ABSTRACT

Aim: the aim of this prospective multicenter study was to evaluate treatment outcomes of mandibular overdentures supported by 4 one-piece unsplinted implants placed and loaded immediately, investigating survival and success rate of the implants, marginal bone loss and maintenance complications.

Materials and Methods: 96 one-piece DLMF implants (TixOs Nano OvdR, Leader-Novaxa, Milan, Italy) were inserted in the edentulous mandible of 24 patients in 4 different clinical centers. Four implants were placed in each edentulous mandible. Immediately after implant placement, a mandibular overdenture was connected to the implants. At the 1-year scheduled follow-up examination, clinical, radiographic and prosthetic parameters were assessed. Success criteria included: absence of pain, sensitivity, suppuration, implant mobility, absence of continuous peri-implant radiolucency, distance between the implant shoulder and the first visible bone contact (DIB) <1.5 mm.

Results: after 12 months of loading, the overall implant survival rate was 98.9%, with one implant loss. Among the surviving implants (95), 4 did not fulfill the success criteria, giving an implant-crown success of 95.8%. The mean DIB was 0.28 mm (± 0.30).

Discussion and Conclusions: based on these results, the immediate loading of 4 unsplinted DLMF implants by means of ball attachment supported mandibular overdentures seem to represent a safe and successful procedure.

INTRODUCTION

Edentulous patients with a severely resorbed mandible have often experience problems with conventional dentures, such as insufficient stability and retention during masticatory function. An implant overdenture provides stability of the prosthesis. The aim of the present 1-year prospective multicenter study was to evaluate treatment outcomes of mandibular overdentures supported by 4 one-piece unsplinted DLMF implants placed and loaded immediately, investigating implant survival rate, implant success, marginal bone loss and maintenance complications.

MATERIALS AND METHODS

A total of 24 patients with a complete mandibular edentulism were enrolled in 4 different clinical centers. Panoramic radiographs and computed tomography (CT) scans were undertaken. Four one-piece DLMF implants (TixOs Nano OvdR, Leader-Novaxa, Milan, Italy), with a roughness surface, were placed in each edentulous mandible for a total of 96 implants inserted. The implants were immediately loaded with provisional restoration and after two weeks, the definitive prosthesis was delivered. At the 1-year of functional loading the evaluation of implant survival and implant success was performed according to the following clinical and radiographic parameters: absence of pain, sensitivity, suppuration, implant mobility, absence of continuous peri-implant radiolucency; distance between the implant shoulder and the first visible bone contact (DIB) <1.5 mm. Prosthetic complications were evaluated, such as the need for reactivation of retentive caps, substitution/replacement of the matrix cap or acrylic resin or tooth (denture) fractures.

RESULTS

Implant Survival

The overall implant survival rate was 98.9%, with 95 implants in function. This failure of one implant was attributed to lack of osseointegration, without clinical signs of peri-implant infection.

Implant success

91 out of 95 implants (95.8%) were classified in the implant success group. Two of these implants (2.1%) had a history of exudation, with some sensitivity on function. Two additional implants (2.1%) had a DIB between 2-4 mm, associated with deep periodontal probing. The overall radiographic evaluation of the implants revealed a mean distance from the implant shoulder to the first crestal bone to implant contact (DIB) of 0.28 mm (± 0.30) at the 1-year examination.

Prosthetic maintenance

The most common maintenance need was the replacement of the retentive caps in the denture base, because of inadequate retention. Ten of the patients (41.6%) required the substitution of the retentive caps to their overdentures. These repairs averaged around an hour of dental chair time. Reline of 2 dentures was required (8.3%). Repairs classified as “other” included those needed as a result of cracked or fractured dentures and loose or lost denture teeth (4.1%).

<table>
<thead>
<tr>
<th>N° of patients</th>
<th>Overall incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement of caps</td>
<td>10</td>
</tr>
<tr>
<td>Reline</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

Table. Prosthetic maintenance.

DISCUSSION AND CONCLUSION

Today, immediate loading of mandibular implant overdentures using four splinted implants is a scientifically and clinically validated protocol, and several studies have concluded that overall implant success had not been adversely affected by immediate loading. Based on these results and within the limits of this study, the immediate loading of 4 unsplinted DLMF implants by means of ball attachment supported mandibular overdentures seem to represent a safe and successful procedure, with excellent 1-year survival (98.9%) and success rates (95.8%). No detrimental effects on marginal bone level were evidenced after 1-year of functional loading. The most common maintenance need was replacement of the retentive caps in the denture base, because of inadequate retention.