SUMMARY

Conventional surgical approach for cyst enucleation is removal of buccal compact bone plate, which often results in remarkable bone loss and subsequent mucosal recession. This report presents one case of residual mandibular cyst enucleation and one case of apicoectomized mandibular molar, both treated with the bony lid approach. A window of buccal compact bone was precisely created using an electro-powered osteotome orientated beyond the limits of cyst, followed by removal of the bone segment. After the completion of the enucleation and apicoectomy, the bony lid was relocated on its original position. The main advantage of this method over conventional one is maintaining the buccal compact bone plate integrity and minimizing the dimensions of the remaining bone cavity.

Keywords: Bony Lid; Enucleation; Apicoectomy; Mandibular Molar

Introduction

In most cases, conventional osteotomies in the maxilla and the mandible are invasive surgical procedures and result in remarkable bone loss. The created defects very often can not be completely regenerated. They persist for years causing problems for feature treatment and impairing aesthetics. Guided bone regeneration with or without graft materials may offer solutions, but this procedure requires more time and involves risk of wound dehiscence and subsequent contamination.

Jaw cysts remaining after tooth extraction, also called residual cysts, and periapical cysts are frequent findings in dentoalveolar surgery. The classic method for their removal is conventional enucleation. According to this procedure, the buccal bone plate is removed, the cystic membrane is separated from the surrounding bone and the enucleation follows as usual. In cases of periapical cysts the whole procedure is combined with root apex resection. The disadvantage of the classical method is the bone defect that is often left after healing, which usually results in mucosal recession that is likely to have an impact on the adequate control of a conventional or implant prosthesis, or even on the aesthetics of the area. The use of autogenous bone graft, bone substitutes or connective tissue graft, may give satisfactory solutions to these problems. However, besides the possible risks mentioned above, some patients do not desire either to undergo a second surgery, or to afford the financial cost of such procedures. For these reasons, it is preferable to avoid, where possible, creation of such defects from the beginning, by utilizing more conservative surgical techniques.

The bony lid technique has been described as a bone-saving method and was originally applied in cases of maxillary sinus surgery. Subsequently, it was expanded in cases of apicoectomy of mandibular molars and enucleation of residual cysts. Based on previous experience, this paper describes 2 cases where the bony lid approach was advocated, and explores problems and concerns related to this treatment concept.

Case Reports

A female and a male patient of 63 and 25 years old respectively presented to the clinic. The first patient desired to wear a partial denture and was referred by the department of prosthodontics. The second one mentioned history of swelling in the region of second right lower molar.
Figure 1. Pre-operative panoramic radiography

Figure 2. Pre-operative cross-sectional reconstruction of CT scan images

Figure 3. Creation of the bony lid

Figure 4. The bony lid

Figure 5. The cyst before removal

Figure 6. The detached bony lid

Figure 7. The bone cavity after cyst removal
Figure 8. Relocation of the bony lid

Figure 11. Pre-operative panoramic reconstruction of CT scan images

Figure 9. Wound suturing

Figure 12. Pre-operative cross-sectional reconstruction of CT scan images

Figure 10. 3-months follow up CT scan image

Figure 13. The bony lid

Figure 14. The resected apexes
Prior to surgery, both cases were evaluated radiographically by conventional panoramic and CT scan examination (Figs. 1, 2, 11 and 12). The first case presented radiolucency in the region of lower right molars, whilst the second one presented radiolucency around the apices of the second right molar. Both radiolucencies were well defined. The diagnoses were residual and periapical cysts and the treatment plan comprised enucleation and enucleation/apicoectomy respectively using the technique of bony lid.

In both cases, after a full thickness mucoperiosteal flap elevation, a parallelogram window of buccal compact bone to the trabecular bone was precisely created using an electro-powered MicroSaw (Dentsply Friadent, Mannheim, Germany). The latter was first developed in 1984 and consists of a thin diamond disk with a diameter of 8mm. The disk is mounted on the hand piece with a disk protector to prevent any injuries of the soft tissues. The sequence of osteotomies performed with the diamond disk was, 2 proximal, 1 baso-horizontal and 1 on the occlusal crestal site. The window was orientated beyond the limits of the cyst (Figs. 3, 4 and 13). Subsequently, the removal of the bone lid took place using a chisel. The detached bony lid was being kept in physiological saline solution during the operation. The enucleation of the cyst in the first case was performed in the usual manner (Fig. 7). In the second case, the root apex was removed by 2mm at least in order to eliminate the apical canal delta. The apicoectomy was not followed by retrograde filling due to the difficulty of access to the surgical area (Fig. 14). Emphasis was given however to the quality of root filling. The resection angle was approximately equal to 10^\circ.

The procedures were completed with the relocation of the bony lid on its original position (Figs. 8 and 15). In both cases, the native bone graft was stabilized without sutures since the bony lid was slightly bevelled, so that the later be able to apply as an inlay autogenous bone graft. After the operation was completed, the mucoperiosteal flap was sutured with 4.0 mattress sutures (Figs. 9 and 16).

The patients were subscribed the routine postoperative medication. 3 months later, in both cases no clinical symptoms or signs were found and the follow-up CT scan images revealed completely integration of the bony lids (Figs. 10 and 17).

**Discussion**

The main advantage of the osteoplastic method over the conventional approach is the maintenance of the buccal compact bone plate integrity. Replacement of the buccal compact bone minimizes dimensions of the remaining bone cavity. Filling of the cavity with any bone graft material is not always necessary, and it depends on...
the size of the remained defect. In general, if the defect size is estimated to be small, the latter may be left to heal spontaneously, either a conventional prosthesis is to be placed or an implant supported one. On the contrary, if dimension of the remained defect is not negligible, the use of autologous bone and bone substitute is proposed. This is particularly important when the bone segment has a small thickness\(^{14}\). Additional advantages are good vision and access in the lower molar region, and creation of a bone boundary which may be helpful in containing any haematoma and allowing primary bone healing\(^{15}\).

There are some conditions that should be always taken into consideration. The incision must be generous and made from the canine tooth to the wisdom tooth area. It also has to be fine and made through the compact bone to the trabecular bone. Caution must be taken regarding the possible buccal location of the mandibular canal. The CT scan examination in such cases may be helpful. The initial stability of the bony lid must be sufficient. Since the bony lid must be chiseled, some patients under regional anaesthesia may find it quite disagreeable\(^{15}\).

In the case of apicoectomy, the integrity of bony window depends, apart from the aforementioned factors, also on the quality of root filling and the absence of unfilled canals or isthmuses. In this respect, the root apex is supported to be removed by 2mm\(^{7}\). The necessity of retrograde filling remains controversial. Some authors prefer root canal filling and resection alone, without even smoothing the exposed gutta-percha\(^{1,11}\). Some others find that retrograde root filling improves apical sealing\(^{18,23}\). In general, if the access for retrograde filling is limited but root canal is completely filled, this may result in long term clinical success. In case of retrograde filling the cavity must be at least 3mm deep and the filling material as bacteria-proof as possible\(^{10}\). The angle of resection is supported to be 10\(^\circ\)approximately\(^{25}\). Finally, it is supported that avoiding bacterial re-infection from the root canal is far more important than complete curettage, since remaining inflammatory tissue is intergraded in the granulation tissue of the healing process. So, complete curettage can be omitted if anatomical structures are at risk\(^{20}\).

Bony lid approach is likely to present some complications. The clinicians should be aware of possible injury to adjacent anatomical elements (nerves, tooth roots) due to poor preoperative planning. Furthermore, fracture of the bone segment during reposition or accidental drop into the bone cavity during the healing period may occur. Infection and necrosis of the avascular replanted bony lid is also a possible risk\(^{14,15}\).

Considering limitations of classic bony lid approach exposed above, access to lower molar region was proposed via trephining. If the distance between the roots is small, a burr of 10-12mm in diameter should be used. If the distance between the apices is greater, trephination must be performed twice, once mesial and once distal to the apexes using burr diameter of 4-6mm. The advantages of this modified technique are easier surgical procedure compared to the traditional one, significant reduction of post-operative pain due to the shorter and easier operation and significantly quicker consolidation of graft material in the bone defect. However, the risk of nerve damage remains, and there is also the disadvantage of poorer view of the surgical field compared to the traditional bony lid method\(^{2}\).

Many studies have shown that the use of bony lid method resulted in faster bone regeneration without connective tissue ingrowth compared with the conventional approach\(^{15,17,22}\). It is worth mentioning that in less than 2\% of patients wound dehiscence occurred with contamination of the inlay bone graft and subsequent wound revision\(^{15}\).

In both the presented cases, it was estimated that the use of an electro-powered MicroSaw instead of continuous drilling of the bone with burs offers advantages as regards the accuracy of replacement and stabilization of the bony lid. However, further investigation is required to support the results of this report despite the promising clinical outcome.

References


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