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# Pharyngeal packing in maxillofacial trauma surgery: A narrative review of clinical practice, complications, and medicolegal considerations

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#### Abstract

Pharyngeal packing is often used in head and neck surgeries to help protect the airway, improve visibility during the procedure, and reduce nausea and vomiting after surgery. But when it comes to maxillofacial trauma, its role is less clear, and there's surprisingly little research about the risks and potential legal consequences. This review takes a closer look at how pharyngeal packing is used in trauma surgeries, focusing on the practical benefits, complications, and the challenges around documentation and legal issues, especially when packs are accidentally left behind. After reviewing studies published between 2000 and 2025, we found that while pharyngeal packing can help with things like controlling the airway and improving the surgical field in trauma cases, it's not without its risks especially when packs are retained, leading to aspiration, obstruction, or other serious complications. The research also highlights the fact that there's no standard protocol for inserting or removing these packs, which can contribute to medicolegal issues. Although cases of retained packs are rare, they've caused significant harm and sparked litigation. As a result, it's clear that there needs to be more awareness, better communication between surgical teams, and standardized safety protocols to help prevent these avoidable issues.

Keywords: Pharyngeal packing, maxillofacial trauma, airway management

#### 1. Introduction

Pharyngeal packing is a long-established adjunctive measure employed during surgeries of the head and neck region to minimize blood and secretion aspiration, reduce postoperative nausea and vomiting (PONV), and facilitate a cleaner surgical field <sup>[1, 2]</sup>. While it is widely used in elective procedures such as rhinoplasty, tonsillectomy, and orthognathic surgery <sup>[3, 4]</sup>, its role in maxillofacial trauma surgeries is more complex and less clearly defined. Trauma surgeries are often performed in emergent, high-stress settings with distorted anatomy, heavy bleeding, and unpredictable airway dynamics <sup>[5]</sup>. In such scenarios, the pharyngeal pack can be both a valuable tool and a potential source of serious complications if improperly managed.

Despite its routine application, the literature surrounding pharyngeal packing in trauma-specific settings remains sparse, particularly with regard to standardization of practice, complication rates, and medicolegal outcomes <sup>[6, 7]</sup>. One of the most concerning complications is the retention of the pharyngeal pack, which can lead to airway obstruction, aspiration, or even fatal outcomes <sup>[8, 9]</sup>. Such adverse events have medicolegal implications and have led to litigation in various surgical specialties, yet very few systematic reports or audits exist within the field of oral and maxillofacial surgery <sup>[10]</sup>.

Furthermore, inconsistent documentation, unclear responsibility for pack removal between surgical and anesthetic teams, and the lack of universally accepted protocols have compounded the risks [11, 12]. As maxillofacial trauma surgery often requires rapid decision-making and multidisciplinary coordination, a deeper understanding of the role, risks, and responsibilities surrounding pharyngeal packing is essential.

This review explores current clinical practices of pharyngeal packing in maxillofacial trauma, examines associated complications, highlights the medicolegal risks of retained foreign materials, and proposes strategies for safer implementation in surgical practice.

# 2. Clinical Indications and Techniques of Pharyngeal Packing

Pharyngeal packing is mainly used in surgeries of the upper aerodigestive tract to prevent airway contamination and reduce complications like nausea, vomiting, and aspiration of blood [13, 14]. In maxillofacial trauma, its role extends beyond airway protection to managing severe oronasal bleeding, stabilizing the oropharyngeal field, and ensuring a safer surgical environment [15, 16]. Indications in trauma include complex midface fractures (Le Fort II and III), Naso ethmoidal injuries, compound maxillary disruptions, and pan facial trauma where airway bleeding is a significant risk [17]. However, it is contraindicated in cases with cerebrospinal fluid leaks or skull base fractures due to the risk of intracranial migration [18].

The technique of packing varies based on surgeon preference, anatomical access, and anticipated bleeding. Typically, a sterile roller gauze is moistened (to reduce mucosal abrasion) and packed into the oropharynx under direct visualization, often in coordination with the anesthesiology team <sup>[19]</sup>. The ends of the gauze are frequently left visible and taped externally to prevent retention; some centers advocate the use of radio-opaque gauze or tagged packs to enhance traceability <sup>[20, 21]</sup>. Importantly, the anesthesiologist must be informed at the time of insertion and reminded during the surgical time-out or at extubation to ensure removal.

Alternative materials such as absorbable gelatin sponges or hemostatic agents have been trialed in selective settings, but are not routinely used for pharyngeal isolation in trauma cases due to limitations in volume control and safety data <sup>[22, 23]</sup>. In addition, there is significant variability in practices across institutions, with no globally standardized protocol governing the indication, insertion technique, or removal verification for pharyngeal packing in maxillofacial trauma <sup>[24]</sup>.

#### 3. Complications Associated with Pharyngeal Packing

Pharyngeal packing plays a crucial role in surgery but carries risks, including mild postoperative discomfort to lifethreatening complications like aspiration, airway obstruction, and retention, which can lead to hypoxic injury or death [25, 26]. Postoperative sore throat is a common minor complication, often caused by mucosal irritation or pressure necrosis, especially when dry or abrasive materials are used [27]. Wetting the pack before insertion can significantly reduce mucosal damage [28]. Other discomforts may include dysphagia, increased cough reflex sensitivity, and, in rare cases, oropharyngeal ulceration from prolonged packing [29]. A more serious and potentially fatal complication is retained pharyngeal packing. Failure to remove the pack at the end of the procedure can result in upper airway obstruction, pneumonia, aspiration laryngospasm, cardiopulmonary arrest [30, 31]. These incidents, though rare, have been the subject of closed claims in anesthesiology and surgical malpractice cases [32]. A study by Griffiths et al. found that retained throat packs were among the most commonly litigated retained surgical items in ENT and maxillofacial procedures [33].

In addition, if not securely placed, pharyngeal packs can become dislodged intraoperatively, migrating toward the larynx or esophagus, thereby compromising the airway or gastrointestinal tract <sup>[34]</sup>. This is particularly risky in trauma cases, where the anatomy may be distorted, and bleeding obscures visualization.

There is also concern regarding the use of non-radio-opaque gauze, which complicates identification via imaging in the

event of a missing pack <sup>[35]</sup>. The absence of tagging, documentation, or formal checklists has been implicated in multiple case reports of pack retention across specialties <sup>[36]</sup>. Ultimately, these complications are preventable with diligent communication, visible tagging of packs, thorough documentation, and cross-verification between surgical and anesthetic teams prior to extubation and surgical closure <sup>[37, 38]</sup>

# 4. Airway Management and Protocols in Facial Trauma and Pharyngeal Packing

Effective airway management is critical in managing patients with maxillofacial trauma. Airway management techniques in these cases are emphasized, particularly regarding the challenges posed by facial injuries [39]. The importance of surgical airways in facial trauma is underscored, especially when traditional methods fail. Proper airway management is essential to prevent complications such as aspiration, obstruction, and respiratory distress [40].

Pharyngeal packing is a commonly used technique in maxillofacial surgery to control bleeding and secure the airway. The role of packing in severe oronasal bleeding following Le Fort injuries is critical, as it helps maintain hemostasis and manage the airway during complex fractures [41]. However, the technique carries risks, especially if the pack is left in place postoperatively, leading to complications such as airway obstruction and aspiration pneumonia [42].

Trauma airway management presents significant challenges, particularly when pharyngeal packing is involved. These challenges are highlighted, emphasizing the need for clear documentation and communication to prevent retained packs, which are associated with severe complications such as hypoxia and aspiration [43, 44]. Clinical protocols for pharyngeal packing in facial trauma emphasize the importance of clear documentation, communication, and regular checks during surgery to ensure the pack is properly placed and removed. The need for clinical audits and protocol reinforcement is also highlighted, as they ensure adherence to safety standards and reduce the risks of complications associated with throat packing [45, 46].

Protocols and checklists play a significant role in minimizing complications related to pharyngeal packing. Structured protocols significantly reduce the likelihood of retention and associated adverse outcomes. These protocols also improve overall safety and communication within the surgical team, reducing the risk of litigation in the event of an adverse outcome [47, 48, 49].

## 5. Medicolegal Aspects: Retained Packs and Documentation Failures

Among the various risks associated with pharyngeal packing, retention of the throat pack postoperatively stands out as one of the most serious, preventable, and medicolegally significant complications. A retained throat pack may lead to airway obstruction, hypoxia, aspiration pneumonia, or even death, and is frequently categorized as a "never event" in surgical safety protocols [50, 51].

In the context of maxillofacial trauma, the risk of retention is heightened due to complex anatomy, heavy intraoperative bleeding, emergency timelines, and the frequent need for multidisciplinary surgical involvement. These factors often result in poor handover, fragmented documentation, and lack of clarity about who is responsible for pack removal surgeon or anesthesiologist <sup>[52]</sup>. Numerous case reports have documented life-threatening consequences of retained throat

packs, some culminating in litigation. In one notable case, a pharyngeal pack left in situ post-extubation led to complete airway obstruction requiring emergency reintubation and ICU admission [53]. Courts and medical boards have consistently held surgical teams liable in such cases, especially when documentation of insertion and removal was absent or ambiguous [54, 55]. A study on anaesthesia-related malpractice claims identified retained surgical items, such as throat packs, as a recurring issue in airway-related lawsuits, often linked to inadequate checklists or communication failures [56]. In India, post-2019 amendments to the Consumer Protection Act and rulings by the National Consumer Disputes Redressal Commission (NCDRC) emphasize the importance of informed consent and surgical accountability, particularly when avoidable errors cause harm [57, 58]. Legally, the lack of proper documentation for pack insertion, clear visual cues or tags, and a signed confirmation of removal can be seen as gross negligence in cases involving retained items [59].

Therefore, the implementation of strict documentation protocols, team-wide awareness, and standardized checklist systems is not only a clinical necessity but a legal safeguard for practitioners involved in high-risk maxillofacial trauma procedures [60, 61].

### 6. Prevention Strategies and Proposed Protocols

Preventing complications associated with pharyngeal packing particularly retention and aspiration requires a multi-tiered approach combining clinical vigilance, standardized documentation, and team communication. Given the high-stakes nature of maxillofacial trauma surgery, prevention strategies must be proactive, protocol-driven, and enforceable across disciplines [62].

One of the most effective measures is the use of tagged or

radio-opaque throat packs. These allow for visual and radiologic confirmation in case of uncertainty about pack retrieval <sup>[63]</sup>. Additionally, leaving a visible end of the pack taped to the cheek or secured externally serves as a practical physical reminder <sup>[64]</sup>.

Documentation is crucial for ensuring safety. An intraoperative surgical checklist or electronic medical record (EMR) should include:

- Time of insertion.
- Person responsible for insertion,
- Confirmation of removal,
- Sign-off by both the surgeon and anaesthesiologist [65, 66].

Many institutions use whiteboard tracking systems in the operating room, marking throat pack usage and erasing it only after confirmed removal <sup>[67]</sup>. Additionally, incorporating throat pack status into the WHO surgical safety checklist or anaesthesia handover sheet provides an extra layer of monitoring <sup>[68]</sup>. Interdepartmental training is vital. Surgeons and anaesthesiologists must understand their shared responsibilities. Regular simulation-based training or clinical audits can help reinforce safe practices and identify areas for improvement <sup>[69]</sup>.

We propose a trauma-specific checklist (see Table 2) and protocol flowchart (Figure 1) tailored for maxillofacial trauma, designed to address challenges like urgent timelines, poor visibility, and multi-team coordination. The protocol emphasizes early communication, intraoperative visibility, and dual-team verification at extubation. Implementing these structured systems shifts pharyngeal packing from a routine practice to a monitored, accountable clinical action, reducing both human error and medicolegal liability [70,71].

Complication	Mechanism	Severity	Preventability	Reported Cases
Postoperative sore throat	Mucosal irritation from dry or rough packing	Mild	High	[27, 28]
Oropharyngeal ulceration	Pressure necrosis due to prolonged duration	Mild to moderate	High	[29]
Airway obstruction	Retained pack post-extubation or intraoperative migration	Severe	Very High	[30, 31, 33]
Aspiration pneumonia	Pack dislodgement into trachea or failure of removal	Severe	High	[8, 45]
Fatal hypoxia/cardiopulmonary arrest	Retention causing complete upper airway blockage	Catastrophic	Very High	[53]
Dislodgement during surgery	Unsecured pack, poor visual control in trauma cases	Moderate to severe	Moderate	[34, 42]
Intracranial migration (in CSF leak cases)	Forcible packing in skull base fractures	Catastrophic	High	[46]
Legal action/litigation	Documentation failure, poor communication between teams	Variable	Very High	[54-58]

Table 1: Reported Complications Associated with Pharyngeal Packing

This table summarizes the complications linked to pharyngeal packing in maxillofacial trauma surgery, categorizing them by severity, preventability, and reported cases. It highlights both minor issues, such as postoperative sore throat, and severe complications, including airway obstruction and fatal hypoxia due to retained packs.

Table 2: Throat Pack Safety Checklist for Maxillofacial Trauma Surgery

Checkpoint	Action Required	Responsibility	
Pack Type & Visibility	Use moist, radiopaque, tagged gauze; visible externally	Surgeon	
Communication at Time of Insertion	Verbally inform anesthetist and document in intra-op notes	Surgeon/Anesthetist	
Operating Room Whiteboard Update	"Throat pack inserted" clearly written	Circulating Nurse	
Pre-Closure Verification	Pack location reconfirmed; surgical team double-checks	Surgeon & Assistant	
Anesthesia Extubation Check	Verbal and visual confirmation before extubation	Anesthesiologist	
Pack Removal Documentation	Time and responsible person noted; checklist ticked and signed	Surgeon & Nurse	
Final Pack Count	Throat pack included in final surgical item count	Scrub Nurse	

This table presents a safety checklist for the use of pharyngeal packing in maxillofacial trauma surgery. It details essential checkpoints for proper pack placement, communication between the surgical and anesthesia teams, and final verification steps to ensure safe practice and prevent complications like retained packs

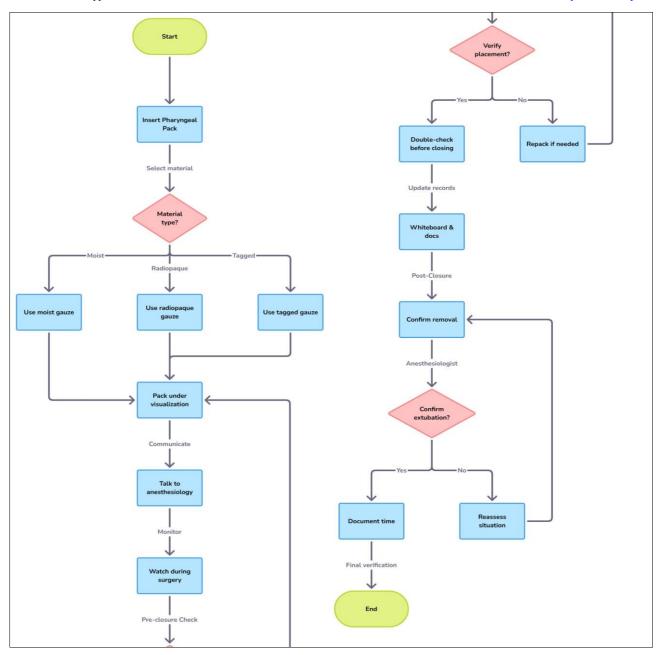


Fig 1: Pharyngeal Packing Protocol and Safety Checklist in Maxillofacial Trauma Surgery

This flowchart outlines the protocol for pharyngeal packing in maxillofacial trauma, including steps for pack insertion, intraoperative checks, and post-surgical removal. It emphasizes key actions and responsibilities of the surgical, anesthesiology, and nursing teams to prevent complications such as pack retention and airway obstruction, ensuring safe practice and proper documentation.

### 7. Conclusion

Pharyngeal packing is vital in maxillofacial trauma surgery for airway protection and surgical control, but carries risks such as retained packs and aspiration. A lack of standardized protocols, especially in emergency settings, increases the likelihood of complications. This review stresses the importance of interdisciplinary coordination, visible tagging, and thorough documentation to mitigate these risks. Practitioners must also be aware of the medicolegal consequences of pack retention, particularly in jurisdictions with strict negligence standards. Clear, trauma-specific protocols are essential for patient safety and clinician protection. Further audits and studies are needed to refine

these practices.

#### 7.1 Conflict of Interest

Not available.

## 7.2 Financial Support

Not available.

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