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Original article

# Biochemical and clinical comparisons of segmental maxillary posterior tooth distal movement between two different force magnitudes

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## Summary

**Background/objectives:** Maxillary tooth distal movement is a treatment option for Class II malocclusion. This prospective clinical study (split-mouth design) was aimed to compare chondroitin sulphate (CS) levels in gingival crevicular fluid (GCF), the rates of tooth movement, and patient pain and discomfort during segmental maxillary posterior tooth distal movement using either 120 or 180 g of retraction force.

**Materials and methods:** Twenty patients (6 males and 14 females; aged 18.85 ± 4.38 years) with Class II malocclusion were recruited. The force magnitudes were controlled at 120 or 180 g, randomly assigned to either the right or left five-tooth segments. Gingival crevicular fluid samples were collected with Periopaper® strips. Competitive ELISA with monoclonal antibody was used to measure CS levels in GCF. The rates of segmental maxillary posterior tooth distal movement, and the amount of pain and discomfort were evaluated.

**Results:** The median CS levels during the segmental distal movement period were significantly greater than those before the segmental distal movement period ($P < 0.05$). At each 1-week period during segmental distal movement, the differences between the median CS levels induced by the two different force magnitudes were not significantly different. The rates of segmental distal movement induced by the two different force magnitudes were not significantly different. The mean visual analog scale scores for pain and discomfort with 180 g of retraction force was significantly greater than that with 120 g ($P < 0.05$).

**Conclusions:** One hundred and twenty grams of retraction force was sufficient to cause segmental distal movement, as indicated by biochemically assessed bone remodeling activity and a similar rate of tooth movement to that caused by 180 g of retraction force; it also produced less patient pain and discomfort.

**Trial Registration:** The study has been registered as TCTR20170728001.