

Dental pulp during orthodontic tooth movement: immunohistochemical study

Giuseppina Cutroneo¹, Cecilia Spoto², Elena Filippini², Angela Militi², Marco Matarese², Giovanna Vermiglio², Michele Runci Anastasi², Antonio Centofanti²

¹ Department of Clinical and Experimental Medicine, University of Messina, Messina, Italia

² Department of Biomedical and Dental Sciences and Morphofunctional Imaging, University of Messina, Messina, Italia

Dental pulp is formed by connective tissue and it is localized in cavity of tooth. In the dental pulp is verified all defensive processes so as in all connective tissues. This tissue is continuously exposed to mechanical stresses during the phases of orthodontic therapy [1]. The progression of the inflammatory process in human pulp fibroblasts apparently depends on stimulation by neuropeptides and production of inflammatory cytokines. A recent report described apoptosis in dental pulp tissues of rats undergoing orthodontic treatment [2]. The literature shows conflicting results for correlation of pulpal changes incident to orthodontic force. Some reports suggested permanent damage to pulpal tissue from orthodontic force, but others claimed no significant long-lasting effects on the pulp [2]. However tissue reactions incident to orthodontic tooth movement depend mainly on the pattern of stress-strain distribution in the paradental tissue. In recent years, the alterations in pulpal vasculature and blood flow in response to orthodontic force have gained much attention. The clinical impact of these studies was to determine whether any alterations in pulpal tissue could jeopardize the long-term vitality of the teeth. In this study we analyzed *in vivo* human samples of dental pulp of 18 subjects, scheduled for orthodontic treatment at the Department of Dentistry of Messina University. The premolars were subjected to a buccally directed tipping force (50 g) with Nickel Titanium closed coil spring (American Orthodontics). On dental pulp samples, after extraction of the premolars, were monitored by analysis of the expression of different proteins that compose it and by analysis of Vascular Endothelial Growth Factor (VEGF). We have demonstrated an initial decrease in blood flow at 7 days, followed by an increase in blood flow at 28 days.

References

- [1] Ariffin et al. (2011) Cellular and Molecular Changes in Orthodontic Tooth Movement. *ScientificWorldJournal* 11:1788-1803.
- [2] Krishanan et al. (2006) Cellular, molecular, and tissue-level reactions to orthodontic force. *Am J Orthod Dentofacial Orthop* 129:1-32.

Key words

Dental pulp, VEGF, orthodontic force.