

Emphysematous Complications Following Third Molars Removal: Incidence among 10779 Surgeries and Report of Two Cases

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Abstract

Subcutaneous emphysema is a condition that results from introduction of air into soft tissues. In head and neck, it is commonly observed following fractures of paranasal sinuses. Less frequently, it may occur during surgical procedures for tooth removal, when air from dental hand-pieces is forced into surgical site. Depending on its extension, it may involve vital spaces such as mediastinum. This specific finding may induce life-threatening situations. The aim of this article is to establish the incidence of subcutaneous emphysema among 10,779 impacted third molar surgical procedures and report the cases in which such complications had occurred. In this retrospective study, data collected from 10,779 third molar extraction procedures performed at Piracicaba School of Dentistry were evaluated for the occurrence of subcutaneous emphysema. Two cases of subcutaneous emphysema (0.018%) occurred following extraction of impacted third molars. Both were associated with mandibular tooth and related to the use of dental air hand-piece. One of the cases involved submandibular and buccal spaces while the other involved buccal and canine spaces. Regression of emphysema occurred spontaneously and postoperative recovery was uneventful. Subcutaneous emphysema following impacted third molar extractions is rare and strongly associated with the use of air turbines. Follow-up and preservation are the treatments of choice, but clinicians should be aware about the possibility of microbial spreading through facial spaces.

Keywords

Subcutaneous Emphysema, Impacted Tooth, Air Hand-Piece

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1. Introduction

Surgical removal of impacted third molars is one of the most common procedures performed by oral and maxillofacial surgeons. The main indications for this procedure include: prevention of infection (pericoronitis); prevention of caries and periodontal disease; prevention of resorption of the second molar root; prevention of odontogenic cysts and tumors; and facilitation of orthodontic treatment [1] [2].

As any other surgical procedure, wisdom tooth removal may be associated with several accidents and complications. It is important that clinicians are aware of them, in order to discuss the risks and benefits with the patient preoperatively, hence minimizing its occurrence, recognizing them as early as possible and offering the correct treatment for each situation.

Excellent literatures have been published about accidents and complications associated with third molar surgery. Depending on many factors, such as bony and soft tissue morphology, tooth position, patient health, habits or cooperation and surgeon experience, the following situations may develop as a result of this surgical procedure: soft tissue injuries, osseous injuries (tuberosity fracture, buccal or lingual plate fracture, mandibular fracture), oroantral communication, root fracture, neurological injuries (lingual and inferior alveolar nerve), bleeding, infection and delayed healing [2]-[6]. Subcutaneous emphysema following impacted tooth extraction in an uncommon finding that should be recognized as early as possible in order to determine its extension and, based on this parameter, offer adequate treatment and patient follow up [7] [8].

The aim of this manuscript is to report and discuss two new cases of subcutaneous emphysema following third molar removal surgery among 10,779 cases operated in a Brazilian dental school. A pertinent literature review is also presented by the authors.

2. Case Report 1

A 28-year-old man presented at the oral and maxillofacial surgery clinics at Piracicaba Dental School for removal of the lower left third molar, which was partially erupted. After careful physical examination and signing of informed consent, surgical procedure was performed. Under local anesthesia, a mucoperiosteal flap was raised in order to expose the tooth and overlying mandibular bone. With the aid of an air hand-piece under sterile saline irrigation, bone removal and tooth sectioning was performed. A straight elevator was used to retrieve tooth fragments from its socket. 3-0 silk sutures were placed following careful debridement and irrigation of the surgical field.

Immediatelly after surgery an abnormal swelling on the left buccal and submandibular regions was noted (Figure 1 and Figure 2). It was soft and painful on palpation. Crepitation was evident. Radiographs were immediately obtained and revealed no signs of bone involvement, and showed radiolucent areas in the submandibular areas compatible to emphysema (Figure 3).



Figure 1. Frontal view demonstrating moderate edema on the submandibular region and left cheek.



Figure 2. Profile view demonstrating submandibular edema.



Figure 3. Mandibular PA radiograph showing diffuse radiolucent areas on the submandibular area.

Extensive subcutaneous emphysema involving submandibular and upper portion of anterior triangle of the neck was given as diagnosis. Postoperative medication included non-steroidal anti-inflammatory and pain killers. Recovery was uneventful and seven days after surgery neither swelling nor crepitation could be observed.

3. Case Report 2

A 19-year-old white man presented at the oral and maxillofacial surgery clinic at Piracicaba Dental School for removal of the impacted lower right third and fourth molars (**Figure 4**). After careful physical examination and signing of informed consent, surgical procedure began. Preoperative medication included 4 mg of dexamethasone (per oral 1 hour before procedure). Under local anesthesia, a mucoperiosteal flap was raised in order to expose



Figure 4. Preoperative panoramic radiograph demonstrating impacted lower third and fourth molars.

the external oblique line of the mandible. With the aid of an air dental hand-piece under sterile saline irrigation, ostectomy was performed in order to expose the underlying teeth and allow for sectioning. Using apical and curved elevators, removal of the teeth was performed. After debridement and irrigation of the cavity with saline, interrupted 3-0 silk sutures were applied. Immediately after the surgical procedure, significant buccal and palpebral swelling were observed (**Figure 5**). On palpation, it was soft and crepitation was marking.

No other medication was prescribed postoperatively, except analgesics and mouth rinses. Postoperative recovery was uneventful and 7 days after intervention total remission of subcutaneous emphysema could be observed (Figure 6).

4. Discussion

Intraoperative or postoperative complications associated with third molar surgery are not common and are estimated to occur in 4% to 10% of all operated patients [3] [6]. Subcutaneous emphysema is extremely rare. Both reported cases occurred among 10,779 consecutive third molar extractions, which represent an overall incidence of 0.018% over a 5-year period.

The main cause of emphysema formation during third molar surgery is the use of high speed air hand-pieces (300.000 rpm) for bone removal and tooth sectioning, which results in a 40 psi air flow directed to the bur tip [8]. This is usually harmless but in the presence of a periosteal tearing or extensive dissection, underlying tissues may be invaded. The resultant emphysema may involve subcutaneous tissue, deep fascial spaces (canine, sub-mandibular, buccal, sublingual, pharyngeal or retropharyngeal), thorax and mediastinum [7] [8].

Diagnosis of subcutaneous emphysema is based on clinical findings and may be confirmed by radiological examination. Clinically, it observed a swelling that becomes evident as air invades soft tissue. Palpation of an emphysematous area is frequently accompanied by crepitation. Depending on the extension of the emphysema and the area involved, surgeon will judge whether radiological examination is necessary. Small emphysematous areas usually do not require further examination. When midface is affected, radiographic examination may be of no value unless orbital involvement is suspected. However, when submandibular space is affected, it is strongly recommended that image studies are obtained. The main reason is that there is a possibility for extension to vital anatomical structures, such as retropharingeal space and mediastinum. Suggested X-ray exams include standard facial incidences, cervical and thoracic radiographs and, for selected cases or if the exam may be easily obtained, cervical and thoracic CT scans are of great value.

When literature is reviewed, it becomes clear that subcutaneous emphysema following third molar removal occurs more frequently in mandibular than in maxillary teeth. A reasonable explanation for this is the fact that, differently from lower tooth, upper third molar extraction seldom requires the use of air rotatory devices [6]. However, when emphysema develops postoperatively it is probably associated with a situation in which the patient has inadvertently forced air through the operated area. This could happen either because of the presence of an oroantral communication (in case of upper third molars) or, in rare cases, when patients play some type of blows instruments that result in increased air pressure in the oral cavity and surgical site.

Subcutaneous emphysema usually requires no specific treatment, as air tends to be resorbed from tissues in five to ten days. Although little information is available in the literature regarding the necessity of using prophylatic



Figure 5. Immediate postoperative photograph illustrating extension of the emphysema through buccal space and right periorbital region.



Figure 6. Total remission of emphysema can be observed 7 days after surgical procedure.

antibiotics, it seems to be a reasonable policy in those cases where deep cervical or thoracic extension is present, once oral microorganisms could be inoculated together with the air.

Prevention of subcutaneous emphysema could be achieved by careful surgical technique, minimizing of soft tissue detachment and limiting the use of air turbines or using electrical hand-pieces instead.

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