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The effects of artificial saliva and topical fluoride treatments on the degradation of the elastic properties of orthodontic chains

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ABSTRACT

The effect of artificial saliva and topical fluoride treatments on the force relaxation and change in force delivery by three brands of elastomeric chains over a 4 week period was studied. The effect of storage in air and in the different test media on the distraction to achieve forces of 150g and 300g was determined for the chains. The effect of the test media on load relaxation of the chains was also examined.

Elastomeric chains exhibit good elastic behavior when distracted to an initial force of less than 300g. When forces exceeded 300g, permanent deformation occurred and the force delivery was less predictable. Exposure to artificial saliva and topical fluoride affected the elastic properties of the elastomeric chains and increased the distraction required to deliver both the 150g and 300g force. The increase in distraction for a force of 150g, however, was relatively small and probably insignificant in the clinical setting. The distraction required to produce 300g was significantly larger and appeared to be clinically significant. Pre-stretching the elastomeric chains by 100% of their initial length was not found to be advantageous in terms of the load relaxation behavior. There was less load relaxation found in chains that were immersed in distilled water and Acidulated Phosphate Fluoride than in chains exposed only to air.

KEY WORDS: Elastomeric chains, Elastic properties, Load relaxation, Fluoride, Artificial saliva.