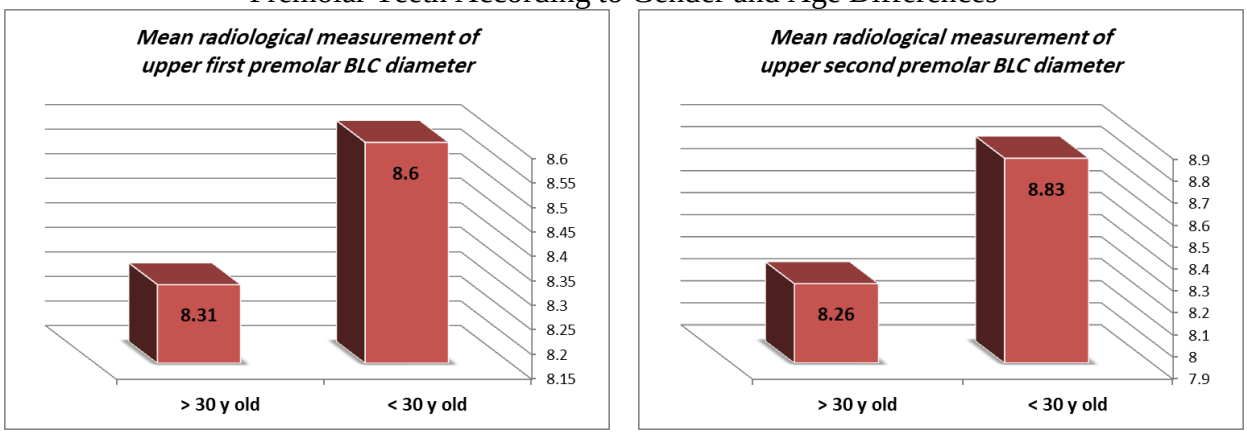
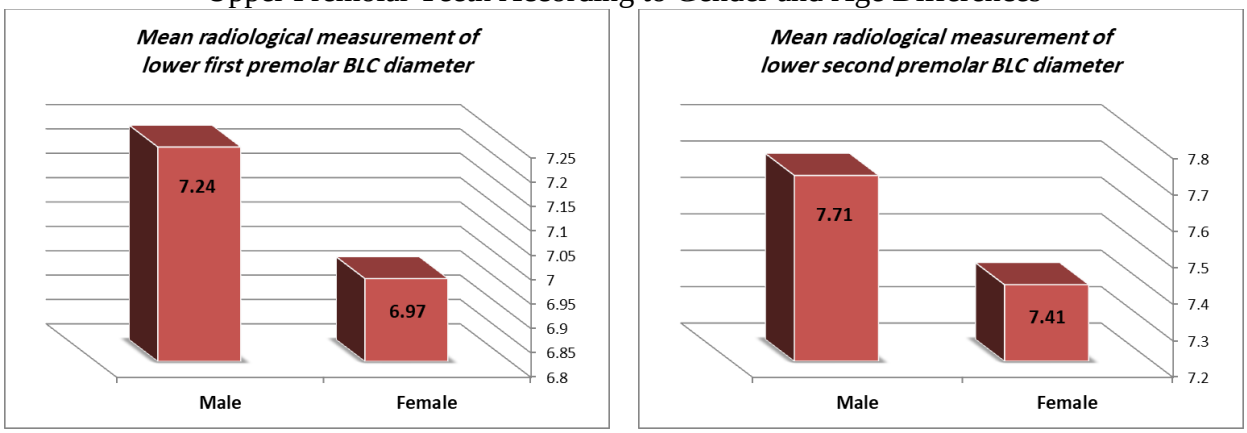



Figure 11: Comparison between Bucco-Palatal Diameter of Crown at Cervix (BPC) of Upper Premolar Teeth According to Gender and Age Differences



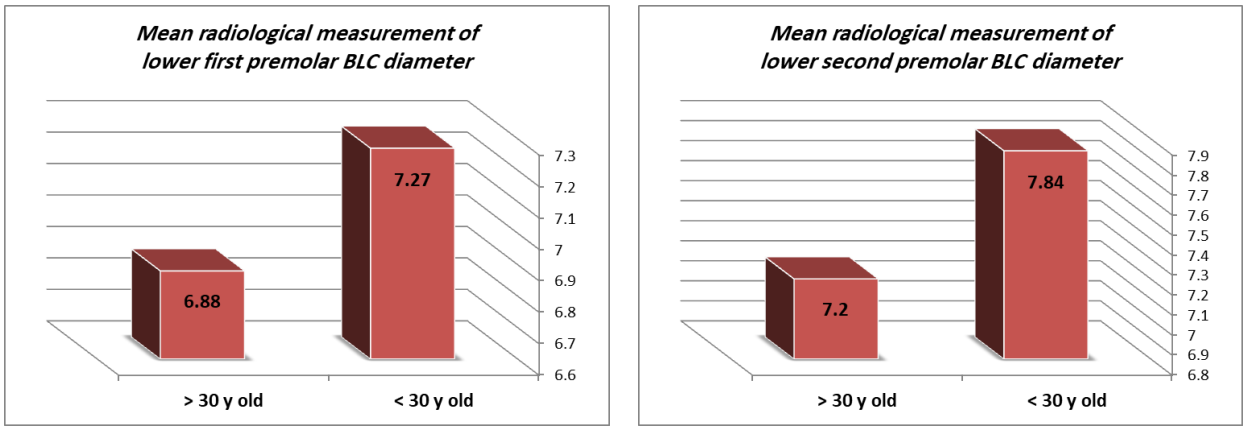



Figure 12: Comparison between Bucco-Lingual Diameter of Crown at Cervix (BLC) of Lower Premolar Teeth According to Gender and Age Differences

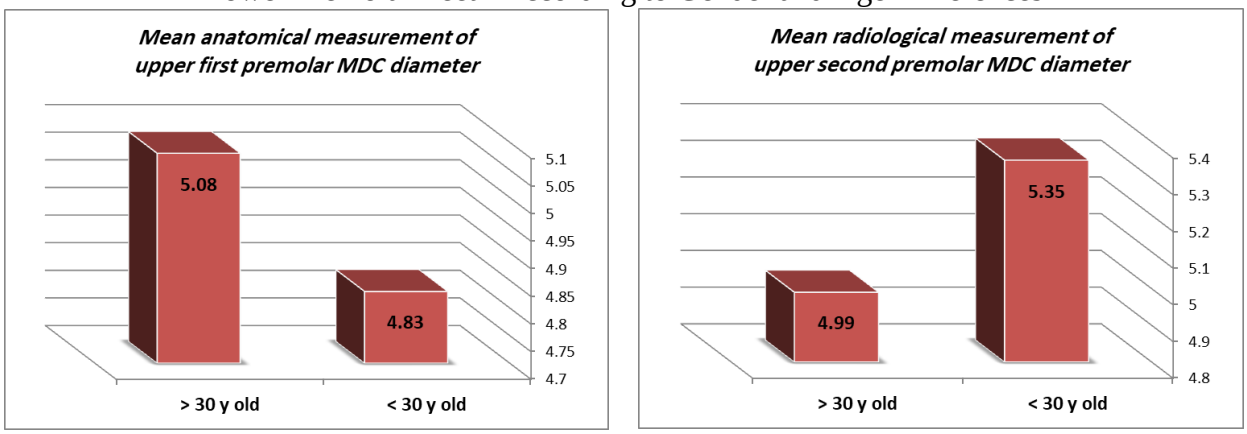



Figure 13: Comparison between Mesio-Distal Diameter of Crown at Cervix (MDC) of Upper Premolar Teeth According to Gender and Age Differences

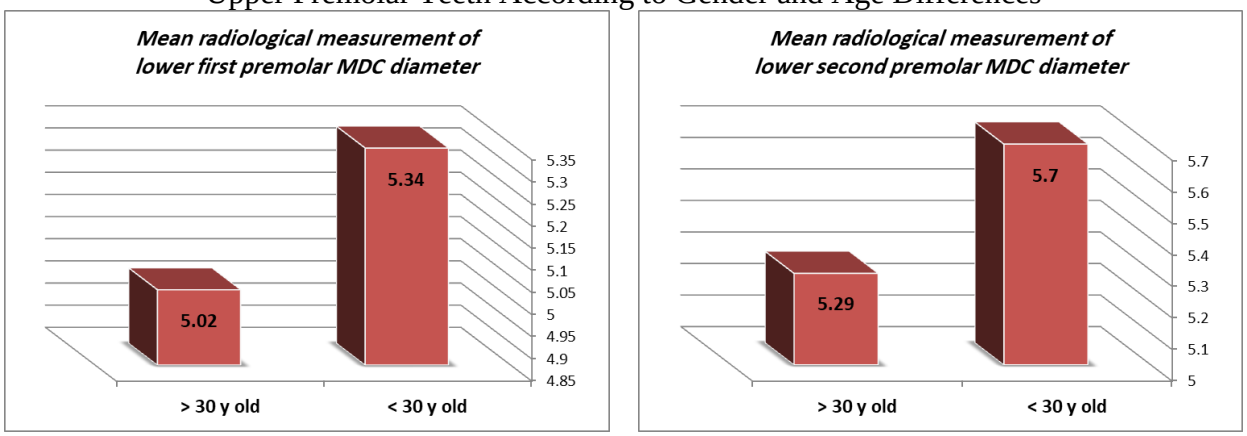



Figure 14: Comparison between Mesio-Distal Diameter of Crown at Cervix (MDC) of Lower Premolar Teeth According to Gender and Age Differences

## DISCUSSION

The Cone Beam Computed Tomography (CBCT) produces a comprehensive three-dimensional (3D) depiction of the teeth, jaws, and adjacent facial tissues [4].

Dental size differences may be attributed to many variables, including inheritance, race, sex, environment, and secular changes[5] .

The current analysis identified statistically significant differences in tooth length according to sex group for maxillary first and second premolars and maxillary first premolars, and significant differences according to the age group for maxillary first premolars this agrees with Ahmad H et al [6] but disagrees with Fernée C et al [7].

Significant differences in crown length according to sex group for maxillary second premolars and mandibular first and second premolars agree with Cunha A et al [8].

Significant differences in root length according to sex group for maxillary first and second premolars and mandibular first and second premolars, significant differences according to the age group for maxillary first premolars and mandibular second premolars agree with [9] but disagree with Elhejazi A et al [10].

Significant differences in the buccolingual diameter of the crown according to age group for maxillary second premolars, and mandibular first and second premolars, significant differences according to sex group for mandibular first premolars. Significant differences in the buccolingual diameter of the crown at the cervix according to the age group for maxillary first and second premolars, mandibular first premolars, maxillary and mandibular second premolars, significant differences according to sex group for mandibular first and second premolars agree with those studies [11,12] but disagree with Fernée C et al [7]. Significant differences in the mesiodistal diameter of the crown according to the age group for mandibular first and second premolars, the mesiodistal diameter of the crown at the cervix according to the age group for maxillary and mandibular premolars agrees with Cunha A et al [8] in contrast, this disagrees with Jeelani W et al [13].

Non-significant differences in the mesiodistal diameter of the crown between maxillary first and second premolars agree with Jeelani W et al [13] and Eliewy Saloom et al [14].

## CONCLUSION

On CBCT, tooth length, crown length, and root length measurements were longer in males than females and those above 30 longer than those below 30. Bucco-palatal diameter and bucco-palatal diameter at the cervix length were longer in males than females but those above 30 were shorter than those below 30. The mesiodistal and mesiodistal diameters at the cervix were longer in those below 30 than above 30.

## CONFLICT OF INTEREST

None declared.

## ACKNOWLEDGEMENTS

The authors thank all the institutions and dental clinics that provided the required data and support for conducting the present article.

## REFERENCES

1. Fan W, Zhang J, Wang N, Li J, Hu L. The Application of Deep Learning on CBCT in Dentistry. Diagnostics. 2023 Jun 14;13(12):2056.
2. Distefano S, Cannarozzo MG, Spagnuolo G, Bucci MB, Lo Giudice R. The “Dedicated” C.B.C.T. in Dentistry. Int J Environ Res Public Health. 2023 May 25;20(11):5954.
3. Dean KE. A radiologist’s guide to teeth: An imaging reviewof dental anatomy, nomenclature,trauma, infection, and tumors. Neurographics. 2020;10(5–6):302–18.
4. Kachhara S, Nallaswamy D, Ganapathy D, Ariga P. Comparison of the

CBCT, CT, 3D printing, and CAD-CAM Milling options for the most accurate root form duplication required for the root analogue implant (RAI) protocol. JIAOMR 2021;33(2):141.
5. Mendez EC, Limoeiro AG da S, Piana TD. Multiple Roots and Canals in Mandibular Canines and Premolars in a Brazilian Population: A Cross Sectional Study Using CBCT and Panoramic Radiography. IJAERS. 2020;7(12):210–6.
6. Ahmad H, Nasir U, Zeb M, Ali A, Qureshi A, Naeem S. A prospective study of the Various Categories of Crown to Root Ratio of Premolars by Using Cone Beam CT Images. PJMHS. 2022 Sep 30;16(9):129–31.
7. Fernée C, Zakrzewski S, Robson Brown K. Dimorphism in dental tissues: Sex differences in archaeological individuals for multiple tooth types. Am J Phys Anthropol. 2021 May 27;175(1):106–27.
8. Cunha AS, Vertuan dos Santos L, Schaffer Pugsley Baratto S, Abbasoglu Z, Gerber JT, Paza A, et al. Human permanent tooth sizes are associated with genes encoding oestrogen receptors. J Orthod 2021;48(1):24–32.
9. Llena C, Fernandez J, Ortolani PS, Forner L. Cone-beam computed tomography analysis of root and canal morphology of mandibular premolars in a Spanish population. Imaging Sci Dent. 2014;44(3):221–7.
10. Elhejazi A, Alanazi AA, Alanazi K, Alqahtani F, Shabi YM, Alqahtani AA. The Morphological Difference Between Maxillary Posterior Teeth In Saudi Population. Ann. Dent. 2021;9(2):58–61.
11. Khan MA, Verma M, Dwivedi P, Hassan SB, Verma AK. Estimation of Sex From the Buccolingual Dimension of Tooth Among the North Indian Population. Cureus. 2024 Apr;16(4).
12. Soto-Álvarez C, Fonseca GM, Viciano J, Alemán I, Rojas-Torres J, Zúñiga MH, et al. Reliability, reproducibility and validity of the conventional buccolingual and mesiodistal measurements on 3D dental digital models obtained from intra-oral 3D scanner. Arch Oral Biol. 2020 Jan; 109:104575.
13. Jeelani W, Asad W, Ahmed M. A Comparison of Four Different Methods of Prediction of Mesiodistal Widths of Unerupted Permanent Canines and Premolars. J. Dent. Indones. 2022 Apr 30;29(1).
14. Eliewy Saloom J, Muslim Al Azzawi A, Nahidh M, Chaffat Auliawi Al-Mayahi S, Sahib Mahdi B. Predicting Canine and Premolar Mesiodistal Crown Diameters Using Regression Equations. Int J Dent. 2021 Jul 23; 2021:1–5.