

# Atraumatic Extraction or A – Traumatic Extraction? Choice Is Yours

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## Introduction

Since the beginning of dentistry, dental extractions are the most frequently performed procedures<sup>1</sup>. However, the trauma caused inadvertently results in alveolar bone damage and soft tissue injury. An array of new techniques & instruments are in the foreplay to overcome the above hurdle. Instruments such as: periosteal, piezosurgery, Benex vertical extractor and physics forceps and many other have been specially designed to extract teeth atraumatically with minimum discomfort to patient. Given the increased demand on implantology, atraumatic extraction has come to be an essential step and the use of piezosurgery may reduce soft tissue injury in addition to saving the bony integrity of the socket.

Despite controversial beginnings, immediate implants are widely accepted and the available literature consistently cites high levels of success (ranging from 94 to 100% on average). The benefits of immediate implant include reduction of morbidity, reduction of alveolar bone resorption, preservation of gingival tissues, preservation of the papilla in the esthetic zone, and reduction of treatment cost and time (the healing phase is shorter in general and there is a reduction in the number of procedures). With the extraction socket as a guide, the surgeon can also more easily determine the appropriate parallelism and alignment relative to the adjacent and opposing residual dentition.<sup>2,3</sup>

Clinicians have stressed that tooth extraction prior to implant placement must be atraumatic; however, the method of achieving this has never been addressed in detail. Vigorously tearing the periodontal ligament (PDL) fibers leads to alteration of the bundle bone surrounding the socket, as well as blood vessel disruption. Any alternative approach to this severing action should be welcomed for it should reduce the trauma caused by extraction and faster socket healing.

The introduction of piezosurgery has added versatility in the field of periodontology & implant dentistry. This case report presents the reliability & efficacy of piezosurgery when performing atraumatic extraction followed by immediate implant placement.

## Piezosurgical Unit & Extraction Tips

The Piezotome®Cube (Acteon) was used in the present case. Six different tips (Figure 1) were available to adapt to the various clinical situations. First one is LC1, with a length of active part 9mm. It is to be inserted, along the periodontal ligament, between the root and the alveolar bone. LC2 allows access to the tight spaces between the root and the alveolar bone without risk of damaging cortical bone.

Contamination by touching the implant with instruments made of a dissimilar metal or by contact with soft tissue, cloth, or even surgical gloves was avoided. The implant (Osstem) of dimension 4.5 x 10.5mm was then pressed into the prepared site with 35 N torque with the mount on handpiece and finally aided by the insertion mount. Thus, implant placement was done with insertion tool attached to the implant head with handpiece mechanically and finally with torque controlled ratchet manually to snugly fit the implant. Implant that was placed was checked for stability by applying gentle pressure to determine if it could be depressed or rotated. Furthermore, primary implant stability was assessed with the torque-controlled ratchet. The cover screw, provided with the implant package, was then placed using the hex-driver using finger

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How to cite this Article: Datta A., Lamba A K., Faraz F., Tandon S., Aggarwal K., Mahima, Garg M., Atraumatic Extraction or A – Traumatic Extraction? Choice Is Yours HTAJOCD.2019; 12(2):31-32

pressure. At this point, the implant was confirmed to be immobile, which reaffirmed primary implant stability.

## Treatment Protocol

A 25 year old female reported to the Department of Periodontology with a chief complaint of trauma in the upper front tooth region. Radiographic evaluation revealed a horizontal root fracture at middle one third of 21. The patient's general and medical history was taken and was found non contributory. After clinical and radiographic examination, it was observed that there was no underlying pathology and tooth was unrestorable but was surrounded by healthy bone. Atraumatic extraction followed by immediate placement of implant was planned. The entire procedure was explained to the patient and written consent was obtained.

After administration of local anesthesia (Lignocaine with Adrenaline), patient was asked to perform presurgical mouthrinse with 0.2% chlorhexidine gluconate. LC2 tip was used to access the space between root and alveolar bone with a to and fro motion. The vibrating osteotomy blade tips were inserted beneath the gingival margin between the bone and the root surface. Also, maintaining the parallelism to the long axis of the tooth, the blade was moved in a sweeping fashion; proceeding in small increments of 2–4 mm towards the apex. The fractured segment was removed carefully. The LC1 tip was inserted up to the apex and the remaining root fragment was removed. The socket was debrided with curettes and thoroughly irrigated. An Implant (osstem) of dimension 4.5 × 15mm was placed. Primary stability was achieved by wrenching the implant into the bone beyond the apex of the socket, indigenously prepared DFDBA was packed between the implant and labial socket wall. The cover screw was placed and interrupted sutures were placed.

Postoperatively the patient was prescribed with ibuprofen 400mg(S.O.S), amoxicillin and clavulanic acid (625mg) twice daily along with metronidazole (400mg) thrice daily for 3 days.

Patient was advised to follow standard postoperative instructions, which included ice-pack, soft high nutrient diet, thorough rinsing with antiseptic mouthwash (chlorhexidine gluconate 0.2%). The patient was instructed to avoid sneezing, nose blowing, drinking with straws or other actions that might create high intranasal pressure or vacuum. On the fourteenth day sutures were removed and satisfactory healing was noted. Final prosthesis was delivered after 6 months.

## Discussion

Extraction methods used traditionally often results in post operative pain and damage to the hard and soft tissues surrounding the tooth<sup>4</sup>. These techniques either damage the interproximal bone by leveraging against it during tooth elevation or reshape the socket in the course of luxation with a forceps<sup>5</sup>. This leads to difficulty in maintaining the socket integrity and hard and soft tissue loss thus making future prosthetic replacement a challenging task for the clinician. Therefore, a crucial aspect to the success of an immediate

implant is preservation of the extraction socket and atraumatic extraction.

Piezosurgery has been used with great degree of success to limit the trauma to the dentoalveolar housing during tooth extraction. It provides ultrasonic frequency of 24–29? kHz, and microvibration amplitude between 60 and 200? mm/s. It allows precise cutting of bone with a clean, minimal bloody field and without soft tissue damage<sup>6,7</sup>.

The extraction tips were brought through the gingival sulcus into the space occupied by the PDL between the root and socket to cut the PDL fibers surrounding the tooth socket up to or greater than 10 mm. Thus, when the roots or teeth were mobilized after severing the most apical fibers, the coronal portion of the socket was not submitted to a violent “rip.” Therefore there was no buccal bone fracture or root fracture while extraction. Also, the bleeding was limited during extraction. This was not surprising since Blus et al previously reported that cutting the gingiva with a similar tip did not lead to bleeding as a result of temporary occlusion of the capillaries.<sup>9</sup>

A recent systematic review by Troedhan et al.<sup>9</sup> has revealed that piezotomes exerts a minimal thermal damage on the bone, enhanced healing, least bone destruction due superior depth-control and accurate osteotomy cuts as well as protection to the soft tissue.

Additionally, a meta-analysis by Al-Moraissi et al. showed that the occurrence of postoperative complications including pain, oedema, and trismus were greatly minimized with the piezoelectric surgery when compared to the conventional rotary instrument technique.<sup>10</sup> Moreover, the total numbers of analgesics consumed

are lesser with piezosurgery. The only disadvantage faced was the extended time of the piezoelectric surgery.

## Conclusion

In the modern era, the ultimate goal of treatment is shifting to minimally invasive treatment and minimum time period. The use of Piezosurgical Unit fulfills both the criteria and proves to be more efficient in atraumatic extraction thereby reducing the marginal bone loss, thus providing better bone preservation for subsequent tooth replacement.

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