

Electrical Magnetic Mallet - A New innovation in Dental and Implant Practice

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Abstract

Magnetic Mallet is the most innovative surgical device able to improve working standards in sinus lift, split crest, dental and implant practice. Thanks to Magnetic Mallet the sinus lift and the split crest come out more defined and less invasive for the patient, while the surgeon can operate in an easier and faster way. Magnetic Mallet assures a higher comfort for both patient and surgeon. The use of magnetic mallet has provided us with some clinical advantages during the surgical procedure over the traditional method of osteotomy using hand mallet and chisel.

Keywords: Magnetic Mallet, Implant, Osteotome

Introduction

Electrical magnetic mallet is an innovative, unique and patented surgical device able to improve working

standards in dental and implant practice. With the magnetic mallet dental implant treatments are now more defined and less invasive for the patient, and the surgeon can operate in an easier and faster way. Plastic deformation is a structural phenomenon peculiar to the great majority of materials which is due to specific forces applied in fixed times. According to the applied forces and to its application time, molecular flowing can be improved in a better way.

Magnetic mallet is a device governed by preconceived forces implemented in optimal time. These forces are transmitted to the head of the instruments (bone expander). The instrument are firmly hooked up to the hand piece and the application time of the force is the best on to achieve the desired plastic deformation. In this way the use of magnetic mallet prevents the so-called

benign paroxysmal vertigo syndrome (BPVS), that is the post-operative symptom of vertiginous nature.

Mechanism of action

The electrical magnetic mallet is a magneto-dynamical instrument assembled into a hand piece energized by a power control device, delivering forces by timing of application (Fig. 1).

The bone expanders were attached to the hand piece that pushes a shock wave on their tip. The magnetic wave and the subsequent shock wave were calibrated regarding the timing of application of the force, and induced axial and radial movements applied on the tip of the bone expander, with a fast force of 90 daN/8 μ s.

The magnetic mallet imparted to osteotomes a longitudinal movement along the central axis, moving up and down toward the pilot bone hole, providing a driving mechanism of longitudinal movements. Such mechanical sequence of osteotomes progressively condensed the internal bone wall of the initial hole radially outward with respect to the central axis to create high-density bone tissue along a substantial portion of the length of implant site preparation.

The magnetic mallet device had a better bone condensing efficiency, especially in softer bone because of the magnetic wave and the subsequent shock wave; induced axial and radial movements applied on the tip of the osteotome with a fast energy prevent patient distress.¹



Fig 1: Magnetic Mallet with instruments

Innovative features and Advantages of Magnetic Mallet

- It avoids that the applied forces influences the whole maxilla-cranial mass. No more problems of disease for the patient (Vertigo) caused by the displacement of the otolithes.
- It allows a more defined positioning and alignment of the bone expander.
- It allows better visibility during surgical treatment.
- It limits the bone milling.
- It allows a better access to the inner part of maxilla and to the mandible.
- It allows an easy insertion of the implants.
- The sinus lift and ridge expansion procedures with magnetic mallet are absolutely, barely invasive and barely traumatic to the patient.

Split crest and Implant placement

- Bone is a biological tissue that can be modeled and compacted toward the desired location and shape by use of osteotomes,² but this procedure requires the practitioner to be extremely aware of bone quality.³ When adequate quantities of dense bone are available, removing bone by drills is not a problem. But when the alveolar bone is soft or when the ridge has resorbed enough to compromise implant placement, the ability to

preserve and improve existing bone, it becomes mandatory.

Magnetic mallet take advantage of the fact that bone is viscoelastic,⁴ it can often be compressed and manipulated. Additionally, this technique generates no heat, an advantage because heat is a major detriment to Osseo-integration (Fig. 2).

In the posterior maxilla, magnetic mallet presents much more visibility than a rotating drill with irrigation stream.

Furthermore, its allow for greater tactile sensitivity, making them more appropriate than drills for probing⁵.

With magnetic mallet, type-IV bone can be changed into type-III, and type-III bone can generally be compacted to resemble type-II bone.^{6,7}

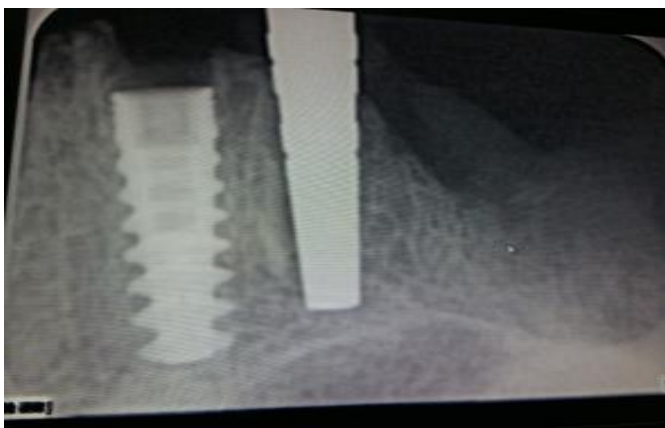


Fig 2: Split crest and implant placement using Electrical Magnetic Mallet.

Crown Removal with Magnetic mallet

The magnetic mallet can also be used as a crown remover with the optional hand piece. The operation is based on the principle that it generates calibrated impulses which act in the opposite direction to the surgical hand piece (Fig. 3). Thus obtaining an instrument that is able to deform and break up the fixing cement with the consequent loss of stability of the prosthesis which can then be removed. Clinical test have

shown that its efficacy is excellent both in removing bridges and crowns and on implants.



Fig 3: Crown removal with Magnetic Mallet

Discussion

Electrical magnetic mallets used for condensing bone procedure in edentulous molar and premolar maxillary regions. In spongy bone, osteotomes change the density of the bone around the osteotomy site for implantplacement.²

With a series of gradual widening tapered instruments, the trabecular bone is compressed laterally in order to improve the quality and density of the implant osteotomy. Lateral bone compression during site preparation can improve the quality of type-III bone to seem more like type-II bone, so that implants may also be placed, with good success, in type-IV bone compressed to type-III bone as can be found in the maxillary molar region, especially when the bone width and height are insufficient.

This surgical procedure is supported by data from several experimental studies in animals showing that insertion of implants by means of osteotomes resulted in faster and greater bone apposition compared with implants inserted in a conventional way. The results of that study revealed that the benefit of the osteotome technique is an increased bone-implant contact ratio in the early phase after the implant placement providing an

enhanced primary stability. Primary stability is an essential factor for Osseo-integration process because it increases the success rate of dental implants in type 4 bone.⁸ It has been claimed that implant placement by the osteotome technique not only improves primary stability but leads to accelerated bone healing compared with conventional implant placement in trabecular bone, as can be found, for example, in the human posterior maxilla.⁹ The use of magnetic mallet provided essential advantages both for operator and patient in comparison with hand mallet. During surgical procedure, magnetic mallet delivered a more precise control of osteotome of the entry direction (or directionality) of the tip into the bone. This is an important concept because bone is generally formed of parts with different density and that the expander tends to be deflected when it moves from a bone part with a specific density to another bone part with a different density. The handling of the device is very simple because the mechanical oscillations transmitted to the osteotome are transmitted without difficulties to the bone. Furthermore, this procedure improved the patient comfort avoiding BPPV.

Conclusion

The magnetic mallet device had a better bone condensing efficiency, especially in softer bone because of the magnetic wave and the subsequent shock wave; induced axial and radial movements applied on the tip of osteotome with a fast energy prevents patient distress. However, further clinical trials are mandatory to evaluate the efficiency of this new device for osteotome procedure, but these results encourage the development and continuation of this technique.

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