



Case Study: Temporal Swelling Misdiagnosed as Temporal Arteritis Due to Faulty Root Canal Treatment in Upper Maxillary Molar

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DOI: 10.31080/ASDS.2025.09.2013

Received: March 24, 2025

Published: April 03, 2025

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Abstract

Temporal swelling is often misdiagnosed as temporal arteritis, especially when the swelling presents in the temporal region. However, odontogenic infections, particularly those resulting from incomplete or faulty root canal treatment, can also cause swelling in this unusual location. This case study describes a 58-year-old male patient who presented with temporal swelling and pain initially suspected to be temporal arteritis. A detailed dental history revealed a history of root canal treatment performed two years ago on the affected upper maxillary molar. Radiographic and CBCT imaging confirmed underfilling in the mesial root canal and associated peri-apical changes. The patient underwent re-root canal therapy, including proper cleaning, shaping, and disinfection of the root canal, with the use of calcium hydroxide as an intra-canal medicament. Antibiotics were administered, and the patient showed significant improvement, with resolution of the temporal swelling. This case emphasizes the importance of distinguishing between odontogenic and systemic causes of facial and temporal swelling and highlights how incomplete root canal treatment can lead to severe complications, such as facial space infections. It further stresses the significance of thorough and well-executed endodontic procedures to prevent such complications.

Keywords: Temporal Swelling; Temporal Arteritis; Odontogenic Infection; Root Canal Treatment; Incomplete Root Canal Filling; Peri-apical Infection; Cone-beam Computed Tomography (CBCT); Calcium Hydroxide; Re-root Canal Therapy; Facial Space Infections; Apical periodontitis; Endodontic retreatment

Introduction

Temporal swelling can be associated with various pathologies, including temporal arteritis, infections, and dental conditions. This case study presents an unusual case where temporal swelling, initially suspected to be temporal arteritis, was actually due to a faulty root canal treatment of an upper maxillary molar. This case highlights the importance of thorough clinical examination and understanding the connection between dental infections and distant facial swelling.

Case Presentation

A 58-year-old male patient presented to the dental clinic with complaints of swelling and pain in the temporal region, which he believed to be related to temporal arteritis. The patient had initially visited a pulmonologist and a general physician without relief, as the symptoms persisted despite treatment for a suspected systemic inflammatory condition. The patient, a routine smoker, reported experiencing pain and swelling originating from the right maxillary first molar, which had previously undergone a root canal treatment two years ago.

Upon careful evaluation, the dentist noted that the pain originated from poor obturation of the maxillary first molar. The swelling, however, was not in the usual periapical region of the tooth but in the temporal region, which was unusual and raised suspicion of a systemic cause, such as temporal arteritis, or an associated space infection.

A detailed medical and dental history revealed that the patient had visited the dental clinic for regular oral hygiene appointments but had not been properly evaluated for potential complications of the previous root canal treatment. The patient did not report any issues with mouth opening but described consistent odontogenic pain originating from the previously treated tooth.

Radiographic and clinical findings

Upon radiographic examination, it was noted that the previous root canal treatment was suboptimal, particularly in the mesio-buccal canal of the upper first molar. The obturation material was short of the apex, and peri-apical radiolucency was visible, suggesting an incomplete root canal treatment and the potential for ongoing infection. These radiographic findings, combined with the patient's complaint of dull, continuous aching pain and tenderness to percussion on the tooth, led to a preliminary diagnosis of an odontogenic origin for the pain and swelling.

To further investigate, a cone-beam computed tomography (CBCT) scan was performed. The CBCT scan confirmed the underfilling of the mesial root of the tooth and showed significant peri-apical changes associated with the upper molar. Interestingly, air-filled compartments were detected in the temporal fascial region, consistent with the spread of infection from the tooth to the adjacent soft tissue spaces.

Diagnosis

While the initial symptoms pointed to temporal arteritis, the radiographic findings and clinical signs suggested an odontogenic cause, particularly a chronic infection from an incomplete root canal filling. The temporal swelling was likely the result of the infection spreading from the periapical tissues to the temporal space, leading to swelling in an unusual anatomical location. This highlights the importance of considering dental causes of facial and temporal swelling, especially in patients with a history of root canal treatment.

Treatment and management

Given the findings, the patient was started on a course of antibiotics to address the suspected infection. A re-root canal treatment was scheduled, and the following steps were taken:

- **Retreatment Procedure:** The existing root canal filling was removed using a solvent to dissolve the gutta percha. The mesio-buccal canal, which had been underfilled, was carefully cleaned and shaped to ensure thorough debridement of the canal space.
- **Irrigation:** Copious amounts of irrigation with sodium hypochlorite (NaOCl) and EDTA were used to disinfect the root canal space and remove any residual debris. Proper irrigation is crucial in ensuring the complete elimination of infected material and preventing the spread of infection to the surrounding tissues [1].
- **Intra-canal Medication:** An aqueous calcium hydroxide dressing was placed inside the canal as an intra-canal medicament. Calcium hydroxide has excellent antimicrobial properties and is effective in neutralizing bacteria that may have been left behind after incomplete root canal treatment [2]. The dressing also helps to control inflammation in the surrounding tissues.
- **Follow-up Care:** The patient was instructed to continue antibiotics to support infection control while the root canal treatment was being completed. Follow-up appointments were scheduled to monitor the healing process.
- **Outcome:** By day 5 post-treatment, the patient reported a significant reduction in the temporal swelling, with no further odontogenic pain associated with the upper molar. The patient's symptoms improved, and the temporal swelling gradually subsided, confirming that the odontogenic infection was the cause of the previously misdiagnosed temporal arteritis.

Probable causes of faulty root canal treatment

Several factors contributed to the failure of the initial root canal treatment:

- **Apical Extrusion of Infected Debris:** The improper cleaning and shaping of the canal led to the extrusion of infected debris into the periapical tissues, which may have caused the spread of infection to the temporal space [3].

- **Incomplete Cleaning and Shaping:** The mesio-buccal canal was underfilled, leading to the retention of infected tissue and bacteria. This could have facilitated the persistence of the infection and its spread to adjacent tissues [1].
- **Inadequate Sealing:** The lack of proper obturation and sealing of the root canal system allowed bacteria to thrive within the canal and spread to the surrounding tissues, contributing to the flare-up of infection.
- **Bacterial Overgrowth:** The failure to completely disinfect the root canal space allowed for the overgrowth of pathogenic bacteria such as *Enterococcus faecalis*, which is commonly associated with post-treatment infections and chronic periapical lesions [1].

Clinical differentiation from temporal arteritis

Although temporal arteritis shares some overlapping symptoms, such as swelling and pain, the key differentiating factors in this case included:

- **Patient History:** The patient had a history of recent dental treatment, which should raise suspicion of a dental origin for the temporal swelling. Temporal arteritis typically presents with systemic symptoms like jaw claudication and visual disturbances, which were absent in this case [4].
- **Clinical Signs:** Temporal arteritis typically presents with a thickened, palpable temporal artery, often accompanied by systemic features like fever and fatigue. The absence of these features in this case pointed toward a localized odontogenic infection [5].
- **Radiographic Findings:** The presence of underfilled root canal and peri-apical changes, combined with air-filled spaces in the temporal region on CBCT, strongly suggested an odontogenic infection rather than temporal arteritis.
- **Response to Treatment:** The patient's prompt improvement following antibiotics and retreatment further supported the odontogenic origin of the swelling. Temporal arteritis typically requires steroid treatment, and the lack of response to steroids in this case pointed to a different underlying cause [6].



Figure 1: PRE-OP and POST-OP treatment images of root canal treatment.



Figure 2: Pre and Post treatment images of the patient.

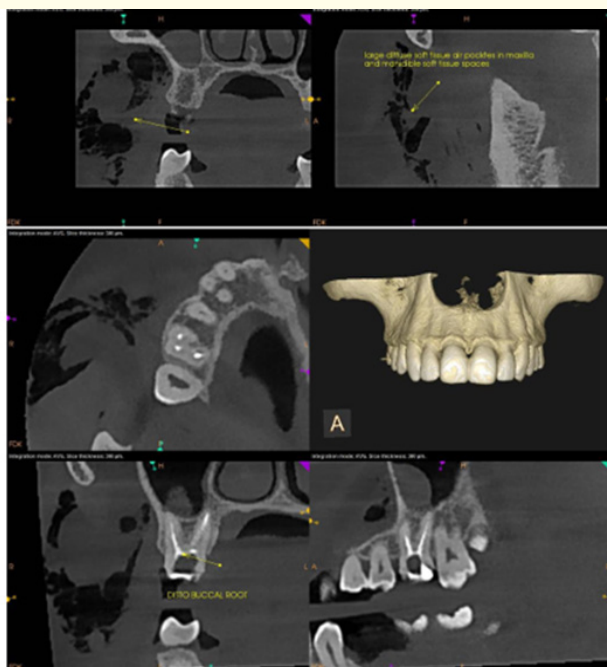


Figure 3: CBCT Images indicating large diffuse soft tissue air pockets in maxilla and mandible soft tissue spaces.

Conclusion

This case highlights the importance of a comprehensive dental evaluation when dealing with unusual facial swelling. While temporal arteritis can present with localized swelling in the temporal region, odontogenic infections should always be considered as a differential diagnosis, especially in patients with a history of dental treatment. In this case, a faulty root canal treatment was the root cause of the temporal swelling, and proper management, including re-root canal treatment and antibiotic therapy, led to a full resolution of symptoms. This case underscores the importance of thorough root canal procedures, proper cleaning and shaping, and the need for careful attention to clinical history in diagnosing and treating patients with unusual facial swelling.

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