

Application of Piezosurgical Techniques to Maxillary Sinus Grafting and Dental Implant Placement

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Piezosurgical techniques offer several significant advantages in the practice of Oral and Maxillofacial Surgery. Piezoelectric generators offer selectivity in cutting bone while sparing vital soft tissue structures. Precise, fine, well controlled procedures can be performed more accurately than with the more conventional rotary instrumentation commonly found in dentistry. Because of this precision, a lighter touch can be implemented allowing quicker healing and better hemostasis. The following case demonstrates the advantages of applying piezosurgery to a dental implant case.

A 69-year-old female patient presented with fractured tooth #14 referred by her general dentist. The tooth was determined to be non-restorable due to the extent and depth of tooth structure lost (figure 1) and extraction was planned. At the time of presentation, the patient shared an interest in a future restoration using a dental implant. A limited vertical bone height was noted at the site preoperatively. Atraumatic extraction was performed using an ultrasonic piezosurgical technique which allowed the sectioning of the three roots and removal of the tooth with minimal loss of bone. A synthetic bone graft substitute was placed and a resorbable barrier membrane was used (figure 2). The surgical site was carefully closed using PTFE suture. The post-operative course was uneventful.

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Figure 1



Figure 2

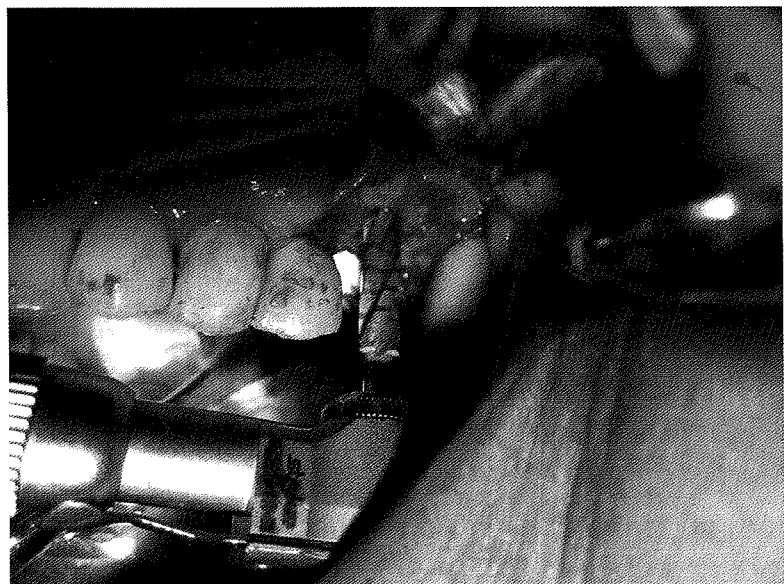


Figure 3

Piezosurgical Techniques

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Following a 4-5 month healing period, a radiographic exam demonstrated good bone density with adequate healing with compromised vertical bone height of 7mm, due to extensive pneumatization of the maxillary sinus.

A simultaneous dental implant placement with sinus graft was performed using a crestal ridge approach with the aid of a piezosurgical technique. The implant site was prepared to the final diameter using standard surgical protocol except that the osteotomy was made just 1-2 mm inferior to the sinus floor (figure 3), with the depth controlled using drill stops as needed (figure 4). The remaining bone was then selectively removed sparing the sinus lining using a piezosurgical tip (figure 5) with copious irrigation, the position of the sinus was verified using a blunt depth gauge (figure 6). A synthetic bone graft material was chosen, and was placed directly into the osteotomy site, the material gently condensed and the 4.1 x 10 mm dental implant was placed (figure 7). The implant was found to have excellent initial stability. The post-operative x-ray demonstrated elevation of the sinus membrane greater than 3 mm above the apex of the dental implant (figure 8). Implant healing and osseointegration was uneventful with 4 month post-operative x-ray demonstrating good osseous healing and good retention of the bone 3 mm superior to and surrounding the implant apex. An increase in the density of the newly formed bone was also noted (figure 9). The implant was restored without event.

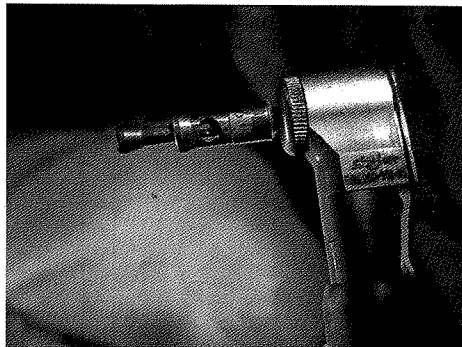


Figure 4

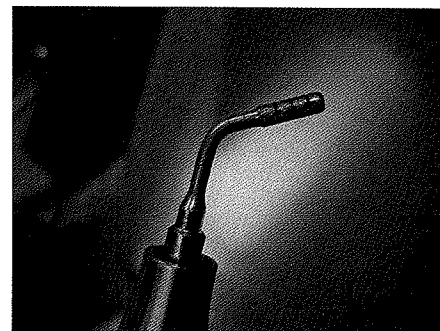


Figure 5

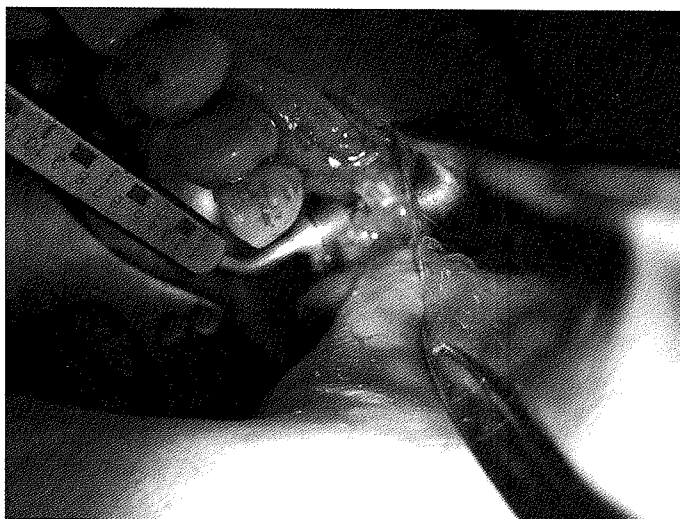


Figure 6



Figure 7

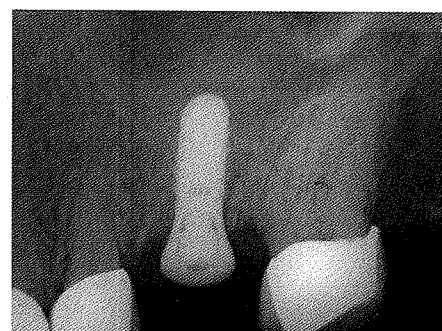


Figure 8

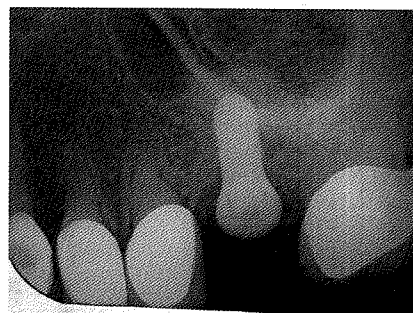


Figure 9