Evaluation of Histologic Changes of Human Dental Pulp Following Orthodontic Extrusive and Intrusive Forces

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Abstract

Statement of Problem: Understanding the effects of orthodontic force on the pulp is of particular interest, especially because altered pulpal respiration rate, secondary dentin formation, internal root resorption, and even pulpal necrosis have all been associated with orthodontic treatment.

Purpose: The aim of this study was to evaluate and compare the effects of orthodontic extrusive and intrusive forces on the histologic changes of the human dental pulp after 3 days and 3 weeks.

Materials and Method: In this study, 52 sound upper first premolars from 26 patients, scheduled for extraction for orthodontic reasons, were selected. The patients were divided randomly into 2 groups (3 days and 3 weeks). In each group, 10 teeth received orthodontic extrusive forces, 10 teeth underwent intrusive forces and 6 teeth served as controls. Histologic changes were evaluated and the data were statistically evaluated by nonparametric tests.

Results: Vacuolization and disruption of the odontoblastic layer showed statistically significant differences between the control and either of the experimental groups in each test period. Furthermore, fibrous tissue formation in the extrusive group was significantly higher than the control group in the 3-week period. There was no significant difference between 3-day and 3-week intervals in each experimental group, except that fibrosis in the extrusive group was significantly increased after 3 weeks of force application. Comparison between extrusive and intrusive groups revealed no statistical significance in each test period.

Conclusion: The results indicate that if orthodontic forces are applied in the optimal range and are not more intense than the physiological limit of tissue tolerance, irreversible injuries to the pulp can be prevented.

Key words: Histology, Pulp, Extrusive, Intrusive