

# CONSERVATIVE APPROACH IN THE TREATMENT OF RECURRENT ODONTOGENIC KERATOCYST IN THE MANDIBLE

## КОНЗЕРВАТИВЕН ПРИСТАП ВО ТРЕТМАН НА РЕКУРЕНТ НА ОДОНТОГЕНА КЕРАТОЦИСТА ВО МАНДИБУЛА

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### Abstract

Odontogenic keratocyst (OKC) is a developmental jaw cyst of epithelial origin, characterized by aggressive biological behavior, a high recurrence rate, and a tendency for infiltrative growth. Unlike other jaw cysts, OKC exhibits a thin but highly proliferative epithelial lining and is often associated with PTCH1 gene mutations, placing it among tumor-like cystic lesions. The aim of this paper is to present a clinical case of a recurrent odontogenic keratocyst in a male patient born in 1981, treated at the University Clinic for Maxillofacial Surgery, five years after the initial surgical intervention. Several surgical treatment modifications for OKC have been described, each with specific advantages and limitations depending on the size, location, and relationship to adjacent anatomical structures. In this case, a conservative approach with decompression and marsupialization was applied to achieve gradual reduction of the cystic cavity while preserving important anatomical and neurovascular structures. A second-stage surgical procedure involving complete cyst removal and peripheral osteotomy is planned to minimize the risk of further recurrence. This case emphasizes the importance of an individualized treatment strategy, a staged surgical approach, and long-term follow-up in the management of this clinically challenging lesion. **Keywords:** odontogenic keratocyst, marsupialization, recurrence, mandible.

### Апстракт

Одонтогената кератоциста (ОКЦ) претставува развојна циста на вилицата со епително потекло позната по своето агресивно биолошко однесување и висока стапка на рецидиви тенденција за инфилтративен раст. Заразлика од другите вилични цисти, ОКЦ се карактеризира со тенок, ноактивно пролиферативен епител и честа поврзаност со мутации во РТСН1 генот што ја вбројува во групата на туморски лезии со цистична морфологија. Целта на овој труд е да се прикаже клинички случај на рецидивирачка одонтогена кератоциста кај пациент роден 1981 година, третиран во Универзитетската клиника за максилофацијална хирургија, пет години по иницијалната хируршка интервенција. Постојат повеќе модификации во хируршкото лекување на ОКЦ, секоја со свои предности и недостатоци, во зависност од големината, локацијата и односот со анатомските структури. Во овој случај применет е конзервативен пристап со декомпресија и марсупијализација со цел постепено намалување на димензиите на цистичната празнина и зачувување на невровакуларните структури. Во наредната фаза е планирано целосно хируршко отстранување односно енуклеација со периферна остеотомија со цел минимизирање на ризикот од повторен рецидив. Овој случај ја нагласува важноста на индивидуализираниот третмански пристап, мултифазното хируршко управување и долгорочното следење на оваа клинички предизвикувачка патологија. **Клучни зборови:** одонтогена кератоциста, марсупијализација, рецидив, долна вилица, третман.

### Introduction

Odontogenic keratocysts (OKCs) are among the most challenging cystic lesions encountered in oral and maxillofacial surgery<sup>1</sup>. First described by Philipsen in 1956, OKCs originate from remnants of the dental lamina. Histologically, they are characterized by a parakeratinized stratified squamous epithelial lining (Philipsen, 1956; Neville, 2016)<sup>2,3,4</sup>.

Clinically, OKCs often develop silently, sometimes persisting for long periods before being detected, and are frequently discovered incidentally during routine imaging<sup>5,6</sup>. This silent growth can lead to large lesions at the time of diagnosis. OKCs are known for their potential to cause local bone destruction and their high recurrence rate<sup>7</sup>. The posterior mandible, particularly the angle and ramus, is the most common location<sup>8</sup>. Radiographically, OKCs may

appear as unilocular or multilocular radiolucencies with well-defined corticated borders<sup>9</sup>. Treatment ranges from conservative approaches such as marsupialization or enucleation to more radical interventions including resection, with the choice influenced by lesion size, location, and proximity to critical anatomical structures<sup>10</sup>.

## Aim of the Study

The primary objective of this paper is to provide an in-depth clinical and surgical overview of a recurrent odontogenic keratocyst located in the posterior mandible, managed via marsupialization. The decision to present this case is based on the cyst's well-documented histopathological characteristics, high risk of recurrence, and notable local extension. This report contributes to the academic discussion regarding the balance between conservative and radical approaches for OKCs and emphasizes individualized treatment planning, thorough intraoperative assessment, and vigilant postoperative follow-up to optimize patient outcomes.

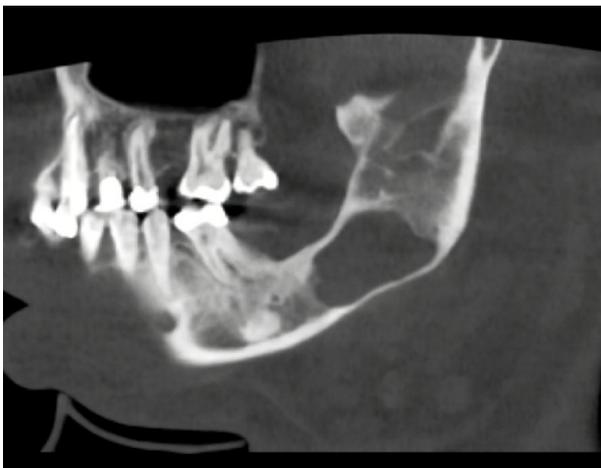
## Materials and Methods

The patient was evaluated and treated at the University Clinic for Maxillofacial Surgery. Full informed consent was obtained prior to inclusion in this case report.

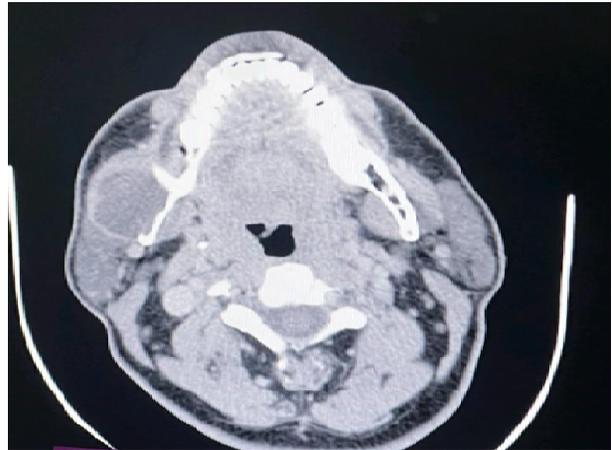
### Clinical Examination:

Extraoral inspection showed mild facial asymmetry over the right mandibular body, without cutaneous changes or lymphadenopathy.

Intraoral examination revealed a firm, non-fluctuant swelling in the right posterior mandible, with intact mucosa and no signs of infection.



**Figure 1.** Sagittal CBCT view showing a multilocular radiolucent lesion in the right posterior mandible



**Figure 2.** Axial CT view demonstrating a well-defined radiolucent

**Radiographic Evaluation:** Cone Beam Computed Tomography (CBCT) was obtained for detailed assessment (Figure1).

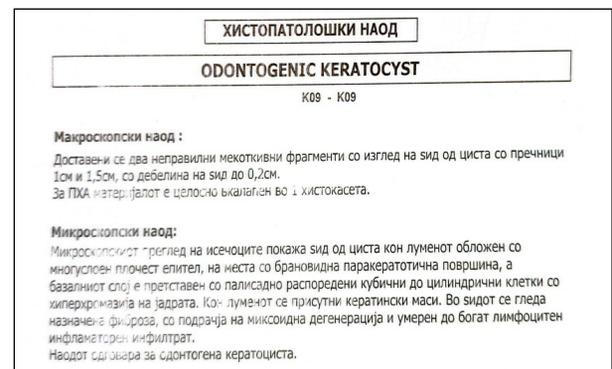
Evaluation in axial, coronal, and sagittal sections demonstrated a well-defined, corticated, multilocular radiolucent lesion.

**Axial views:** marked thinning of both buccal and lingual cortical plates, with subtle outward buccal expansion and preserved cortical continuity (Figure 2).

**Coronal views:** maintaining an intact corticated outline, with no evidence of neurovascular invasion.

**Sagittal views:** extension toward the mandibular ramus, with absence of cortical perforation.

**Histopathological Analysis:** Microscopic examination of the sections shows a cyst wall whose luminal surface is lined by stratified squamous epithelium, in areas displaying an undulating parakeratotic surface. The basal layer consists of palisaded cuboidal to columnar cells with nuclear hyperchromasia. Within the cyst wall, there is marked fibrosis with areas of myxoid degeneration and a moderate-to-dense lymphocytic inflammatory infiltrate.



**Figure 3.** Histopathological findings characteristic of an odontogenic keratocyst.

The findings are consistent with an odontogenic keratocyst (Figure 3).

## Surgical Procedure

The cyst was treated with marsupialization (cystotomy – Partsch I) under general anesthesia<sup>10</sup>. This technique involves partial excision of the cystic saccus, removing only the superficial portion of the cyst wall together with a thin bony layer or periosteum.

It was indicated due to the large size of the cystic lesion and the potential risk of: pathologic fracture of the jaw and, injury to the important anatomical structures<sup>11</sup>.

Extended linear incision was made along the edge of the bony defect. A mucoperiosteal flap was gently elevated to expose the bone. The thin bone covering the cyst was removed. The superficial portion of the cyst wall was removed using a scalpel and the cyst contents were aspirated; the cavity was thoroughly irrigated.

The mucoperiosteal flap was then repositioned into the bony defect so that it lined the upper part of the cavity.

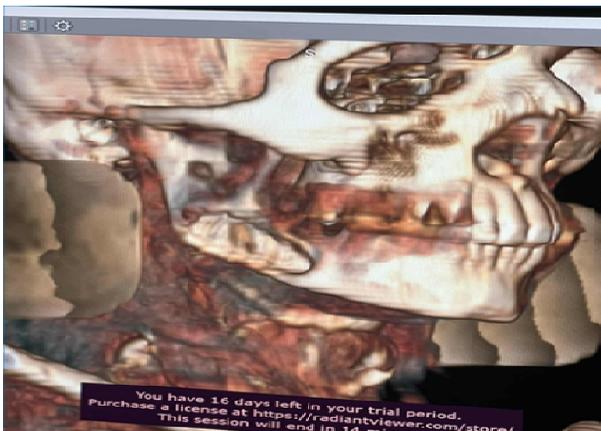
The edges were sutured with simple interrupted stitches, creating a permanent opening for drainage.

The cavity was firmly packed with an iodoform gauze drain, which was secured to the surrounding tissue with sutures to keep it in place.

Eight days after surgery, the packing was trimmed and removed. The cavity was cleaned, irrigated, and a new iodoform packing was placed to maintain the opening and allow further healing.

## Case Report

A 43-year-old male (born 1981) presented with a recurrent swelling on the right posterior mandible, referred to our clinic five years after a previous intervention which had



**Figure 4.** 3D CT reconstruction showing destruction and thinning of the mandibular bone caused by the lesion

been performed following a diagnosis of an odontogenic keratocyst and according to the patient, involved a complete removal. The swelling developed gradually over several weeks causing mild discomfort but no acute pain or paresthesia. Extraoral examination revealed facial asymmetry. Intraorally, a firm, non-fluctuant swelling was observed, extending toward the ramus, with missing teeth in the affected area. CT confirmed a large multilocular lesion with buccal cortical thinning<sup>5</sup> (Figure 4).

**Radiographic Evaluation:** CBCT revealed a well-defined, corticated radiolucent lesion in the right posterior mandible toward the ascending ramus. The lesion measured approximately 5.5 cm, with a multilocular appearance and scalloped internal borders, radiographically characteristic of an odontogenic keratocyst.

There was marked thinning of the buccal and lingual cortical plates, with mild buccal expansion but no cortical perforation. No teeth were present in the region, and no calcifications or secondary infection were observed. The overall radiographic pattern-multilocularity, scalloped margins, cortical thinning, and extension into the ramus which actually is a characteristic of OKC, as described in CBCT literature<sup>11,12</sup>.

**Histopathology:** Analysis confirmed an odontogenic keratocyst with a typical parakeratinized epithelial lining.

**Surgical Procedure:** Surgical management was initiated under general anesthesia. After localizing the projection of the cystic cavity, a conservative mucoperiosteal incision was created to expose the underlying lesion while minimizing disruption of the surrounding tissues. Elevation of the flap provided a direct access to the thinned cortical bone, which was carefully removed to reveal the cystic lumen (Figure 5).

A limited window was fashioned in the cyst wall, and a portion of the lining was excised to allow decompression. The opening was then adapted and sutured to the oral mucosa forming a stable marsupialization opening intended to maintain continuous drainage and pressure reduction within the cavity. The procedure was carried out with delib-



**Figure 5.** Intraoperative view during marsupialization of the odontogenic keratocyst

erate focus on preserving critical anatomical structures in close relation to the lesion<sup>13</sup>.

An iodoform drain was placed through the newly created opening to secure patency during the early healing phase. This conservative approach successfully established controlled decompression while avoiding injury to important anatomical structures and reducing the overall surgical burden.

**Postoperative follow-up:** The patient was advised to attend regular follow-up visits for clinical and radiographic evaluation.

## Discussion

There are various opinions in the literature regarding the management and recurrence potential of odontogenic keratocysts (OKCs). While some authors emphasize their aggressive behavior and high recurrence rates, others highlight that conservative approaches can achieve satisfactory long-term outcomes, particularly when the cyst is large or in close proximity to significant anatomical structures<sup>14,15</sup>. Consequently, the choice of treatment is influenced by lesion size, bucco-lingual expansion, cortical perforation,

proximity to major anatomical structures, recurrence status, and patient-related considerations. Multiple treatment modalities are described, each with specific advantages and limitations regarding recurrence, morbidity, and preservation of surrounding tissues<sup>16,17</sup>. A review of the available long-term studies demonstrates clear variability in recurrence rates among treatment modalities. The summarized tendencies are presented in the following table (Table 1).

In the present case, the lesion was managed through marsupialization, a conservative technique that offers several clinically relevant advantages<sup>18,19</sup>. It allows gradual reduction in cyst volume, promotes progressive bone regeneration, and reduces the risk of damage to the inferior alveolar nerve—benefits particularly important in large or recurrent OKCs. Additionally, marsupialization is associated with lower postoperative morbidity, decreased surgical trauma during the secondary enucleation phase, and improved preservation of mandibular architecture<sup>3</sup>.

However, the technique presents certain limitations or **disadvantages**<sup>18,19</sup>. Marsupialization requires a prolonged treatment period and demands strict patient compliance to maintain the patency of the decompression opening and

**Table 1.** Treatment modalities and recurrence rate 1

Treatment Modality	Follow-up Time / Study Context	Recurrence Rate	Notes
<b>Enucleation only</b>	Surgical management over long-term studies (20+ years) <sup>12</sup>	Up to ~60% in some series (e.g. in long term study, enucleation alone had highest recurrence ~60%)	High risk especially for large/multilocular OKCs; minimal adjuncts used.
<b>Enucleation + Peripheral Ostectomy</b>	Retrospective case series, Hacettepe Univ (2001-2015), ~5 yrs follow-up	~14.8%	Lower morbidity; good option for posterior mandibular lesions.
<b>Enucleation + Carnoy's Solution (or Modified Carnoy's)</b>	Multiple studies including network meta-analysis, retrospective cohorts	Often around 10-15% recurrence; sometimes lower (~5-12.5%) depending on region, adjunct used, follow-up period.	Better control when used carefully; modified versions avoid chloroform in some countries.
<b>Decompression / Marsupialization</b>	<b>Long-term experience in studies with &gt;5 years follow-up</b>	<b>~11-25% depending on case and whether followed by definitive surgery</b>	<b>Usually used for large cysts to reduce size before definitive removal.</b>
<b>Resection</b>	Systematic reviews & large cohort studies	Very low recurrence (often 0%)	But high morbidity; usually reserved for recurrent, aggressive, or syndromic cases.

prevent infection. Because the cystic lining is not fully removed during the initial stage, viable epithelial remnants may persist, meaning that recurrence potential remains until final enucleation is completed. These factors underscore the need for careful case selection and long-term follow-up<sup>20,16</sup>.

Carnoy's solution—both the classic formulation containing chloroform and the modified formulation without chloroform—has been widely documented as an effective adjunct for reducing recurrence of OKCs. Its mechanism involves chemical fixation and coagulation of epithelial remnants within the peripheral bone, thereby decreasing the likelihood of residual islands that could lead to recurrence. The concern raised in recent decades relates primarily to the potential carcinogenicity of chloroform, prompting the development of modified Carnoy's solution, which retains efficacy but eliminates the controversial component<sup>19</sup>. In the present case, Carnoy's solution was not used because the surgical team opted for marsupialization as the initial stage of treatment, avoiding chemical adjuncts until definitive enucleation is performed.

## Conclusion

Marsupialization resulted in a progressive reduction of the cystic cavity, confirmed clinically and radiographically throughout the follow-up period. The decompression window remained patent, soft-tissue healing was satisfactory and no episodes of infection or postoperative complications occurred. What was important is that the patient exhibited no neurosensory disturbances of the inferior alveolar nerve, despite its initial close proximity to the lesion. The gradual decrease in cyst size was accompanied by early bone apposition along the cavity margins, indicating a favorable regenerative response.

These findings represent the expected beneficial effects of marsupialization, demonstrating effective decompression, reduction of cystic volume, and preservation of surrounding anatomical structures. As is typical with staged management of large OKCs, the forthcoming definitive enucleation will build upon these improvements and facilitate complete lesion removal, contributing to long-term stability. Because the cystic lining remains partially intact during this phase, the current observations appropriately reflect intermediate—rather than final-treatment—outcomes.

In summary, marsupialization in this case generated highly favorable early clinical and radiographic results, including substantial lesion shrinkage and successful preservation of the important anatomical structures. These outcomes highlight the value of marsupialization as an initial therapeutic approach for extensive odontogenic keratocysts, as it reduces surgical morbidity, protects anatomy, and creates optimal conditions for a safer

and more conservative definitive procedure. The achieved decompression maintained nerve function, and ongoing bone regeneration collectively underscore the effectiveness of this technique in managing large lesions situated in anatomically sensitive regions.

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