Radicular cysts are the most common (52–68 per cent) cystic lesions affecting the jaw. They are commonly found at the apices of involved teeth and sometimes lateral to accessory root canals. They are a direct sequel of chronic periapical infection. Most of them are asymptomatic and are discovered when periapical radiographs are taken of teeth with non-vital pulps. Patients often complain of slowly enlarging swellings. Radiographically, most radicular cysts appear as round or pear-shaped unilocular radiolucent lesions in the periapical region. The cyst may displace adjacent teeth or cause mild root resorption.

The following case report presents the successful treatment of radicular cysts using autologous periosteum and platelet-rich fibrin (PRF) with demineralised freeze-dried bone allograft (DFDBA).

Case Report

A 17-year-old female patient reported to the Department of Periodontics, HKES’s S. Nijalingappa Institute of Dental Sciences and Research, Gulbarga, India, with a chief complaint of pain, swelling ongoing and pus discharge in the lower anterior region since two months. Past history revealed trauma in the lower anterior region five years ago with recurrent swelling and pus discharge.

On intraoral examination, inflamed and swollen gingiva was seen in relation to 41, 42, and 43 (FDI notation). A draining fistula was seen on the labial aspect in relation to 41 (Fig. 1). 42 had grade I mobility, whereas no mobility was noticed with 31, 41, and 43. A pulp vitality test was negative with 41, 42, and 43, while adjacent teeth showed normal response. Periodontal probing depth was ≤3 mm for concerned teeth, and no clinical attachment loss was seen. They were also painless on vertical percussion. On radiographic examination, two radiolucent areas of size approximately 2 x 2 mm were seen in relation to 41, 42, and 43 (Fig. 2). No root resorption was seen.

The treatment plan comprised of endodontic treatment of non-vital teeth followed by surgical enucleation of cystic lesions if necessary. The treatment plan was explained to the patient, and a written informed consent was obtained. In the same visit, root canal treatment was started under rubber dam application followed by working length determina-
tion. After complete biomechanical preparation, 2 per cent chlorhexidine gluconate was used as an ir-
rigant and intracanal medicament. In the subsequent visits, root canal treatment was completed. Persist-
ent pus discharge was observed at three months af-
ter endodontic treatment, and surgical enucleation
was planned.

The procedure was as follows: local anaesthesia
was administered, crevicular incisions were given,
and a full thickness mucoperiosteal flap from 41 to
43 and a split thickness flap in regio 31 and 32 were
reflected. The area was degranulated revealing two
small perforations of the buccal cortical plate in the
regions of 41 to 43 of size 1 x 1 x 1 mm. The remain-
ing buccal cortical covering was carefully removed
with rotary and hand instruments to expose the rest
of the lesions of size 3 x 3 x 2 mm. Fragmented pieces
of the lesion were freed from the bone, and a com-
plete curettage of the cystic lesions was done (Fig. 3).
The cystic cavities were thoroughly irrigated, and a
root biomodification of involved teeth was done us-
ing tetracycline. DFDBA was mixed with sterile saline
solution and grafted in an attempt to close the defect
via osteoconduction (Fig. 4). Autologous healthy pe-
riosteum was harvested from regio 31–32 (Fig. 5), and
PRF was prepared from the patient’s blood, as de-
scribed by Choukroun et al.3 The lesion was covered
with periosteum, over which PRF was placed as a sec-
ond layer of barrier membrane covering the graft
(Figs. 6 & 7).

The flap was coronally advanced and closed with
interrupted sutures using 3–0 black braided silk (Fig.
8). A periodontal dressing was applied at the surgical
site. The patient was prescribed amoxicillin 500 mg
TID and diclofenac sodium 50 mg TID both for 5 days
with 0.12 per cent chlorhexidine gluconate rinse BD
for seven days. The patient was asked to report after
a week for suture removal, and the curetted tissue
was submitted for histopathological examination.
The patient returned for the postoperative visit, and
the healing was uneventful.

Histopathology revealed the presence of a vary-
ing thickness of epithelium with fibrocellular con-
nective stroma. The epithelium was disrupted with
infiltration of chronic inflammatory cells along with
vacuolations within the epithelium. The connective
tissue showed dense infiltration of lymphocytes and
plasma cells with few macrophages (Fig. 9). A diag-
nosis of radicular cyst was given. The patient was fol-
lowed up for nine months. A radiograph at six months
shows a healing lesion (Fig. 10). A subsequent radi-
ograph nine months after operation (Fig. 11) reveals
increased radiopacity where the bone graft was
placed, and no evidence of recurrence of the lesion
was seen (Fig. 12).

Discussion

A radicular cyst is an odontogenic cyst of inflam-
matory origin preceded by a chronic periapical gran-
uloma and stimulation of cell rests of Malassez found
in the periodontal membrane. The pathogenesis of
radicular cysts comprises of three distinct phases:
the phase of initiation, the phase of cyst formation,
and the phase of enlargement.4 The initial swellings
of these radicular cysts are usually bony hard, but as
they increase in size, the covering bone may become
very thin despite initial superperiosteal bone depo-
sition. With progressive bone resorption, the swellings

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exhibit "egg shell crackling". The associated teeth are always non-vital and may show discolouration. Although the associated teeth usually show no root resorption, there may be smooth resorption of root apices. When cysts are intact, cyst cavities may be filled with brown-or straw-coloured fluid, giving them a shimmering gold appearance.4 Radicular cysts are inflammatory lesions leading to bone resorption and can reach great dimensions and become symptomatic when infected or with great size due to nerve compression. The main cause of failure of endodontic treatment is generally accepted to be the continuing presence of microorganisms in the root canal system that have either resisted treatment or have reinjected the root canal system. E. faecalis was the most frequently found microbe in such cases.5 

Chlorhexidine gluconate has been proposed for use both as an irrigant and as a medicament especially in endodontic retreatment. As a medicament, it is more effective than calcium hydroxide in eliminating E. faecalis infection inside dentinal tubules.6 As an irrigant, it appears as effective or superior to sodium hypochlorite in the elimination of E. faecalis.7 The adult human periosteum is highly vascular and is known to contain fibroblasts, osteoblasts, and stem cells. Skoog8 subsequently introduced the use of periosteal flaps for closure of maxillary cleft defects in humans; he reported the presence of new bone in cleft defects within 3–6 months following surgery. Furthermore, animal studies have reported heterotopic ossification in different organs after implantation of free periosteal grafts.9, 10 In all age groups, the cells of the periosteum retain the ability to differentiate into various cells.11 On the basis of these observations, it can be hypothesised that the periosteal membrane can contribute to the stimulation of new bone formation and has an immense potential for regeneration.

PRF belongs to the new generation of platelet concentrates with simplified processing. PRF contains a variety of growth factors, which enhance healing by increasing angiogenesis and matrix biosynthesis.12 The immense osteoinductive capability of DFDBA is well-described in the periodontal literature.13

The treatments of these cysts are still under discussion, and many professionals opt for a conservative treatment by means of endodontic technique.14 However, in large or non-healing lesions, the endodontic treatment alone is not efficient and surgical treatments like marsupialisation or enucleation should be considered.15 In this case, surgical enucleation was preferred and was performed uneventfully.

**Conclusion**

To conclude, a radicular cyst is a common condition found in the oral cavity. However, it usually goes unnoticed and rarely exceeds the palpable dimension. This case report illustrates the successful management of a radicular cyst with enucleation and endodontic treatment. The use of autologous periosteum and PRF has a promising future in periodontal regeneration._

Editorial notes: A list of references is available at the publishers.

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