



Guided tissue regeneration in managing an incisor with a labially fused supernumerary: case report

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Supernumerary teeth occur most commonly in the maxillary anterior region. When in the midline area, such a tooth is commonly referred to as a mesiodens with most remaining unerupted.^{1,2} The prevalence of supernumerary teeth is reported to be from 1 to 3%.^{3,4} Supernumerary teeth may cause or be related to over-retention of primary teeth, impaction, or ectopic eruption of nearby permanent teeth, and abnormal development or root resorption of adjacent teeth.¹ Most commonly, a mesiodens is located between or palatal to the central incisors. Very few are located labially.¹ Uncommonly, supernumerary teeth may be fused to normal teeth in the arch, most frequently by lateral fusion.⁵⁻⁷ Problems associated with this type of fusion include poor esthetics, crowding, abnormal eruption, residual periodontal defects, and difficulty managing the tooth to which the supernumerary is fused.

When a supernumerary tooth is fused to a normal tooth in the lateral position, spacing may be a problem in the arch and has usually indicated the removal of the supernumerary. The fusion may involve the root cementum only or also the root and crown dentin and/or enamel, with separate or communicating root canals. When the fusion occurs palatally or labially, there also may be problems with the occlusion, repair of a bony defect, and/or the attached gingiva.

Removing a fused tooth presents several difficulties. Healing may result in the formation of a pocket or a long junctional epithelium. In teeth with fused crowns and roots, this has sometimes been avoided by the sequential removal of the fused root and later the crown.⁸ The fused portion also may be removed in one procedure by sectioning.^{8,9} To achieve a new attachment, the gingival tissues must be excluded from the root surface.^{10,11} However, bone-derived granulation tissue may lead to ankylosis and root resorption, while granulation tissue derived from gingival connective tissue may result in root resorption.⁵

Guided tissue regeneration allows the regeneration of normal periodontal attachment to the root surface

where surgery has created communication of that surface with gingival epithelial and connective tissues. Preventing apical migration of gingival epithelial tissues and contact of the gingival connective tissue with the root surface after surgery allow establishment of periodontal ligament cells on the root surface.^{12,13}

Case report

A 9-year-old Caucasian male was referred to the University of Otago School of Dentistry. The medical history was noncontributory except for mild asthma controlled by a Ventolin™ (Glaxo — Edinburgh Pharmaceuticals, Palmerston North, New Zealand) inhaler (salbutamol) on demand. General and dental development were normal for his chronologic age and he was receiving routine dental care from a community school clinic. The reason for referral was a supernumerary tooth labially positioned over the erupted maxillary left permanent central incisor. On attempted extraction of the supernumerary, the permanent tooth also had shown movement, suggesting fusion of the two teeth.

Oral examination

The extraoral and intraoral soft tissues were normal and oral hygiene was moderately effective. The dentition was in the early to middle mixed stage with a Class I molar relationship on both sides. There was a 50% overbite and an overjet of 4 mm. The anterior teeth were not crowded and the maxillary anteriors were completely erupted. The teeth had no caries or restorations. The supernumerary tooth was partially erupted labial to the maxillary left central incisor (Fig 1). Dental floss could only be manipulated to the gingival level between crowns suggesting fusion.

Radiographic examination

A panoramic radiograph was exposed to check dental development and to look for missing teeth or other dental abnormalities. This confirmed that all permanent teeth except the third molars were present and developing normally. In the anterior region, a tooth was superimposed over the maxillary left permanent central

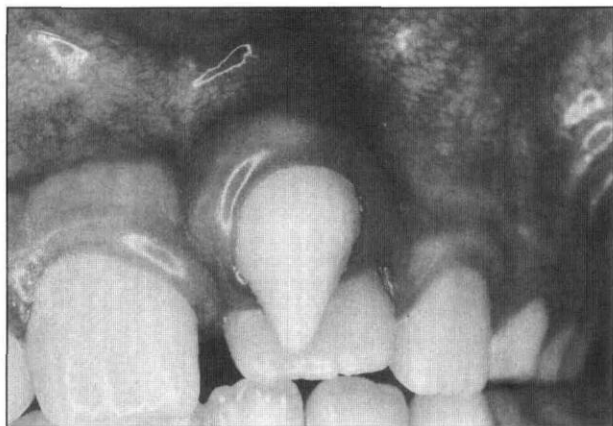


Fig 1. Anterior view of maxillary left permanent central incisor with a labially erupted supernumerary tooth.

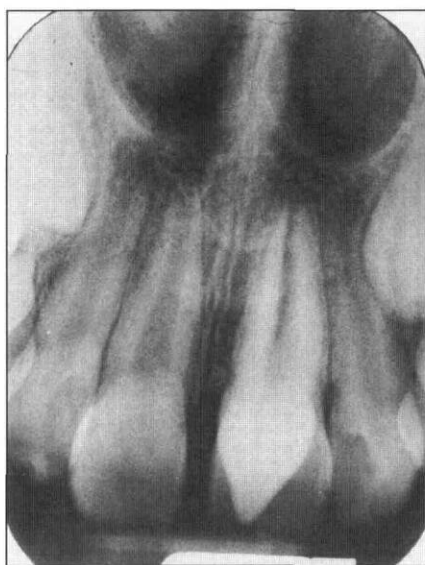


Fig 2. Periapical radiograph of maxillary left permanent central incisor and labial supernumerary tooth.

incisor. Periapical, occlusal, and lateral radiographs also were exposed to determine the presence of separate root canals and the level of fusion (Fig 2). Although there appeared to be two root canals, the radiographs did not allow determination of their degree of communication.

Treatment

Because removing the supernumerary tooth would create a significant bony dehiscence with exposure of the root surface of the maxillary left central incisor, a guided tissue regeneration procedure to promote normal periodontal tissues was planned. Placement of the guided tissue regeneration membrane after removing the supernumerary tooth is shown schematically in Fig 3. Because of the possible root canal communication, endodontic surgical procedures were included in the planning. The procedure was carried out under general anesthetic with local anesthetic infiltration (3% Citanest™ [Astra Pharmaceuticals, North Ryde, Aus-

tralia] with Felypressin™) as requested by the anesthetist to provide control of local pain and bleeding. A gingival crevicular incision was made from the distal of the right lateral incisor to the distal of the left lateral incisor where a releasing incision was made. A full-thickness flap was raised revealing the fused supernumerary tooth with two-thirds of its root devoid of alveolar bone. The apical level of fusion could not be determined visually or by probing, but the shape of the visible portion suggested fusion of cementum and dentin only.

A straight surgical bur was used with slow speed and saline coolant to section the crown of the supernumerary at the level of the cemento-enamel junction (CEJ). The crown separated cleanly, revealing the roots fused from this level. The width of the fusion was approximately 6 mm. Continuing a sweeping motion around the curve of the permanent tooth root with the straight bur, the two teeth were gradually separated taking care to avoid removing lateral bone or damaging the surface of the root adjacent to the fusion. At the level of separation, 10 mm below the CEJ, the root canals did not communicate, although the canal of the supernumerary tooth was exposed along a deep palatal groove (Fig 4).

The full extent of the bony dehiscence was clearly visible (Fig 5). A patch of Gore-Tex™ Teflon (Gore Associates, Flagstaff, AZ) membrane was cut and

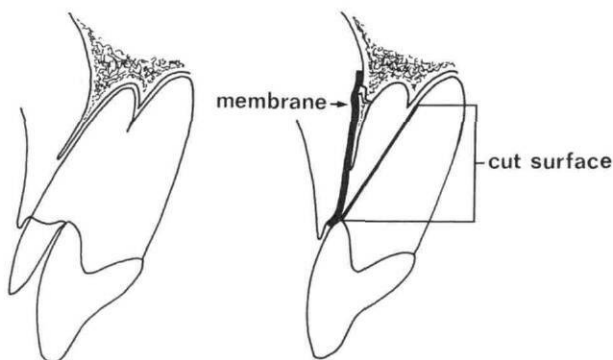


Fig 3. Diagram of guided tissue regeneration membrane placement. The left shows a labiopalatal cross section of the fused teeth. The right shows the membrane placement after removal of the supernumerary tooth. The space below the membrane is expected to fill with bone, which will attach to the cut surface of the tooth by periodontal ligament and cementum.

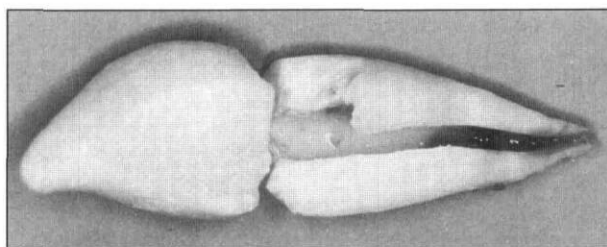


Fig 4. The supernumerary tooth showing the palatal groove along the root.

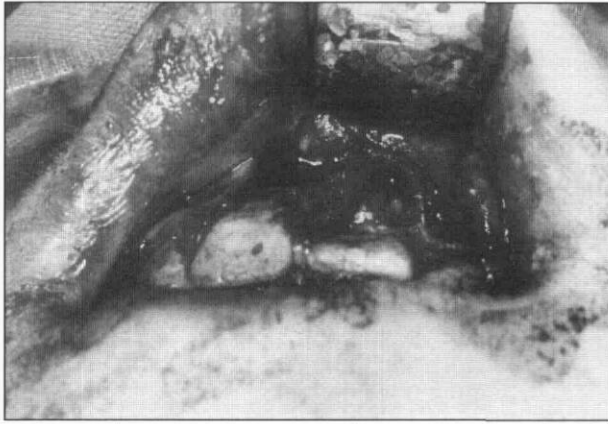


Fig 5. View of the maxillary left permanent central incisor showing the degree of bone dehiscence after surgical removal of the supernumerary tooth.

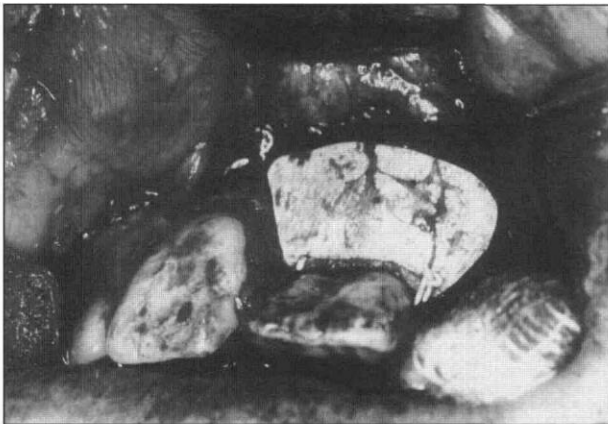


Fig 6. Maxillary left permanent central incisor with a patch of Gore-Tex Teflon membrane covering the bony defect over the root.

shaped to cover the residual bony socket's lateral edges. This was sutured in place using Gore-Tex sutures (Fig 6). The flap was replaced over the membrane and sutured with 4-0 black silk sutures. Postoperative pain was controlled with oral paracetamol and recovery was uneventful. The silk sutures were removed after one week. A flap was raised to enable the membrane to be removed after 6 weeks. Granulation tissue filling the bony defect was clearly evident (Fig 7).

Four weeks after surgery, the maxillary central incisors suffered trauma in a playground accident. Both teeth showed normal color and mobility, and were vital to cold and electric pulp testing. Radiographs revealed no abnormalities. Followup has been at 3-month intervals to check the periodontal healing and to evaluate the condition of the traumatized teeth. At the present time, 30 months after surgery, there is a very narrow 4-mm pocket with 3 mm of periodontal attachment loss. Crevice depths around the remainder of the tooth are 2 mm with no associated attachment loss. There has been 7 mm of attachment gain in the original 10-mm defect. The color of the tooth remains accept-

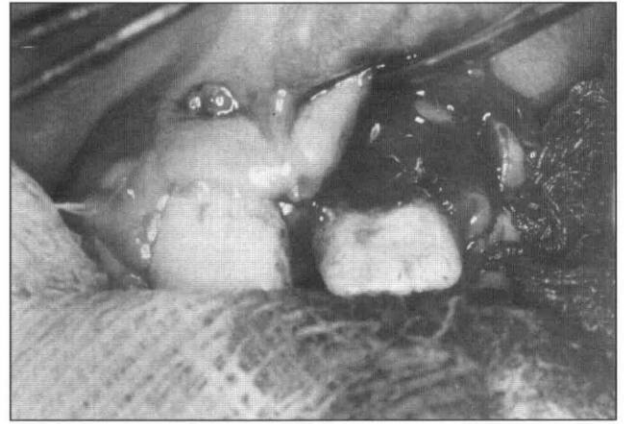


Fig 7. Appearance of the dehiscence area over the maxillary left permanent central incisor when the flap was raised after 6 weeks to allow removal of the membrane.

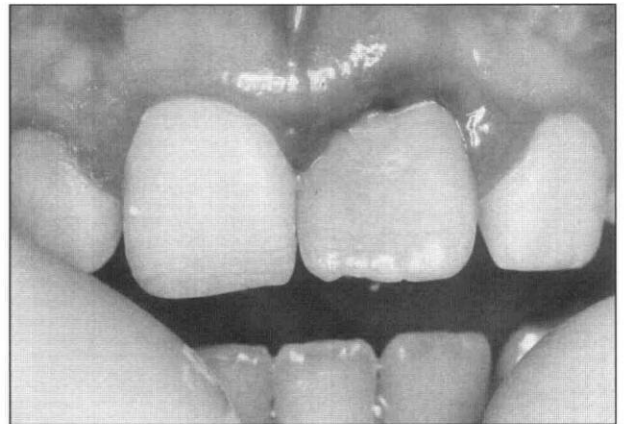


Fig 8. Appearance of maxillary left permanent central incisor 18 months after the surgical removal of a labially fused supernumerary tooth and the repair of the bony dehiscence using guided tissue regeneration.

able but its vitality is in question as it does not respond to cold testing (Fig 8). Nevertheless the root apex has shown continued closure (Fig 9), and there are no other abnormal signs or symptoms. The tooth is now monitored at 6-month intervals.

Discussion

Managing this case presented several treatment dilemmas, the first being the surgical removal. Because the roots of the teeth were not surrounded by bone (as in past reports of laterally fused teeth), it was not possible to carry out a two-stage procedure to achieve periodontal healing.^{5,14} Surgery was uncomplicated but resulted in a labial bony dehiscence. In the past this would have been expected to heal with a long junctional epithelium and without the reformation of labial bone. It was also important to preserve an acceptable band of labially attached gingiva.

A guided tissue regeneration technique provided the greatest likelihood of regenerating normal tissues and attachment. This technique has been successful in treating bone loss from periodontal disease¹⁵ and for

ridge augmentation.¹⁶ It is not possible to state unequivocally that regeneration of a new periodontal attachment has occurred, but other reports indicate that this is likely,¹⁷ and 7 mm of attachment has been gained 30 months after surgery.

The second dilemma was the timing of the procedure. Some authors advocate early removal to prevent orthodontic problems and more complicated surgery,^{1,18} while others suggest waiting until root development of the permanent incisors is complete to prevent damage to nerve or blood supplies.¹⁹

In this case, surgery was delayed 9 months from initial presentation to maximize the success of endodontic therapy if required. Had the teeth shared a common canal near the apex, endodontic treatment (including any necessary surgery) would have been included in the management. With the favorable bony healing, future endodontic therapy should present no problems if a surgical approach is required, since the tooth has demonstrated continued root closure while its vitality remains under review.

This case demonstrates the application of guided tissue regeneration principles during surgery in the developing dentition. The long-term survival of the maxillary left central incisor was compromised periodontally and esthetically because of the presence of a long bony dehiscence associated with the labially fused supernumerary tooth. Healing has been successful so far and if problems develop, the alveolar bone will not have been compromised and will allow several treatment options.

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Fig 9. Radiographic appearance of maxillary left permanent central incisor 18 months after surgical removal of a labially fused supernumerary tooth showing continued root growth and apex closure.

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