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## Displacement and stress distribution in the temporomandibular joint during clenching

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### ABSTRACT

The aim of this study was to analyze biomechanical reactions in the mandible and TMJ during clenching under various restraint conditions. A three-dimensional finite element model of the mandible, including the TMJ, was created for test purposes. The results were as follows: (1) Under any restraint conditions, displacement was greatest on the surface of the condyle and less on the articular disc and the surface of the glenoid fossa, in that order. Resultant stresses followed the same trend. (2) Displacement and stress were greatest when the lower central incisor was restrained and attenuated as the posterior teeth were restrained. Because the biomechanical reaction of the TMJ during clenching was greatest when the lower central incisor was restrained, premature contact of these teeth may be one of the factors involved in the initiation of temporomandibular arthrosis.

**KEY WORDS:** Stress analysis, Temporomandibular joint, Clenching, Finite element analysis.

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