ORIGINAL ARTICLE

AL-ANBAR MEDICAL JOURNAL
Anb. Med. J. 22(2): 114–119, 2026

Novel Use of Grommet Tube in the Treatment of Odontogenic Cysts Marsupialization: A Preliminary Study

Batool Abdulnasser Ismail[1, *] and Mohammed Khudhur Abdljalel[1, †]

[1] *Department of Oral and Maxillofacial Surgery, College of Dentistry, University of Anbar, Anbar, Iraq.*
(Received : 5 December 2025; Accepted : 2 March 2026; First published online: 1 April 2026)

ABSTRACT

Background: A conservative surgical method called marsupialization is used to treat large odontogenic cysts. A novel cyst tube (Grommet tube) was utilized to improve the drainage following marsupialization.
Objectives: To evaluate the efficacy of the Grommet tube by measuring the rate of reduction in cyst size, assessing patients' satisfaction, and evaluating the occurrence of complications.
Materials and methods: Marsupialization was performed under local anesthesia in 10 patients. Cone-beam computed tomography and a semi-automated segmentation method in the 3D Slicer 5.8.1 software were used to measure the cyst volume at baseline and six months after marsupialization, and a comparison between them was made to measure the percentage of reduction in cyst size. To evaluate variations in the rate of reduction of cystic lesions in accordance with different parameters, a volumetric analysis was used.
Results: Ten patients (2 female, 8 males; mean age 37 years, range: 18-51 years) with preoperative and postoperative cyst volumes of 6254 ± 4889.52 mm^3 and 4145.5 ± 3385.3 mm^3, respectively (P-value < 0.05), were handled. The volume reduction percentage was 33.71% after 6-months period. Overall, patient satisfaction was moderate. Significant results (P-value < 0.05) were obtained for sex, age, pathological diagnosis, and reduction rate. All patients showed soft tissue overgrowth, and 50% of cases revealed tube displacement.
Conclusion: The Grommet tube was effective in reducing cyst size. The patients were satisfied with the tube. Tube displacement and soft tissue overgrowth were observed in a significant number of cases.
Keywords: Grommet tube; Marsupialization; Odontogenic cysts.

DOI: 10.33091/amj.2026.167647.2534

INTRODUCTION

The jaw serves as host for cysts because of its involvement in tooth formation. Cysts are pathological cavities that are lined with epithelium and containing fluid, semisolid, or gaseous material [1]. Cysts of the jaw represent a significant component of oral maxillofacial (OMF) pathology, with an increasing number of cases identified incidentally via routine radiographic examinations in general dental practice. Cysts in OMF pathology are categorized into two groups: odontogenic and non-odontogenic cysts [2]. Odontogenic cysts are pathological cavities lined by epithelium originating from odontogenic epithelium. Odontogenic cysts are thought to arise from inflammatory or developmental pathogenic factors, potentially originating from the reduced enamel epithelium of a tooth crown, epithelial rests of Malassez, or remnants of the dental lamina [3]. Treatments ranged from single marsupialization, bone resection, and enucleation to a mix of these methods [4]. Marsupialization entails maintaining the cavity of a large cyst in an open state by decompression devices, which decreases intracystic pressure and promotes the regeneration of neighboring bone, thus leading to the gradual reduction of the cyst [5].

Marsupialization of odontogenic cysts might be executed utilizing several instruments [6]. Intravenous tubing, tuberculin syringes, and nasopharyngeal airways have been utilized in the catheterization of odontogenic cysts [7]. Recently, researchers have proposed tooth-supported decompression de-

* Corresponding author: E-mail: batool.a.ismail@uoanbar.edu.iq
† Corresponding author: E-mail: den.mka.jasim@uoanbar.edu.iq

vices akin to removable dentures, that enable patients to easily remove and clean the cyst cavity. Nonetheless, these devices are tooth-supported, rendering them particularly inappropriate for individuals with missing teeth [8].

The stent's failure has been ascribed to the combined effects of adjacent soft tissue inflammation, everyday mastication, and routine irrigation manipulation. This can be exasperating for both the surgeon and the patient, resulting in numerous operating room trips and an increased probability of postoperative complications [9].

To overcome the limitations of other methods, in the current study, we applied a new drainage tube to evaluate its efficacy. We use a silicone piece from a dental implant surgical kit. The Grommet tube used in this study was a standard medical-grade silicone tube, routinely used in clinical practice. This device prototype was inspired by the Grommet tube used by otolaryngologists to treat otitis media with effusion. Conventional Grommet tubes are limited by their small size and instability. Therefore, a larger, easier-to-handle, and more stable device was used. Case selection should be based on patient compliance with follow-up visits and should be reserved for large cysts near vital structures such as nerves and the maxillary sinus.

The study aimed to evaluate the radiographic and clinical effectiveness of the tube by assessing patients' satisfaction, tube related complications, and factors affecting the reduction in cyst volume.

MATERIALS AND METHODS

Study design and sample

This pilot prospective observational study was conducted at the University of Anbar's College of Dentistry, Department of Oral and Maxillofacial Surgery, from January 2025 to October 2025. The duration of sample collection was 4 months. The group of patients in this study consisted of individuals diagnosed with odontogenic cysts who were indicated for a marsupialization procedure. The research involved 10 participants. The Ethical Approval Committee of the University of Anbar approved the study protocol (Reference number 236, dated 25-12-2024). The study goals were clarified for all patients, and informed consent was obtained.

The inclusion criteria consisted of pathological diagnosis of odontogenic cysts and large-sized cysts when it is not possible to safely exclude injury to vital neighboring structures, such as nerves, blood vessels, adjacent roots, the maxillary sinus, or the floor of the nose. Patients aged 15 to 60 years, both sexes, were enrolled in the study. Soft tissue cysts, systemic disorders affecting bone healing, non-compliance with follow-up visits, a history of neck and head radiotherapy or chemotherapy, and antiresorptive medicines or corticosteroids were all considered for excluding patients.

Surgical procedure for marsupialization

Before performing the procedure, aspiration was performed to verify the nature of the cystic lesion, to exclude vascular lesions, and to help differentiate a maxillary cyst from a maxillary sinus using a plastic syringe. All marsupialization treatments were completed under local anesthesia, including 2% lidocaine with 1:80,000 adrenaline, by giving infiltration anesthesia to anesthetize branches of the superior alveolar nerve buccally and the greater palatine nerve or nasopalatine nerve palatally in the upper jaw lesion and the inferior alveolar nerve block, along with infiltration anesthesia into the long buccal nerve or mental nerve in the lower jaw. A small linear incision of about 1 cm was made in the buccal mucosa by using a scalpel handle and a number 15 blade. After reflecting on the mucosa, when the cortical bone is intact, the cystic lining is accomplished by using a low-speed handpiece and a round bur with saline irrigation to remove the bone. To confirm the initial diagnosis of the odontogenic cyst, a piece of cystic lining was taken with a blade number 15, fixed in 10% formalin, and sent to a histopathologist.

After that, the cystic cavity was irrigated and the cystic contents evacuated. The Grommet tube (from the dental implant surgical kit) was inserted into the cyst (Figure 1). The tube was sutured to the oral mucosa with 3/0 black silk suture using a basic interrupted suturing technique. Finally, the cavity was irrigated several times with 0.9% sodium chloride (normal saline) using a disposable plastic syringe. Following surgery, patients were told to apply a cold pack to the outside of the operation site for 15 minutes every hour during the first 8 hours. They were also advised to eat a soft diet, avoid hot foods, not rinse their mouths, and avoid eating over the surgery area on the day of the operation.

post-surgery, patients received co-amoxiclav tablets of 625 mg to be taken three times a day and metronidazole tablets of 500 mg taken three times a day, both medicines taken for 5 days. If a patient was allergic to penicillin, they were given 500 mg tablets azithromycin once a day for 5 days instead. Additionally, 500 mg paracetamol tablets were provided for pain relief as needed. Patients were also instructed to use a 0.12% chlorhexidine mouthwash 3-5 times a day for two weeks, starting the day after surgery, to keep their mouths clean. The patients were instructed to rinse out the cavity 3 times daily with normal saline using a 5 ml disposable plastic syringe. The sutures were removed one week after the surgery.

One month after tube placement, soft tissue overgrowth was observed. Excess tissue was removed using blade No.15 to expose the tube (Figure 2).

Data collection and follow-up

Patients' satisfaction was evaluated using a Likert scale (1 to 3 points, 1 = dissatisfied, 2 = neither satisfied nor dissatisfied, and 3 = satisfied) following a 6-month follow-up. During follow-up, patients were assessed for complications, including tube displacement, infection, or soft tissue overgrowth. Cone

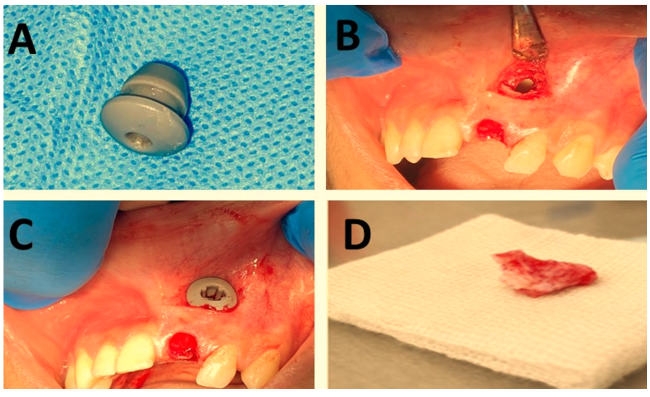

Figure 1. Grommet tube. B: Bone removal and exposure of cystic lining. C: Insertion of the Grommet tube in the cavity. D: Piece of cystic lining.

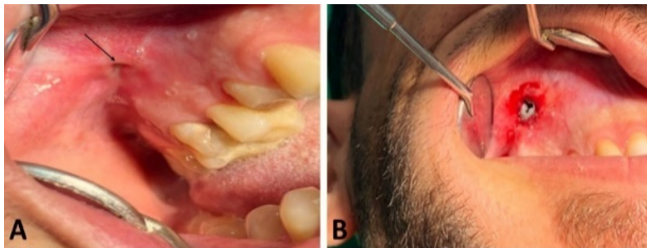

Figure 2. A: Black arrow indicates the area of soft tissue overgrowth around the Grommet tube. B: Excision of excess soft tissue performed using a number 15 surgical blade.

beam computed tomography (CBCT) was performed for all patients preoperatively and following a 6-month period for evaluation of reduction in cyst size to verify the time of resection according to the lesion size and its association with the adjacent structures. Enucleation was achieved as there was sufficient reduction in cyst size with minimal risk to the anatomical landmark (blood vessels, maxillary sinus, nerves, and adjacent teeth roots). Cyst volume was measured from the baseline data that had been taken before marsupialization. To visualize and examine 3D data, open-source image computing software 3D Slicer (version 5.8.1) was employed.

Segmentation is manually accomplished via the paint tool in the segment editor on the digital image to select the cystic area in the 3 spatial projections (sagittal, coronal, and axial), and automatically via the grow from seeds segmentation algorithm, which leads to a 3D visual examination. The tool segment statistics were applied to acquire volume measurements. Another CBCT was performed 6 months later to measure the reduction in cyst size (Figures 3 and 4).

The variables that may affect the effects of decompression are sex (male and female); age (≤ 40 years and > 40 years); lesion location (maxilla, mandible); pathological diagnosis; and oral hygiene (good, fair, or poor). Assessment of the oral hygiene was done by using the plaque index (PI) of Silness J and Loe H [10]. The Mean value is calculated by summing the values and dividing the result by the number of values in the sample. Lesion reduction rate (mm^3/day) was determined by

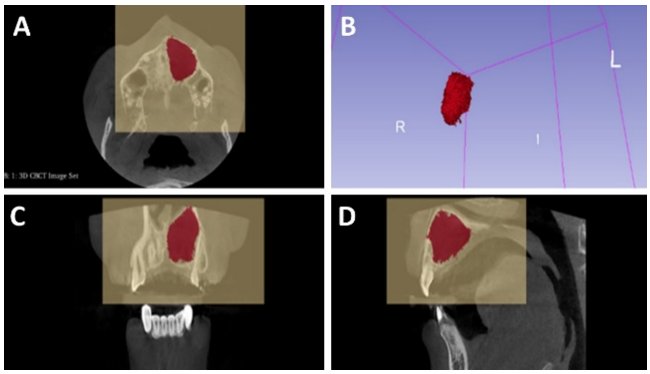

Figure 3. Cyst segmentation before marsupialization in an 18-year-old male patient. A: Axial cone beam computed tomography image showing the segmented cyst (red area). B: 3D reconstruction of the cyst. C: Coronal view of the lesion. D: Sagittal view demonstrating cyst extension.

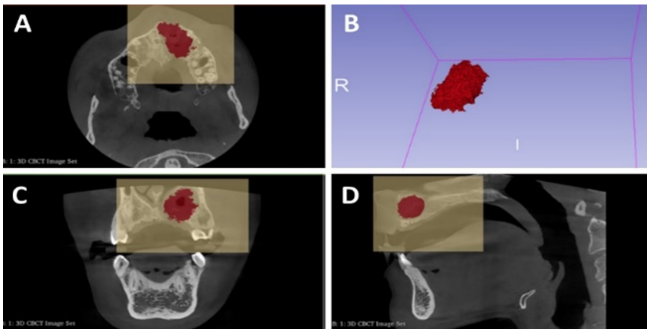

Figure 4. Cyst segmentation after marsupialization in an 18-year-old male patient. A: Axial cone beam computed tomography image showing the segmented cyst (red area). B: 3D reconstruction of the cyst. C: Coronal view of the lesion. D: Sagittal view demonstrating cyst extension.

subtracting the volume after decompression (mm^3) from the volume before decompression (mm^3) and dividing the result by the 180-day observation period. The (preoperative volume - postoperative volume)/ (preoperative volume) multiplied by 100 yields the percentage.

Statistical analysis

A combination of Statistical Package for the Social Sciences (SPSS) version 28.0 (IBM Corp., Armonk, NY, USA) and Microsoft Excel 2019 was used to analyze the data. To validate if the data has a normal distribution, the Shapiro-Wilk test was employed. For the evaluation of the lesion volume before and after the surgical procedure, the Wilcoxon Signed-Rank Test was applied. Peer-to-peer differences were assessed by the Mann-Whitney U test for dichotomous variables (e.g., sex, age, oral hygiene level, lesion localization) and the Kruskal-Wallis test for variables with three or more levels (e.g., pathological diagnosis). Cyst size reduction was statistically significant at a P-value < 0.05.

RESULTS

The total number of patients in the research was 10, with an age range of 18-51 years. The mean age of the patients was 37 years, with a median of 37.0. Males constituted 80% of the cohort. The maxilla was the location of 60% of the lesions. Of the total sample, 50% had radicular cysts. The Patients' oral hygiene was assessed as fair in 60% of patients. Analysis of reduction rates according to different parameters is summarized in Table 1.

Responses from the patient satisfaction surveys were quite varied. The mean satisfaction score from the descriptive analyses is 2.35 (scale 1-3), with a standard deviation is 0.45, which shows that the satisfaction is moderate. The responses from patients about the usage and comfort of the tube are shown in Table 2.

In Table 3, the data describe the frequency and complications related to the tube, including tube displacement, soft tissue overgrowth, and infection.

The mean cyst volume was 6254.0 ± 4889.53 mm^3, which decreased postoperatively to 4145.5 ± 3211.61 mm^3. To verify the statistical significance of this change, the Wilcoxon Signed-Rank Test was employed, yielding P-value of 0.002,

http://doi.org/10.33091/amj.2026.167647.2534

Table 1. Comparison of reduction rates of 10 patients with odontogenic cysts according to different parameters.*

Variables	Number (%)	Reduction rate (mm^3/day)	Statistics test (P-value)
Sex[a]			
Male	8 (80%)	13.46 ± 3.91	0.041*
Female	2 (20%)	4.72 ± 1.02	
Age[a]			
≤ 40 years	6 (60%)	19.52 ± 2.18	0.026*
> 40 years	4 (40%)	12.73 ± 3.05	
Location[a]			
Maxilla	6 (60%)	12.11 ± 1.17	0.312
Mandible	4 (40%)	11.12 ± 2.24	
Pathological diagnosis[b]			
Dentigerous cyst	2 (20%)	14.19 ± 1.17	
Keratocyte	3 (30%)	14.26 ± 1.03	0.019*
Radicular cyst	5 (50%)	23.43 ± 2.24	
Oral hygiene[a]			
Good	4 (40%)	21.05 ± 1.22	0.234
Fair	6 (60%)	19.52 ± 2.84	

* Significant difference between groups (P- value < 0.05), a: Mann-Whitney U test, b: Kruskal-Wallis's test.

Table 2. Patient satisfaction responses regarding tube usage and comfort of the Grommet tube.

	Questionnaire	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Average	Percentage %
1	Ease of tube irrigation	0 (0%)	2 (20%)	8 (80%)	2.8	93.324
2	Comfort of the tube	0 (0%)	4 (40%)	6 (60%)	2.6	86.658
3	Oral odor	0 (0%)	7 (70%)	3 (30%)	2.3	76.659
4	Tube retention	5 (50%)	5 (50%)	0 (0%)	1.5	49.995
5	Pain-free experience	0 (0%)	5 (50%)	5 (50%)	2.5	83.325
6	No impact of the tube on daily activities	0 (0%)	6 (60%)	4 (40%)	2.4	79.992

Table 3. Distribution of complications associated with the tube among 10 patients with odontogenic cysts.

Complications associated with the tube	Yes	No	Percentages
Tube displacement	5	5	50%
Soft tissue overgrowth	10	0	100%
Infection	0	10	0%

which is a statistically significant difference. The percentage reduction in volume was 33.71%.

DISCUSSION

Marsupialization aims to relieve pressure within the cystic cavity and permit new bone to fill the defect. This procedure has been widely utilized for jaw cysts [11]. The study provides a standardized surgical protocol, evaluates radiographic and clinical outcomes, and incorporates patient satisfaction as a principal outcome measure. The study gives us some preliminary information on how well this minimally invasive treatment works and what benefits it might have. It does this by carefully measuring the cysts shrinks to an extent, laying the groundwork for larger investigations in the future.

After a decompression period lasting 3 to 27 months, Kwon et al. [12], showed a 33.9% to 77.6% reduction in cyst volume using a Penrose drain. After 6 and 7 months, Bellini et al. [13], reported a 47.1% using iodoform gauze. In the present study, the volume reduction was 33.71. These findings align with prior research indicating substantial reductions in volume following marsupialization.

We evaluated the reduction rate across different parameters. The mean age of the patients was 37, so age 40 was chosen as the study age group. Higher reduction rates in males may be related to differences in bone density or compliance with postoperative care. However, the smaller sample size of females should be considered a limitation that may have influenced the statistical power of this comparison. A large decrease rate can be noticed in males more than females, based on research done by Jeong et al. [14]. However, this difference was not statistically significant. These results align with that study.

Older patients tend to show delayed healing responses. This might be associated with bone healing, which diminishes with age due to less blood supply and decreased cell activity. Kwon et al. [12] revealed that compared to older patients, younger patients had a noticeably higher rate of decrease.

The higher reduction observed in the maxilla can be attributed to its richer blood supply, allowing greater remodeling and reduction. Statistically significant results were obtained by Oliveros-Lopez et al. [15], which showed a higher rate of reduction of odontogenic cysts in the mandible com-

pared to the maxilla. According to the results of a study conducted by Wongrattanakarn et al. [16], no significant differences were observed in reduction rates according to lesion location.

Radicular cysts had the most significant reduction rate. Because radicular cysts are inflammation-driven lesions, removing inflammation and decreasing pressure through marsupialization results in a more pronounced reduction. The findings reported no statistically significant differences shown in the reduction rates across numerous pathological diagnoses by Jeong et al. [14] and Anavi et al. [17].

Patients with good oral hygiene showed higher reduction rates than those with fair oral hygiene; no statistically significant difference was noticed. These results indicate that maintaining good oral hygiene will help in cyst reduction. To our knowledge, this is the first research that correlates oral hygiene with volume reduction. Among the various parameters associated with reduction rates, age, sex, and pathological diagnosis were the only ones found to contribute to the bias associated with the level of reduction of cyst size. Nonetheless, neither lesion location nor oral hygiene status contributed to the bias. Despite this, the same surgical technique, follow-up, and measurements were performed for all, minimizing bias associated with the procedure. Thus, the most likely reason for the variations was biological variations and differences in the composition of the cyst, rather than differences in the treatment techniques used. The tube's design is likely to ease postoperative care and boost patient compliance, a vital factor in the success of decompression procedures. It is reasonable to presume that the inner lumen, which allows direct irrigation, improves hygiene and lessens work for the patient. It is likely that the small diameter and smooth-surfaced Grommet tube reduced discomfort during mouth movements. However, dissatisfaction related to tube retention highlights a clinically relevant limitation. Even with these problems, the fact that no pain has been reported shows that the tube is well tolerated and doesn't cause any more postoperative problems than normal surgical discomfort. Overall, these findings suggest that while the tube demonstrates favorable patient-centered outcomes, design optimization is essential to enhance retention and guarantee long-term clinical efficacy.

While the technique has clinical merits, the high rate of soft tissue overgrowth and tube displacement are important drawbacks of the device. Compared with conventional devices, such as acrylic stents, Grommet tubes have a shorter intracystic length and a smaller, narrower external flange. These factors may contribute to a less effective design for mechanically separating the inner lining of the cyst and the adjacent oral mucosa. A tube with such a little projection can even enable the surrounding soft tissue to grow over the tube, especially in regions with high epithelial mitotic activity.

No infections were recorded in this study. The lack of infections could be attributed to the ease of flushing the tube to remove potential debris and stagnant fluid from the cyst cavity. Kivovics et al. [18], described a custom-made removable appliance. The device was stable in place. The study did not report cases of infection or soft-tissue overgrowth. However, skilled clinicians and technicians are required for CAD/CAM planning, CBCT registration, and 3D printing. There was a higher cost due to software, hardware, and materials than for traditional tubes.

This study's findings show that using a Grommet tube during the marsupialization of cysts of odontogenic origin is effective in keeping the tube open and reducing cyst size. This method presents a new, simple, minimally invasive alternative to the more traditional method of enucleation and could lead fewer postoperative complications and greater patient comfort. Clinically, this method offers the same or reduced risk of injury to surrounding structures while allowing for the gradual reduction of the cyst cavity. In addition, the technique is simple, and the tube's efficacy may even improve the healing process. The limitations of the study involve a small sample size, short-term follow-up, and an absence of comparisons with other methods.

CONCLUSION

The novel use of the Grommet tube for marsupialization of odontogenic cysts yields good results. It was effective in reducing cyst size. It was associated with satisfactory patient outcomes. Even though there were some problems, such as tube displacement and soft tissue overgrowth, the Grommet tube can be considered a tolerated technique. It is advisable to conduct future research with an expanded sample size and extended follow-up periods.

ETHICAL DECLARATIONS

Acknowledgments

None.

Ethics Approval and Consent to Participate

The study received approval from the Ethical Approval Committee of the University of Anbar (Reference number: 236, on 25/12/2024). Informed consent was obtained from each patient.

Consent for Publication

Not applicable.

Availability of Data and Material

The data generated and analyzed during this study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that there is no conflict of interest.

Funding

No funding.

Use of Artificial Intelligence

Artificial intelligence has been used to correct spelling and grammar.

Authors' Contributions

Ismail BA and Abdljalel MK designed the study. Ismail BA and Abdljalel MK did clinical work. Ismail BA gathered, analyzed, and interpreted the data. Abdljalel MK supervised the research work. All authors reviewed and endorsed the final version of the manuscript.

http://doi.org/10.33091/amj.2026.167647.2534

REFERENCES

[1] L. D. Sulistyani, L. Iskandar, V. N. Zairinal, A. K. Arlen, F. Purba, and D. Ariawan. Transformation of odontogenic cysts to neoplasms-a systematic review. *Annals of Maxillofacial Surgery*, 13(1):76–80, 2023.

[2] M. Ruslin et al. Epidemiology, treatment, and recurrence of odontogenic and non-odontogenic cysts in south sulawesi, indonesia: A 6-year retrospective study. *Journal of Clinical and Experimental Dentistry*, 14(3):e247, 2022.

[3] S. J. Brown and B. I. Conn. Odontogenic cysts: classification, histological features and a practical approach to common diagnostic problems. *Diagnostic Histopathology*, 28(5):253–266, 2022.

[4] R. Wakolbinger and J. Beck-Mannagetta. Long-term results after treatment of extensive odontogenic cysts of the jaws: a review. *Clinical Oral Investigations*, 20(1):15–22, 2016.

[5] H. Liu, N. Zhou, and X. Huang. The application of wing-shaped window decompression device in the treatment of large odontogenic keratocyst: An observational study. *Medicine*, 103(36):e39601, 2024.

[6] F. W. G. Costa, F. S. R. Carvalho, F. N. Chaves, and E. C. S. Soares. A suitable device for cystic lesions close to the tooth-bearing areas of the jaws. *Journal of Oral and Maxillofacial Surgery*, 72(1):96–98, 2014.

[7] M. A. Pogrel. Treatment of keratocysts: the case for decompression and marsupialization. *Journal of Oral and Maxillofacial Surgery*, 63(11):1667–1673, 2005.

[8] F. Ugurlu, S. Akyuz, and A. Mentes. Outcome of mandibular dentigerous cysts 1 to 10 years after decompression using a custom-made appliance. *Journal of Oral and Maxillofacial Surgery*, 79(1):152–163, 2021.

[9] J. J. Swantek, M. I. Reyes, R. I. Grannum, and O. E. Ogle. A technique for long term decompression of large mandibular cysts. *Journal of Oral and Maxillofacial Surgery*, 70(4):856–859, 2012.

[10] J. Silness and H. Löe. Periodontal disease in pregnancy ii. correlation between oral hygiene and periodontal condition. *Acta Odontologica Scandinavica*, 22(1):121–135, 1964.

[11] N. Nakamura, T. Mitsuyasu, Y. Mitsuyasu, T. Taketomi, Y. Higuchi, and M. Ohishi. Marsupialization for odontogenic keratocysts: long-term follow-up analysis of the effects and changes in growth characteristics. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, 94(5):543–553, 2002.

[12] Y.-J. Kwon et al. Effect of decompression on jaw cystic lesions based on three-dimensional volumetric analysis. *Medicina*, 56(11):602, 2020.

[13] P. Bellini et al. Optimal time to definitive enucleation of large cysts following marsupialization: A single center, retrospective study. *Journal of Stomatology, Oral and Maxillofacial Surgery*, 125(4):101837, 2024.

[14] H.-G. Jeong, J. J. Hwang, S. H. Lee, and W. Nam. Effect of decompression for patients with various jaw cysts based on a three-dimensional computed tomography analysis. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*, 123(4):445–452, 2017.

[15] L. Oliveros-Lopez et al. Reduction rate by decompression as a treatment of odontogenic cysts. *Medicina Oral, Patologia Oral y Cirugia Bucal*, 22(5):e643, 2017.

[16] S. Wongrattanakarn, V. Trachoo, B. Kaboosaya, P. Charoenlarp, N. n. Chongruangsri, and P. Promoppatum. Factors affecting the reduction rate of odontogenic cysts after decompression based on 3-dimensional volumetric analysis. *Imaging Science in Dentistry*, 53(4):313, 2023.

[17] Y. Anavi, G. Gal, H. Miron, S. Calderon, and D. M. Allon. Decompression of odontogenic cystic lesions: clinical long-term study of 73 cases. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, 112(2):164–169, 2011.

[18] M. Kivovics, D. Pénzes, J. Moldvai, E. Mijiritsky, and O. Németh. A custom-made removable appliance for the decompression of odontogenic cysts fabricated using a digital workflow. *Journal of Dentistry*, 126:104295, 2022.