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Management of an advanced endodontic-periodontal lesion in a molar fused to a supernumerary tooth



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Abnormal dental morphology and position have been associated with severe periodontal diseases due to increased plaque accumulation and unfavourable gingival contour. Restoring the favourable contour becomes an important part of the treatment in such cases and can be challenging for the dental practitioner. This case report highlights the multidisciplinary approach for the management of an endodontically periodontally involved molar fused to a supernumerary tooth. The treatment needs and sequence for the management of endodontic-periodontic lesions are discussed and illustrated.

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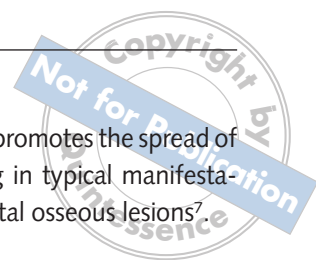
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■ Introduction

Fusion is commonly identified as the union of two distinct dental germs, which occurs in any stage of the dental organ development. They are joined by the dentine; pulp chambers and canals may be linked or separated depending on the developmental stage when the union occurs. This process involves epithelial and mesenchymal germ layers resulting in irregular tooth morphology¹. Fusion may also occur between a normal tooth and a supernumerary tooth such as a mesiodens or a paramolar^{2,3}. Teeth with this

abnormality are not aesthetically pleasing, due to their irregular morphology. They also have a predisposition for caries and periodontal disease, as well as spacing problems⁴. Unfortunately, many of these fusions require surgical removal because of their abnormal morphology and excessive mesiodistal width, which cause problems with spacing, alignment and function. In some cases, endodontic treatment is very complicated. Cooperation with practitioners from different areas of dentistry is important to create or achieve functional and aesthetic success in these cases.



■ Endodontic–periodontal continuum

There is a close ontogenetic relationship between endodontic and periodontal tissue structures, which is anatomically reflected in the apical foramen and accessory and lateral canals. The major connections between periodontal and pulpal tissues are the apical foramina. In addition to these main avenues of communication, there are a multitude of branches connecting the main root canal system with the periodontal ligament – the accessory canals⁵. Accessory canals occur most frequently in the apical third of the root⁶. In addition to the apical foramina and accessory canals, there is a third possible route for bacteria and their products – the dentinal tubules⁵. Although the opening of each of these small tunnels facing the periodontal ligament is sealed with cementum, areas of the root with loss of cementum can allow periodontal infection to reach the pulp or vice versa.

Table 1 Classification according to Mutschelknauss⁸ and Guldener⁹.

- Lesions of endodontic origin with periodontal involvement
 - (a) Expansion of the pulp lesion, either periapically or para-/interradicularly via the accessory and lateral canals
 - (b) Iatrogenic: by perforation
- Lesions of periodontal origin with endodontic involvement
 - (a) Iatrogenic: periodontal therapy requires hemisection/apicectomy
 - (b) Retrograde pulp infection
- Combined endodontic–periodontal lesions where two independent defects have merged into one

Table 2 Classification according to Geurtsen et al¹⁰.

1. Combined lesions requiring only a single root-canal treatment (favourable prognosis)
2. Combined lesions requiring both endodontic and periodontal treatments (less favourable prognosis)
3. Combined lesions with little hope of successful treatment (poor prognosis)

Clinically, this relationship promotes the spread of infection, potentially resulting in typical manifestations of endodontic–periodontal osseous lesions⁷.

■ Classification

Endodontic–periodontal lesions are difficult to classify, because they lack the characteristic manifestations of strictly endodontic or strictly periodontal lesions. It is difficult to distinguish with hindsight the parts of the lesion that were endodontic or periodontal in origin.

The classifications by Mutschelknauss⁸, Guldener⁹ and Simon et al⁷ are based on aetiology, and describe the development of endodontic–periodontal lesions, whilst the classification by Geurtsen et al¹⁰ focuses on therapeutic and prognostic aspects (Tables 1 to 3).

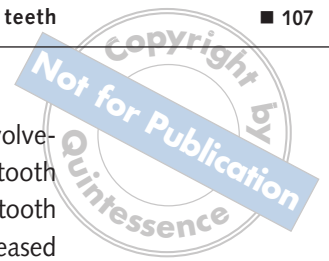
■ Diagnosis

Diagnosis of endodontic–periodontal lesions is often confusing and difficult. When pathological changes induced by either pathway occur and are left without treatment for a period of time, they tend to communicate between pulp tissue and periodontal ligament, then spread out around the affected tooth, simulating a lesion derived from the other pathway.

Endodontic–periodontal lesions that are primarily endodontic in origin characteristically expand to the periodontal structures via the apical foramen, resulting in an osseous defect that progresses relatively

Table 3 Simon et al⁷ classified the lesions based on the primary source of infection.

1. Primary periodontal lesions
2. Primary endodontic lesions
3. Primary periodontal lesions with secondary endodontic involvement
4. Primary endodontic lesions with secondary periodontal involvement
5. True combined lesions



quickly along the periodontal ligament from apical to coronal, or forms a sinus tract. The probing depths of the tooth remain normal until a closely circumscribed location reveals significant probing depths of 10 mm to 12 mm. Radiographs show a normal-shaped alveolar ridge in the proximal area and osteolysis spreading from an apical/interradicular focus to the periapical area⁴. Lesions that are primarily periodontal usually involve other teeth in the dentition, have typical periodontal symptoms and show absence of caries or other causes of pulpal involvement. The diagnosis involves thorough clinical examination supported by radiographs and tooth vitality tests.

■ Treatment

To structure the complex treatment of endodontic-periodontal lesions, a treatment protocol should combine endodontic and periodontal therapeutic steps in a specific sequence and at defined intervals, as shown in Fig 1¹¹. Following initial treatment, priority is given to the endodontic aspect to allow healing by regeneration, unless the patient presents with acute periodontal symptoms. Any decision in favour of periodontal measures or even surgical endodontics will be based on the clinical and radiographic findings 6 months after root canal therapy. An additional 6 months later, the regeneration of the endodontically induced part of the bony defect should be more or less complete; any residual periodontal defects should subsequently be treated by regenerative periodontal techniques.

Throughout the treatment steps, prognosis of the tooth should be periodically assessed and decisions should be taken accordingly.

■ Case report

A 26-year-old male patient presented with pain and discharge of pus in a mandibular posterior tooth. On examination the right mandibular first molar revealed an abnormal crown morphology. The aspect of the dental elements suggested the union of a supernumerary tooth crown with the distobuccal crown of this molar. A probing depth of 7 mm and clinical attachment loss of 6 mm with suppuration was noted on the distobuccal aspect. The probing depth mid-

buccally was 8 mm with grade II furcation involvement¹². The presence of a supernumerary tooth fused with the molar created an unfavourable tooth shape and gingival contour, resulting in increased plaque accumulation (Fig 2). The tooth was not tender upon percussion and there were no carious lesions. The tooth was found to be non-vital.

The radiograph revealed an arc-shaped bone loss in the interdental region between the mandibular right first and second molars and interradicular radiolucency for the mandibular right first molar (Fig 3).

In the treatment protocol, endodontic therapy preceded periodontal intervention. However, after an apparently acceptable root canal therapy, periodontal symptoms remained. The decision was taken to perform periodontal surgery. Under local anaesthesia, a full thickness flap was elevated using sulcular incisions. A cervical enamel projection was found to be extending completely into the furcation. The supernumerary tooth, which was fused all along its length, was resected using a narrow tapered cylindrical diamond bur (Fig 4). The rough tooth surface was smoothed and furcation-plasty was performed to eliminate the cervical enamel projection. The exposed gutta-percha was sealed using Glass Ionomer Cement (GC Fuji II, GC Corporation, Tokyo, Japan) (Fig 5). Following thorough debridement, a xenogenic demineralised bone matrix (Osseograft®) was used as graft material. Removal of the supernumerary tooth resulted in better adaptation of the flap to cover the furcation area completely (Fig 6).

One month later, healing was satisfactory with good adaptation of the gingiva to the shaped root surface, and the tooth remained asymptomatic (Fig 7). A wide interdental space had been created due to loss of the papilla distal to the mandibular first molar, and the patient was instructed to use a small interdental brush to keep the area plaque-free. The results were stable after a follow-up of 1 year and the patient remained asymptomatic (Fig 8).

■ Discussion

Abnormal dental morphology and position have been associated with severe periodontal diseases due to increased plaque accumulation and interference with plaque control. There have been numerous

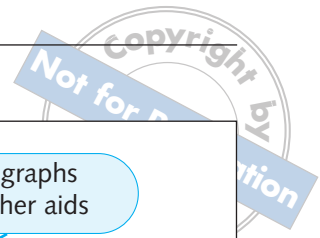


Fig 1 A sequential treatment chart for the management of combined endodontic–periodontal lesions, modified by permission of Blackwell Publishing, from Hauelsen H, Ratka-Krüger P, Heidemann D. Paro–Endo–Läsion: Unerwartete Ursache parodontaler Destruktion. In: Heidemann D (ed). Deutscher Zahnärztekalendar. Munich: Hanser Verlag, 1999:97–129.

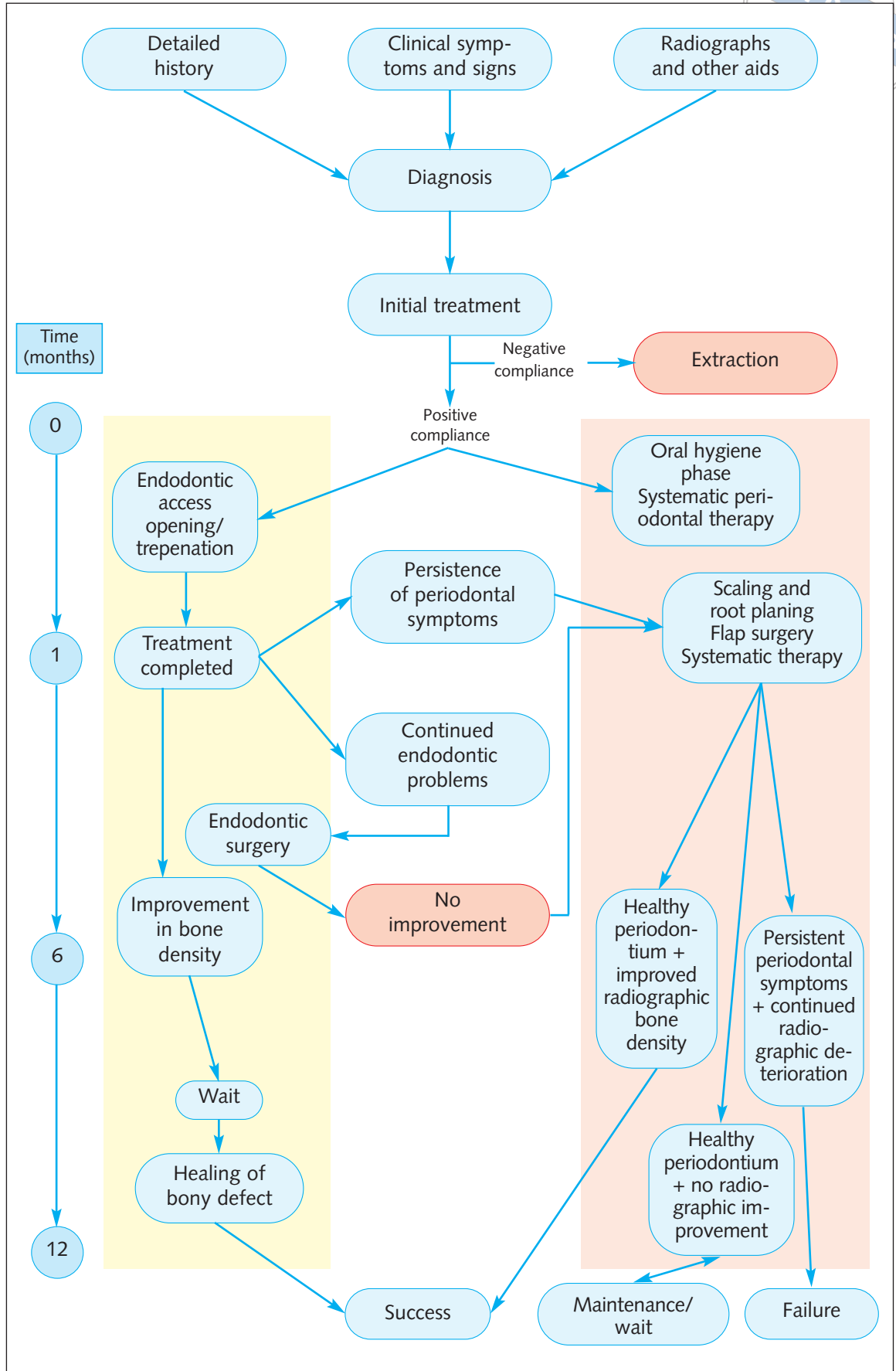




Fig 2 Severe attachment loss in tooth 46 fused to a supernumerary tooth; the abnormal crown morphology resulted in poor gingival adaptation and contour.



Fig 3 Radiograph of tooth 46 immediately following obturation of root canals with gutta-percha.



Fig 4 Reflection of the flap reveals complete fusion of the supernumerary element with tooth 46, severe loss of bone and a cervical enamel projection extending into the furcation region.



Fig 5 Supernumerary tooth resected and tooth surface contoured and smoothed; the exposed gutta-percha was sealed using glass ionomer cement.



Fig 6 Satisfactory adaptation of the flap following resection of the supernumerary tooth and bone grafting.



Fig 7 Ten days post-surgery; a satisfactory tooth and gingival contour.



Fig 8 One year post-surgery.

reports of carious and periodontal involvement of fused teeth^{2,4}. Fusion can occur between teeth of the same dentition or mixed dentitions and between normal and supernumerary teeth. A diagnostic consideration, but not a set rule, is that supernumerary teeth are often slightly aberrant and fusion between supernumerary and normal tooth will generally show difference in the two halves of the fused crown. The clinical picture of the present case was similar. Teeth with this abnormality, if in the anterior region, are not aesthetically pleasing because of their irregular morphology. They also present a high predisposition for caries and periodontal disease, as well as spacing problems. The main periodontal complication in fusion cases occurs because of the presence of fissures or grooves in the union between teeth involved. If these defects are very deep and extend subgingivally, the possibility of bacterial plaque accumulation in this area is quite high. The periodontal involvement of the fused mandibular molar with a supernumerary tooth in the present case can be explained on a similar basis. Also, the abnormal shape of the crown resulted in an unfavourable gingival contour, complicating the treatment.

The simultaneous existence of pulpal problems and inflammatory periodontal disease can complicate the diagnosis and the treatment planning and affect the sequence of care to be performed. Treatment of the present case included consideration and management of all the affecting factors, including the correction of abnormal shape of the tooth and elimination of cervical enamel projection, ensuring better adaptation of the gingiva. This case highlights the need for an interdisciplinary approach in the treatment of endodontic–periodontal lesions.

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