Finite element stress analysis of four Mini-implants in the mandibular interforaminal region with different cantilever extensions

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Abstract

Aim of the study: to evaluate the stress patterns induced in bone surrounding mini-implants in mandibular overdenture with different cantilever distal extension bases using three dimensional finite element analysis.

Materials and methods: Mini-implant retained overdenture prosthesis were simulated on the computer software with three different cantilever extensions (6,12 and 18 mm) of the overdenture base to evaluate the effect of cantilever distal extensions on the pattern of stress distribution in bone surrounding mini-implants.

Results: on vertical and oblique loading application the highest Von Misses stresses were noticed with 18 mm distal cantilever extension and the least Von Misses stresses were noticed with 6 mm distal cantilever extension. The stresses induced around the neck of the posterior mini-implants were higher than stresses induced around the neck of the anterior ones.

Conclusion: Decreasing the cantilever extension may reduce the stresses induced in the mini-implants. The most distant abutment in cantilever prosthesis may be subjected to the highest stresses.

Key words: Mini-implant, Finite element analysis, stress analysis, Cantilever

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