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Closure of Palatal Defects Following Excision of Palatal Pleomorphic Adenomas

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Aim: The purpose of this study is to compare different palatal defect closure techniques following excision of palatal pleomorphic adenomas (PPA) in four cases and to review the associated dental literature.

Methods and Materials: Excision of all four PPA's was performed under local anesthesia. Three different closure techniques used among the cases included an intact mucosal flap, a pedicled buccal fat pad, or secondary healing.

Results: On average the defects healed completely at two months following surgery. While final healing was ideal, partial necrosis of the mucosal flap and minimal postoperative bleeding were seen as complications in two cases.

Conclusion: Regardless of the size of the palatal defect created by the surgical excision of a PPA it heals ideally by secondary healing. However, the possibility of secondary bleeding and infection during the healing period should be kept in mind.

Keywords: Buccal fat pad, palatal defect, pleomorphic adenoma, PPA, surgical technique

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Introduction

A variety of tumors or tumor-like conditions can occur in major and minor salivary glands. The majority are benign or malignant neoplasms of epithelial origin (salivary), but tumors may also arise from adjacent tissues (fat, nerves, blood vessels, lymph nodes, etc.). Mucous-secreting salivary glands are distributed throughout the oral cavity with the highest concentrations in the lips and palate.[1] The classification of salivary gland tumors is under constant revision covering a spectrum from benign to malignant.[2]

Salivary gland tumors of the palate can be divided into three types: benign, locally aggressive, and malignant tumors with the potential to metastasize.[3] The most common locally aggressive tumor of the palate is the pleomorphic adenoma (PPA) accounting for about 40-70% of all major and minor salivary gland tumors.[4,5] Treatment for the PPA is aggressive local surgery because inadequate resection will lead to local recurrence. Wide local excision extending at least 1/2 cm beyond the visible tumor margin and down to cortical bone with removal of the surface layer of the cortex with a bur is advocated. Bone invasion does not occur with the PPA, but tumor deposits may lie on the bone surface.[6]

Healing and reconstruction of palatal defects after excision of tumoral lesions of the palate can vary, and there is limited literature information about them. The aim of this study is to compare different closure techniques of the surgical defects after excision of PPA's in four cases.

Case Report

Diagnosis

A summary of the clinical details of each of the four PPA cases is presented in Table 1.

Table 1. Summary of clinical details in four cases.

Case	Age	M/F	Defect Size (cm)	Closure Technique	Operating Time (Min.)	Follow-up (months)	Complication	Duration of Complete Epithelialization (Days)
1	30	M	2.5x4	Intact mucosa	30	48	Partial necrosis of mucosal flap	80
2	42	M	3x4.5	Buccal fat pad	45	22	-	40
3	70	M	3.5x5	Secondary healing	35	12	-	60
4	36	F	2x3.5	Secondary healing	30	4	Postoperative minimal bleeding	55

Four patients with palatal swellings were referred for evaluation and treatment during different time periods. Included were three males and one female ranging in age from 30 to 70 years. None of the patients presented clinical, laboratory, or radiological evidence of metastatis of the lesions at the time of diagnosis. Initial biopsies were performed on all patients as follows:

- Case 1 - Incisional biopsy
- Case 2 - Fine needle aspiration
- Case 3 - Fine needle aspiration
- Case 4 - Excisional biopsy

While the fine needle aspiration biopsy suggested a negative cytologic result in Case 2 and a mucoepidermoid carcinoma in Case 3, a definitive histological analysis of all the tumors revealed PPA.

Treatment

Surgical excision of all lesions was carried out under local anesthesia. Lesions over the bone were totally excised extending minimal 0.5 cm beyond the visible tumor margin. Dissection of the tumors was performed from the periphery to the center of the lesions. The greater palatine artery was identified, cut, and cauterized. No visible bone surface was removed after the excision of the lesions. Since there was healthy intact mucosa covering the tumor in Case 1, closure of the defect was anticipated through careful dissection of this mucosa from the tumor (Figure 1).

In Case 2, the patient refused to return for regular follow-up evaluations so reconstruction of the palatal defect with a pedicled buccal fat pad was chosen as a more suitable means of closure (Figure 2).

In the other two cases, defects were left to secondary healing (Figures 3 and 4).

A postoperative prophylactic antibiotic regimen was prescribed for seven days to all patients.

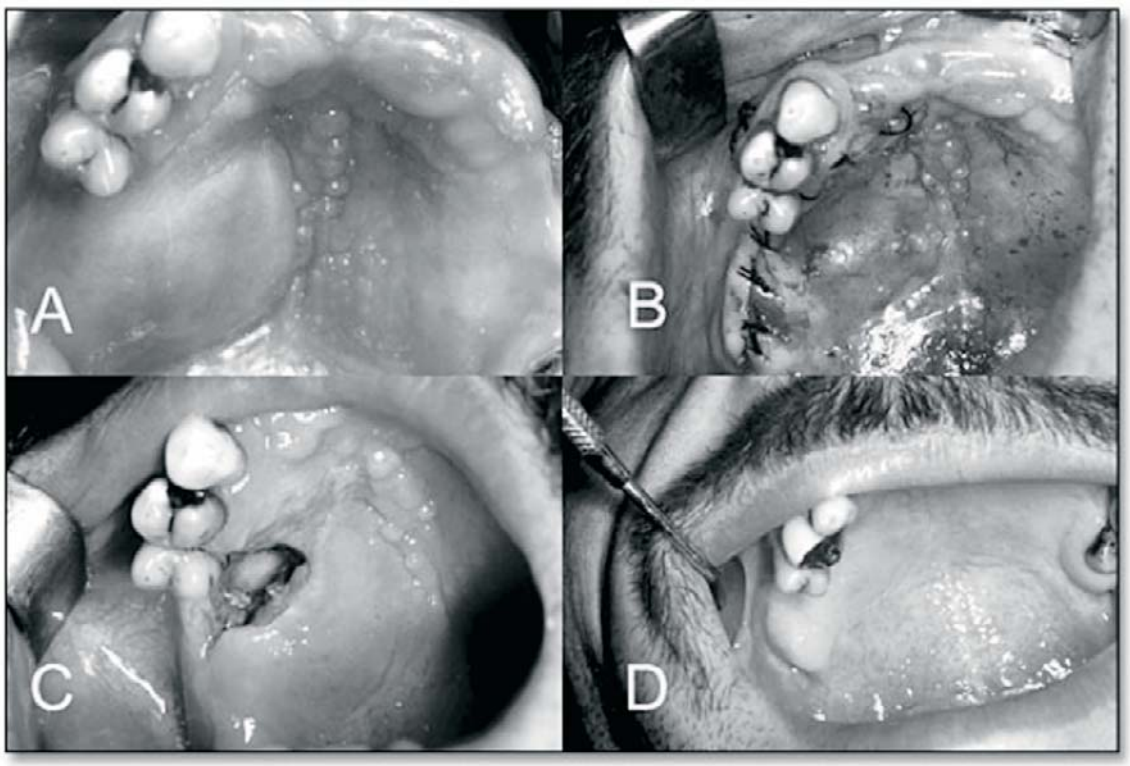

Figure 1. Case 1: Reconstruction of a postablative palatal defect. **A.** Typical appearance of a PPA. **B.** The use of an intact mucosal flap for closure. **C.** Partial necrosis of the mucosal flap 10 days following surgery. Denuded palatal bone is visible. **D.** Healing 80 days later.

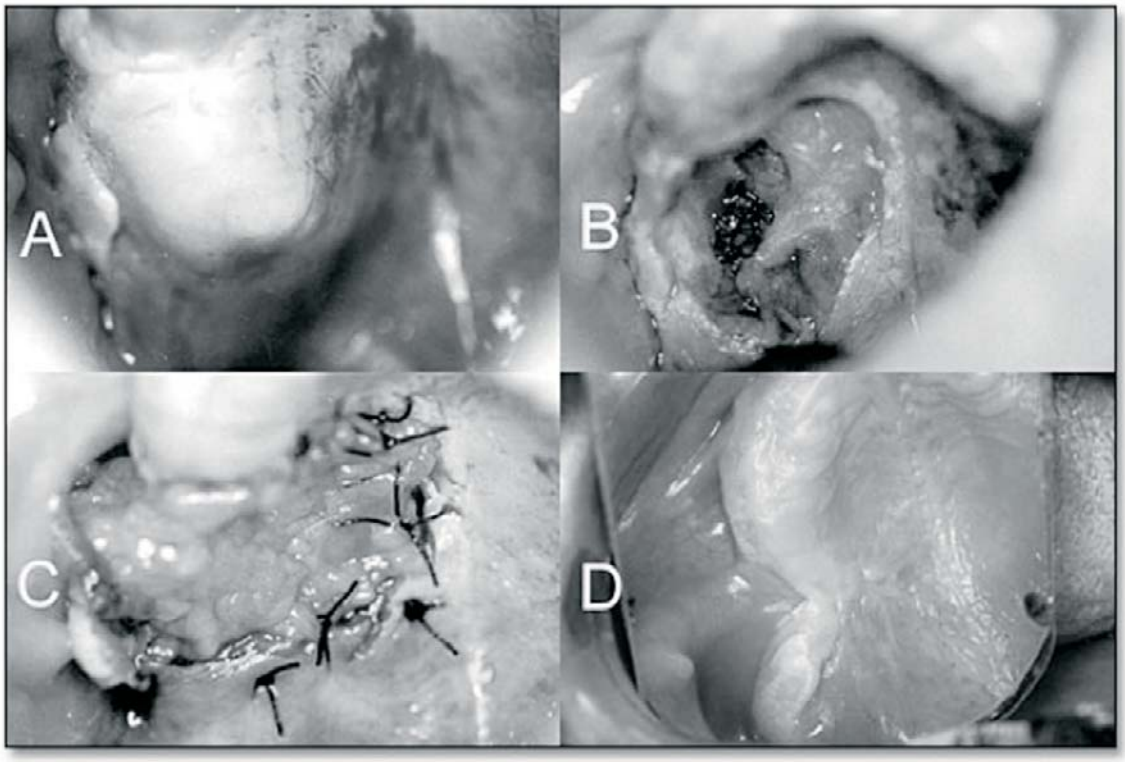

Figure 2. Case 2: Reconstruction of large palatal defect extending to alveolar crest. **A.** Appearance of a PPA. **B.** The intraoperative view of the palatal defect. The cauterized greater palatine artery is visible. **C.** Reconstruction of palatal defect with buccal fat pad. **D.** Healing 6 months later.

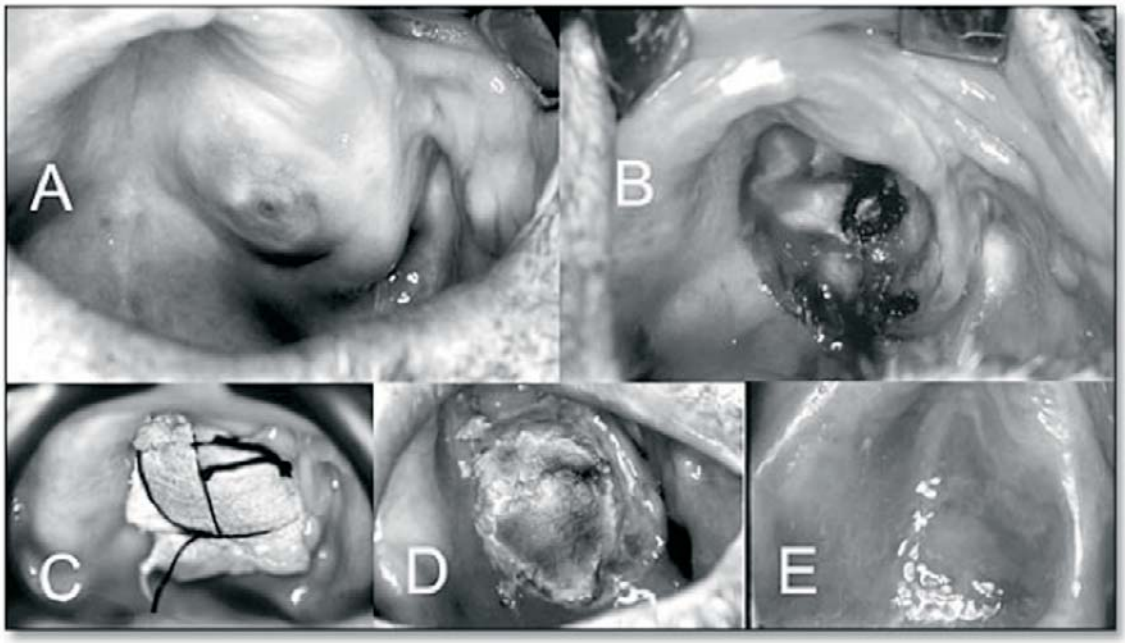

Figure 3. Case 3: Secondary healing of the palatal defect. **A.** Preoperative view. **B.** Surgical defect **C.** Defect covered by a gauze pack. **D.** The view of a collagen gelatin sponge after removal of gauze pack. **E.** Complete epithelialization of the defect after 60 days.

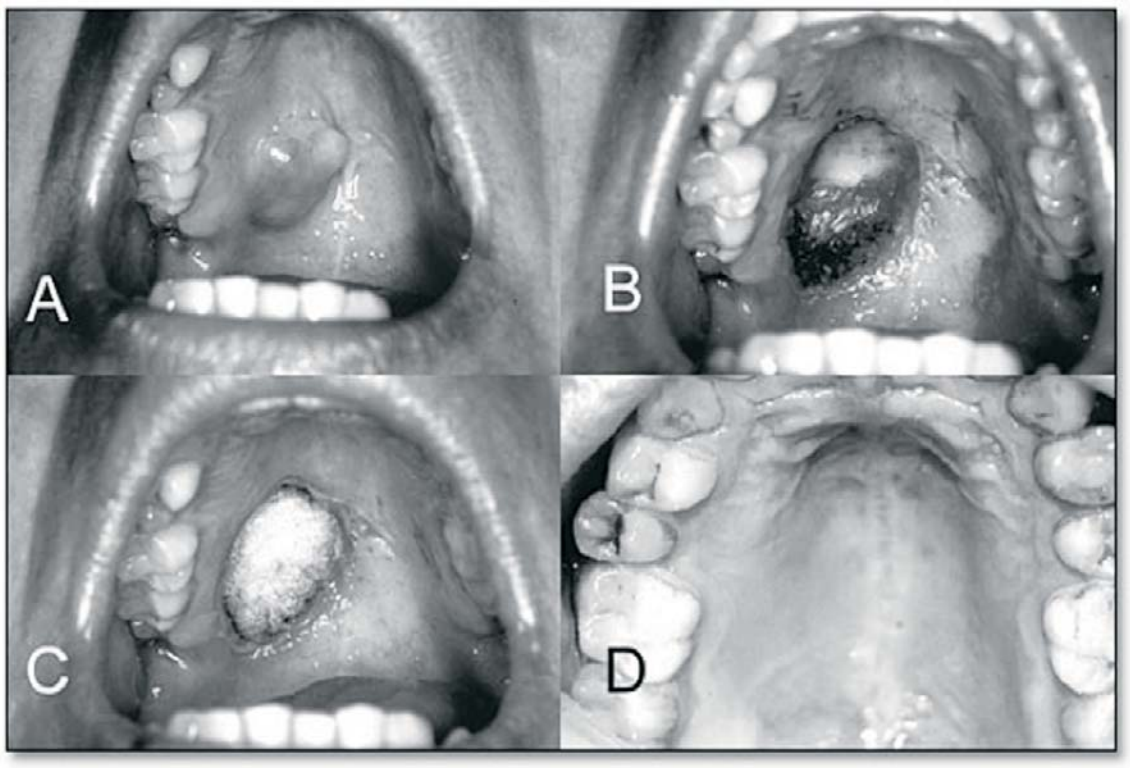

Figure 4. Case 4: Secondary healing of palatal defect. **A.** Preoperative view. **B.** Appearance of surgical defect. **C.** The defect covered by oxidized regenerated cellulose. **D.** Healing 55 days postoperatively.

Operation time was determined as the time from initial mucosal incision to the termination of suturing. The duration of complete epithelialization was defined as the time needed for the closure of the palatal defects to appear clinically the same as the adjacent healthy mucosa.

Results

In this case series all palatal defects were completely epithelializated at the end of follow-ups. Partial necrosis was seen in Case 1 that was closed with the intact mucosa covering the tumor. A second surgical procedure was not performed to address this problem. With attention paid to daily oral hygienic procedures the secondary defect completely healed in 80 days.

Operation time was longer in Case 2 than the others because of the second surgical site associated with the use of a pedicled buccal fad pat for closure. However, the palatal defect in this case healed in the shortest time and the patient experienced minimal postoperative pain.

After the excision of the lesions in the other two cases, hemostatic agents (Case 3 - oxidized regenerated cellulose; Case 4 - collagen gelatin sponge) were immediately applied to the denuded bone. In Case 3, a gauze pack was then placed over the haemostatic agent and sutured to the buccal and palatal mucosa. In Case 4, an acrylic stent, which was prepared preoperatively, was attached to the palate to provide initial wound coverage. Three days after surgery the gauze pack and acrylic stent were removed and the defects were left to secondary healing. Healing was observed during oral prophylaxis appointments.

On average the defects healed completely at two months following surgery. While final healing was ideal, partial necrosis of the mucosal flap (Case 1) and minimal postoperative bleeding (Case 4) were seen as complications in two cases.

Discussion

The classic clinical presentation of the pleomorphic adenoma is a firm, painless,

nonulcerated, irregularly dome-shaped swelling. Palpation may reveal isolated softer areas and a smooth or lobulated surface. Slow persistent enlargement over a period of years is typical, and lesions may achieve sizes greater than 1.5 cm in diameter. Minimum size of the lesion in the cases presented here was 2 x 3.5 cm.

Histologically, this tumor has epithelial cells in a nest-like arrangement with pools of myxoid, chondroid, and mucoid material. A distinct fibrous connective tissue capsule containing tumor cells surrounds and usually limits the extension of the tumor. Treatment goals for PPA's include the following:

- Tumor eradication
- Restoration of function
- Preservation of anatomical form
- Preservation of anatomical structures without compromising the resection of lesion
- Prevention of tumor recurrence

Since recurrences are frequent following simple enucleation or incomplete excision, wide excisional biopsy is the recommended treatment for PPA's. Tumorous involvement of the capsule may play a role in recurrence.[7] Incisional biopsies have a reputation for seeding tumors, leading to local recurrence.[8] For this reason, biopsy often takes the form of an excisional biopsy.

The use of accurate fine needle histologic diagnosis can be of considerable help. The accuracy of fine needle aspiration of salivary gland tumors compares favorably with microscopic examination of frozen sections. Lesions must be more than 1 cm in depth, however, to be suitable for fine needle biopsy.[9] However, in two of the cases presented here (Cases 2 and 3) fine needle aspiration results were not confirmed by microscopic examination of the surgical specimens.

Local excision of benign tumors of the palate without removal of palatal bone is adequate for an excellent prognosis. Various surgical techniques have been suggested for the closure of intraoral defects such as primary closure, buccal mucosal graft, split thickness skin graft, allogenic graft, regional rotational flap, and distant flap.[10] The type and size of the defect determine the technique to be used. Reconstruction of palatal defects after excision of PPA's can vary. There is a limited amount of information about these lesions in the dental literature information. The most common palatal closure techniques are secondary healing, intact mucosal flap, otogenic or allogenic grafts, transpalatal flap, buccinator myomucosal flap, and pedicled buccal fat pad flap.[10-14]

The buccinator island flap was recently popularized by Zhenmin et al.[15] who used the flap design in cases of cleft palate and periorbital defects. Like a transpalatal flap, the advantage of this type of flap include its consistent vascular anatomy, abundant blood supply, and favorable arc of rotation. But it requires a long operation time and secondary surgical procedures. There is also risk of damage to the parotid duct.

The use of pedicled buccal fat pads in small or medium intra-oral defects is a convenient, reliable, and quick reconstructive method. The rich blood supply of the buccal fat pad, its easy mobilization, and fewer complications make it an ideal flap. Furthermore, the buccal fat pad is located close to the defect to be covered diminishing the risk of infection.[10,16] These features of the pedicled buccal fat pad allow it to be considered as a reliable method of closure of defects that cannot be repaired by conventional procedures. As stated previously, Case 2 was closed with a pedicled buccal fat pad and the operation time was longer than the others because of the additional surgical site needed. However, the defect healed ideally in the shortest time compared to the other closure methods used.

Although healthy intact mucosa over the tumor was used for closure in Case 1, there is an important disadvantage of this technique. PPA's have a loose capsule which adheres firmly to the overlying mucosa which can result in residual tumor cells remaining under the mucosa creating a potential for recurrences. Denuding the palatal bone surface after the excision of a PPA to remove such residual cellular material has resulted in excellent secondary healing by the formation of granulation tissue. Secondary healing of such palatal defects brings some advantages such as not requiring unique surgical expertise, avoiding the creation of an additional surgical area, and minimizing the operation time.

However, a delay in epithelialization, secondary bleeding, and infection are risk factors that should be kept in mind using this surgical approach.

Conclusion

Regardless of the size of the palatal defect created by the surgical excision of a PPA it heals ideally by secondary healing. However, the possibility of secondary bleeding and infection during healing period should be kept in mind. Using either an acrylic stent or a gauze pack for 3 days after the insertion of a hemostatic agent on the exposed bone surface is necessary to minimize these risks.

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