

Lateral Periodontal Cyst Diagnosed by Intraoral Ultrasonography

Ağız İçi Ultrasonografi ile Teşhis Edilmiş Bir Lateral Periodontal Kist

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ABSTRACT A lateral periodontal cyst (LPC) is a non-inflammatory odontogenic cyst that usually develops around the lateral root surfaces of premolars and canines. Patients usually visit clinics with complaints of painless swelling in a localized area of the mouth. Generally, the related teeth are vital, with no other symptoms. On radiographs, LPCs can be seen as regular and oval radiolucent lesions. Depending on their location and shape, the lesions may not be visible on panoramic radiographs in some cases, thereby necessitating the use of advanced imaging methods. Advanced imaging methods, such as ultrasonography (USG), can be used to diagnose these lesions. Intraoral USG is a rare application of USG, which has recently been introduced in the field of dental radiology. In dentistry, intraoral USG has been used for the examination of salivary glands and their ducts, the floor of the mouth, mucosal lesions, the tongue, periodontal tissues, and periapical lesions. In this case, a LPC case diagnosed by using intraoral USG and conventional imaging and treated surgically is presented.

ÖZET Lateral periodontal kist (LPK), genellikle premolar ve kanin dişlerinin lateral kök yüzeyleri çevresinde gelişen, inflamatuvar olmayan bir odontojenik kisttir. Hastalar, genellikle ağızlarının lokalize bir bölgesinde ağrısız şişlik şikâyeti ile kliniklere başvurur. İlgili dişler genellikle vital ve asemptomatiktir. Radyografilerde LPK'ler düzenli ve oval radyolüsent lezyonlar olarak görülür. Konumlarına ve şekline bağlı olarak lezyonlar bazı durumlarda panoramik radyografilerde görünmeyebilir ve bu nedenle ileri görüntüleme yöntemlerinin kullanılması gerekir. Bu lezyonları teşhis etmek için ultrasonografi (USG) gibi ileri görüntüleme yöntemleri kullanılır. İnteraoral USG, dental radyoloji alanında son zamanlarda kullanılan nadir bir USG uygulamasıdır. Diş hekimliğinde, ağız içi USG tükürük bezlerinin ve bunların kanallarının, ağız tabanının, mukozal lezyonların, dilin, periodontal dokuların ve periapikal lezyonların muayenesi için kullanılmaktadır. Bu olguda, ağız içi USG kullanımı ve konvansiyonel görüntüleme ile teşhis edilen ve cerrahi olarak tedavi edilen bir LPK olgusu sunulmaktadır.

Keywords: Ultrasonography; periodontal cyst; doppler ultrasonography; panoramic radiography

Anahtar Kelimeler: Ultrasonografi; periodontal kist; doppler ultrasonografi; panoramik radyografi

Lateral periodontal cysts (LPCs) are odontogenic developmental cysts. They are thought to arise from dental lamina residues and account for 0.7% of all jaw bone cysts and 0.4% of all odontogenic cysts.¹ LPCs are commonly observed in the mandibular canine-premolar region and less frequently observed in the maxillary anterior region and are often asymptomatic.^{2,3}

Depending on their location, LPCs may not always be diagnosed by routine radiographic methods. If the cyst is located on the buccal or lingual surface

of the root, it may be masked and not seen on conventional radiographs. Sometimes, the radiographic appearance of lateral radicular cysts and odontogenic keratocysts developing between adjacent teeth can be similar to that of LPCs. Advanced imaging methods, such as ultrasonography (USG), can be used to diagnose such cystic lesions.⁴

USG is one of the most frequently used methods because it is easy to use, can display images instantly, does not contain ionizing radiation, is relatively cheap, and does not cause artifacts from dental

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materials. As it does not have any harmful effects, USG can be used repeatedly.^{5,6} USG has been frequently used for examining the maxillofacial region in recent years and has gained an important place in the detection and differential diagnosis of solid, semisolid, and cystic lesions. Moreover, it is a useful imaging method for the diagnosis of jaw bone lesions.^{5,7,8} Although USG is not effective in imaging structures that are normally behind the bone, the images can still be obtained as many intra-bony lesions in the jaws cause thinning or perforation of the buccal cortical bone.⁹

Most applications of USG are transcutaneous.¹⁰ However, the use of intraoral USG has recently been drawing increasing interest in the field of maxillofacial radiology for the examination of salivary glands and ducts, the floor of the mouth, the buccal, labial, and palatal mucosa, the tongue, periodontal tissues, and periapical lesions.⁴ So far, no USG probe has been manufactured for intraoral use. Small-footprint (hockey stick) or intraoperative transducers with a high frequency (up to 18 MHz), which are produced for various purposes, are typically used for intraoral scanning. However, these probes may not be able to access all areas in the oral cavity.

Here, we report a case of LPC diagnosed with intraoral USG and treated surgically. To the best of our knowledge, this is the first report of a case of LPC diagnosed with intraoral USG in the literature.

CASE REPORT

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national). An informed consent form was obtained from the patient for all diagnoses and treatments. A 58-year-old male patient applied to the oral and maxillofacial radiology department for swelling between the mandibular right canine and first premolar. The patient had no systemic disease. During the clinical examination, fluctuant swelling was observed between the right mandibular canine and first premolar (Figure 1). The related teeth, canine and first premolar were vital according to the electrical pulp vitality test; their responses were similar to those of symmetrical teeth.

No obvious finding was detected during panoramic radiography, only a shadowy radiolucency superimposed on the roots of the related teeth was observed on periapical radiographs (Figure 2A, B). It was decided to perform USG in order to confirm the preliminary diagnosis of the lesion. A transoral approach was preferred for USG as the lesion was in an easily accessible location. The lesion was scanned using an 18 MHz hockey stick transducer on a horizontal plane. Intraoral USG revealed a homogeneous, anechoic, cystic lesion with posterior acoustic enhancement. The diameter of the lesion was 7.5 mm, and its depth was 5.0 mm (Figure 3A). Color Doppler USG revealed that the lesion had no central blood supply or blood vessel (Figure 3B).

The cystic lesion was resected by removing the full thickness flap from the relevant area, the lesion was found to cause resorption in the bone tissue (Figure 4A-B). The defect region was closed by applying concentrated growth factor (CGF) (Figure 4C). Histopathological examination of the excised lesion under a light microscope with hematoxylin-eosin staining confirmed the preliminary diagnosis of LPC (Figure 5). Histologically, the appearance is a cystic cavity with a 1-5 cell thick nonkeratinized squamous epithelium lined connective tissue wall.

DISCUSSION

LPCs originate in dental lamina residues, extend along the lateral surface of a vital tooth, and are generally asymptomatic.¹¹ In the present case, the lesion was located between the buccal root surfaces of the mandibular canine and first premolar and the related teeth were vital, in accordance with the available information.



FIGURE 1: Clinical appearance revealed a swelling between the canine and first premolar.

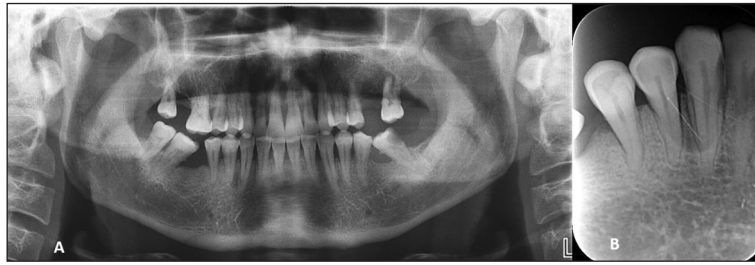


FIGURE 2: (A-B): Conventional radiographic images of the case. A: No finding observed on the panoramic image. B: A shadowy radiolucency superimposed on the related teeth roots on the periapical radiography.

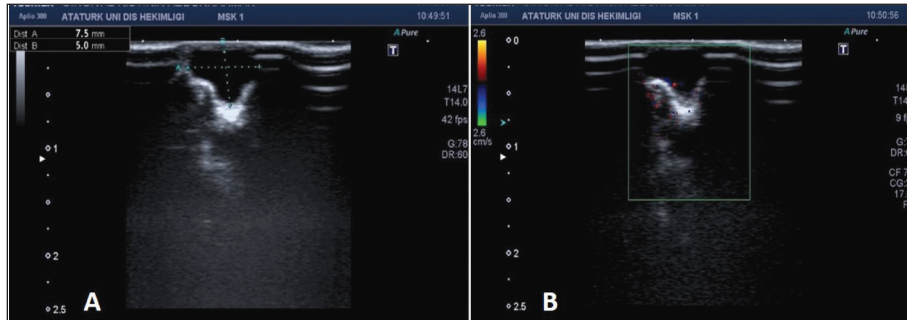


FIGURE 3: Intraoral ultrasonography scanning of the lesion. A: The homogeneity, anechoic, cystic lesion with posterior acoustic enhancement. B: The lesion showed no central blood supply and blood vessel in the color Doppler ultrasonography.

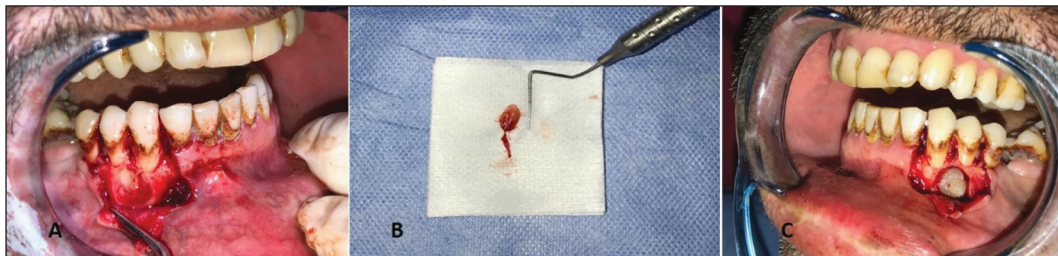


FIGURE 4: The surgical treatment of the lesion. A: The defect area seen after the lesion was excised. B: The enucleated lesion. C: Concentrated growth factor application.

LPCs can be confused with other inflammatory and developmental jaw cysts or tumors. These cystic lesions can develop centrally in the alveolar bone or periodontal ligament, and as they grow, they can thin the cortical layer and even perforate the bone. The perforation of the cortical bone may cause gingival swelling. In such patients with swelling, differential diagnosis should be made, especially in the case of gingival cysts. In the present case, the patient visited various hospitals because of gingival swelling and used unnecessary antibiotic drugs due to a misdiagnosis of periodontal abscess. When the swelling did not subside, he visited our clinic.

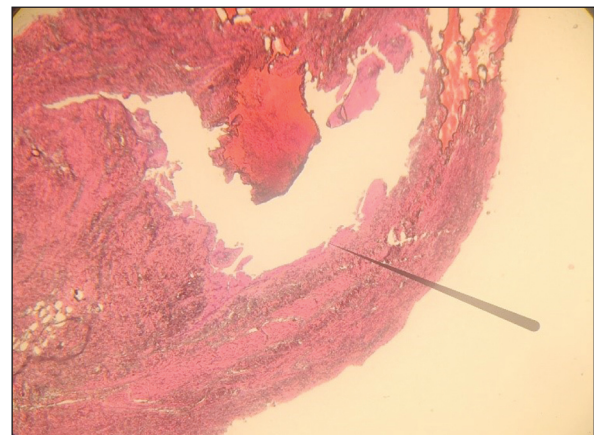


FIGURE 5: The histopathological examination of the lesion under the light microscope with hematoxylin-eosin revealed the cystic lesion lined with thin multi-layer flat epithelium.

Enucleation has been suggested for treating LPCs. In most reported cases, all or most bone defects resulting from enucleation have been healed with new bone formation.¹² In the present case, the lesion was treated with CGF application after enucleation. CGF is a new second-generation platelet concentrate; it contains various growth factors and fibrins and can facilitate the recovery of soft and hard tissues.¹³

LPCs can be radiographically seen as regular radiolucent lesions with limited sclerotic border. In the present case, periapical radiography provided an imperceptibly clear image. Depending on the location of the lesion and various superimpositions, optimum images cannot always be obtained on plain radiographs. In such cases, advanced imaging methods may be needed. Plain radiographs and dental volumetric tomography have been used to detect LPCs in previous studies.¹⁴ In the present case, LPC was diagnosed by intraoral USG for the first time.

Simple cystic lesions are completely anechoic lesions that show no or limited internal echogenicity and increased posterior wall echogenicity on USG images, while complex cystic lesions are lesions that show dense or high internal echogenicity and increased posterior echogenicity on USG images. On the other hand, lesions with no liquid components (solid lesions) show no increase in posterior wall echogenicity and moderate echogenicity on USG images. Combined lesions, in which both cystic and solid regions are combined within the same lesion, are evaluated as semisolid lesions. In a previous study, USG findings were correlated with histopathological findings in patients with jaw lesions to distinguish cystic lesions from solid lesions.⁹ Therefore,

USG may provide useful information before surgical planning. To our knowledge, no case of LPC diagnosed using intraoral USG has been reported so far.

The present case is compatible with other reported LPCs in terms of the shape, location, and radiographic features, in addition to the related teeth being vital. Misdiagnosis of LPCs can result in unnecessary tooth extractions, endodontic treatments, and antibiotic use. Early diagnosis of jaw cysts is important to prevent the risk of morbidity. Plain radiographs may not always be sufficient for the diagnosis of jaw lesions. USG can help distinguish solid from cystic jaw lesions, as in the present case.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Fatma Nur Yozgat İlbaş; **Design:** Fatma Çağlayan; **Control/Supervision:** Fatma Çağlayan, Recep Orbak; **Data Collection and/or Processing:** Fatma Nur Yozgat İlbaş; **Analysis and/or Interpretation:** Yerda Özkan; **Literature Review:** Fatma Nur Yozgat İlbaş, Yerda Özkan; **Writing the Article:** Fatma Nur Yozgat İlbaş; **Critical Review:** Recep Orbak, Fatma Çağlayan; **References and Fundings:** Fatma Çağlayan; **Materials:** Yerda Özkan, Recep Orbak.

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