# *Commentary:* Short-term force

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Orthodontic tooth movement results from the application of mechanical forces to the crowns of teeth. Movement will occur under different force conditions, such as heavy or light, continuous or intermittent. The identity of an optimal orthodontic force remains elusive, however, despite emphatic statements in the literature since the turn of the century. Orthodontists wish to move teeth effectively, with maximal control of the direction and rate of movement. To this end, fixed appliances are used widely, facilitating the constant application of force to teeth, to cause their movement from undesirable to desirable positions. This method is considered state-of-the-art, and a large industry has evolved around the production of various gadgets that facilitate the constant application of force to teeth. Everything in this industry is geared toward the application of force to teeth for many hours every day, if not for each moment of the day.

The present article questions the above dogma. Following experiments by Rubin, Lanyon, and their associates on avian ulnae in vivo, the authors applied forces to rat maxillary molars for 1 hour, 1 day and 14 days and observed that while constant forces (14 days) caused the molars to move a certain distance mesially, the 1 hour force moved the teeth 75% of that distance. This finding is potentially of great importance. It implies that teeth can be moved orthodontically by forces that last short periods, such as 1 hour in 2 weeks, or perhaps shorter, if the principle of Rubin et al. can indeed be extrapolated to the alveolar bone, periodontal ligament and orthodontic tooth movement. If the biological reactions of the avian ulna and the murine paradental tissue are indeed similar, then a door has been opened for a method to move teeth with forces of very short duration, which probably would not necessitate orthodontic braces as we know them.

The authors, however, report only on the clinical finding of tooth movement long after the cessation of the applied force; they do not provide any explanation based on histological or any other examination of the involved tissues. In the absence of any tissue evaluation, any explanation can be only featured as a speculation, leaving many unanswered questions: is there evidence of strain memory in the alveolar bone or, particularly, in the periodontal ligament? Might occlusal forces be detrimental to short-duration orthodontic forces? To eliminate the latter from consideration as independent variables, the investigators extracted the mandibular molars prior to the onset of force application to the maxillary teeth. It would, however, be interesting to determine whether teeth would continue to move in the presence of occulsal forces.

This article, despite its limited scope, particularly its lack of investigation into the mechanism behind the clinical observation, offers a report on a finding that might revolutionize clinical orthodontics. If teeth can be moved efficiently after being subjected to mechanical forces of very short duration, then dental braces, at least as we know them today, may become obsolete in the near future.

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