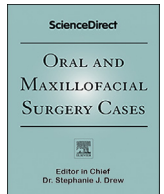




ELSEVIER

Contents lists available at ScienceDirect

Oral and Maxillofacial Surgery Cases

journal homepage: www.oralandmaxillofacialsurgerycases.com

Dental and surgical controversial practices during the marsupialization procedure for the treatment of nasopalatine duct cysts

Kabunda Syebele^{a,b,*}, Thifhelimbilu I. Munzhelele^c, James M. Mchenga^d^a Department of Maxillo, Facial and Oral Surgery, Sefako Makgatho Health Sciences University, P.O. Box D22, Medunsa, 0204, South Africa^b Department of Maxillo, Facial and Oral Surgery, University of Pretoria, South Africa^c Head of Department of Maxillo, Facial and Oral Surgery, Sefako Makgatho Health Sciences University, P.O. Box D22, Medunsa, 0204, South Africa^d Head of Clinical Unit, Department of Maxillo-Facial and Oral Surgery, Sefako Makgatho Health Sciences University, P.O. Box D22, Medunsa, 0204, South Africa

ARTICLE INFO

Keywords:

Nasopalatine duct cyst
Marsupialization
Surgical controversy

ABSTRACT

Background: Marsupialization procedure is a recognized treatment modality for larger nasopalatine duct cysts, before a secondary enucleation is performed. However, reported practices of tooth extraction, root canal therapy on vital teeth adjacent to the cyst, and the post-operative packing of the cystic cavity, appear to be questionable.

Methods: This clinical study reviewed the chart of 20 patients following a standardized marsupialization procedure, for the treatment of large nasopalatine duct cyst. A large fenestration was created in the cystic wall. The vitality of all teeth adjacent to the cyst was preserved. Extraction of and/or root canal therapy of adjacent vital teeth were absolutely avoided. No postoperative packing of the cystic cavity was performed. Digital panoramic radiographs were used for pre and postoperative monitoring of the lesion.

Results: All the cystic opening remained patent postoperatively for several months/years, without the use of any packing. The large cystic cavities steadily reduced in size.

Primary and permanent teeth continued their normal eruption process in final positions in pediatric patients. All teeth adjacent to the cystic cavity remained vital after marsupialization. Clinical and radiological realignment of displaced teeth was observed.

Conclusion: The preservation of vital teeth adjacent to the nasopalatine cyst remains a critical objective during marsupialization, irrespective of the lesion's size. Root canal therapy and extraction of vital teeth are unnecessary in the management of this non-odontogenic lesion. We found no rationale to support the postoperative packing of the cystic cavity.

1. Introduction

Nasopalatine duct cysts (NPDCs) are reported in the literature as the most common non-odontogenic cystic lesions in the maxilla [1–4].

Enucleation of NPDCs with primary closure remains the treatment of choice for small and medium size lesions [1–3]. The marsupialization technique is also a recognized modality treatment for larger lesions, with the aim of performing a secondary enucleation on a

* Corresponding author. P.O. Box 30331, Kyalami, 1684, South Africa.

E-mail addresses: kabunda.syebele@smu.ac.za (K. Syebele), irene.munzhelele@smu.ac.za (T.I. Munzhelele), james.mchenga@smu.ac.za (J.M. Mchenga).

reduced cavity [3,5–7].

However, some of the dental and surgical practices associated with the marsupialization technique during the management of NPDCs, as mentioned in the literature, remain subjects for debate. The most controversial aspects are the performance of root canal treatment (RCT) and/or the extraction of adjacent vital teeth during the procedure, as well as the postoperative packing of the cystic cavity with various materials [5,8–12]. On the one hand, the performance of RCT on vital adjacent teeth appears to be contrary to good basic dental practice, as NPDCs are not odontogenic pathology. On the other hand, the postoperative packing of the cystic cavity may maintain a positive intra-cystic pressure that precisely opposes the original reason behind the performance of the marsupialization procedure. Therefore, it may interfere, for example, with the objective of achieving a steady reduction of the cystic cavity size.

The aim of this case series report is to debate specific dental and surgical practices as mentioned in the literature and to add value to a well-known management of larger (“neglected”) NPDCs i.e., the marsupialization technique.

The following questions are debated.

- Is there a need for extraction of vital teeth adjacent to a NPDC?
- Is there a need to perform RCT on vital teeth adjacent to a NPDC?
- Is it necessary to postoperatively pack the cystic cavity during marsupialization of a NPDC?

2. Materials and methods

This retrospective case series was based on the records of 20 patients who consulted a Maxillofacial Surgery center in South Africa, for the treatment of large NPDCs (Fig. 1).

A standardized marsupialization technique was performed by a single operator on all 20 patients. The procedure entailed the creation under local anesthesia, of either medial or lateral vestibular opening that needed to remain patent for several months or years. The cystic cavity was not packed and no obturator was used.

Root canal treatment and/or extraction of adjacent vital teeth were avoided during the procedure for all 20 patients. The junctional margin of the cystic membrane and the oral mucosa was sutured with a continuous type of suture using absorbable material (cat gut chromic 3–0 or vicryl® 3–0).

The patients were instructed on how to maintain the empty cavity clean by regular flushing with warm salty water initially, and later normal water from the tap, especially after every meal. A 20ml plastic syringe was provided to the patient for this purpose. The clinical post-operative monitoring period extended from three to 24 months. The primary and permanent dentitions were allowed to erupt normally in younger patients after marsupialization. Digital panoramic radiographs were used for monitoring purposes.

3. Results

All 20 patients had the following identifiable symptoms at the first consultation: swelling in the palate and/or the vestibular sulcus of the maxillary frontal segment and tooth displacement, especially in pediatric patients (Fig. 1). Facial disfigurement and change in the naso-labial profile were found in large-sized (≥ 30 –50 mm) cystic lesions that presented with vestibular swelling. The estimated horizontal biggest diameter of the lesions ranged from 11.3 to 86.7 mm on digital panoramic radiographs.

All adjacent teeth in the 20 operated patients remained vital after marsupialization. Significant clinical re-alignment of the displaced teeth was observed in younger patients without implementation of any orthodontic treatment (Fig. 2A and Fig. 2B). However, displaced teeth in adult patients responded poorly to marsupialization.

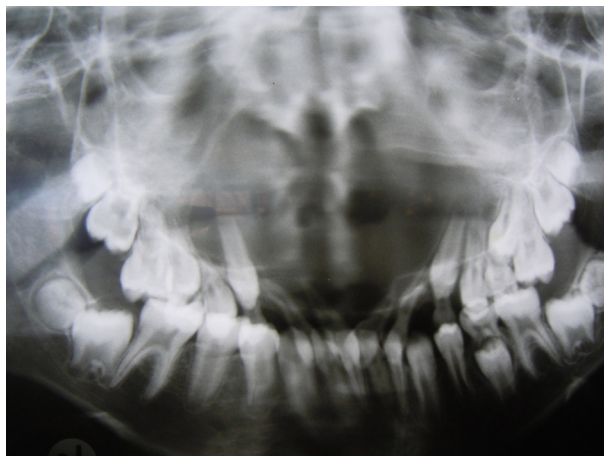


Fig. 1. Panoramic view radiograph of a NPDC showing a massive osteolytic lesion extending horizontally from tooth 16 to tooth 26. Note the presence of mixed dentition and the grossly destroyed alveolar bone of the anterior segment.

The normal eruption of permanent teeth was observed in conjunction with progressive reduction of the cystic cavity. The regeneration of the previously destroyed palatal and alveolar bone, as shown in Fig. 3A and B, was noted.

The swellings in the palate and in the labial sulcus, as well as facial disfigurement, were immediately reduced after marsupialization. The reconfiguration of the previously bulging hard palate into its normal shape was observed after four to eight weeks postoperatively, without packing of the cystic cavity. All cases were histologically confirmed as NPDCs.

No postoperative infection was recorded. There was no neurological fallout reported in the maxillary anterior segment (paresthesia). All 20 operated patients complied fully with the postoperative instructions.

4. Discussion

Marsupialization as an initial treatment for large cystic lesions is well documented in the literature [2–8,12]. It is based on the elimination of intracystic pressure buildup, achieved by the creation of a permanent draining mechanism. The expected result is the gradual reduction of the cystic cavity as a result of the effect of unopposed physiological growth forces (bone growth, muscle action). A secondary enucleation of a reduced cystic lesion may then be performed.

Some literature reports mentioned the performance of RCT and/or tooth extraction of vital teeth adjacent to the NPDCs during marsupialization [9–12]. The presents authors are of the opinion that these controversial practices need to be re-visited.

Neglected NPDCs, often severely affect the adjacent teeth, the palatal and/or the alveolar bone (Fig. 1). Advanced degree of tooth mobility may also be observed [10]. However, despite the extent of bone destruction and the degree of tooth mobility, adjacent teeth remain vital. Tooth vitality in the context of NPDCs is widely reported in the literature [8–16]. Therefore, it remains difficult to understand the rationale behind tooth extractions and/or endodontic treatment being controversially performed on vital teeth during marsupialization procedures on NPDCs.

Gnanasekhar et al. [17] suggest that large cystic lesions with a diameter greater than 5 cm are likely to involve the teeth and cause devitalization of the pulp. The authors did not provide the exact mechanism in this regard. No devitalized tooth was observed in the present case series report, despite the average size of the cystic lesions. This is in line with the fact that the NPDC is not odontogenic lesion.

Based on results in this case series, it would appear that there is no rationale to supports either tooth extraction or the performance of RCT. The NPDC is a non-odontogenic cyst, not associated with any pulpal or periodontal origin. It remains, therefore, of utmost importance for the clinician to differentiate an apical periodontal lesion from NPDC [17,18].

The packing of the cystic cavity after marsupialization with various types of ribbon gauze (impregnated or not) is a widely reported practice in the literature and is used in the management of most cystic jaw lesions [5–7,12,19]. The reasons for postoperative packing is to avoid, either, the cavity becoming a food trap, or to avoid the margins of the window from collapsing and healing. Bodner [5] suggests that the ribbon gauze must be kept in the marsupialized cystic cavity until the line of junction between the mucosa and cystic lining is healed.

In the specific context of NPDCs, we consider the postoperative packing of the cystic cavity as one of the most controversial practices. The results observed in this case series strongly suggest that the margins of a well-designed fenestration would not collapse, and a well-motivated patient could effectively keep the cavity clean (Fig. 2A). Furthermore, we argue that the presence of the packing material would maintain a positive intracystic pressure, which in turn would likely interfere with the steady reduction of the cystic cavity and the remodeling of deformed soft tissue and bone structures. This statement is based on the fact that the ribbon gauze used to pack the cavity needs to be well condensed in the empty cavity to fully occupy the empty space and avoid the creation of a food trap. The specific case of the hard palate, for example, is the best testimony in this aspect. Active tongue muscles are capable of remodeling the bulging hard palate in a very short period of time when the cystic cavity is not packed after marsupialization. This allows the hard palate bone to recover its anatomical configuration rather than persisting as a bulging bony prominence in the palate. The same principle also applies to



Fig. 2. Same patient as in Fig. 1. Initial clinical presentation of the four maxillary incisors (Fig. 2A) showing also a clean post-operative cystic cavity. Same patient as in Fig. 2A; the four permanent upper incisors are in more acceptable position 24 months later (Fig. 2B).

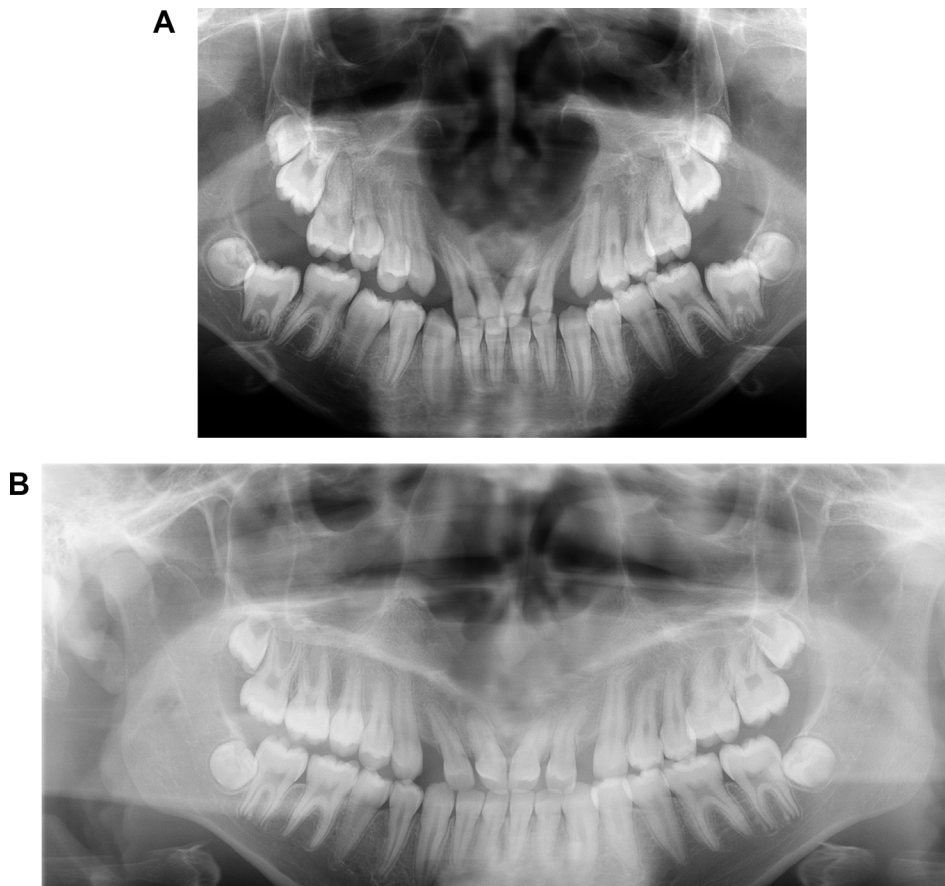


Fig. 3. Same patient as in Fig. 1. The cystic cavity has substantially reduced in size after 12 (Fig. 3A) and 30 (Fig. 3B) months respectively. The palatal and alveolar bones have regenerated. Permanent teeth have completed their eruption (2nd molars, premolars and canines).

the bulging in the buccal sulcus space, which contributes substantially to facial disfigurement. Immediately after marsupialization without postoperative packing, the buccal bulging was flattened.

5. Conclusion

The purpose of the present case series was to identify and debate controversial dental and surgical practices as encountered in the literature in relation to the marsupialization technique for the management of large NPDCs.

The findings of the current study suggest that there is no need for the performance of root canal therapy or extraction of adjacent vital teeth. Furthermore, there is little rationale to support the practice of immediate postoperative packing of the cystic cavity.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Disclosures

No conflict of interest or third-party funding to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.omsc.2018.09.001>.

References

- [1] Neville BW, Damm DD, Allen CM, Chi AC. Developmental defects of the oral and maxillofacial. In: Neville, Damm, editors. Oral and maxillofacial pathology. fourth ed. Elsevier, Inc; 2016. p. 1–48.
- [2] Regezi JA, Sciubba JJ, Jordan RCK. Cysts of the jaws and neck. In: Regezi JA, editor. Oral pathology. seventh ed. Elsevier, Inc; 2017. p. 245–68.
- [3] Elliott KA, Franzese CB, Pitman KT. Diagnosis and surgical management of nasopalatine duct cysts. *Laryngoscope* 2004;114:1336–40.
- [4] Swanson KS, Kaugars GE, Gunsolley JC. Nasopalatine duct cyst: an analysis of 334 cases. *J Oral Maxillofac Surg* 1991;49:268–71.
- [5] Bodner L, Manor E. Cystic lesions of the jaws - a review and analysis of 269 cases. *Eur J Plast Surg* 2010;33:277–82.
- [6] Hou R, Zhou H. Article of marsupialization and decompression on cystic lesions of the jaws: a literature review. *J Oral Maxillofac Surg Med Pathol* 2013;25:299–304.
- [7] Manor E, Kachko L, Puterman MB, Szabo G, Bodner L. Cystic lesions of the jaws – a Clinicopathological Study of 322 cases and review of the literature. *Int J Med Sci* 2012;9:20–6.
- [8] Suter VGA, Büttner M, Altermatt HJ, Reichart PA, Bornstein MM. Expansive nasopalatine duct cysts with nasal involvement mimicking apical lesions of endodontic origin: a report of two cases. *J Endod* 2011;37:1320–6.
- [9] Kose E, Sekerci AE, Soylu E, Nazlim S. An extremely rare anatomical variation bilateral canal sinus and nasopalatine duct cyst and role of cbct in diagnosis. *Int J Sci Res* 2014;3:361–3.
- [10] Perumal CJ. An unusually large destructive nasopalatine duct cyst: a case report. *J Maxillofac Oral Surg* 2013;12:100–4.
- [11] Tanaka S, Lida S, Murakami S, Kishino M, Yamada C, Okura M. Extensive nasopalatine duct cyst causing nasolabial protrusion. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008;106:e46–50.
- [12] Paul S, Kapoor V, Kumar M, Narula R, Kapoor V, Kapoor U. A clinical study of cysts of the maxillofacial region; and an assessment of clinico-radiologic-pathological variables affecting the formulation of a comprehensive patient need based treatment plan. *Indian J Dent* 2014;5:69–74.
- [13] Szubert P, Sokalski J, Krauze A, Kondziela I, Splawa-Neyman A. Nasopalatine duct cyst – case reports. *Dent Med Probl* 2010;47:508–12.
- [14] Dedhia P, Dedhia S, Dhokar A, Desai A. Case report - nasopalatine duct cyst. Case report in dentistry. 2013. <https://doi.org/10.1155/869516>.
- [15] Cecchetti F, Giada M, Marco C, Germano F, Arcuri C, Ennio B. Nasopalatine duct cyst: report of 52 cases in a retrospective epidemiological study. *J Surg* 2013;1:14–7.
- [16] Kobashi H, Ishii S, Yakushiji N. Huge nasopalatine duct cyst treatment with the help of cystectomy and bilateral fenestration surgery of the nasal cavity: a case report. *Oral Maxillofac Surg Cases* 2017;3:112–7.
- [17] Gnanasekhar J, Walvekar S, Al-Kandari A, Al-Duwairi Y. Misdiagnosis and mismanagement of a nasopalatine duct cyst and its corrective therapy: a case report. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1995;80:465–70.
- [18] Faitaroni LA, Bueno MR, Carvalhosa AA, Mendonca EF, Estrela C. Differential diagnosis of apical periodontitis and nasopalatine duct cyst. *J Endod* 2011;37:403–10.
- [19] Sokler K, Sandey S, Grgurevic J. Surgical treatment of large mandibular cysts. *Acta Stomatol Croat* 2001;35:253–7.