Effect of dental implant offset on stress distribution pattern. Finite Element Analysis.

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Purpose: A three-dimensional finite element analysis was conducted to evaluate and to compare the stress distribution around two prosthesis-implant systems, in which implants were arranged in either a straight-line or an offset configuration.

Results: In both systems, the major stress occurred for vertical load respectively on mesial and on distal neck area of the first and third implants: 6.304 MPa (VM) on the first implant for Straight System and 6.173 MPa (VM) on the third for Angled System. The peak stress occurred for the minimum principal stress (S3) on the neck of the first implant for both systems at the level of -8.835 MPa for the Straight System and -8.511 MPa for the Angled System.

Conclusion: In this analysis, the Angled System, with an intra-bone offset, did not induce a stress concentration in any point around the implants that was different from the Straight System. The stress distribution was very similar on both systems as well.