



# Bifid alveol and root of the canine teeth

Kanin dişlerinde bifid alveoli dentes ve kök

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## ABSTRACT

**Introduction:** Anatomic variations of canine alveols can pose a considerable challenge to endodontic diagnosis and treatment. The purpose of this study is determining the bifid alveol and bifid root of canine tooth in dried jaws and pulled out canine roots, to deal with their clinical significance.

**Materials and Methods:** We examined 100 dried human maxillary bones and 76 mandibular bones for existence of bifid alveol. Age, sex and race of these bones were unknown. In 158 pulled out canines from endodontic patients, are examined for existence of bifid root. 98 of these canines were mandibular and the others were maxillary.

**Results:** In our study, we observed 2 bifid alveol in 76 dried mandible. Besides one mandibular bifid root detected in the 158 pulled out canines.

**Conclusion:** This unusual anatomy could lead to problems during exfoliation or extraction of canines. Clinicians should be careful during extraction of anomalous canine teeth to ensure that all roots have been retrieved. This variation could not be discovered with routine intraoral examination. But it is usually discovered with routine dental radiographs. As a result, this anomaly should kept in mind and radiographs should be taken before the extraction of canine.

**Keywords:** Bifid alveol, canine tooth, anomalous canine, bifid root

## INTRODUCTION

Canine teeth have a long root length, round apex, trigon root shape in cross section, longer anatomic crown length than the root length and less pronounced cingulum (the formation at the cervical area of incisor's lingual side) and is divided to mesial and distal facet with enamel ridge (1). Human mandibular canines do not present an internal anatomy as simple as could be

## ÖZ

**Giriş:** Kanin alveollerinde bulunan anatomik varyasyonlar endodontik teşhis ve tedavide dikkate değer zorluk yaratabilir. Bu çalışmanın amacı alt ve çene kemiklerinde bifid alveoli, çekilmiş kanin diş köklerinde bifid kök prevalansını belirlemek ve bunun klinik önemine değinmektir.

**Materyal ve Metod:** Bu çalışmada yaşı, cinsiyeti ve ırkı bilinmeyen 100 maksillar 76 mandibular insan kemiği bifid alveoli dentes varlığı açısından ve endodonti hastalarından değişik nedenlerle çekilmiş 158 kanin diş çift kök varlığı açısından incelendi.

**Bulgular:** Kanin dişlerden 98 tanesi mandibular geri kalanı maksillar kanin idi. Çalışmamızda 76 mandibular kemikte 2 adet bifid alveoli dentes saptandı. Ayrıca 158 çekilmiş kaninde 1 adet çift köklü mandibular kanin saptandı.

**Sonuç:** Sık rastlanmayan bu anomali eksfoliasyon ve diş çekimi sırasında sorunlara yol açabilir. Endodontide rutin intra-oral periapikal radyografiler önemli bir teşhis aracıdır. Klinisyen bu anormal kanin diş çekimi sırasında bütün kökleri kurtarmak için dikkatli olmalıdır. Bu varyasyon rutin intraoral muayene sırasında keşfedilmeyebilir. Bu tip varyasyonlar genellikle rutin dental radyografide saptanır. Sonuç olarak bu gibi anomaliler akıldta tutulmalı ve kanin diş çekilmeden önce radyografi alınmalıdır

**Anahtar Kelimeler:** Bifid alveol, kanin diş, kanin diş anomalisi, bifid kök

expected; there are such canines with a single root and two canals, two roots or fused roots (2). Canines with bifid alveoli dentes are usually seen bilateral and more common in maxilla than mandible. Enamelum has an important role in the root development. Any defect in the dental lamina in early phase of root formation may result bifid alveoli dentes. At the same time this anomaly may be associated with the genetic and cellular changes (1).

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It's important to be aware of root canal anatomy and its variations for a successful endodontic treatment. The cleaning, shaping and obturating exactly of the canals is very difficult because of the various anatomic variations of the canine teeth (3-5).

The endodontic treatment of mandibular canines are usually performed assuming that the teeth have a single canal and single root. But it is reported that these teeth have 2 roots %1-5 and have single root and 2 canals %22 and usually these canals send to one apical foramen (6,7). It's necessary to know the canine anatomy for a successful endodontic treatment (8).

It should be noted that canine teeth with bifid alveoli dentalis might have a second neurovascular bundle in the channel (9).

In recent years, there are technological advantages for dental imaging techniques such as digital radiography, ultrasound, magnetic resonance imaging techniques, densitometer, 2- and 3-dimensional cone-beam computed tomography, computed tomography for dental imaging techniques. These techniques are important to detect anatomical variations (7,10).

The aim of this study is to emphasize the importance of attentive clinical and radiological examination during the endodontics of canines with two roots.

## MATERIALS and METHODS

This study performed cooperation between Akdeniz University Faculty of Medicine Department of Anatomy and Akdeniz University Faculty of Dentistry Department of Oral and Maxillofacial Surgery.

In the Department of Anatomy we examined 100 dried human maxillary bones and 76 mandibular bones for existence of bifid alveol. The fractured, pathological, or deformed skulls were excluded from the study. Age, sex and race of these bones were unknown.

In the Department of Oral and Maxillofacial Surgery 158 pulled out canines from endodontic patients, are examined for existence of bifid root. 98 of these canines were mandibular and the others were maxillary.

## RESULTS

In our study, we observed 2 bifid alveol in 76 dried mandible. Both bifid alveol were at the left side of mandibles (Figure 1). We didn't observe any bifid alveol of maxillary canine tooth in 100 dried maxillary bone. Besides one mandibular bifid root detected in the 158 pulled out canines. It was in the right side of mandible (Figure 2). Maxillary canine teeth with bifid root weren't observed.



Figure 1. Bifid alveol of mandibular canine.



Figure 2. Mandibular canine with bifid root.

## DISCUSSION

The mesiodistal diameter of canines is wider than normal size. This infrequent root anomaly may cause problems during exfoliation and tooth extraction. Bifid alveoli dentales have clinical importance. Inadequate anesthesia may occur in consequence of bifid alveoli

dentales. Variations of alveolar foramen in bifid alveoli dentales might explain the reason of ineffective anesthesia in some cases. This variations may cause leakage during the anesthesia. Therefore, a pain after anesthesia may occur. Different anesthesia technics are recommended in the patients with anormal canals and alveols (11,12).

Canines with two roots are unusual dental anomalies (13).

In majority of cases, mandibular canines have one root and one root canal, although 15% may have two canals. Literature report shows incidence of two-rooted canine as low as 1.7% (14). It is very important to detect such anatomical aberrations on the permanent teeth, so that the endodontic treatment can be performed appropriately. The dental anatomical knowledge is an essential condition in the practice of the specialty medicine (2). In our study, we also detected 2 bifid alveol in 76 dried mandible in the right side and one bifid root in 158 pulled out canine teeth. Radiographies are important for diagnosis and treatment of these complicated cases. Meticulous and careful evaluation of periodontal ligament space during the radiological examination may indicate the presence of an extra root or canal. In dental practise prolongation of accessing time to bucco-lingual cavity is an important clue for extra or hidden canals (15).

The periapical radiographs with high quality and attentive examination of radiographs is crucial for determining the differences of root and canal morphology. It is reported that anatomic variations might be overlooked because of three-dimensional root canal system is viewed two dimensional in periapical radiographs (13). The examination of radiographs with magnifying glass or x3/x5 magnifying eyeloupe and taking two-angled radiographs is recommended for indefinite conditions (13,16).

Canine with two alveoli dentales is very rare condition. This variation couldn't be discover by routine intraoral examination. But usually could be discovered with routine dental radiographs. It is important to recognize this anomalies to eliminate complications such as traumatic neuroma, paresthesia and bleeding. Eventually panoramic radiographies might be useful to determine the type of anatomic variations which effects the prognosis. Dentists should have sufficient knowledge about anatomic root variations to determine endodontic treatment method.

## CONCLUSION

Knowledge of anatomic root variations reduces the operation time and provides efficient treatment during processes such as tooth extraction, implant placement, anaesthetical applications. In our study, it's emphasized that the importance of carefully clinic and radiographic

examination during the endodontic treatment because of the variety in the root canal morphologies of canine teeth. Basically, the article contributed to the practical knowledge available related to dental surgery which is quite significant and usefull for surgeons. Extended studies requires to determine insidance of canine teeth with bifid rooth and bifid alveoli dentales.

## CONFLICT of INTEREST

None declared.

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