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RESEARCH ARTICLE

MAGNETIC MALLET: A STAIRWAY TO ATRAUMATIC EXTRACTION – A CASE REPORT

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ABSTRACT

Research and innovation in Oral Implantology is a never ending process. Introduction of Magnetic Mallet in Oral Surgery and Oral Implantology in the recent years has gained a lot of popularity in procedures like Atraumatic Extraction, Implant Osteotomy, Sinus Floor Elevation and Bone Condensation Technique. This is a unique instrument which gives the clinician freedom to visualise the field as it does not require Saline Irrigation while performing the procedures.

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INTRODUCTION

For Immediate Implant Placement, meticulous extraction of the Area of Interest(i.e., the tooth) is of utmost importance in the anterior region[1]. Buccal plate should always be maintained and preserved while extraction of the tooth as it prevents soft tissue recession and inturn provides primary stability[2]. Whenever we extract teeth especially in anterior esthetic zone, preservation of the buccal plate is the primary concern for successful placement of Immediate Implant[3]. Therefore, we always try to luxate the root stump and the grossly decayed tooth without causing excessive damage to the adjacent tissue and the underlying bone using delicate periotomes to preserve the bone. Also, in cases of fracture of the buccal plate we need to do bone augmentation along with Membrane Placement making the Immediate Implant a relatively longer procedure even for Socket-Shield Technique therefore, meticulous extraction is a must[4]. It can be concluded that the success of Immediate Implant depends a lot on how atraumatically the tooth has been extracted.

ABOUT MAGNETIC MALLET: Magnetic Mallet exploits magneto-dynamic technology in dental surgery. It was introduced by Dr Bonwill first in 1873. He introduced the magnet with the aim to increase the efficacy of gold fillings by mechanically hitting the fillings with mild intensity this process brought better precision in gold fillings[5]. Crespi R in 2012 was the first Clinician to use Magnetic Mallet in Implant Dentistry.

The machine is composed of a handpiece energized by a power control device, delivering forces by the timing of application. Different inserts could be attached to the handpiece, which pushes a shock wave on its tip according to the surgical procedure.

MODE OF ACTION: The Magnetic Mallet makes use of Electro-Magnetic waves produced by the handpiece which bring about radial and axial movements that are transmitted to the tip of the osteotome/periotome. The Electronically generated collision occurs between the two (i.e, the osteotome/periotome and the tooth surface).

CASE REPORT 1

A patient named Rajni reported to the OPD with a chief complaint of pain and inability to eat in the upper region of the jaw. On Intra-Oral Examination, it was observed that 12 was Carious and Grossly Decayed. Patient was advised IOPAR and OPG for the radiographic examination. After radiographic examination, patient was advised for extraction wrt 12 because Esthetic region was involved it was decided to do the extraction atraumatically with the help of Magnetic Mallet.
The Surgery was performed under Prophylactic Anti-biotic Coverage. The patient reported for the surgery, Local Anesthetic was administered and using Magnetic Mallet Atraumatic Extraction was performed wrt 12, 24. Care was taken that there was No Soft Tissue loss while performing the extraction. Osteotomy was performed, Implant site was prepared and ADIN System of Implants was placed

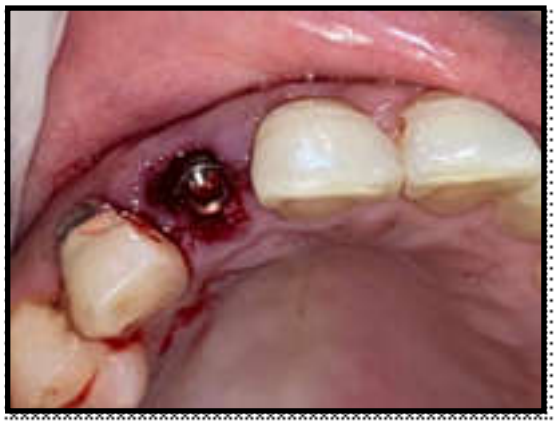
with sufficient Primary Stability of 45N and abutment was placed and Temporization was done. The Temporary was cemented Free of any Occlusal Contacts. Patient was asked after one week for Follow-Up and again after 12 weeks for Cementation of Final Prosthesis. Final Cementation of the prosthesis was done after 12 weeks.

PRE-OP INTRA-ORAL PHOTOGRAPH

PRE-OP OPG

ATRAUMATIC EXTRACTION AND PREPARED OSTEOTOMY SITE

IMPLANT PLACEMENT



CASE REPORT 2:

A patient named Janak Dulari reported to the OPD with a chief complaint of pain in the lower right back tooth region and missing tooth in the lower left back tooth region of the jaw. On Intra-Oral Examination, it was observed that 34, 44 were root stumps and patient was partially edentulous wrt 36, 46. Patient was advised for OPG for the radiographic examination. After radiographic examination, patient was advised for extraction wrt 34, 44 and Immediate Implant Placement done wrt 34, 36, 44, 46. The Surgery was performed under Prophylactic Anti-biotic Coverage. The patient reported for the surgery, Local Anesthetic was administered and using Magnetic Mallet Atraumatic Extraction was performed wrt 12, 24. Care was taken that there was No Soft Tissue loss while performing the extraction. Osteotomy was performed, Implant site was prepared and ADIN System of Implants was placed with sufficient Primary Stability of 45N and abutment was placed and Temporization was done. The Temporary was cemented Free of any Occlusal Contacts. Patient was asked after one week for Follow-Up and again after 12 weeks for Cementation of Final Prosthesis. Final Cementation of the prosthesis was done after 12 weeks.

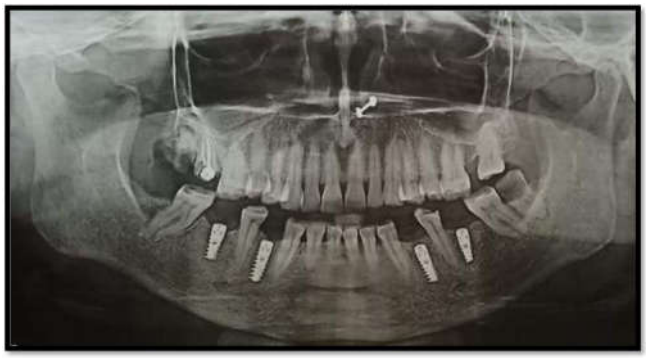
INTRA-ORAL PHOTOGRAPHS

PRE-OP OPG

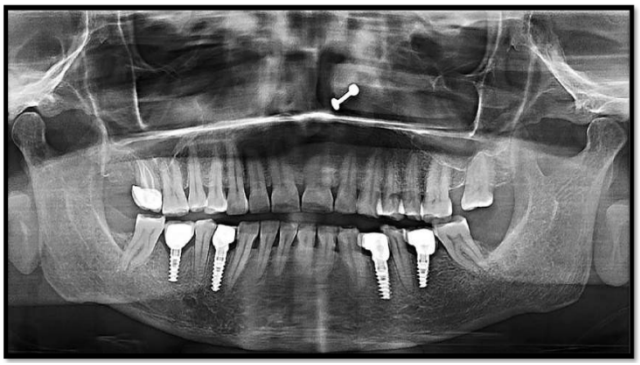
ABUTMENTS PLACED

PROSTHESIS TRIAL


POST-OP OPG



OPG POST-CEMENTATION



DISCUSSION

Rehabilitation of Single missing tooth in the anterior region is always very challenging because of various factors involved. It is very important to maintain the bone height and the bone width along with the soft tissue to achieve good esthetic result. Whenever an immediate implant is planned it becomes very important to perform completely atraumatic extraction in order to achieve the required aesthetics with minimal bone and soft tissue loss. The aim is to always provide the patient with FP1 prosthesis whenever it is possible. In cases, where we can't achieve FP1 prosthesis then we need to think of procedures like grafting both hard tissue and soft tissue depending on the amount of bone and soft tissue loss. Magnetic Mallet was introduced by Dr Bonwill in 1873 for increasing the efficacy of gold fillings later on it was modified to prepare osteotomies and expand bone which would also help in procedures like tooth and root extraction, impacted tooth removal, sinus lift procedure and removal of crown and bridge. Magnetic Mallet is magneto-dynamical handpiece with ergonomical design. It comprises of central control unit which provides force for mechanical blows. The current Magnetic mallet provides four different force adjustments 75, 90, 130 and 260 kP. It comes with a handpiece which can have replaceable tips as per the surgical requirements.

One of the biggest advantages of using this mallet is complete osteotomy can be performed with the same unit and a much controlled force when compared with conventional osteotomy. The magnetic mallet are much less invasive because the force to perform the osteotomy is 80-100µs when compared to the traditional mallet where the force required is 350-400µs. The procedure using traditional mallet is very traumatic for the patient when compared with magnetic mallet reducing the surgical time and improving the efficacy of the procedure. Also, when magnetic mallet is used no irrigation is required which reduces the chances of the surgical site getting infected or contaminated this also improves the visibility of the surgical site for the operator which further helps in improved placement of the implant. It also causes faster bone healing, the alveolar bone is only parted and drilled and not shaved preserving more bone at the osteotomy site. It leads to bone condensation which further improves the primary bone stability of the implant. No heat is produced as when we do normal drilling hence, necrosis of bone is much less or almost negligible. (Also, when we use Magnetic Mallet post-surgical complication such as pain and swelling is less because it is non-invasive and atraumatic). We observe good prognosis of implants in soft bone rather than hard bone because of condensation of D3 and D4 bone can be converted D2 bone providing much higher primary stability required for immediately loading the implants.

CONCLUSION

The ease to use the mallet for atraumatic extraction and preparing the osteotomy site makes it a very handy and usable device for immediate implant placement. It is fast, precise and causes minimal soft tissue loss, with efficient bone condensation providing adequate primary stability making it Novel Innovation in the field of Oral Implantology. Since it is a newer technique more clinical studies are required to validate the use of Magnetic Mallet in the field of Implantology[5]. Retrospective study of tooth extraction with or without using less traumatic surgical procedure like magnetic mallet showed that there was less volume loss and the result was significant when compared to normal and traumatic extraction[6]. Hence, this research showed that the magnetic dynamic technique generates better preservation of volume of the alveolar ridge and less loss of external contour of the gingiva.

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