

Fusion of Third and Fourth Mandibular Molars, Paradental Cyst and Hyalin Ring Granuloma: Case Report

Mandibular Üçüncü ve Dördüncü Molar Füzyonu, Paradental Kist ve Hyalin Ring Granüloma

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ABSTRACT Introduction: In this article will reportedTo report a quite rare phenomenon of fusion of third and fourth molar with a paradental cyst associated with hyalin ring granuloma. **Case report:** A partially erupted and fused third and fourth molar that has pericoronitis removed from a 22 year old man with operation. A cyst like structure came out attached to the apices of the fused tooth. Microscopic examination showed a paradental cyst with hyaline ring granuloma. Paradental cyst is an inflammatory cyst and hyalin ring granuloma is a histological diagnosis characterized by the presence of foreign-body giant cells associated with hyaline rings. **Result:** The cause of these pathologies is controversial and there are suggestions on the role of food impaction. In this case paradental cyst and hyaline ring granuloma determined were at an area consisting pericoronitis. This situation supports the role of food impaction on the etiologies of these pathologies.

Key Words: Fusion, fourth molar, odontogenic cysts, hyalin

ÖZET Giriş: Bu yazıda çok nadir olarak rastlanan üçüncü ve dördüncü molar füzyonu ile birlikte görülen ve hyalin ring granüloma ihtiva eden paradental kist rapor edilecektir. **Olgu sunumu:** 22 yaşında bir erkekten yarı gömülü ve perikoronitis bulunan füzyonlu üçüncü ve dördüncü molar diş opere edilerek alınmıştır. Füzyonlu dişin apeksine bağlı olarak kist benzeri bir yapı soket dışına çıkmıştır. Mikroskopik inceleme sonucunda hyalin ring granüloma içeren paradental kist tanısı konulmuştur. Paradental kist inflamatuvar bir kisttir. Hyalin ring granuloma histolojik bir tanı olup hyalin ringler ile birlikte yabancı cisim dev hücrelerinin görülmesi ile karakterizedir. **Sonuç:** Bu patolojilerin etiyojisi tartışmalıdır ve gıda birikiminin etiyojilerinde rol oynadığı düşünülmektedir. Perikoronitis bulunan bir bölgede paradental kistin ve hyalin ring granülomanın birlikte görülmesi, gıda birikiminin bu patolojilerin etiyojisinde rolü olduğu düşüncesini desteklemektedir.

Anahtar Kelimeler: Füzyon, dördüncü molar odantogenik kistler, hyalin

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Fusion is the union of two developing tooth germs, resulting in a single large tooth structure. They are joined by the dentine; pulp chambers and canals may be linked or separated depending on the developmental stage when the union occurs. The fusion process may involve the entire length of the teeth, or it may involve the roots only.¹⁻³

The paradental cyst is usually seen adjacent to vital partially erupted mandibular third molars and they are associated with a history of pericoronitis. The cyst is located adjacent to the root of the tooth – not the crown and the size of the cyst varies with most lesions measuring 10-15 mm in diameter. Inflammation in the superficial part of the periodontium (perico-

ronitis) of erupting teeth seems to play a major role in stimulating odontogenic epithelium. Histological features are indistinguishable from those of the radicular cyst. Enucleation of the paradental cyst and extraction of the tooth is the recommended treatment.⁴⁻⁷

Hyalin ring granuloma (HRG) is a histological diagnosis characterized by the presence of foreign-body giant cells associated with hyaline rings lying within a chronically and, less often acutely inflamed fibrous tissue stroma. The lumen of the rings may contain a cellular connective tissue, chronic inflammatory cells or multinucleate foreign-body giant cells. In about 80% of the cases, the lesions were present in the edentulous premolar-molar area of the mandible. The histopathological features of HRG are similar, irrespective of the clinical manifestations and they are usually discovered as incidental histopathological findings.⁸⁻¹²

The following is a case report of a supernumerary fourth molar fused to the distal surface of a mandibular third molar with a paradental cyst that contains hyalin ring granuloma.

CASE REPORT

The patient's informed consent was obtained. A 22-year old man was referred to our clinic with a 6-months history of recurrent tenderness at the right mandibular third molar region. Clinical examination revealed a partially erupted third molar tooth with pericoronitis. The mucosa on the distal site of the tooth showed signs of inflammation. Radiographic examination showed a supernumerary tooth (fourth molar) fused to the distal surface of the mandibular third molar and a diffuse radiolucency surrounding the distal surface and the periapical area of the fused tooth (Figure 1). The vitality test of the fused tooth was interpreted as positive. The third molar, with the fused supernumerary tooth was removed totally after ostectomy than the empty socket is curretted. The flap was sutured back into position. A cyst like structure come out with the apices of the fused tooth (Figure 2). Healing post-operatively was uneventful. Both teeth and cyst like structure were submitted to histological

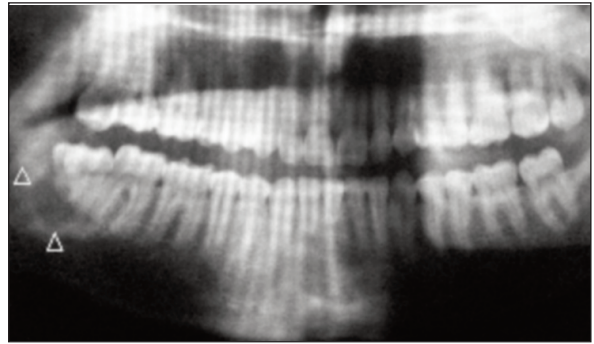


FIGURE 1: Radiographic appearance of bone resorption around the fused molar teeth.



FIGURE 2: Macroscopic view of the fused third and fourth molars with paradental cyst attached to the apical area.

examination. Microscopic examination showed the fusion of teeth (Figure 3), a paradental cyst with non-keratinized stratified squamous epithelium (Figure 4) and hyaline rings with multinuclear giant cells and inflammatory cells (Figure 5).

DISCUSSION

The specific etiology of fusion has not been established yet. It is thought that some pressure or force during the development of teeth causes them to fuse to gather, either completely or incompletely.^{13,14}

The pathogenesis of paradental cyst is controversial. Colgan¹⁵ et al proposed a role for food im-

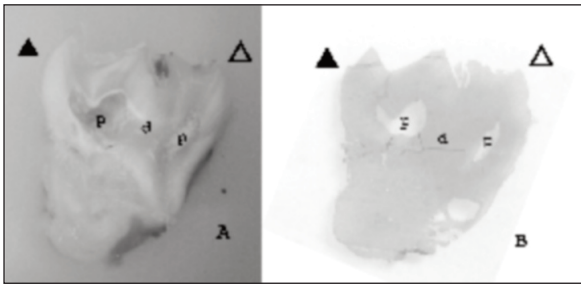


FIGURE 3: Macroscopic (A) and histologic section (B) of fused mandibular third molar (black arrow) and fourth molar (hollow arrow) confirming the dental union of teeth (d: dentine, p: pulp) (H&E).

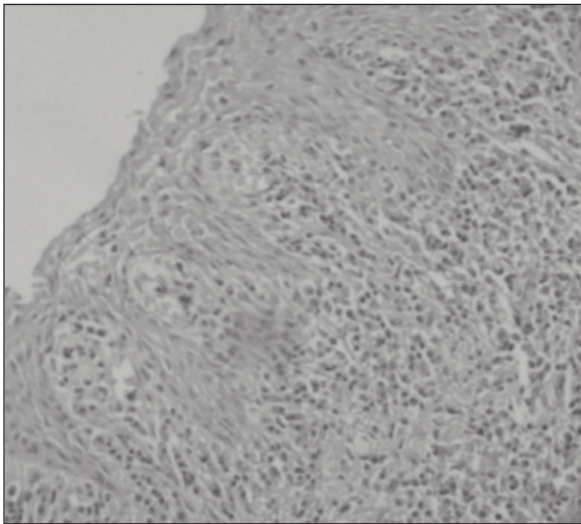


FIGURE 4: Stratified squamous epithelium lining the cyst with an intense mixed inflammatory cell infiltrate (H&E X40).

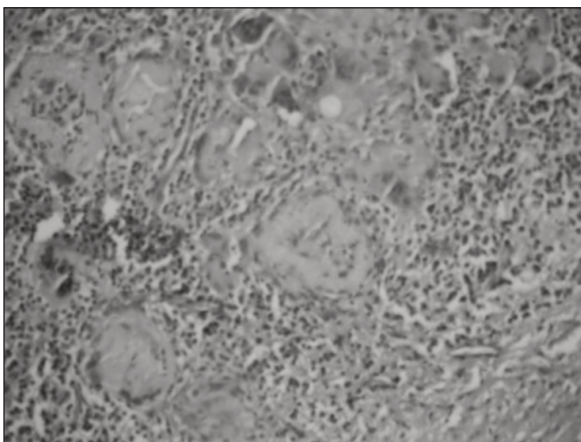


FIGURE 5: Multinuclear giant cells and inflammatory cells are associated with the hyalin rings, and some of these mononuclear cells are seen within rings (H&E X260).

paction in the development of the paradental cyst. Craig¹⁶ reported the presence of a small projection of enamel into the bifurcation area of the roots on the buccal aspect of teeth and he proposed that this extension of enamel onto the root surface allowed stagnation at this site during episodes of pericoronitis and that the subsequent inflammatory process caused destruction of the bone and development of a cyst. They also showed the presence of foreign body-type giant cells in paradental cysts and this feature constituted an indirect support for the food impaction hypothesis. In this case the pericoronitis and the fused tooth which has an irregular surface constitute an appropriate environment for stagnation and retention and of food. We were also determined the foreign body-type giant cells in the paradental cyst. These clinical and histological findings of the patient support the role of food impaction in the pathogenesis of paradental cyst.

Fowler and Brannon¹⁷ reported that the paradental cyst is attached to the root surface covering the bifurcation and may extend for variable distances along the root surface. In this case the paradental cyst was located at the apical area of a fused tooth and it was mimicking a radicular cyst.

The etiologic factors that give rise to HRG are not known precisely. Lewars¹⁸ and Adkins¹⁹ were suggested that HRG could represent a reaction to foreign material such as food. Many authors support the concept of an exogenous origin for these lesions, resulting from implantation of food particles such as beans and peas.²⁰⁻²² Talacko and Radden⁹ developed an animal model for production of a foreign body reaction to implanted legume cells and demonstrated the development of similar lesions to HRG. However other investigators did not support this view, and have considered the hyaline rings to be degenerate blood vessels,^{21,23} degenerate collagen,²⁴ or fibrosed extravasated serum proteins,²⁵ or have considered the lesion to be due to infection by *Torulopsis glabrata*,²⁶ or to be of unknown etiology.²⁷

Keirby and Soames¹⁰ reported a HRG associated with pericoronitis in a patient with a long history of food impaction in the area. In this case the

hyalin ring granuloma is determined associated with pericoronitis and paradental cyst, but there was no evidence of vegetable material microscopically. Talacko and Radden⁹ suggested that once the food gains access to the tissues, it is rapidly digested and altered by the host responses and the cellulose moiety of plant foods is indigestible and persists in the form of hyaline material, inciting a chronic granulomatous tissue response. Harrison and Martin²⁸ proposed that collagen is probably laid down at the periphery of the cellulose with time, thus explaining the differences between the thick hyaline rings and the thin plant cell walls.

HRG were reported in dentigerous, residual and nasopalatine cysts in the past.^{11,25,29} In this case the HRG were determined in paradental cyst. Some

authors propose a role for food impaction for the pathogenesis of both HRG and paradental cyst. The role of food impaction at the etiology of pericoronitis is beyond question. In this case we saw these pathologies (pericoronitis, paradental cyst, hyaline ring granuloma) at the same area; this situation supports the thoughts about the role of food impaction on this subject.

Surgical removal of lower third molar is a common procedure and sometimes histopathological examination of soft tissues surrounding impacted teeth is neglected. The microscopic examination is necessary for definitive diagnosis of all lesions, because of this reason routine histopathological examination of soft tissue must be done after third molar surgery.

REFERENCES

- Regezzi JA, Sciubba JJ: Abnormalities of Teeth, Regezzi JA, Sciubba JJ. Oral Pathology Clinical Pathologic Correlations. 3th ed. Philadelphia, WB Saunders Co., 1999, p 453
- Hernandez-Guisado JM, Torres-Lagares D, Infante-Cossio P, Gutierrez-Perez JL. Dental gemination: report of case. *Med Oral* 2002;7:231-6.
- Nunes E, de Moraes IG, de Novaes PM, de Sousa SM. Bilateral fusion of mandibular second molars with supernumerary teeth: case report. *Braz Dent J* 2002;13:137-41.
- Philipsen HP, Reichart PA, Ogawa I, Swei Y, Takata T. The inflammatory paradental cyst: a critical review of 342 cases from a literature survey, including 17 new cases from the author's files. *J Oral Pathol Med* 2004;33:147-55.
- Fowler CB, Brannon RB. The paradental cyst: a clinicopathologic study of six new cases and review of the literature. *J Oral Maxillofac Surg* 1989;47:243-8.
- Colgan CM, Henry J, Napier SS, Cowan CG. Paradental cysts: a role for food impaction in the pathogenesis? A review of cases from Northern Ireland. *Br J Oral Maxillofac Surg* 2002;40:163-8.
- Silva TA, Batista AC, Camarini ET, Lara VS, Consolaro A. Paradental cyst mimicking a radicular cyst on the adjacent tooth: case report and review of terminology. *J Endod* 2003;29:73-6.
- Chou L, Ficarra G, Hansen LS. Hyaline ring granuloma: a distinct oral entity. *Oral Surg Oral Med Oral Pathol* 1990;70:318-24.
- Talacko AA, Radden BG. The pathogenesis of oral pulse granuloma: an animal model. *J Oral Pathol* 1988;17:99-105.
- Keirby FA, Soames JV. Periostitis and osteitis associated with hyaline bodies. *Br J Oral Maxillofac Surg* 1985;23:346-50.
- Keskin A, Duran S, Alkan A, Günhan O. Hyaline ring granuloma in inflammatory odontogenic cysts: report of two cases. *J Oral Maxillofac Surg* 2000;58:115-8.
- Matthews JB. Hyaline and foreign in cyst walls, Brown RM: Investigative Pathology of the Odontogenic Cyst. Florida, CRC Press; 1991. p.191.
- Hou GL, Tsai CC. Fusion of maxillary third and supernumerary fourth molars. Case report. *Aust Dent J* 1989;34:219-22.
- Gunduz K, Sumer M, Sumer AP, Gunhan O. Concrescence of a mandibular third molar and a supernumerary fourth molar: report of a rare case. *Br Dent J* 2006;200:141-2.
- Colgan CM, Henry J, Napier SS, Cowan CG. Paradental cysts: a role for food impaction in the pathogenesis? A review of cases from Northern Ireland. *Br J Oral Maxillofac Surg* 2002;40:163-8.
- Craig GT. The paradental cyst. A specific inflammatory odontogenic cyst. *Br Dent J* 1976;141:9-14.
- Fowler CB, Brannon RB. The paradental cyst: a clinicopathologic study of six new cases and review of the literature. *J Oral Maxillofac Surg* 1989;47:243-8.
- Lewars PH. Chronic periostitis in the mandible underneath artificial dentures. *Br J Oral Surg* 1971;8:264-9.
- Adkins KF. Granulomas in edentulous jaws. *N Z Dent J* 1972;68:209-12.
- Rannie I. Chronic mandibular periostitis associated with "vasculitis". *Pathol Microbiol (Basel)* 1975;43:199-203.
- Mincer HH, McCoy JM, Turner JE. Pulse granuloma of the alveolar ridge. *Oral Surg Oral Med Oral Pathol* 1979;48:126-30.
- Simon JH, Chimenti RA, Mintz GA. Clinical significance of the pulse granuloma. *J Endod* 1982;8:116-9.
- Dunlap CL, Barker BF. Giant-cell hyalin angiopathy. *Oral Surg Oral Med Oral Pathol* 1977;44:587-91.
- El-Labban NG, Kramer IR. The nature of the hyaline rings in chronic periostitis and other conditions: an ultrastructural study. *Oral Surg Oral Med Oral Pathol* 1981;51:509-15.
- Chen SY, Fantasia JE, Miller AS. Hyaline bodies in the connective tissue wall of odontogenic cysts. *J Oral Pathol* 1981;10:147-57.
- Hase MP, Radden BG, Reade PC. Torulopsis glabrata infection in the oral cavity. *J Oral Pathol* 1976;5:8-16.
- McMillan MD, Kardos TB, Edwards JL, Thorburn DN, Adams DB, Palmer DK. Giant cell hyalin angiopathy or pulse granuloma. *Oral Surg Oral Med Oral Pathol* 1981;52:178-86.
- Harrison JD, Martin IC. Oral vegetable granuloma: ultrastructural and histological study. *J Oral Pathol* 1986;15:322-6.
- Ide F, Kusama K, Saito I, Imemura S. Pulse granuloma in the wall of a dentigerous cyst. *J Oral Maxillofac Surg* 1982;40:659-62.