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DR. GORDON J. CHRISTENSEN
Effective Denture Stabilization in an Atrophic Mandible

Denture stabilization with implants can make a dramatic difference in the lives of patients, providing benefits in function, aesthetics, and overall health. However, for many denture wearers, traditional implant treatment may be unattainable for any number of reasons. A primary factor is the expense of the procedure. Inadequate bone can be a challenge for many patients, requiring extensive bone grafting prior to conventional implant placement. Finally, as patients age, many simply do not wish to devote a great deal of time to a surgical process that can go on for months and requires a considerable amount of recovery time.

As a general practitioner who has an extensive history placing conventional dental implants, I am an enthusiastic advocate for the traditional procedure. However, I have seen many patients in my practice for whom it is impractical or simply out of reach financially. The last few years have seen a trend developing for a different kind of implant treatment that may provide an excellent solution for some denture patients involving mini-dental implants (MDIs) (also known as small-diameter implants).

MDIs were initially introduced as transitional devices to retain a denture while a conventional implant was allowed to osseointegrate. What many practitioners found was that if a patient did not return to have these transitional implants removed within 3 to 6 months, they became very difficult to remove, as they too had integrated into the bone. In 2004, the FDA-approved MDI System (3M ESPE) (formerly IMTEC Sendax MDI implants) for long-term use.

In recent years, this treatment has been increasingly discussed by the implantology community, primarily as a solution for patients who are not ideal candidates for conventional implants or who cannot afford this option. In my practice, it has been particularly appropriate for patients with atrophic mandibles who do not wish to go through the expense or time of conventional implant treatment with significant bone grafting.

The official protocol for placing MDIs is taught to general practitioners as well as specialists in one-day seminars, making it a relatively simple technique to learn. A minimum of 3 implants are recommended for mandibular denture stabilization. The sites for each implant are marked on the patient's tissue, and a 1.5 mm pilot drill is used to create entry points. The mini-implants are inserted into the pilot holes and then advanced with a progression of a finger driver, winged thum wrench, and a ratchet. As a clinician with significant experience in implant placement, I use a more advanced procedure utilizing a flap in cases if appropriate, but a basic case can typically be performed without this step.

After placement of the implants, the patient's denture is then fitted with housings that snap onto the o-ring heads of the implants. This allows the denture to be tissue-supported but implant retained, which offers the capability of immediate loading. Reported success rates for MDIs have ranged from 91% to 97.4%.5-5 The most comprehensive study tracked 2,500 implants and reported a 5-year survival rate of 94.2%.6 As the body of research for this treatment grows larger, additional evidence can be expected to support the suitability of MDIs in the edentulous mandible.

The following case report demonstrates a typical implant procedure, highlighting the difference it can make in a patient's life and confidence.

**CASE REPORT**

**Diagnosis and Treatment Planning**

A 55-year-old female presented to the office stating that "my bottom teeth fall out." The patient's maxilla had been edentulous for 8 years, and the mandible for 5 years. She wore a full upper denture and a mandibular denture and stated that she was in the habit of applying and reapplying denture adhesive 8 to 10 times per day.

While the patient's primary concern was the lack of stability in the mandible, she also had a minor concern with sores from the dentures. The patient found her condition very mentally debilitating, as she was a relatively young and healthy woman. She stated that she felt that her mouth looked like an 80-year-old's, and she didn't have confidence speaking or smiling because of the lack of stability of her lower denture. Significant items revealed by her medical history were: the patient was a smoker and she was also being treated for hypertension. Panoramic (Figure 1) and cephalometric radiographs were taken, as well as pre-treatment photos. The diagnosis established was an atrophic mandible, after which diagnostic models were made of the existing dentures, and edentulous impressions were taken of the upper and lower arches.

The patient returned for a consultation appointment to discuss the available treatment options. A number of choices were presented and discussed with regard to time, expense, and complications. One treatment option was the creation of a new complete set of maxillary and mandibular dentures. For additional stability, 4 MDIs could be placed in the mandible to stabilize the lower denture. Alternatively, bone grafting could be performed and conventional implants placed in the mandible. After discussing the options, the patient elected to move forward with MDI treatment. The steps of the treatment were discussed in continued on page 132.
Effective Denture Stabilization... continued from page 130

greater detail and the patient was also informed of the risks of implant treat-
ment prior to signing a consent form.

Treatment Begins: Surgical Appointment
At the surgical appointment, anesthesia was administered via bilateral blocks
with 2% lignocaine (1:200,000 epineph-
rine). A surgical guide was placed and
osteotomy sites were indicated through
the template by inserting an endodontic
explorer through the soft tissue to create
bleeding points. A No. 2 round bur was
utilized to penetrate the soft tissue down
to the crest of bone (Figure 2). A conser-
Cative mucoperiosteal flap was created
with a 15° Bard Parker blade and reflect-
ed to expose the crest (Figure 3). A 1.1
mm drill was then utilized to create four
5 mm osteotomies, into which the 1.5
mm by 10 mm collared o-ball MDIs were
placed. Prior to implant placement, four
1.1 mm drills ligated with dental floss
were placed into the osteotomies to eval-
uate parallelism (Figure 4). The implants
were advanced into the bone by using a
finger driver and thumb wrench. The
area was then secured with 4.0 vicryl
sutures. The underside of the patient's
transitional mandibular denture was
relined with COE SOFT reline material
(Grady America) and then relieved to
accommodate the heads of the implants,
and the patient was dismissed.

Post-surgical Impression and
Prosthetic Appointments
Two weeks later, the patient returned
for suture removal and for impressions
(Figure 5). MDIs impression copings
were placed on the o-ball implants and
luted together with light-cured flow-
able resin (Heliomolar [Ivoclar Viva-
dent]) (Figures 6 and 7), and impressions
were captured with a vinyl polysilox-
ane impression material (Impregum 3M
ESPE). Secondary impressions were also
taken for fabrication of the maxillary
complete denture.

Two weeks following the impres-
sion appointment, a maxillary-
mandibular relationship was taken
with a unibase (wax rim), and a shade
and mold were selected. A denture try-in
with the teeth (Blue Line Teeth [Ivoclar Vivadent]) set up in wax (Figure
8) was completed one week following
this appointment. One week later, the
final maxillary and mandibular pros-
theses were delivered (Figures 9 to 12).

Post-delivery Appointments
Follow-up appointments have shown
the patient to be thrilled with the treatment. She stat-
ed that it had made a huge
change in her life and had
given her much more confi-
dence. After experiencing
the level of stability made
possible with the MDIs in the
mandible, the patient is now
considering a similar procedure for the maxilla. Despite the fact that stability
in the maxilla was not an ini-
tial concern for the patient,
she now feels that if it can be made bet-
ter, she would like to pursue treatment to improve her confidence even more.

DISCUSSION
This case demonstrates 2 variances
from the standard protocol for MDI
placement, in that a flap was per-
formed and the implants were not
immediately loaded. As a dentist who has
been traditionally trained in implant place-
ment, I personally prefer to create flaps in cases with atrophic mandibles. While not strictly re-
quired for MDI placement, a flap
allows the clinician greater certainty
of placement in the middle of the crest.
In cases where more bone is available, a flapless procedure is quite straightforward.

Because the patient in this case was
relatively young, the decision was
made to not immediately load the
implants in order to allow the bone
and soft tissue to mature more fully.
This simply provides more assurance
that the implant will survive in the
long-term with a young patient in
robust health. Immediate loading is
often very suitable for older patients,
due to the fact that their occlusal forces
may not be as strong, and they are seek-
ing an immediate quality of life
improvement rather than an implant
that will survive for 10 years or more.
However, in this case, it was deter-
mined to allow for a longer period of
bone maturation prior to engaging the
retentive feature of the overdenture.

Fixation of the implant at placement
is an essential requirement for success of
the MDI system, as well as with con-
ventionally endosseous implants.

It is critical that the clinician utilize
an array of different clinical findings and
technology to assist in
ment decisions.

Conclusion
Incorporating the
Medizintechnik
required in the MDI
implant system to
establish another quas-
A immediate load ca-
In this case the clinical result occurred in a parallel 1.5 mm of
the osteotomies plant treatment finding can occur due to
reasons, including
osteoconductive
ibility via
the implant in the
frame for an ideal out-
ence of anatomic
al and a potential anterior
terior maxillary
ate implant place-
fore, it is very cor-
denture to the clinician's

to the clinician's pos-
 implants on the
urosurgical
ally, this is successfully max-
versatility of the MDI+
ring hours.
This prosthetic abutment design allows for a fl-
feature within a-

The been seen on a
tof the past,
monstrating excep-
mm o-ring
exhibit crestal

Most importantly, it feels that the im-
overdenture is a hu

CONCLUSIONS
Many dentists have
Implants

Dr. Jackson graduated from Utica College cum laude with a BS degree in biology. He received his DDS degree at State University of NY at Buffalo, School of Dental Medicine. Dr. Jackson completed postgraduate training at St. Luke’s Memorial Hospital Center’s general practice residency program and completed his formal oral implantology training at New York University School of Dentistry. Dr. Jackson is a Diplomate of the American Board of Oral Implantology/Implant Dentistry, a Fellow of the American Academy of Implant Dentistry (AADM), and a member of the ADA. Currently, he serves as Trustee for the AAD, and is past president of the Northeast District of the AAD, as well as, past president of the Oneida-Herkimer County Dental Society. Dr. Jackson is an attending staff dentist for Faxton-St. Luke’s Healthcare general practice residency program. He has also joined the faculty of the Las Vegas Maxicourse in Oral Implantology. He has presented oral implantology lectures internationally and has published peer reviewed articles in various journals on the topic of implant dentistry. Dr. Jackson is treasurer for the AAD’s Research Foundation and a scientific reviewer for the Journal of Oral Implantology. He can be reached via email at tjacksonimplants@aol.com.

Disclosure: Dr. Jackson receives financial compensation from 3M ESPE for lecturing on MDI implants.

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