Commentary: External root resorption

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Root resorption continues to be one of the most exasperating and least understood of the clinical problems in orthodontics. Why, in the treatment of apparently similar cases, treated in the same manner, do we see considerable variation in the extent and distribution of root resorption? Mechanical factors which have been considered are the types of force system applied to produce tipping, bodily movement, intrusion or extrusion, the magnitude of forces and/or movements applied, and the time period over which these forces were applied either continuously or intermittently. Tongue and thumb habits have been considered, as have systemic factors.

This article is a valuable addition to the literature. It describes in detail the external root resorption on each surface of each root of all teeth from the canines to the third molars. Presumably the jackscrew and magnetic appliance generate similar force systems (although unequal in magnitude) to produce facial bodily movement. The description of the magnetic appliance was not clear in this regard. It is also unclear what the authors mean by "jiggling." Are these the jiggling forces of occlusion? The jackscrew appliance, once deactivated and tied, would be static.

The comments on differential secondary cementum repair were interesting. It is difficult to understand why the areas of significant resorption did not repair to any extent while the areas of minimal resorption did. Surely one area of resorbed dentine is similar to another area of resorbed dentine? Perhaps timing is important to this question as the monkeys were sacrificed in each case after a particular movement cycle followed by 4 months retention and then 2 months relapse. Would the observed repair be different after 8 months relapse?

Author's response

The questions raised by Dr. Wainwright hit the issue of external root resorption (ERR) exactly at the core of the problem: what measures can be taken to prevent ERR and how can the reparative process, subsequent to ERR assault, be enhanced? Unfortunately (or, perhaps, fortunately), the clinician does not possess the diagnostic tools to assess circumferential ERR, especially with respect to the most affected buccal root surface. Thus, with all its restrictions, inferences must be drawn directly from animal modalities.

This study strongly suggests that the clinician, when treating the adult patient with severe maxillary width deficiency and with non-patent mid-palatal suture, consider the use of a presurgical procedure[1,2] (e.g. osteotomy) prior to rapid palatal expansion (RPE) treatment. A one-step RPE treatment will cause an excessive compression of the buccal roots against the extremely dense buccal cortical plates with the consequences presented in the paper. In addition, each practitioner should reevaluate the scientific merit behind treatment philosophies which recommend approximation of roots against the cortical plate as an anchorage procedure.[3]

The findings of this study should also encourage the application of fixed retention devices — and discourage the use of removable mechanics — immediately subsequent to RPE treatment. Such a procedure will obviate the hazard of jiggling. Jiggling, according to Webster's New World Dictionary, is a succession of quick, slight

jerks. In the broad dental context, jiggling is associated with occlusal trauma.[4] Orthodontically, however, jiggling might be linked to any interrupted force system, particularly alternating, applied counteracting forces. Most likely, the predisposition of abundant osteoclasts (odontoclasts) on the buccal root surface following RPE treatment bear the hazard of initiating a boost in ERR response on the palatal root surface during jiggling movements.

As to the question of diverse cementum repair response, we would like to refer the reader to our paper, in press, on the histological results of this study in which we thoroughly address this issue.

References

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