

Infratemporal gossypiboma presenting as persistent infection after third molar displacement: diagnostic considerations

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Abstract:

Gossypiboma refers to a foreign-body reaction caused by the inadvertent retention of surgical materials — such as gauze, cotton swabs, or pads — within an operative site. It results from a foreign body inflammatory response that may be aseptic or associated with secondary infection. This case report describes a 30-year-old woman who developed a persistent orofacial infection resulting from a retained surgical gauze (gossypiboma) following the displacement of a third molar into the infratemporal space. Diagnosis was challenging due to the rarity of this condition in oral and maxillofacial surgery, and initial treatments — including tooth retrieval, abscess drainage, and antibiotic therapy — failed to resolve the infection. Computed tomography (CT) revealed a characteristic spongiform gas pattern adjacent to the lesion, raising suspicion of a retained foreign body. During subsequent surgical exploration, the retained foreign body was identified and successfully removed. This report underscores the importance of considering gossypiboma in the differential diagnosis of persistent postoperative infections and highlights the necessity of strict surgical protocols to prevent such occurrences.

Keywords: Gossypiboma, foreign body, third molar, infratemporal space, odontogenic infection

INTRODUCTION

Gossypiboma refers to a foreign-body reaction caused by the inadvertent retention of surgical materials — such as gauze, cotton swabs, or pads—within an operative site. The term derives from *gossypium* (cotton) and *-oma* (mass), and is also referred to as textiloma, muslinoma, or gauzoma in the literature¹. Kumar et al. (2017)¹ stated that any foreign body has the potential to trigger an inflammatory response in the host, which depends on factors such as its antigenicity and the possible development of secondary infection¹. In the context of gossypiboma, infection is not inherent to the material itself but may result from subsequent bacterial colonization by surrounding microbial flora.

Gossypiboma may cause a reaction that may be sterile or become secondarily infected depending on local conditions and bacterial colonization, potentially leading to a chronic inflammatory response presenting as either an exudative or fibrous pattern¹. The exudative reaction is characterized by an acute inflammatory process that may evolve into a chronic response, with

Statement of Clinical Significance

This case highlights gossypiboma as a rare cause of persistent postoperative infection following third molar displacement. Its nonspecific presentation may delay diagnosis. Recognition of imaging features and surgical history is essential to guide timely intervention and prevent complications.

the formation of granulation tissue and a surrounding fibrous capsule. In contrast, the fibrous reaction involves the recruitment of monocytes and macrophages, leading to the formation of a foreign body giant cell granuloma that may adhere to and become encapsulated within soft tissues¹. The exudative type is more likely to present with early clinical signs and symptoms, which may facilitate suspicion of gossypiboma and allow timely diagnosis and surgical management¹.

Most gossypiboma cases occur in abdominal or orthopaedic surgery, with estimated incidences ranging from 1 in 1,000 to 1 in 10,000 procedures^{1–3}. However, these figures are primarily derived from abdominal surgery literature and may not be directly applicable to oral

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and maxillofacial procedures. Reports involving the oral and maxillofacial region are exceedingly rare, with only a limited number of cases described in the literature^{4–24}. Nonetheless, such occurrences remain clinically significant and potentially severe.

We present a case following the displacement of the upper left third molar into the infratemporal space. In maxillary third molar surgery, such displacement has been associated with the application of excessive posterior force, limited surgical access, and anatomical factors such as a thin maxillary tuberosity. However, our report focuses on the retention of a surgical gauze (gossypiboma) at the operative site, which likely occurred during the initial extraction attempt. This resulted in a protracted and unfavorable clinical course that did not resolve despite retrieval of the displaced molar and the administration of broad-spectrum antibiotic therapy. Beyond its medicolegal implications, this case emphasizes the importance of strict adherence to surgical protocols, including proper sponge counts, and highlights the need to maintain a high index of suspicion in similar scenarios. This is particularly relevant in routine oral and maxillofacial procedures such as third molar extractions.

CASE REPORT

A 30-year-old woman was referred to the Oral and Maxillofacial Surgery Department with persistent swelling of the left hemiface. She had undergone extraction of the upper left third molar 15 days prior, and approximately 8 days postoperatively developed progressive swelling, which persisted for one week before presentation. Clinical examination revealed swelling involving the buccinator, infraorbital, nasolabial, and left gonial regions, which was symptomatic and fluctuant on palpation (Figure 1). No signs of airway compromise or systemic instability were documented at admission. Empirical intravenous antibiotic therapy was initiated with penicillin G (4 million IU every 4 hours) and clindamycin (600 mg every 6 hours). This regimen was selected to provide broad-spectrum coverage targeting both aerobic and anaerobic microorganisms commonly involved in odontogenic infections affecting deep facial spaces, in accordance with institutional protocols.

Contrast-enhanced computed tomography (cCT) demonstrated displacement of the upper left third molar into the malar and infratemporal spaces, associated soft tissue swelling, and subcutaneous emphysema extending

to the ipsilateral parapharyngeal space — a finding that, while not specific, may be associated with infection or air dissection into soft tissues (Figure 2). A spongiform gas pattern adjacent to the displaced tooth and reactive laterocervical lymphadenopathy (groups IIA and IIB) were also noted.

Abscess drainage was performed under general anaesthesia via a Keen approach. This approach was selected to access the infratemporal space while minimizing the risk of injury to adjacent anatomical structures. Due to significant facial swelling, limited surgical visibility, and concern for potential hemorrhage from the pterygoid venous plexus, immediate retrieval of the displaced molar was deferred. The priority was infection control through drainage. The surgical site was irrigated with saline and diluted povidone–iodine, and a Penrose drain was inserted intraorally.

On postoperative day three, persistent drainage was noted. Approximately 40 mL of purulent material was aspirated and sent for culture, which yielded *Staphylococcus aureus* sensitive to clindamycin. Despite these findings, antibiotic therapy was escalated to ampicillin–sulbactam (3 g every 6 hours) in combination with clindamycin (600 mg every 8 hours), due to concern for a polymicrobial infection

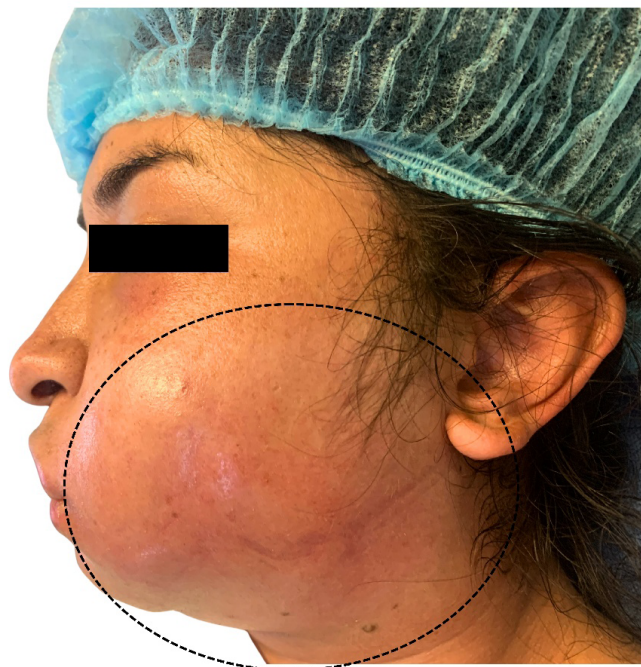


Figure 1. Severe swelling involving the buccinator, infraorbital, nasolabial, and left gonial angle regions, symptomatic and fluctuating on palpation (dashed circle).

not fully captured by culture results, particularly given the involvement of deep facial spaces and the lack of clinical improvement. Consequently, surgical reintervention was required. The displaced molar was removed under local anaesthesia using the previous surgical approach, followed by copious irrigation of the site and mobilization of the drain.

After 72 hours without clinical improvement, the persistence of symptoms despite adequate drainage and antibiotic therapy, together with the presence of a spongiform gas pattern on CT imaging, raised suspicion of a retained foreign body (Figure 3), prompting surgical re-exploration. During the procedure, a retained surgical gauze (gossypiboma) was identified in the infratemporal space and completely removed (Figure 4A). Given the torpid clinical course, it was suspected that the retained gauze originated from a prior extra-institutional intervention, during which an attempt had been made to extract tooth 28 in a private clinic. The radiopaque status of the material could not be determined, as no radiopaque marker was identified intraoperatively or on imaging. Histopathological analysis was not performed, as the diagnosis

was macroscopically evident and the patient showed rapid clinical improvement following removal. She was discharged on day 15 with a 5-day course of oral sultamicillin (375 mg every 8 hours). At follow-up, no further complications were observed at postoperative day 30 (Table 1, Figure 4B).

DISCUSSION

Gossypiboma is typically the result of lapses in surgical protocols, including failure to perform sponge counts, the use of non-radiopaque materials, or the occurrence of unexpected intraoperative complications. Inexperience and anatomical complexity may also contribute¹⁻³. Symptoms of gossypiboma are often nonspecific and vary according to anatomical location and chronicity¹⁻³.

In the oral and maxillofacial region, the most common clinical manifestations include persistent pain, swelling, and infection unresponsive to standard treatment⁴⁻²⁴. The differential diagnosis should therefore include postoperative abscess, hematoma, retained tooth fragment, maxillary sinus infection, and osteomyelitis. Delayed diagnosis is frequent, as gossypiboma can mimic other postoperative complications. In chronic cases, additional findings such as osteolysis, fistula formation, delayed healing, or radiological features resembling granulomatous or cystic lesions may be observed⁴⁻²⁴.

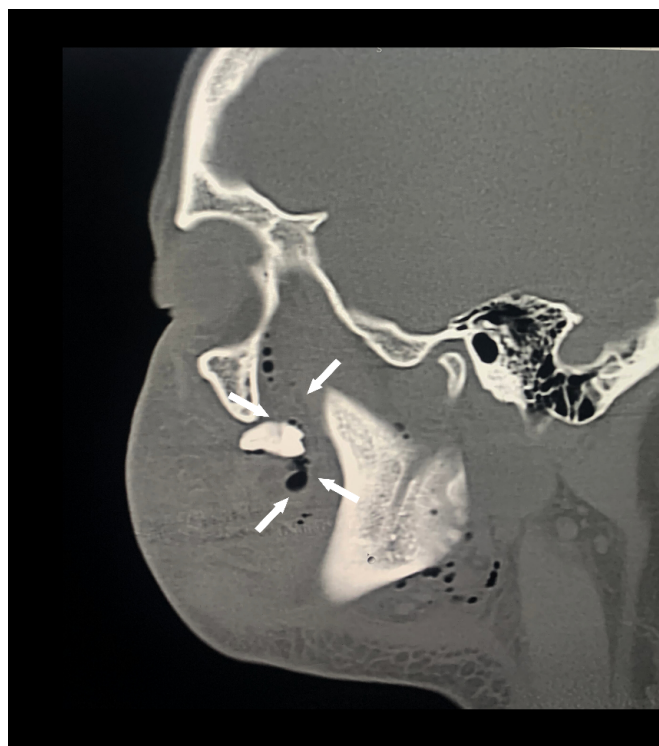


Figure 2. Contrast-enhanced computed tomography scan (CT), sagittal section. Three-plane evaluation of left maxillary third molar displaced into the infratemporal space (white arrows).

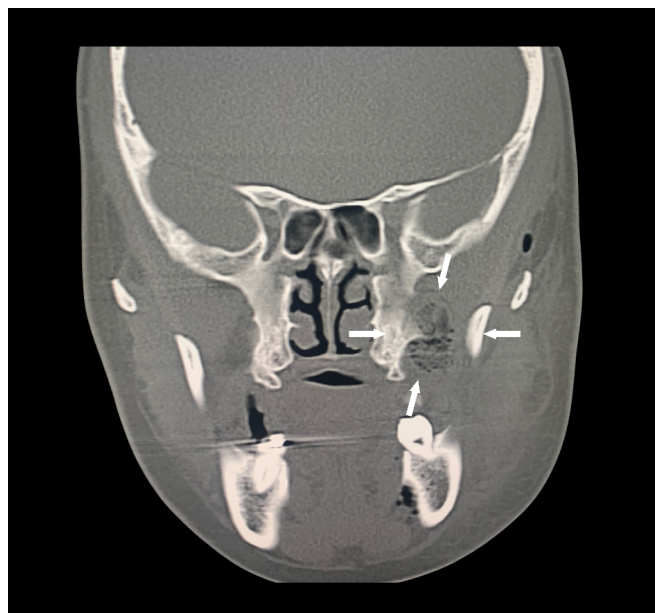


Figure 3. Contrast-enhanced computed tomography scan (CT), coronal section. Spongiform pattern due to presence of gas in the infratemporal area (white arrows).

In such cases, histopathological analysis is mandatory in order to establish a definitive diagnosis⁶.

A high index of clinical suspicion is essential for diagnosis. Although plain radiography may provide initial information, computed tomography (CT) or magnetic resonance imaging (MRI) is often required to accurately define lesion extent, anatomical relationships, and associated infection^{1–24}. In the present case, a key diagnostic turning point was the persistence of infection despite adequate drainage and

antibiotic therapy. The identification of a spongiform gas pattern on CT imaging, while not pathognomonic, raised suspicion of a retained foreign body and prompted surgical re-exploration. This highlights the importance of correlating radiological findings with clinical progression.

Management requires complete surgical removal of the foreign body, and the antibiotic therapy should be regarded as an adjunctive measure for controlling associated infections rather than a definitive treatment.

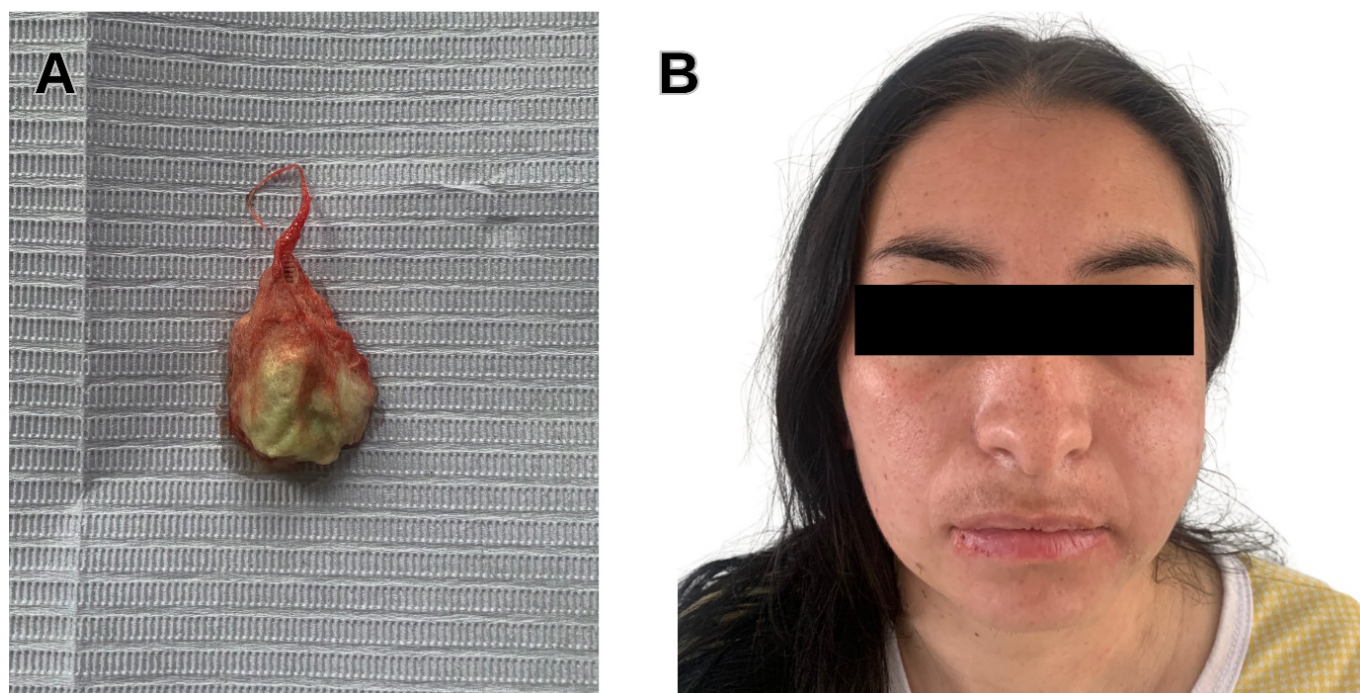


Figure 4. A. Cotton gauze-type foreign body removed from the surgical site in the infratemporal space (gossypiboma). B. Resolution of the clinical condition at postoperative day 30.

Table 1. Chronological summary of clinical events during the course of the case.

Day	Clinical Status	Intervention	Key Decision
Day 0	Displacement of the third molar associated with a possible retained gauze in the infratemporal space following an extrainstitutional intervention.	—	—
Day 8	Onset of swelling	—	—
Day 15	Hospital admission	IV antibiotics started	Empirical broad coverage
Day 15	CT imaging	Displaced molar + gas pattern	Drainage indicated
Day 15	Surgery	Abscess drainage	Tooth not removed
Day 18	Persistent drainage	Escalate antibiotics	Tooth removal
Day 21	No improvement	Re-exploration	Suspect foreign body
Day 21	Surgery	Removal of gauze	Definitive treatment
Day 30	Follow-up	Clinical resolution	—

The decision to escalate antibiotic therapy despite culture results reflects a common challenge in deep cervicofacial infections, where polymicrobial involvement may not be fully captured by microbiological sampling. In such scenarios, clinical response — rather than culture findings alone — should guide therapeutic adjustments. This case reinforces the principle, consistently emphasized in the literature, that failure to remove the etiologic factor may lead to persistent or recurrent infection despite appropriate antimicrobial therapy. Well-established preventive strategies to avoid retention of foreign bodies include strict adherence to surgical counting protocols and the routine use of radiopaque gauze to facilitate early detection^{1,2}.

Our case highlights several important diagnostic and clinical management challenges. Although gossypiboma is well described in abdominal and orthopedic surgery, reports in the oral and maxillofacial region remain exceedingly rare. Compared to previously published cases (Table 2), the present report is distinctive due to its location in the infratemporal space following third molar displacement and the diagnostic delay associated with nonspecific clinical findings.

CONCLUSION

Gossypiboma is a rare but significant complication in oral and maxillofacial surgery, with potential for considerable morbidity if unrecognized. Surgeons must maintain a high index of suspicion when postoperative infections persist despite appropriate management. Early diagnosis and prompt surgical intervention are vital. Above all, strict adherence to intraoperative protocols, including thorough sponge counts and the use of radiopaque materials, remains the cornerstone of prevention. Additionally, recognition of the spongiform gas pattern on CT imaging may serve as an important diagnostic clue, facilitating earlier identification of retained surgical materials and improving clinical outcomes.

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AUTHORS' CONTRIBUTIONS

DSPA: Conceptualization, Investigation, Writing – review & editing. SELJ: Conceptualization, Investigation, Writing – review & editing. YLCG: Conceptualization, Investigation, Writing – review & editing. JPRM: Conceptualization, Investigation, Writing – review & editing. All authors actively revised and approved the final version of the manuscript.

CONFLICT OF INTEREST STATEMENT

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Competing interests: The authors have no relevant financial or non-financial interests to disclose.

Ethics approval: Written informed consent was obtained from the patient for publication of this case report and accompanying images. According to institutional guidelines, ethical committee approval was not required for single case reports that do not involve experimental interventions. All procedures were conducted in accordance with the Declaration of Helsinki.

DATA AVAILABILITY STATEMENT

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Table 2. Reported cases of gossypiboma in the maxillofacial region.

Author (Year)	Age (years)/ Sex	Anatomical Site	Previous Surgery	Retention Time	Signs and Symptoms	Imaging Modality	Treatment
Al-Ruhaimi and Nwoku (1991) ¹¹	19/F	Right mandibular ramus (lingual aspect)	Orthognathic surgery	2 months	Pain, swelling, paresthesia of lower lip and right cheek	OPG	Exploratory surgery under general anesthesia and removal of foreign body (radiopaque gauze)

It continues...

Table 2. Continuation.

Author (Year)	Age (years)/ Sex	Anatomical Site	Previous Surgery	Retention Time	Signs and Symptoms	Imaging Modality	Treatment
Catterlin and Thronson (1993) ¹²	19/M	Right mandibular third molar region	Lower third molar extraction	3 weeks	Asymptomatic, incidental radiographic finding	OPG	Removal of foreign body (radiopaque gauze)
Pekanan et al. (1996) ¹³	39/M	Right maxillary sinus	Caldwell–Luc approach and inferior antrostomy	4 months	Persistent purulent discharge	Waters radiograph, CT scan	Removal of foreign body (gauze)
Amr (2009) ¹⁴	27/M	Right submandibular region	Submandibular sialoadenectomy	8 years	Pain and purulent discharge	CT scan	Exploratory surgery under general anesthesia and removal of foreign body (gauze)
Song et al. (2009) ¹⁵	27/F	Left mandibular angle	Mandibular contouring surgery	25 days	Fever, swelling, pain, purulent discharge	CT scan	Removal of foreign body, curettage, and copious irrigation under general anesthesia
	45/F	Right mandibular angle and ramus	Mandibular contouring surgery	23 days	Facial asymmetry, pain, purulent discharge	CT scan	Same as above
	27/F	Unilateral mandibular angle (unspecified)	Mandibular contouring surgery	15 days	Fever, swelling, pain, purulent discharge	ND	Same as above
Pons and Schouman (2010) ¹⁶	60/M	Right maxillary sinus	Caldwell–Luc approach	3 months	Sinus pain and persistent purulent rhinorrhea	CT scan	Removal of foreign body (gauze)
Dimitrakopoulos et al. (2011) ¹⁷	25/F	Frontal bone (midline)	Craniotomy and multiple surgeries (Apert syndrome)	21 years	Symptomatic firm mass, headache, fever	Waters radiograph, CT, MRI	Removal of foreign body (gauze)
Sigron and Locher (2011) ⁶	42/F	Right mandibular third molar region	Lower third molar extraction	7 years	Pain and foreign body sensation	OPG	Removal of foreign body and histopathological analysis
Mohanavalli et al. (2011) ¹⁸	56/M	Right maxillary sinus	Cyst enucleation	1 year	Intraoral purulent discharge	OPG, Waters, CT	Surgical exploration under local anesthesia and removal of foreign body
Jamjoom and Kallukaran (2013) ¹⁹	37/F	Parasymphysis	Aesthetic maxillofacial surgery (chin implant)	2 years	Pain, swelling, paresthesia, altered dental sensitivity	OPG, CT, MRI	Bone biopsy, removal of foreign body, curettage, irrigation

It continues...

Table 2. Continuation.

Author (Year)	Age (years)/ Sex	Anatomical Site	Previous Surgery	Retention Time	Signs and Symptoms	Imaging Modality	Treatment
Park et al. (2014) ⁹	20/F	Right Eustachian tube	Orthognathic surgery (Le Fort I osteotomy)	8 months	Unilateral secretory otitis media	MRI, nasopharyngeal endoscopy	Endoscopic transnasal removal
Alves-de-Oliveira et al. (2014) ⁸	42/F	Right maxillary sinus	Multiple extractions (posterior maxilla)	23 years	Pain, oroantral fistula with purulent discharge	OPG	Surgical exploration and removal
Park et al. (2015) ¹⁰	28/F	Left infratemporal fossa	Bimaxillary orthognathic surgery	3 years	Pain, nasal obstruction, trismus, cellulitis	CT scan	Navigation-assisted endoscopic surgery and removal
Guerrouani and Kairouani (2017) ²⁰	85/M	Right maxillary sinus	NR	NR	Epistaxis, tumor-like mass, nasal obstruction, cough	CT, MRI	Histopathology, removal, reconstructive surgery
Amani et al. (2017) ²¹	30/M	Right maxillary sinus	Complex orbitozygomatic fracture repair	8 years	Chronic sinusitis, ulcerative lesion	OPG, CT	Removal, curettage, irrigation + antibiotics
Matthew et al. (2019) ⁷	56/F	Right maxillary sinus	Orthognathic surgery (Le Fort I)	10 years	Nasal obstruction and congestion	Contrast-enhanced CT	Caldwell–Luc removal
Carvalho et al. (2019) ⁴	26/F	Left buccal space	Upper third molar extraction	7 days	Pain, swelling, orofacial abscess, limited mouth opening	OPG, CT	Surgical drainage and removal
Mace et al. (2020) ⁵	17/M	Right infratemporal fossa	Upper third molar extraction	3 weeks	Trismus, facial cellulitis, cutaneous fistula	Contrast CT	Removal of molar and gauze, drainage
Zachar and Kanagaratnam (2020) ²²	29/NR	Left mandibular third molar region	Lower third molar extraction	18 days	Pain, facial asymmetry	OPG, CBCT	Removal of gauze and bur fragment
Bhogaraju et al. (2021) ²³	70/M	Left anterior maxilla	Cyst enucleation and extractions	1 year	Facial asymmetry, pain, purulent discharge	CBCT	Removal and histopathology
Harish Kumar et al. (2023) ²⁴	22/F	Glabella	Lipoma excision	10 years	Localized swelling, asymptomatic	ND	Excisional biopsy

OPG: Orthopantomogram; CT: Computed Tomography; MRI: Magnetic Resonance Imaging; CBCT: Cone Beam CT; ND: Not Described; NR: Not Reported.

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