

Mini Dental Implants for Single-Crown Restorations

An efficient treatment option when space is limited

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Regular diameter endosseous dental implants (>3.0 mm in diameter) restored with a crown have become the treatment of choice for single missing teeth in most cases.¹⁻³ However, when replacing mandibular incisors and maxillary lateral incisors, or restoring locations where surrounding teeth may have migrated into edentulous areas, there is often inadequate space to place traditional implants without compromising the surrounding bone.

A solution in cases when there is less than 7 mm of interdental space is the placement of a small-diameter implant (<3.0 mm), also known as a mini dental implant (MDI). These one-piece implants have been successfully used for the long-term stabilization of both complete and partial dentures. They range in diameter from 1.8 to 2.9 mm and in length from 10 to 18 mm, and can have either an O-ball or tapered prosthetic abutment. Due to the excellent primary stability achieved by MDIs and the proliferation of CAD/CAM tools, it is now possible to complete the entire procedure in a single office appointment.

Case Presentation

The patient had his upper left first premolar extracted approximately 5 years ago. There was buccal bone resorption (Figure 1) and a distance of 7 mm between the canine and the second premolar (Figure 2). After evaluation and consultation, the patient elected to have an MDI inserted and restored immediately with a full-crown restoration.

At the placement appointment, the patient rinsed with chlorhexidine gluconate, and local infiltration anesthesia was administered. A 1.1-mm pilot drill at 1200 rpm was used to create a pilot hole. A 2.4-x-15-mm collared O-ball 3M™ ESPE™ MDI Mini Dental Implant (www.3mespe.com) was inserted and hand-screwed to achieve initial stability. A winged thumb wrench was then used to continue to insert the implant (Figure 3), and an adjustable torque wrench was used to verify that it was placed with at least 35 Ncm of force and was ready to be loaded.

An impression and shades were taken and sent to a nearby dental laboratory. An MDI lab analog was placed in the impression and poured in die stone. The laboratory technician created a reduction coping for the head of the O-ball to ensure a path of insertion for the crown. The resulting die was scanned with a CEREC®CAD/CAM system (Sirona, www.sirona.com) and a crown was milled using 3M™ ESPE™ Lava™ Ultimate Restorative block and customized with indirect lab staining. The reduction coping was then used to trim one side of the O-ball. The crown was seated on the O-ball and the fit, shade, and occlusion were confirmed.

The patient approved of the crown and the area was prepared for the final crown cementation. The area was isolated with a dry angle and cotton rolls, and a small piece of rubber dam (Figure 4) was placed over the O-ball and tucked around the implant collar. 3M™ ESPE™ Scotchbond™ Universal Adhesive was applied to the O-ball to enhance the bond strength of the cement. A thin layer of 3M™ ESPE™ RelyX™ Ultimate Adhesive Resin Cement was applied to the inside of the crown, which was then seated on the O-ball head. The crown was light cured for 3 seconds and excess cement was removed. After the cement had completely set, the area was re-evaluated to confirm the crown was slightly out of occlusion, which is preferred because there is no periodontal ligament compression as there is with the surrounding teeth. A final radiograph was taken (Figure 5), and the patient was given postoperative care instructions. The patient returned 1 week after the implant and crown were inserted to report that he had no discomfort and was pleased with his new tooth (Figure 6).

Conclusion

As this case illustrates, in areas where there is inadequate space for a regular diameter endosseous implant, a mini dental implant can be considered. Furthermore, in cases where the occlusal forces can be minimized, an immediate final or temporary crown can be placed, significantly shortening the traditional treatment process.

Disclosure

Dr. Erwood presents lectures on 3M ESPE Mini Dental Implants.

References

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Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6