

# Micro-marsupialization versus surgical excision for the treatment of mucoceles

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## ABSTRACT

**Background:** Mucocele is a common disorder of minor salivary glands which arises due to mucous accumulation resulting from their alteration. Several techniques have been described for the treatment. However, most of them are invasive or require costly armamentarium. **Purpose:** The present study was conducted to evaluate the efficacy of micro-marsupialization technique as an alternative to surgical excision for the treatment of mucoceles. **Materials and Methods:** A prospective study was conducted. A total of twenty patients were selected based on clinical diagnosis of mucoceles and were randomly divided into two groups comprising ten patients each. Micro-marsupialization was done in Group 1 patients and surgical excision in Group 2. Patient's gender, age, size, location, duration, complications, and recurrences were evaluated during various visits. Data between the two groups were analyzed by descriptive and analytical (Chi-square tests) statistics. **Results:** The mean age of the patients in Group 1 was  $19.6 \pm 9.6$  years while in Group 2 was  $21.9 \pm 11$  years. The most common location for mucocele in Group 1 as well as Group 2 patients was lower lip (60% and 80%, respectively). In Group 1, two patients had recurrence while in Group 2, one patient had a recurrence. All recurrent cases were subsequently treated by surgical excision. No statistically significant difference was found between the two methods. **Conclusion:** Micro-marsupialization technique is as efficacious as surgical excision for the treatment of mucocele. It is advantageous over surgical excision as it is simple to perform, is less invasive therefore not associated with complications associated with invasive procedure, and is well tolerated by patients.

**Keywords:** Micro-marsupialization, surgical excision, treatment of mucoceles

## INTRODUCTION

Mucocele is a common benign lesion involving the oral cavity and is caused by accumulation of mucous inside the tissues.<sup>[1-3]</sup>

On the basis of their microscopic characteristics, these lesions can be classified as mucous retention or mucous extravasation cysts, former being characterized by the presence of epithelial tissue while later by a covering with granulation tissue.<sup>[1]</sup>

Mucous extravasation cyst is generally regarded as being of traumatic origin, such as lip biting while the mucous retention cyst results from obstruction of the duct of a minor or accessory salivary gland.<sup>[4]</sup>

Extravasation mucoceles account for over 80% of all mucoceles and are more common in individuals under 30 years of age. In contrast, retention mucoceles are less frequent and are seen particularly in elderly patients.<sup>[5]</sup>

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Clinically, it appears as a soft, discrete, nonpainful swelling of the mucosa. The lesion has no sex predilection and occurs more frequently in children, adolescents, and young adults. The lower labial mucosa is the most frequent site of involvement, but it can develop at virtually any location where minor salivary glands occur, including the soft palate, retromolar region, and buccal mucosa.<sup>[6]</sup>

Evolution of mucoceles is rapid or slow and painless, with periods of remission and exacerbation. If the lesion is localized superficially, it presents a bluish coloring due to the superficial capillary network that appears through it. When located more deeply in tissues, its color is similar to that of the mucosa.<sup>[1]</sup>

Prognosis of the lesion is favorable and is conventionally treated by excision of the gland along with the associated overlying mucosa and glandular tissue down to the muscle layer.<sup>[1]</sup>

However, most of the described techniques are either invasive or requires expensive armamentarium. Therefore, there was a need to demonstrate an alternative technique for the treatment of mucoceles which is neither invasive nor expensive. In this context, current study was designed with an aim to compare a non invasive inexpensive technique of micro-marsupialization with classical surgical excision technique for the treatment of mucoceles.

## MATERIALS AND METHODS

A prospective clinical study was conducted on twenty patients based on the clinical diagnosis of mucocele.

The study sample was derived from the population of patients who presented to the Department of Oral and Maxillofacial Surgery at Government Dental College and Research Institute.

Patients with a history of uncontrolled diabetes, blood dyscrasias, smokers, tobacco abuse, and chronic alcoholics were excluded from the study.

Patients were divided randomly into two groups, comprising ten patients each depending on the initial treatment planned for mucoceles.

Detailed case history was taken. While taking case history age, location, color, consistency, size of the lesion (maximum diameter), and evolution of lesion were recorded [Tables 1 and 2].

Micro-marsupialization procedure was performed on Group 1 patients. Patients were asked to rinse with 0.12% chlorhexidine gluconate solution before the procedure. Either topical anesthetic (2% lignocaine gel) was applied for approximately 3 min or surgical site was infiltrated with 2% lignocaine hydrochloride injection. A 3-0 silk suture was passed through the lesion along its widest diameter taking care not to reach the underlying tissue, and a surgical knot was made. Mucoceles were then compressed slightly to extravasate as much accumulated saliva as possible around the suture. Patients were advised to apply 0.5% chlorhexidine gel postoperatively

to prevent secondary infection. Sutures were then removed after 7 days [Figures 1 and 2].

Conventional surgical excision was carried out on Group 2 patients. Surgical site was infiltrated with 2% lignocaine hydrochloride injection. An elliptic incision was made, and lesion was carefully dissected to fully excise it along with the overlying mucosa and the affected glands. The technique became more complicated when the lesion ruptured since the loss of references made it more difficult to ensure complete elimination of the lesion. The wound was finally sutured. The sutures were removed after 7 postoperative days [Figures 3 and 4].

Both groups were followed up for a period of 9 months.

During follow-up visits, complications of procedures if any were noted. Data between the two groups were then analyzed using descriptive (Student *t*-test) and analytical (Chi-square tests) statistics.

## RESULTS

Out of ten patients selected in Group 1, six patients were female (60%) and four were male (40%). In Group 2, six patients were male (60%) while four female (40%). The mean age of patients in Group 1 was  $19.6 \pm 9.6$  years (range 6–35 years) while in Group 2 was  $21.9 \pm 11$  years (range 8–42 years). There was no statistically significant difference between the two groups (*P* value for gender and age was 0.371 and 0.624, respectively).

Mean size of the lesion in Group 1 was  $0.98 \pm 0.3$  cm (range 0.7–1.5 cm) while in Group 2 was  $1.15 \pm 0.6$  (range 0.5–2.5 cm). No statistically significant difference was present between the two groups (*P* = 0.434).

In both Group 1 and Group 2, maximum lesions were present on lower lip (60% and 80%, respectively) and have no evident etiological factor (60%). Trauma including lip biting and cheek biting was the prime etiologic factor in remaining cases (40%).

Mean time for evolution of mucocele in Group 1 patients was  $2.9 \pm 1.5$  months (range 1–6 months) and for Group 2 was  $3.45 \pm 2.3$  months (range 1–9 months).

In Group 1 patients treated by micro-marsupialization, 20% recurrence was recorded. Furthermore, in 10% of the patients, loosening of suture was seen after 2 days.

In Group 2 patients, 10% cases had a recurrence, and 10% cases developed fibrosis in the lower lip subsequent to the surgical excision.

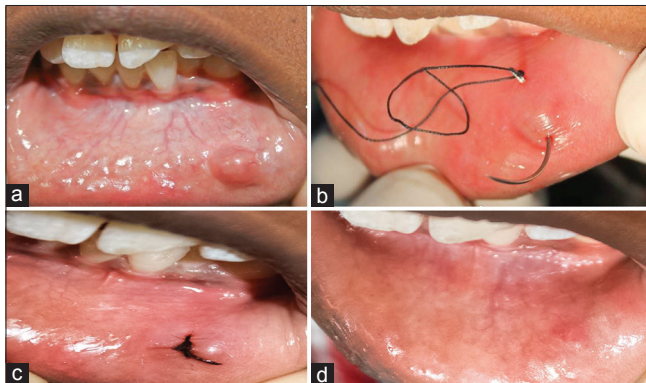
The procedure of micro-marsupialization was repeated in the patient which had loosening of the suture while all cases of recurrence in Group 1 as well as Group 2 were treated by surgical excision of the lesion along with the associated salivary gland as described previously. There was no further recurrence during the entire follow-up period.

**Table 1: Demographic data of Group 1**

Age (years)	Sex	Location	Size (cm)	Color	Consistency	Etiologic factor	Lesion evolution (months)	Complications	Recurrence
6	Female	Lower lip	0.8	Normal	Soft	Lip biting	3	None	No
17	Male	Lower lip	1.5	Bluish	Soft	Trauma 6 months back	5	None	No
30	Female	Buccal mucosa	0.7	Normal	Soft	Not known	2	None	No
15	Female	Lower lip	0.8	Bluish	Soft	Not known	3	Loosening of suture after 2 days	No
35	Female	Floor of mouth	1.5	Normal	Soft to firm	Not known	6	None	Yes
13	Female	Upper lip	1	normal	Soft	Not known	2	None	No
27	Male	Lower lip	1	Normal	Soft	Trauma 1 month back	1	None	Yes
11	Male	Lower lip	0.8	Bluish	Soft	Lip biting	2	None	No
28	Male	Buccal mucosa	0.7	Normal	Soft	Not known	2	None	No
14	Female	Lower lip	1	Normal	Soft	Lip biting	3	None	No

**Table 2: Demographic data of Group 2**

Age (years)	Sex	Location	Size (cm)	Color	Consistency	Etiologic factor	Lesion evolution (months)	Complications	Recurrence
23	Male	Lower lip	1.4	Normal	Firm	Not known	5	None	No
42	Male	Lower lip	0.8	Normal	Soft	Not known	4	None	No
35	Male	Lower lip	1.5	Bluish	Soft	Not known	3	None	No
25	Male	Buccal mucosa	0.5	Normal	Soft	Cheek biting	2	None	No
17	Male	Lower lip	1.5	Bluish	Soft to firm	Lip biting	4	Fibrosis	No
26	Female	Floor of mouth	2.5	Bluish	Soft to firm	Not known	9	None	No
8	Female	Lower lip	1	Normal	Soft	Lip biting	1	None	Yes
9	Female	Lower lip	0.5	Normal	Soft	Trauma 1 month back	1.5	None	No
22	Male	Lower lip	1	Normal	Soft	Not known	3	None	No
12	Female	Lower lip	0.8	Normal	Soft	Not known	2	None	No

**Figure 1:** (a) Preoperative view, (b) intraoperative view, (c) immediate postoperative, (d) after complete healing

Chi-square test was applied, and it was found that rate of recurrence was not statistically significant.

Data from both the groups are presented in Table 3.

## DISCUSSION

The prevalence of all oral mucoceles is 2.5 lesions/1000 population.<sup>[7,8]</sup>

In our study, no gender predilection was found. Out of total twenty patients, ten were male (50%) and ten female (50%). This was in accordance with previous published literature.<sup>[1,2,6-10]</sup>

Various authors report the peak incidence of mucoceles to be in the second and third decade of life.<sup>[1,2,5-8,10]</sup> This coincides with

**Figure 2:** (a) Preoperative, (b) preoperative, (c) immediate postoperative view, (d) after complete healing

our study. Around 85% of the lesions were present in patients below 30 years age.

Mucoceles can appear at any site of oral mucosa where salivary glands are present. The most common site affected is lower lip followed by cheek mucosa and floor of mouth. Tongue, palate, and upper lip are infrequent locations.<sup>[1,2,4,5,7,10-14]</sup> All these data coincide with our study. Seventy percent of the lesions were present on the lower lip, 15% on cheek mucosa, 10% on floor of mouth, and remaining 5% on the upper lip.

According to some authors, the reason for marked predilection of mucoceles in the lower lip is uncertain.<sup>[2]</sup> However, it may be explained by the high incidence of mechanical trauma in this

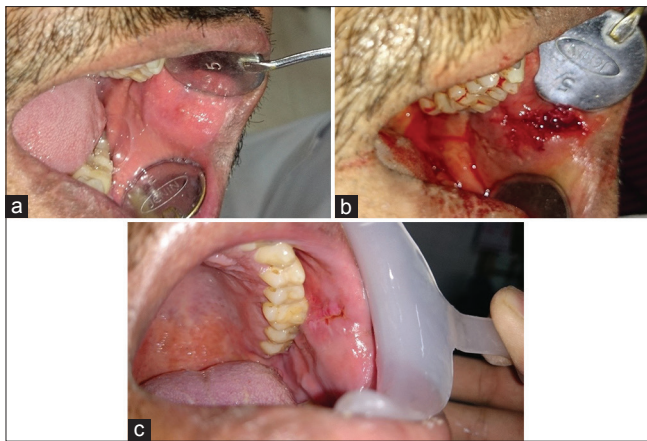


Figure 3: (a) Preoperative, (b) intraoperative, (c) after complete healing

Table 3: Comparison of two treatment groups

Variables	Group 1	Group 2	P
Gender			
Male	4	6	0.371
Female	6	4	
Age (years)			
0-10	1	2	0.624
11-20	5	2	
21-30	3	4	
31-40	1	1	
41-50	0	1	
Size (cm)			
≤ 1	8	6	0.434
> 1	2	4	
Site			
Lower lip	6	8	0.743
Buccal mucosa	2	1	
Floor of mouth	1	1	
Upper lip	1	0	
Lesion evolution (weeks)			
< 4	1	1	0.538
5-12	7	5	
13-24	2	3	
> 24	0	1	
Recurrence	2	1	0.531

region.<sup>[1,7,9,11]</sup> Many patients reported a history of chronic biting of the lip or trauma due to fall in the present study. Some authors also propose that it could be related to oral lichen planus or graft versus host disease.<sup>[6,11,15]</sup> However, we could not find any such disease association with our cases.

The color of mucocèles ranged from blue to the normal color of oral mucosa. The blue color results from tissue cyanosis, vascular congestion associated with the stretched overlying tissue and the translucency of the accumulated fluid beneath. The variation in color depends on the size of the lesion, its proximity to the mucosal surface, and the elasticity of the overlying tissue.<sup>[1,12,13,16]</sup> In our study, around 30% of the cases had bluish appearance, and almost all of them were more than 1 cm in size.

The most common period of evolution of mucocèles is 3 weeks to 3 months.<sup>[5,9]</sup> In our study, 70% of the lesions had evolved in this range.

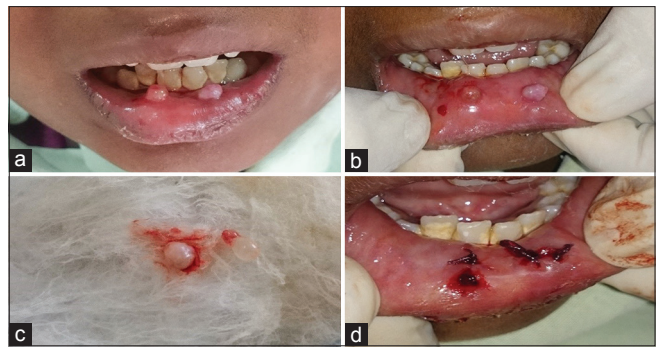


Figure 4: (a) Preoperative, (b) preoperative, (c) excised mucocele along with fibroma, (d) immediate postoperative

Several techniques have been proposed in the literature for the treatment of mucocèles such as surgical excision of the lesion with or without associated salivary gland,<sup>[3,8,10,17]</sup> marsupialization,<sup>[1,10,17,18]</sup> electrosurgery,<sup>[11]</sup> cryosurgery,<sup>[19,20]</sup> laser excision,<sup>[4,21-23]</sup> high-potency topical corticosteroids,<sup>[15]</sup> gamma-linolenic acid,<sup>[24]</sup> OK-432,<sup>[25]</sup> nickel gluconate-mercurius heel-potentized swine organ preparations,<sup>[26]</sup> and micro-marsupialization.<sup>[1,14,16,27]</sup>

Size of the lesion is the most important factor to determine the approach for the treatment.

However, surgical approach is most common. There are three possible surgical approaches for the management of mucocele:<sup>[3,10,17,27]</sup>

1. Simple excision of the lesion
2. Marsupialization
3. Complete excision of the lesion along with the associated salivary gland.

Small mucocèles can be removed completely with the simple surgical excision of the lesion with or without associated salivary gland. Simple excision of the lesion is not advisable as it is always associated with high degree of recurrence.<sup>[10,17,27]</sup>

In addition to excision of the lesion along with the associated salivary gland, special care is required to avoid damaging other glands or ducts while doing the procedure since this may become a cause of recurrence. Furthermore, to apply this technique, the lesion must have a relatively thick connective tissue wall. If wall is too thin, then there will be a risk of rupturing the mucocele, and leakage of its contents would cause soft-tissue collapse, with loss of the anatomical references needed for resection. This would make the procedure more complicated, and it would be difficult to ascertain whether the entire lesion has been removed (including the causal minor salivary gland tissue). As a result, lesion relapse would be the norm.<sup>[5,17]</sup>

On the other hand, large mucocèles are best treated with an unroofing procedure (marsupialization) because excision or dissection would be problematic and risks vital structures such as the labial branch of the mental nerve.<sup>[3,5]</sup> However, this technique is associated with large number of recurrences. To decrease the incidence of recurrence, Baurmash suggested

insertion of a positive pressure gauze packing into the cavity after unroofing. With this addition, the recurrence rate was reduced to 10%–12%.<sup>[28]</sup>

Micro-marsupialization is a procedure carried out to drain the accumulated saliva by passing a suture thread along the largest diameter of the lesion. The introduction of a suture also permits the formation of an epithelial tract to form between the surface and the underlying salivary glandular tissues. The technique is rapid, simple and is the least traumatic of all the described management options.<sup>[1]</sup>

The technique was first described by Morton and Bartley.<sup>[29]</sup>

A fundamental clinical characteristic for the diagnosis of mucous retention phenomena while doing micro-marsupialization is immediate extravasation of mucous while the passage of the suture and consequently reduction of the lesion in volume. If the extravasation does not occur, biopsy and histopathologic analysis are recommended.<sup>[1]</sup>

In our study, we have performed micro-marsupialization procedure in Group 1 patients while surgical excision along with removal of the associated salivary gland in Group 2 patients. Full resolution of mucoceles was observed in 80% of patients in Group 1 and 90% in Group 2. Recurrence was observed in two cases (20%) in Group 1. Both the lesions were larger than 1 cm in size and located deeper in the tissue. Furthermore, there was no mucous extravasation present while passage of the suture through the lesion. In Group 2, recurrence was present in one case (10%) which can be due to damage to adjacent minor salivary glands. All cases of recurrence in Group 1 as well as Group 2 were treated by surgical excision of the lesion along with the associated salivary gland. There was no further recurrence during the entire follow-up period.

Although recurrence was higher in Group 1 patients, there was no statistically significant difference in the recurrence between the two techniques ( $P = 0.531$ ).

Sandrini *et al.* suggested a modification that sutures should be maintained at least for 30 days after micro-marsupialization. The authors claimed longer period is required for the development of epithelialized tracts along the path of the sutures.<sup>[18]</sup> However, in this study, the sutures were maintained only for 7 days in all of the cases. We believed, the sutures, if left for a long time would be a cause of secondary infection and discomfort for the patient. However, this can also be the cause of recurrence due to incomplete epithelization of the suture tracts.

The main drawback of the study is sample size was small and follow-up time was short. Therefore, study on a larger sample size with longer follow-up is warranted before any definite conclusion can be drawn.

## CONCLUSION

Our study suggests micro-marsupialization technique is as efficacious as surgical excision and thus acts as an effective alternative for the treatment of mucoceles, especially in uncooperative, mentally retarded, pediatric age group patients,

and all other patients not fit for surgical procedure. It has advantages such as it is simple to perform, is less invasive, is well tolerated by patients, and has no side effects associated with the invasive procedures. However, proper case selection is important as it does not enable a biopsy to be conducted. Furthermore, this technique should be discontinued if the extravasation of mucous does not occur during the procedure. A biopsy and histopathologic analysis should be considered in that case.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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