

CHANGING THE INCISION PARADIGM: VESTIBULAR ACCESS IN ODONTOGENIC CYST SURGERY

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ABSTRACT

Introduction: Radicular cysts are the most common inflammatory odontogenic lesions of the jawbone, usually arising from untreated dental caries or trauma. Traditional surgical enucleation typically employs a full-thickness sulcular flap (FSF), which carries an inherent risk of postoperative gingival recession, architectural alterations, and loss of interdental papilla height. This case report introduces the mandibular vestibular access incision as an alternative surgical approach designed to optimize structural and cosmetic outcomes. **Case Presentation:** An 18-year-old female of Asian ethnicity presented with a three-week history of progressive pain, swelling, and mild mobility in the lower anterior mandibular region. Diagnostic radiography (OPG and CBCT) revealed a well-defined, unilocular radiolucency with scalloped borders spanning teeth 43 to 33, accompanied by labial cortical bone loss and non-vitality of all adjacent teeth except the lower left lateral incisor. Following pre-surgical root canal therapy and composite splint stabilization, a surgical cyst enucleation, peripheral osteotomy, and apicoectomy were performed. To bypass the gingival margin entirely, a lower vestibular incision was utilized from 43 to 33 to fully expose and enucleate the lesion. Histopathological assessment confirmed the diagnosis of a radicular cyst. At the one-year periodic follow-up, the patient exhibited complete clinical healing with excellent bone fill, absolute preservation of the native periodontal architecture, and no recurrence or gingival complications. **Conclusion:** The mandibular vestibular incision serves as a highly effective paradigm shift in the management of large anterior odontogenic cysts. By completely avoiding the marginal and interdental gingiva, this approach minimizes postoperative morbidity, prevents gingival recession, and maintains periodontal integrity while providing excellent surgical visualization and predictable bone healing.

KEYWORDS

Radicular Cyst, Vestibular Incision, Flap Design, Apicoectomy, Mandibular Anterior Region.

INTRODUCTION

Jawbone cysts have been categorised by WHO into inflammatory, malignant, and developmental. Typically found near the apex of the diseased tooth, radicular cysts are inflammatory lesions of the jaws. They are thought to have formed as an inflammation-induced cyst from the epithelial rest of Malassez within the periodontal ligaments. Radicular cysts are frequently asymptomatic often identified by routine radiography evaluation; however, in some cases, long-standing or chronic lesions cause the cyst to undergo acute exacerbation resulting clinically with pain, swelling, and pus discharge. It is more common in the maxillary anterior region than in the mandible. Approximately 52 -68 % of cystic lesions constitute radicular cysts. (1) A higher prevalence is reported in males, particularly between the third and fifth decades of life. Three stages constitute the pathophysiology of radicular cysts: the initiation phase, the cyst development phase, and the enlargement phase. In addition to being nonvital, the teeth adjacent to the cyst may exhibit discolouration. Clinically, it presents as an enlargement in the buccal aspect of mandible and palatal aspect of maxilla. It generally begins as a bony hard enlargement, however, with progressive enlargement, the bone becomes thin and reabsorbed, and the swelling demonstrate a characteristic crackling or springiness that is fluctuant.(2)

The cyst may cause nearby tooth displacement or minor root resorption.(1) Histologically, radicular cysts are lined by nonkeratinized stratified squamous epithelium entirely or partially. In rare instances, keratinization is reported to be as low as 2%. In these cases, orthokeratinization layer is deeper than the parakeratinized walls and contains a dense, mixed inflammatory infiltrate that is abundant in lymphocytes and plasma cells. The fibrous wall frequently has a large number of capillaries, especially in the regions adjacent to the epithelial lining.(2)

Radicular cysts can be treated with standard nonsurgical root canal therapy for mild lesions; bigger cysts can be treated with surgical techniques such as enucleation, marsupialization, or decompression. Carious teeth or teeth with a history of trauma are often associated with radicular cysts and are typically radiolucent which appears to be hydraulic in nature due to their distinct, expansile, corticated boundaries.(1)

CASE REPORT 1

A healthy 18-year-old female patient of Asian ethnicity presented with a chief complaint of pain and swelling in the lower chin region for three weeks. An incisional biopsy and CBCT had been taken elsewhere. The swelling was initially small in size which gradually increased. The pain was described as dull and aching in nature and had been relieved with medication two weeks prior to presentation. There was a mild mobility of the lower anterior teeth had been noted by the patient for the past two weeks. There was no prior history of trauma to the face that was reported. Patient didn't have any relevant medical history.

Extraoral examination revealed a symmetrical face with no evident findings. Intraorally a mild labial swelling over the 43-33 region was observed, which was non-tender on palpation. The overlying mucosa appeared normal. There was no pus discharge or sinus opening that was noted. Vitality testing of the anterior lower teeth from canine to canine was performed, revealing that only the lower left lateral incisor was vital. The lingual cortex was firm, and the swelling was not bicortical.(FIGURE 1)



FIGURE 1 Intraoral photograph

An incisional biopsy had been performed previously yielding non-conclusive results, demonstrating granulation tissue, dense inflammation and necrotic bone. OPG revealed a well defined unilocular radiolucency with scalloped borders involving the periapical region of teeth 43, 42, 41, 33, 32, and 31.

CBCT findings were suggestive of a provisional diagnosis of keratocystic odontogenic tumor. The lingual cortical plate was intact except for a perforation mesial to 31 with loss of the labial cortical bone. (FIGURE 3a,b) A differential diagnosis of odontogenic keratocyst and periapical cyst was considered.

FIGURE 3 a,b CBCT with lingual cortical plate intact except for a perforation mesial to 31 with loss of the labial cortical bone.

Patient underwent pre-surgical root canal therapy of the involved teeth, followed by stabilization using composite splinting. (FIGURE 4)



FIGURE 4 reveals pre-surgical root canal therapy of the involved teeth, followed by stabilization using composite splinting

Cyst enucleation and apicoectomy was performed under general anaesthesia. A vestibular incision was placed extending from 33 to 43 and a full thickness mucoperiosteal flap was elevated to expose the lesion. Cystic lining was identified and enucleated. Peripheral osteotomy was performed in and around the cystic cavity margins. Apicoectomy was completed for the endodontically treated teeth which includes 31, 32, 33, 41, 42, and 43. Chemical cauterization was done using Carnoy's solution applied for five minutes followed by copious saline irrigation. Abgel was placed and closure was done using 3-0 Vicryl sutures. (FIGURE 5 a-c) The excised tissue was sent for histopathological examination. Postoperatively oral antibiotics and analgesics were prescribed.



FIGURE 5a,b .A vestibular incision was placed extending from 33 to 43 and a full thickness mucoperiosteal flap was elevated to expose the lesion. Cystic lining was identified and enucleated.

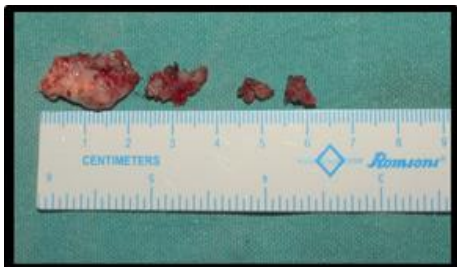


FIGURE 5c Excised lesion

Histopathological examination revealed a cystic area lined by thinned-out stratified squamous epithelium. The subepithelial region showed edema, congestion, and dense infiltration of lymphocytes, plasma cells, neutrophils, and foamy macrophages. The wall exhibited fibromuscular tissue with hyalinization, myxoid change and small bony trabeculae separated by fibrocollagenous tissue, suggestive of a radicular cyst.

The patient was followed up periodically for one year with no evidence of postoperative complications or recurrence. Radiographic evaluation showed good bone fill and satisfactory healing.

DISCUSSION

The symphysis and parasymphysis regions can be effectively accessed using a conventional mandibular vestibular technique which is usually used when symphyseal bone grafts or intraoral fixation of fractures are necessary. The mandibular vestibular technique has minimal morbidity and is relatively simple. However, careful handling of the

mentalis muscle is essential, as improper dissection and reattachment may result in functional compromise. It is the primary elevator of the chin and lower lip, consists of paired conical muscle bellies separated by adipose tissue and a septum in the anterior symphyseal region. The marginal mandibular nerve innervates the muscle fibers as they move inferiorly from the origin into the soft tissue of chin. (3)

The vestibular incision is usually placed within the movable gingiva, approximately 8–10 mm from the junction of the connected and mobile mucosa. A full-thickness sulcular flap (FSF) of any design is raised by a marginal incision, either with or without a vertical releasing incision. The Ochsenbein-Luebke flap or submarginal flaps has a scalloped design, or semilunar in shape. The papilla-sparing flap or papilla-based incision (PSF) combines a marginal and submarginal incision. It forms a sulcular incision in the cervical region of the affected teeth while avoiding damage to the papilla base in the interdental zone. The size of the lesion, the surgical site, the quantity of keratinized tissue, and most importantly, the clinician's training and preferences, all play a significant role in the incision choice. (4) Less gingival recession, a lower risk of papillary height loss and minimal scarring are the advantages of PSF. Additionally, it ensures a large operative area exposure without requiring excessive flap retraction, thereby allowing easier access during periradicular surgery on long roots.(5)

Submarginal flaps must require specific requirements and can only be utilized in regions with the ideal quantity of keratinized tissue, whereas FSF and PSF can be applied everywhere, irrespective of the optimum tissue thickness.(6)

When comparing the FSF technique to PSF, a study by Velvart et al. reported a significant reduction in gingival recession and papilla height(7), while another study by Taschieri et al. found no difference between the two techniques' with respect to gingival margin position and papilla height.(8)

Although it has no effect on the clinical attachment or probing depth, complete mobilization of the interdental papilla has always been associated with papilla height injury and subsequent necrosis of tissues that are not sufficiently separated(4)

Overall, the choice of flap design in periradicular surgery should be considered by anatomical considerations, periodontal status, and the need to preserve esthetics while ensuring adequate surgical access. Although some studies show similar results across flap designs, evidence from some literature indicates that papilla-sparing techniques may be beneficial in reducing gingival recession and maintaining papillary architecture.

Maintaining sufficient vascularity and managing the interdental papilla carefully are still essential to avoiding tissue necrosis and post operative complications. Therefore, meticulous surgical planning, appropriate flap selection, and atraumatic technique are necessary to achieve predictable healing, maintain periodontal integrity, and optimize both functional and esthetic outcomes.

CONCLUSION

Radicular cysts are usually incidental finding during a radiographic evaluation and are asymptomatic when small.(1)The healing process following a vestibular incision after cyst enucleation is highlighted in this article. For the enucleation of specific radicular cysts, vestibular incision may be a safer and more efficient option than the full thickness sulcular flap. It minimizes postoperative morbidity and aesthetic compromise while maintaining periodontal health, gingival architecture preservation, and sufficient surgical access. In appropriately chosen cases, the vestibular approach offers a conservative and predictable technique with satisfactory clinical outcomes, supporting its consideration as a valuable modification in routine cyst management. In appropriately chosen cases, the vestibular approach can offer a conservative and predictable technique with satisfactory clinical outcomes.

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