

Piezoelectric implant site preparation for simultaneous conventional and post-extraction implant placement

By Prof Mauro Labanca

INTRODUCTION

Achieving predictable implant stability while preserving the surrounding bone is a primary objective in implant dentistry. Piezoelectric surgery has become an increasingly valuable adjunct for implant site preparation, offering clinicians greater precision, improved tactile control and selective cutting of mineralised tissue while minimising trauma to adjacent soft tissues.

This clinical case demonstrates the use of the MT-Bone PIEZODRILL for implant site preparation in the anterior maxilla involving both a healed ridge and an immediate post-extraction socket. The procedure highlights how piezoelectric osteotomy can improve surgical precision while allowing clinicians to complete the final osteotomy using their preferred implant drilling system.

CLINICAL CASE

A patient presented for rehabilitation of the maxillary anterior region requiring implant placement at sites 1.2 and 2.2. Site 1.2 represented a healed edentulous ridge, while site 2.2 required immediate implant placement following tooth extraction.

Following flap elevation, the surgical field was exposed and the implant sites were identified before osteotomy preparation commenced (Fig 2).

IMPLANT SITE PREPARATION AT POSITION 1.2

Preparation of the implant bed at site 1.2 was initiated using the MT-Bone PIEZOSURGERY allowing controlled penetration into the cortical bone while maintaining the planned implant trajectory (Fig 2).

The piezoelectric device provided excellent tactile feedback throughout the osteotomy, enabling precise preparation with minimal trauma to the surrounding tissues.

Immediate implant site preparation at position 2.2

Following atraumatic extraction of tooth 2.2, attention shifted to the fresh extraction socket. The socket was first prepared to the desired depth before initiating piezoelectric osteotomy (Fig 3).



Fig 1: Clinical set-up showing the surgical field, instrumentation and piezoelectric surgical unit prior to implant site preparation



Fig 2: Initial osteotomy preparation at site 1.2 using the MT-Bone PIEZOSURGERY



Fig 3: Initial preparation of the extraction socket at site 2.2 following tooth removal using MT-Bone PIEZODRILL



Fig 4: Enlargement and refinement of the osteotomy using the MT-Bone PIEZODRILL to establish the planned implant trajectory



Fig 5: Implant insertion



Fig 6: Biomaterial placed into the post-extraction socket at site 2.2 before implant insertion to improve primary stability and support healing



Fig 7: Final implant placement demonstrating successful insertion at both sites following piezoelectric-assisted implant site preparation

The PIEZODRILL was then used to enlarge and refine the osteotomy, ensuring the correct depth, angulation and parallelism relative to the adjacent implant site (Fig 4). According to the clinician, the piezoelectric approach allows implant site preparation to be performed more efficiently while improving surgical safety and reducing patient trauma.

FINAL OSTEOTOMY PREPARATION

Although most of the site preparation was completed using the PIEZODRILL, the clinician elected to finish the osteotomy using the conventional drills from the selected implant system. This ensured that the final osteotomy geometry precisely matched the implant design while retaining the advantages of the initial piezoelectric preparation (Fig 5).

IMPLANT PLACEMENT

The implant at site 1.2 was inserted into the healed ridge with excellent primary stability.

At site 2.2, biomaterial was placed into the post-extraction socket before implant insertion to enhance primary stability and promote favourable apical healing (Fig 6). Both implants were subsequently placed in their planned positions with satisfactory stability measured using the Osstell ISQ (Fig 7).

CLINICAL CONSIDERATIONS

The MT-Bone PIEZODRILL combines the precision of piezoelectric surgery with a workflow that integrates seamlessly into conventional implant protocols. In this case, the system facilitated controlled osteotomy preparation in both healed and post-extraction sites while preserving surgical accuracy.

The clinician's approach of combining piezoelectric preparation with conventional implant drills enables practitioners to benefit from precise initial osteotomy guidance while maintaining compatibility with their preferred implant system. This hybrid workflow may contribute to improved accuracy, enhanced primary stability and predictable clinical outcomes in implant rehabilitation. [DA](#)



Video of the clinical case

All images courtesy of Mauro Labanca.



ABOUT THE AUTHOR

Mauro Labanca MD, DDS, FICD

In 1986, Mauro Labanca obtained his medical degree from the University of Milan, where he also qualified in dentistry and general surgery. Since 1992, he has practised oral surgery and implantology at his private dental practice in central Milan, Italy. He is an international speaker and key opinion leader for numerous leading dental companies.

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Labanca is co-author of "Atlas Anatomy and Surgery in Dentistry" (Elsevier-Masson), "Clinical Neurochemical and Experimental Aspects of Orofacial Pain in Dentistry" and the DVD "The Dental Anatomy and Surgery in Daily Practice". He is also the author of the DVD "Sutures in Dentistry: Materials and Knotting Techniques", several scientific articles published in peer-reviewed journals, and "Clinical and Anatomical Guide to Oral Surgery" (Quintessence, 2020).

Since 2001, he has directed the "Anatomical Surgery with Cadaver Lab" course at the Institute of Anatomy at the University of Vienna, Austria, and the Institute of Anatomy at the University of Brescia, Italy, with 28 editions conducted to date. The course was selected by the European Association for Osseointegration (EAO) as an Expert Clinician Course in 2023.

In 2006, he founded and became director of the first master's programme in marketing and communications in medicine and private dentistry at IULM University (Libera Università di Lingue e Comunicazione) in Milan, Italy. From 2007 to 2013, he served as consultant professor of oral surgery in the department of dentistry at Vita-Salute San Raffaele University, Milan, Italy. Since 2008, he has been consultant professor of anatomy in the department of medicine at the University of Brescia, Italy. In 2009, he co-founded the Italian Society for the Study of Orofacial Pain (SISDO), where he served as vice-president.