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Removal Of Fractured Dental Implants: A Review Literature

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ABSTRACT

Concept Implants have been around for a very long time since the age of ancient civilizations. Even in modern times many physicians were unsuccessful in creating a functional and biocompatible implant system. It was Branemark in the 1960s who 1st developed and tested on humans the proper modern implant systems which were both functional and biocompatible, with a very low rate of failure. Yet implants are not without its own complications. Fracture of implants is a very common complication. Retrieval of fractured and retained implant body in the bone is in itself a very technique specific and complicated procedure. We shall delve deeper into the topic of their retrieval in this review literature.

KEYWORDS: Implant Fracture, Retrieval Of Dental Implant

INTRODUCTION

Implants have been a revolutionary mode of treatment in the world of restorative dentistry and has become a doorway to many new pathways to give better treatment to patients. The idea of dental implants is as ancient as civilization itself, dating back as early as 3000BC in the Egyptian civilization, where exfoliated teeth were reimplanted into the empty socket and splinted using gold wire or in 2000BC in the Chinese civilization where bamboo pegs were inserted into the socket. In the 18th century Shulman tried fabricating implants using gold but failed miserably. Many more researchers and physicians and surgeons came hereafter and tried but failed. It was only in 1950s, when an orthopedic surgeon Branemark accidentally discovered the high biocompatibility and integration of titanium and devised titanium implants which were then implanted and studied in humans in 1965 in the form of a 10-year study. It showed excellent results and has since become a gold standard in restorative and rehabilitative dentistry. Yet implants are not without their own disadvantages and complications. One such complication is that of the implant body fracture/breakage. This may be due to various reasons namely, excessive torque during placement, excessive biting force, unbalanced forces, metal fatigue. In this article we shall be delving deeper into ways to retrieve fractured of broken implant bodies.

DISCUSSION

The various symptoms associated with a broken/fractured implant are, loosening of super structure,pain, inflammation. After fracture, the super structure may or may not be completely dislodged. If the super structure is dislodged, the implant may get covered up by bone or soft tissue or both. Due to osseointegration, poor visibility, poor accessibility, it is quite difficult to successfully retrieve a broken implantwithout creating secondary complications.

The information about implant component fractures was divided into three types: screw fractures, abutment fractures, and fixture fractures. The management of fractures was classified as screw replacement, prosthesis refabrication, and fixture removal

In 1986, a clinical study was conducted by Fumitaka Takeshita, Yasuyuki Matsushita*et al* with 59 patients having implants and out of them 5 were fractured. All showed fracture at the neck. The implants were retrieved by first reflecting a soft tissue flap, then removing the bone wall above the implant, using a diamond bur and sufficient cooling by using saline, bone groove was then prepared using the same bur along the buccal surface of the implants, then they were successfully removed using an elevator. Upon sectioning and observing under a microscope, it was observed that there was considerable metal fatigue which led to fracture in just 5 years post placement[1]. This technique is the most commonly used technique for retrieval of fractured implants, but sometimes it may not be possible, due to thickness of overlying bone, retained segment being too small, or most importantly, since it is a blind procedure with limited visibility,etc.

With the advent of advanced imaging techniques, and hence imaging guided surgeries, retrieval of foreign materials like metal shrapnel's, bullets, etc has become much easier. This is similar in the case of removal of broken implant bodies. The Dental C-Arm is an irreplaceable piece in the arsenal of a surgeon for removing a retained fractured segment of the implant body. It is much alike the regular C-Arm used in Orthopedic surgeries, only that it is smaller, much more portable and causes much lesser radiation exposure. It is sometimes also known as mini-C-Arm and is a type of Fluoroscopic Imaging. In 2010, Sung-Soo Park, Hoon-Joo Yang*et al* did a clinical study on patients with fractured implants for their successful retrieval using a Dental C-Arm for guidance. The C-arm was connected to an X-ray generator and a computer. The maxillary and mandibulararchis curved, like a horseshoe, and, therefore, almost all maxillary andmandibular areas are within the visual scope of the dental mini-C-arm[2]. Pre-operative panoramic X-rays and CT scans were used as a means of surveying before the tart of the procedure. All surgeons were wearing leaded aprons during the procedure, in order to be shielded from the radiation. the X-ray generator wasobliquely positioned to the buccal surface of the jaw, namely fromthe upper-lateralside to lower-medial side, and the image sensorwas automatically positioned on the opposite side[2]. Anesthesia was induced locally, mucoperiosteal flap was raised, the C-arm was then activated. A blunt hemostat was then moved along the suspected long axis of the broken implant and its position and angulation relative to the implant could be seen in real time in the computer monitor. After the exact location was determined, bone was removed and precise bone guttering was done with a trephine bur and adequate irrigation with saline. Then the implant was successfully retrieved without any complication. In this method since there was image guidance involved, the surgeon was more confident, lesser amount of bone was needed to be removed, dental implants at a much deeper level could be easily retrieved and the procedure was much faster.

A newer approach to the removal of retained fractured implant is the use piezoelectric bone saws. This employs an angulated high frequency vibrating mini saw to remove the surrounding bone structure, and has an inbuilt system of constant irrigation. This method shows much lesser requirement of bone removal due to better ease of approach than a straight hand piece. It also shows in histological slides that there is much lesser chance of bone necrosis than using a straight handpiece and external irrigation. But one disadvantage is that it requires specialized equipment which proves to be quite costly.

After the removal of the fractured implant the empty implant site can then be a site for graft material placement with or without added growth factors like Platelet Rich Fibrin (PRF), Platelet Rich Plasma (PRP) or Platelet Rich Growth Factor (PRGF) in order to prevent bone loss. And to enable to it to be a possible site for implant placement in the future.

CONCLUSION

Although using of image guided surgery or piezoelectric instruments ensures lesser bone removal, give precise location, thus preventing other complications and the procedure was much faster, it does require specialized equipment which removes cost effectiveness from the equation, has radiation hazard and it technique sensitive. Thus, the conventional technique although inaccurate, is still a much more viable option until a better and cheaper technique is developed.

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