

Spontaneous Alveolar Bone Growth In Ankylosed, Infra-Occluded Teeth After Elective Decoronation - A Clinical Case-Series

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Introduction

Following an avulsion injury anterior teeth are often re-implanted back into the socket. If the extra-oral time has been greater than an hour, ankylosis and replacement resorption of the root dentine often takes place. In adolescents where growth is still not complete this results in infra-occlusion of the tooth and localised arrest of alveolar bone growth. This results in a significant prosthodontic challenge in terms of trying to replace the tooth, once the patient has stopped growing, with a fixed restoration that is aesthetically in harmony with the surrounding dentition in terms of the dento-gingival complex.

The aim of this case series is to present three cases in which infra-occluded maxillary central incisors were treated with elective decoronation to promote vertical alveolar bone development whilst preserving bone to allow replacement of the tooth with a dental implant in the correct 3D position and result in an aesthetically acceptable outcome.

Case Description

Case 1: 17 year old male suffered avulsion of his UR1 at the age of 13. Following replantation, the tooth was discoloured, infra-occluded with compromised aesthetics.

Case 2: 16 year old male with traumatic luxation to UR1 which maintained a position labial and apical compared to the remaining anterior dentition. UR1 had avulsed and not replanted. Attempts at distraction using orthodontic forces to correct the vertical bone deficiency had failed. Aesthetic challenge owing to missing centrals and space constraints.

Case 3: 17 year old male suffered avulsion of UR1 at the age of 11. Following replantation the tooth became infraoccluded due to ankylosis. Again, attempts at distraction using orthodontic forces to correct the vertical bone deficiency had failed.

Case 1

Case 2

Case 3

PRE - DECORONATION



Varying degree of infraocclusion after trauma

Coronal segment decoronated up to the level of CEJ and root buried after primary closure

POST - DECORONATION



Vertical alveolar growth noted after decoronation

IMPLANT SURGERY



Root remnants were removed at the time of surgery

Implant placement with horizontal bone augmentation

Crown lengthening was also done on UR2 in this case to convert it into a central incisor

Implant placement with horizontal bone augmentation

POST RESTORATION



Definitive restoration

Provisional restoration at UR1 & UR2 restored as a UR1

Definitive restoration

Decoronation Technique

Based on a modification of the technique described by Malmgren et al, 1984

- Minimal flap elevated buccal and lingual to ankylosed tooth
- Crown of the tooth removed leaving no enamel
- Root is left at the level or just below the bone crest
- The pulp or existing root filling is fully removed with endodontic files
- Bleeding induced within canal to encourage internal replacement resorption
- Socket seal achieved using a free gingival graft from palate or porcine collagen matrix (Mucograft®).
- Once the patients reached skeletal maturity, dental implants were placed with simultaneous guided bone regeneration (GBR) using deproteinised bovine bone and porcine collagen membrane.
- The implants were restored after 8 weeks of submerged healing.

Changes In The Dento-Gingival Complex

Discrepancy in gingival zenith between ankylosed tooth and adjacent central incisor	CASE 1	CASE 2	CASE 3
Pre-decoronation	3mm	8mm	5mm
Post-decoronation and pre-implant surgery	0mm	3mm	1mm
Post restoration	0mm	0mm	0mm

Discussion

- Ankylosis or replacement resorption replaces the tooth with bone to allow bone volume to be maintained
- In adolescent patients ankylosis can arrest vertical bone growth
- Extraction at this age results in extensive horizontal & vertical bone loss
- Extraction of ankylosed teeth in older patients results in significant alveolar trauma
- Decoronation allows the tooth to be replaced by replacement resorption whilst preserving horizontal volume and allowing vertical bone growth
- The cases presented illustrate the improvement in soft and hard tissue following decoronation and implant placement
- All cases showed vertical bone apposition coronal to the retained root
- As well as clinical advantages decoronation is cost effective as none of the cases presented required invasive staged or vertical augmentation procedures
- The success of decoronation encourages re-implantation of avulsed teeth where the extra-oral time has been greater than one hour and the risk of ankylosis is high

References

- Malmgren B, Cvek M, Lundberg M, Frykholm A. Surgical treatment of ankylosed and infra-positioned replanted incisors in adolescents. Scand J Dent Res 1984;92:391-9.
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