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Neurological deficit of the facial nerve after root canal treatment

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Case Report

Here we report the unusual case of a patient who suffered neurological deficit of the facial nerve as a complication of a root canal treatment. During the canal treatment, 3% hydrogen peroxide and 90% ethanol rinses were performed. The present case demonstrated rinse toxicity to vital tissue as evidenced by severe clinical damage. Chlorhexidine can be used instead of potentially toxic rinses with good antimicrobiological results. Furthermore, special attention should be paid to determination of the root canal length and the integrity of the canal system before rinsing. Also irrigation should be applied at a low pressure.

A 47 year-old female patient was referred to the Department of Craniomaxillofacial and Oral Surgery at the University Hospital Zurich. One day prior, a private dental practitioner had performed a root canal on tooth 26 to treat acute pulpitis. During the procedure, 3% hydrogen peroxide and 90% ethanol rinses were performed. Both rinses were prepared by a local pharmacy store. The patient reported feeling a

burning pain in her left maxillary sinus while rinsing and then quickly developed swelling in her left cheek, which worsened during the night.

Fig. 1. Photograph of the patient showing swelling on the left side of her face

The patient's medical history was unremarkable. Clinical examination revealed painful swelling on the left side of her face that extended from the lower border of the mandible up to the left eye (Fig. 1). The swelling was accompanied by weakness of all 3 branches of the facial nerve (Fig. 2) and hypaesthesia of the V2 nerve on the left side. Lymph nodes were not clinically palpable at any level of the neck. The patient could open her mouth to 40 mm only. No necrosis or ulceration was observed in the oral soft tissue. Tooth 26 was percussion positive and restored with a temporary filling.

Fig. 2. a) 3-D photo of limited pursing of lips. b) 3-D photo of limited smile.

The patient was admitted to the Department of Craniomaxillofacial and Oral Surgery at the University Hospital Zurich without delay for monitoring and delivery of intravenous medication. Upon admission, she was immediately given an anti-inflammatory (dexamethasone, 8 mg 3 times a day for 3 days), antibiotic (amoxicillin 625 mg *per os* for 10 days), and intravenous analgesic (metamizol, dicolefanc) medications. During her hospitalization, the patient was subjected to a magnetic resonance imaging (MRI) scan (Fig 3) that revealed subcutaneous emphysema accompanied by inception of necrosis in the left cheek tissue. During the hospital stay, the patient experienced a gradual regression of the swelling and reduction of pain. Weakness of the marginal facial nerve, however, remained unchanged at the time of the patient's discharge from the hospital. The facial nerve recovered completely with 3 months of twice weekly physiotherapy.

Fig.3 a) MR image of subcutaneous emphysema of the left cheek. b) MR image demonstrating inception of necrosis.

Discussion

Here we report the unusual case of a patient who suffered neurological deficit of the facial nerve as a complication of a root canal treatment. The development of subcutaneous emphysema after hydrogen peroxide rinsing, attributable to released oxygen, has been described previously as a complication in endodontics^{1,2}. When irrigating comes into contact with tissue, ulceration accompanied by inhibition of neutrophil migration may occur, leading to damage of endothelial and fibroblast cells, a situation that may culminate in necrosis³. Concomitant neurological deficits in such cases, however, are rare. For example, Witton et al⁴ and Reeh and Messer⁵ reported the occurrence of infraorbital nerve paresthesia. Several cases of facial nerve paralysis and local anaesthesia in dentistry have been reported. The paralysis resolved within 5 days in some cases^{6,7} but became a permanent neurologic deficit after local anaesthesia in others^{8,9}.

Neurological deficit, such as what occurred in the present case, might be attributable to a direct toxic effect of the rinsing. Alternatively, released oxygen producing pressure on the facial nerve branch may cause emphysema of the tissue. The potential role of ethanol in contributing to nerve toxicity should not be ignored. Indeed ethanol has been used to produce neurolysis in chronic pain therapy.

Summing up, the present case demonstrated alcohol and/or hydrogen peroxide toxicity to vital tissue as evidenced by severe clinical damage. The choice of a combination of hydrogen peroxide and alcohol rinse during endodontic treatment is,

however, unusual. To avoid the aforementioned complications, more biocompatible irrigation solutions such as Chlorhexidine may be used instead of potentially toxic rinses and still achieve good antimicrobial results^{10,11}. Furthermore, special attention should be paid to determination of the root canal length and the integrity of the canal system before rinsing. Also, irrigation should be applied at a low pressure as recommended by the European Society of Endodontology. In cases where marked facial swelling does develop, progression of swelling and resultant compression of the nerve branch may be prevented with intravenous steroids given concurrently with antibiotics as a prophylaxis against infection of the necrotic tissue.

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Figure Legends

Fig. 1. Photograph of the patient showing swelling on the left side of her face

Fig. 2. a) 3-D photo of limited pursing of lips. b) 3-D photo of limited smile.

Fig. 3. a) MR image of subcutaneous emphysema of the left cheek. b) MR image demonstrating inception of necrosis.



Fig 1: patient with swelling of the left side

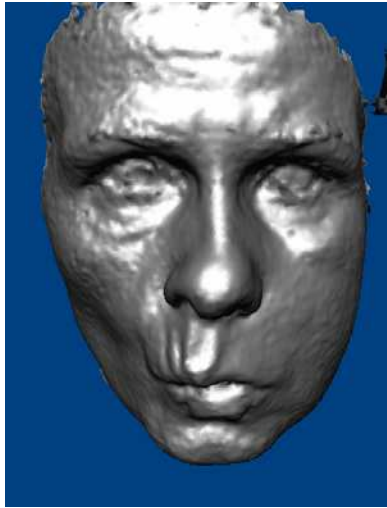


Fig 2a: 3d photo with limited pursing lips

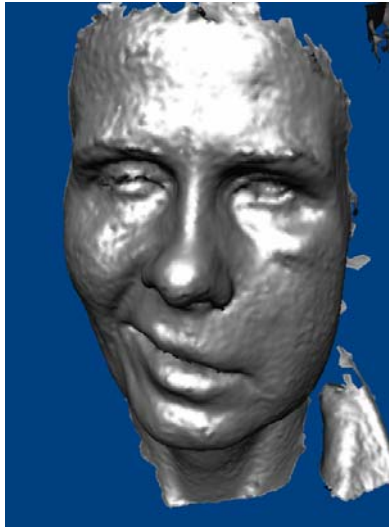


Fig 2b: 3d photo with limited smiling

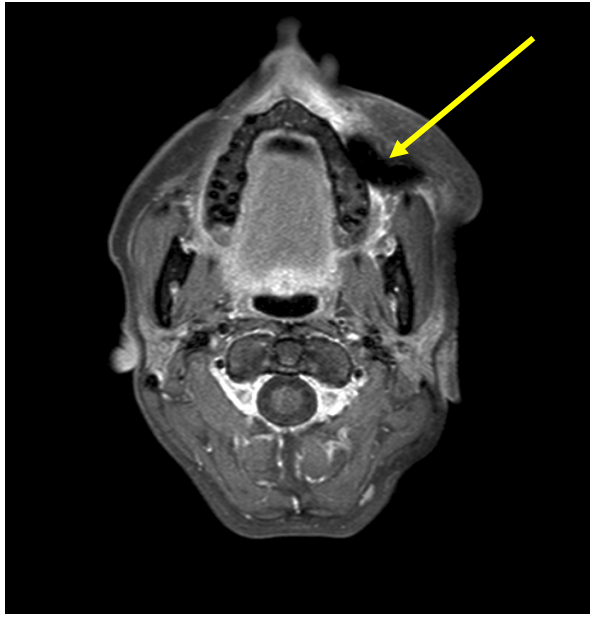


Figure 3a: emphysema of the left cheek



Figure 3b: beginning necrosis