A Multicenter 12-month Evaluation of Single-tooth Implants Restored 3 Weeks after 1-stage Surgery

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Products:
Fixture ST

Purpose: This 3-year prospective study set out to document the survival of Astra Tech Fixture ST placed in the anterior maxilla, and subject to a rapid loading protocol.

Material and Methods Patients were recruited when requiring replacement of one or two teeth in the anterior maxilla. All patients presented with bone volume that would allow an implant longer than 11 mm to be placed. Patients were excluded on the grounds of unstable dental disease, parafunction, occlusal instability, smoking or low bone density. A diagnostic work-up with mounted study models and tomographs was completed for each case.

At time of implant surgery a single-tooth implant (Astra Tech, Fixture ST) was placed according to manufacturer's protocol to achieve good primary fixation. A healing abutment was then secured using finger pressure so as to effect a transmucosal healing. After a 3-week period, the healing abutment was removed and a final abutment secured, again with finger pressure, to ensure that the restorative margin was 1 mm below the mucosal margin. A direct temporary crown was fabricated at the chairside using Protemp and was cemented with Temp Bond. A baseline long-cone radiograph was taken, along with an assessment of implant mobility, papilla index, presence or absence of inflammation, presence or absence of plaque, and width of keratinized tissue.

Eight weeks after surgery the temporary crown was removed and a final impression taken for the subsequent fabrication and cementation (glass ionomer) of the definitive ceramic, or ceramo-metal crown. At this time the abutment screw was tightened to 20 Ncm. Data was collected at 6 months and 1, 2 and 3 years post insertion of the temporary crown. In addition radiographic follow-up allowed the assessment of peri-implant radiolucencies, as well as the marginal bone changes with respect to an established reference point on the implant.

Results 57 implants were placed in 51 patients, however 4 patients were subsequently found to be smoking and were excluded. For the remaining 53 implants, the majority of surgical sites presented with type 2 or 3 bone quality and class A or B bone volume. 70% of implants were longer than 13 mm and 83% were inserted in the central or lateral incisor positions. Of these implants one was diagnosed as a failure at time of temporary crown fabrication and another at 8 weeks, when the master impression was due, yielding a survival rate of 96.2%. At the 1-year recall there was minimal evidence of peri-implant mucosal inflammation (3.6%), with a net gain in papilla length of 0.61 mm.

Radiographic follow-up revealed a 0.59 mm change in marginal bone levels, which appeared to stabilize after 9 weeks, with 70% recording a bone loss of less than 1 mm.

No complications were recorded with respect to abutment screw loosening. Some prosthetic complications were recorded with respect to crown de-cementation and crown fracture. One case of peri-implant mucositis recovered uneventfully, when treated with antibiotics.

Discussion A survival rate of 96.2% is comparable with other single-tooth studies utilizing a standard protocol for unloaded healing. In addition tissue response was favorable, with a healthy maintenance of marginal bone and filling out of interdental papillae, aiding a good esthetic result. Implant design and the conical implant-abutment connection have been cited as important factors in the maintenance of these tissues, and also contribute to a stable connection, highlighted by an absence of abutment screw loosening. In conclusion this study demonstrates that in the presence of good primary stability, single-tooth implants can be subject to a rapid loading protocol, yielding an efficacious and predictable result.

