Maxillary "All-On-Four" treatment using zygomatic implants. A mechanical analysis

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Objective. Zygomatic implants may be used for dental rehabilita-tion in atrophic maxillae. The aim of this study was to establish experimentally the areas of stress distribution using 2 kinds of All-On-Four" maxillary procedures. Study design. The best position to insert the implants was selected using polyurethane craniomaxillary models and surgical guides were made. Group 1 was designed with two posterior zygomatic implants and two conventional anterior implants, and group 2 with two posterior zygomatic implants and two anterior zygomatic implants. A titanium bar was built to link the 4 implants in both groups. Photoelastic replicas of these models were made and the implants were inserted using the surgical guides. An Instrom 4411 testing machine was used to perform a unilateral compressive loading at the level of the right first molar until 2 mm of displace- ment was obtained. Results. Group 1 showed a high strain concentration in the right lateral orbital region at the level of the apex of the zygomatic implant. Less strain was noticed at the apical levels of the conventional implants in the anterior sector and of the contralateral zygomatic implant. Group 2 showed high strains in the lateral inferior orbital area. The load was low in the alveolar bone sector. Discussion. Zygomatic bone and paranasal structures are loaded at high levels when zygomatic implants are used to stabilize a full maxillary prosthodontic rehabilitation on 4 implants. The use of 4 zygomatic implants loads the alveolar bone to a lower extent and seems better suited from a mechanical point of view than the use of 2 zygomatic implants.

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Mechanical

Stress

Zygomas

adverse effects

biomechanics

devices

human

Jaw, Edentulous

materials testing

maxilla

mechanical stress

procedures

prosthesis design

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tooth prosthesis

zygoma

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Dental Implantation, Endosseous

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Dental Prosthesis, Implant-Supported

Humans

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Materials Testing

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