Surgical emphysema in the neck as a result of a dental procedure

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Abstract
We report the development of subcutaneous emphysema in a middle-aged woman that occurred several hours after she had undergone a dental restoration procedure. The patient presented to the emergency department, and she was admitted for observation and prophylactic antibiotic coverage. She recovered in 3 days without further intervention and was discharged.

Introduction
Subcutaneous emphysema, pneumomediastinum, and pneumothorax can occur as a result of many procedures, including tracheotomy, direct laryngoscopy, and esophagoscopy. These accumulations of air are rare after a dental procedure. We report the case of a woman who developed subcutaneous emphysema after she had undergone a dental restoration procedure.

Case report
A 50-year-old woman presented to the emergency department in the middle of the night with severe odynophagia. She had undergone restoration of a fractured mandibular molar several hours earlier. On initial examination, her pulse rate was 110 bpm, her blood pressure was 150/80 mm Hg, and her temperature was 36.5° C (98° F). She was unable to swallow her saliva because of excruciating pain. She was in no respiratory distress, and she maintained an oxygen saturation level of 98% on room air. Mild swelling was noted on the left side of her upper neck and crepitus in the left temporal, malar, submandibular, and submental areas. Findings on examination of the oral cavity were normal except for signs of local trauma at the site of the dental procedure.

Flexible endoscopy revealed that the airway was normal up to the carina tracheae. Findings on the remainder of the clinical examination were unremarkable. X-rays of the neck revealed the presence of air in soft-tissue spaces and in the prevertebral area (figure). The patient was admitted and kept under observation with prophylactic antibiotic coverage. The emphysema and dysphagia resolved after 3 days, and the patient was discharged home in stable condition.

Discussion
When surgical emphysema occurs in the head and neck, it is usually secondary to trauma or a rupture of the pulmonary bullae. Subcutaneous emphysema following dental procedure was first reported in 1900 by Turnbull, who described emphysema of the face following a premolar extraction. In 1957, Shovelton classified subcutaneous emphysema into four categories according to its cause:

- a patient-incited reaction, such as self-inflicted trauma
- the direct injection of air
- the result of a prolonged surgical procedure
- no identifiable cause

More recent reports have implicated the turbine drill as a cause of direct injection of air into the fascial planes. Torres-Melero et al reported a case of pneumomediastinum resulting from dental work with a high-speed air turbine drill. Shackelford and Casani and Chen et al have advised dentists to take special precautions when using a turbine drill.

Ali et al discussed emphysema resulting from the use of rotor drills in dental procedures. Jovanovic-Bateman and Hedreville described sudden emphysema following dental drilling that resulted in severe pain and dyspnea. The roots of the first, second, and third molars communicated directly with the sublingual and submandibular spaces. The sublingual space is also in direct communication with the pterygomandibular, parapharyngeal, and retropharyngeal spaces. The turbine drill and other instruments are equipped with pressurized air- and water-flow systems.
After a tooth has been extracted, the roots may give way to injected air and result in surgical emphysema. Our patient had undergone root canal treatment on the same tooth 12 years earlier. During the dental restoration that precipitated her emphysema, the dentist had used an air-and-water syringe that operates at low air pressure. The emphysema occurred even though the tooth was not extracted. Obviously, this case indicates that dental extraction is not the only circumstance in which a dental procedure can lead to surgical emphysema; even minor procedures that involve the use of air-flow systems can result in this condition. A case of surgical emphysema following dental restoration work was also reported by Bavinger.9

Otolaryngologists and maxillofacial and dental surgeons should be aware of the fact that any dental procedure involving the use of air turbines can potentially result in surgical emphysema.

References