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Force systems from an ideal arch — large deflection considerations

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ABSTRACT

A sophisticated mathematical simulation is presented which allows for the consideration of large activations in orthodontic appliances and their effect upon the resulting force systems which are delivered to teeth. Effects of bracket/wire interaction are studied using this new tool.

Previous studies of force systems from an ideal arch were redone with the new analysis in which the wire was either rigidly restrained or free to slide. The restraint of the wire produced large mesio-distal forces and increased the magnitude of the moments on each bracket. If the wire is free to slide, both large deflection and small deflection solutions give similar results. The relative force system M_1/M_2 fundamentally held true with large deflections and restraint; however, some differences were noted. The significance of allowing wire to slide in the bracket is discussed.

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