



## Correspondence

# Iatrogenic orbital, cervicofacial, and mediastinal emphysema through endodontic crestal perforation

**KEYWORDS**

Dental iatrogenic disease;  
Endodontic complications;  
Crestal perforation;  
Mediastinal emphysema;  
Subcutaneous emphysema

Mediastinal emphysema is air pockets that form around the heart and lungs within the mediastinum because of ruptures of the esophagus, trachea, lung, or because of an inferior extension of cervicofacial subcutaneous emphysema (SE).<sup>1</sup> Tooth extraction, restorative dentistry, root canal therapy (RCT), and periodontal treatment are the causes of iatrogenic SE,<sup>2,3</sup> and third molar extractions comprise nearly half of reported cases. Other pathology leading to SE includes spreading of air generated by gas-forming microorganisms from infected cutaneous or mucosal soft tissues to surrounding interstitial spaces.<sup>1</sup>

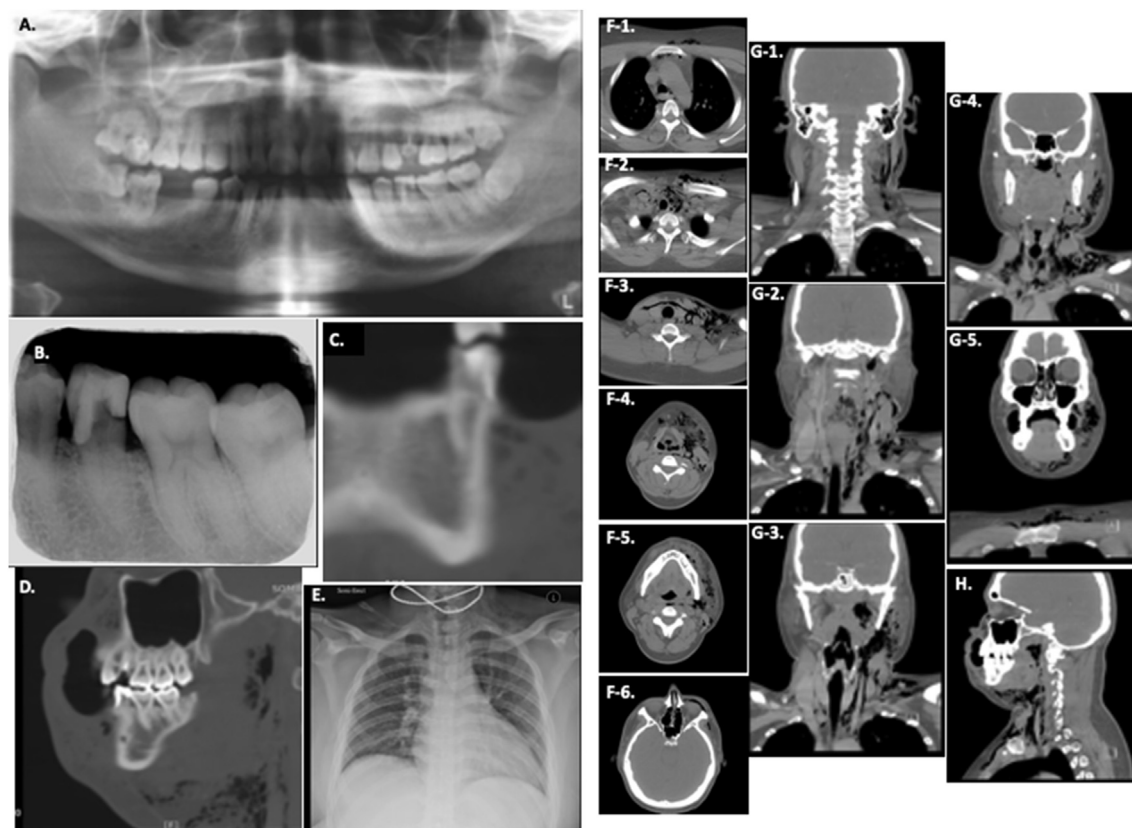
The present report is the first documented case of SE dissecting superiorly into the peri- and intra-orbital soft tissue and inferiorly into the mediastinum through mesial crestal perforation during endodontic treatment of a left mandibular second premolar. The 26-year-old man presented to the emergency room at midnight with a sudden-onset swelling on the left side of his face and neck after an afternoon RCT of the left mandibular second premolar (Fig. 1A–D). The patient's dentist was contacted the next day and said that the RCT had been done using a rubber dam and the mesial crest had been perforated. Neither hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) nor RC-Prep (glycol, urea

peroxide, and ethylenediaminepentaacetic acid) had been used during the treatment. His physical examination showed moderate left facial, periorbital, buccal, submental, and submandibular swelling with crepitation upon palpation. His left neck over the sternocleidomastoid muscle was also swollen and had crepitation upon palpation. The chest X ray and computed tomography (CT) scan of his head, neck, and upper chest showed extensive air pockets within the left periorbital and intraorbital soft tissue, left pterygomaxillary fissure, left temporal fossa, left infratemporal fossa, left parotid, left buccal, bilateral submental, bilateral sublingual, bilateral submandibular, bilateral parapharyngeal, retropharyngeal region, along the presternum, and the bilateral sternocleidomastoid muscle, and in the bilateral supraclavicular, superior mediastinal, and posterior aspect of the proximal thoracic esophagus regions (Fig. 1E–H). Extensive SE within the bilateral cervicofacial and mediastinal spaces were confirmed with the possibility of a secondary infection or inflammation. The patient was then kept under observation and treated with intravenous injection of two vials of ampicillin 1 g/sulbactam 0.5 g (1.5 g/vial, Amsulber®, China Chemical & Pharmaceutical Co., Ltd., Taipei, Taiwan) every 6 h per day. His sign and symptom attenuated and a second set of CT scans taken on the fifth day showed a significant decrease of SE. He was subsequently discharged from the hospital. After oral administration of 1.5 tablets of amoxicillin/clavulanic acid (875/125 mg/tab, Augmentin®, SmithKline Beecham Plc., England) every 12 h per day for 14 days, all his signs and symptoms of SE were resolved.

SE is considered a rare complication of dental treatment and SE from endodontic treatment is even rarer.<sup>4,5</sup> In this case report, there was no communication between the root apex and the mandibular outer cortex (Fig. 1C and D) and the RCT was performed using the rubber dam. SE was induced through the mesial crestal perforation. All dentists must be aware that the crestal perforation may lead to accumulation of air in the subcutaneous spaces.

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**Figure 1** Radiographs of our patient. (A) Panoramic radiograph. (B) The periapical radiograph of the left mandibular second premolar. Mesial crestal perforation was noted. (C) Coronal view of CT scan revealed neither periapical lesion nor cortical bone fenestration. The air pocket was connected to the mesial crestal perforation. (D) Sagittal view of CT scan revealed no periapical lesion. (E) The air pockets were revealed over neck region on chest radiograph. The air pocket was noted connected to mesial crestal perforation to cervicofacial region. CT images without contrast on day 1: (F-1 to F-6) Axial views of CT images of the mediastinal, cervicofacial, and head at the orbital level of air pockets of SE. (G-1 to G-5) Coronal views of CT images of the mediastinal, cervicofacial, and orbital regions also showing air pockets of SE. (H) Sagittal view of a CT image shows the extension route of SE.

## Declaration of Competing Interest

The authors have no conflicts of interest relevant to this article.

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