

A Finite Element Stress Analysis of the Bone around Implant following Cervical Bone Resorption

Eun-yeong Park *, Eun-su Jeong, Cheong-hui Lee, Gwang-heon Cho
(Kyungpook National University)

To analyze the distributions of stresses in the bone around the standard implant (3.75mm x 10mm, 3i Co., USA) due to the vertical occlusal load, it was axisymmetrically modelled 4 different models for finite element stress analysis - 0.0 mm, 0.6 mm, 1.1 mm, and 1.7 mm bone resorption in the cervical area of the implant.

After applied 50 N vertical occlusal force to models respectively, the 4 models were analyzed.

The results obtained were followings ;

- In the model I (0.0 mm bone resorption in cervical area of implant) and II (0.6 mm bone resorption in cervical area of implant), highest stresses (5 MPa) were concentrated in cervical area of implant, and in the model III (1.1 mm bone resorption in cervical area of implant), highest stress (3.5 MPa) was concentrated in cervical area of implant, and in the model IV (1.7 mm bone resorption in cervical area of implant), highest stress (2.5 MPa) was concentrated in alveolar bone crest. The peak stress in cervical bone of implant was decreased following bone resorption.

- In all 4 models, the stress was low in the bone around implant except cervical area of implant irrelevant to the degree of bone resorption.

- The location of stress peak moved from the first bone/implant contact to the alveolar crest following bone resorption in cervical area of implant.