Osseointegration Foundation Charity Overdenture Program Study

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This investigation has been stimulated by the Osseointegration Foundation, working in conjunction with the Zest Anchors implant company. There are three basic valuable activities that emerge from a professional foundation, which were reflected in this case study. They include disseminating information to practitioners, to persuade young clinicians to become research investigators, and to reach out to patients in need of treatment who cannot afford it without a charitable opportunity. Int J Periodontics Restorative Dent 2020;40:279–283. doi: 10.11607/prd.4531

Several implant dentists and patients in both university and private office settings have participated in this charity program. The aim of the study was to focus on implant retention of ill-fitting mandibular dentures, and thus provide an important, positive psychological impact along with an improved food-mastication ability. The study included patients who had a preexisting mandibular denture that could be altered after delivery of implants or who required the fabrication of a new denture. The Zest Company donated surgical kits, including implants and accessory materials, for each patient. There also was a donation made to the foundation to cover unexpected expenses.

Numerous publications have demonstrated that narrow-diameter implants, also referred to as mini implants of small diameter, can enjoy reasonably high success rates.
Narrow-diameter implants can be appropriate in thin ridges where patients are not candidates for regenerative procedures.\textsuperscript{1-4} The reduced cost of narrow-diameter implants may also make them a viable treatment option for patients who are financially compromised. Two or more implants in the anterior mandible have been demonstrated to enhance the quality of life for patients with loose or ill-fitting dentures.

Although the implant-retained mandibular overdenture has become a standard of care, there are patients who lack the financial means to benefit from this treatment modality. In partnering with the Osseointegration Foundation, the authors were able to provide this therapy to 30 patients who otherwise would likely remain untreated. In addition to the philanthropic benefits of this collaboration, the cases were documented to communicate the role that Zest’s Locator Overdenture Implants (LODIs) could play in treatment.

Materials and Methods

Zest’s LODI was used to provide implant retention of mandibular overdentures. This two-piece implant design features a Locator abutment that can be attached to the implant via a threaded connection. The implants were available in diameters of 2.4 mm and 2.9 mm, in lengths of 10, 12, and 14 mm, and with abutment cuff heights of 2.5 mm or 4 mm. The implants featured a resorbable blast media–treated surface, tapered geometry, and progressive thread design for primary stability. The implant was designed as a permanent implant for tissue-supported, implant-retained overdentures and had clearance from the U.S. Food & Drug Administration.

Each investigator was provided with a LODI Premium Surgical Kit that included all of the required instrumentation to place the implants in this study. There were sufficient drills of varying diameter such that the clinician could adjust the drilling protocol to the bone volume and quality that was encountered. The kit also included drill stops should the investigator prefer to place implants via a flapless or mini-flap approach where full visualization of the depth markings are difficult. A torque-limiting ratchet wrench allowed the clinician to assess the insertion torque for each implant placed. The Locator attachments could be picked up in the mandibular denture via a chair-side technique, or an abutment-level impression could be taken if preferred by the clinician, and the attachments processed by a dental laboratory using standard prosthodontic techniques.

Standard exclusion criteria for implant patients were applied for heavy smokers (> 10 cigarettes per day), patients with parafunctional habits (eg, excessive bruxism), patients with uncontrolled systemic disorders (eg, uncontrolled diabetes), patients on osteoporotic medications that could affect bone healing, patients with insufficient bone to place the implants, patients with mental disorders that could impact compliance with follow-up requirements, etc.

This was not a blinded, controlled study but rather a prospective documentation of a multicenter case series. The specific step-by-step protocol for placement of the LODI implants was detailed in the Technique Manual (L-8019-TM) provided to each investigator. Some guidelines and precautions were included: (1) If using the 2.9-mm–diameter implants, there was sufficient clinical experience to confirm that two implants in the anterior mandible can be a predictable solution. If patient anatomy required reducing the size to 2.4-mm implants, it was recommended to use four implants in the mandible. (2) If certain criteria were met (eg, minimum implant insertion torque, well-fitting denture not in need of reline), there is sufficient clinical experience to suggest that these implants could be immediately restored. If the attachments have been picked up by the clinician or processed by the dental laboratory correctly, the overdenture should be tissue-supported, resulting in minimal loading to the dental implants. It is ultimately at the discretion of the clinician to determine whether to provide immediate restoration of the mandible. If not restored immediately, the denture should be relieved and soft-relined to minimize load transfer to the implants during the healing process.

The clinician may have chosen to leave the patient in black processing inserts after restoration. The black processing insert does not pivot, and some clinicians prefer to use it while the patient adjusts to insertion and removal of their overdenture. The black processing insert could be replaced with a Nylon Male insert of...
appropriate retention during one of the follow-up visits.

Results

Thirty edentulous patients received dental implants to support removable overdentures. Ten patients were 50 to 60 years old, 10 were between 61 to 70 years of age, 8 patients were over 70 years old, one patient was between the ages of 41 and 50 years old, and another patient was 32 years old. Eighty-one implants were placed, of which 2 mobilized and were considered failures with initial healing, providing a success rate of 97%. The insertion torque for most implants was between 23 and 30 Ncm with a type II bone quality. Fourteen patients received immediate alteration of an existing mandibular denture and 16 had a delayed new denture. Fifty-four of the implants demonstrated 2 mm or less of crestal bone loss, 17 lost 3 mm, and 10 lost between 4 and 5 mm of support. All remaining implants were stable at both the 1- and 2-year evaluation visits (Figs 1 to 3).

Every patient recognized appreciation for their improved phonetic and esthetic outcomes and considered the results to be most favorable.5–9 The sponsors of this project considered this to be a successful effort to improve the lifestyles of 30 patients.
**Fig 2** (a) Radiographic, (b) buccal, and (c) occlusal views of the mandibular right and left implants in place at 2.5 years. (d) The new dentures in place.

**Fig 3** (a) Five placed implants. (b) Clinical view at 2 years.
Conclusions

This investigation resulted in improving the lifestyle of 30 patients who would not have otherwise received treatment due to financial limitations. The authors have therefore concluded that the project was most successful.

Acknowledgments

The authors declare no conflicts of interest.

References


