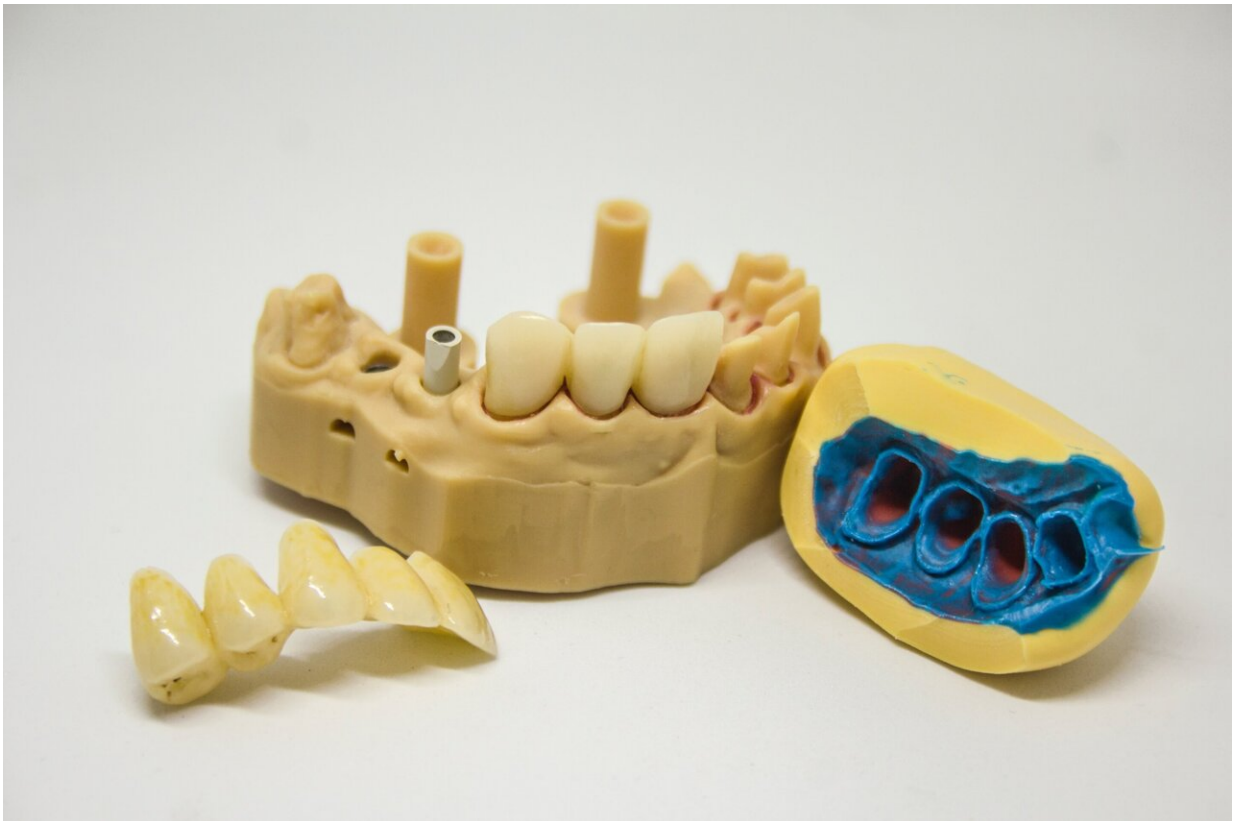


Finite element analysis of orthodontic relapse in different maxillary arch form

November 15 2021



Credit: Unsplash/CC0 Public Domain

Orthodontic relapse is fairly common; however, the mechanisms between relapse and the dental arch form remain unclear. The purpose of the study described in a new article in the *BIO Integration* journal was

to establish three-dimensional (3D) finite element models of different dental arch forms after orthodontic treatment and to analyze the states of different arches applied with various sagittal forces.

By calculating the equations of different dental [arch](#) forms and combining them with a full maxillary arch (14 teeth), 3D finite element models of square, oval, and tapered dental arches were established; they were designed to be subjected to anterior lingual, posterior mesial, and combined forces, respectively.

The von Mises stress and displacement of [teeth](#) under different forces were calculated for each loading scenario. Under the different forcing scenarios, all incisors had irregularity trends, and the inclination and intrusion of the canines were increased, and the premolars had a tendency to buccal or lingual crown tipping or even intrusion in this study. The tapered arch was the most stable and had the smallest displacement and von Mises stress, followed by the ovoid arch; the most unstable arch was the square arch.

To achieve a stable orthodontic effect, a tapered or ovoid arch, rather than a square arch, should be chosen as the final outcome of treatment.

More information: Yuanyuan Li, MD et al, Finite Element Analysis of Orthodontic Relapse in Different Maxillary Arch Form, *BIO Integration* (2021). [DOI: 10.15212/bioi-2021-0012](https://doi.org/10.15212/bioi-2021-0012)

Provided by Compuscript Ltd

Citation: Finite element analysis of orthodontic relapse in different maxillary arch form (2021, November 15) retrieved 27 April 2024 from <https://medicalxpress.com/news/2021-11-finite-element-analysis-orthodontic-relapse.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.