Immediate Post-Extraction Implant Placement, Immediate Function and Long-Term Prognosis. Factors Affecting Alveolar Ridge Changes

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Abstract

Clinical and radiographic observation demonstrating immediate, post-extraction implant placement, following complete bone regeneration. Bone deposition and turn over along the implant in the vertical direction. Soft tissue (gums) behavior with respect of the bone changes [1]. The implant design; monolithic implants (one-piece), implants with connected abutments (two-piece implant). Effect of micro mobility if present, in two-piece implants. Maintaining biological width with respect of augmented architecture of the bone, soft tissue (gums) and implant. Soft, hard tissue and implant interface. Study conducted on a regular every day office clinical situations when the extracted teeth were replaced with implants instantaneously and implants immediately loaded.

Aim of the Work: This clinical observation highlights following subjects. Recommendations in post-extraction conditions. Pros and cons of immediate implant placement and the long-term success rate of the bone regeneration [2]. Prognosis and soft tissue response with respect of the bone regeneration.

Materials and Techniques: In this article Authors summarizing and analyzing data from total 7000 dental implant cases collected x-rays. Where 4500 one-piece implants and 2500 two-piece with minimum 5 years and maximum 25 years observation and valuation period. Approximately 50% were placed immediately in the post extraction sockets, and approximately 50% in the healed bone. Approximately 50% implants were immediately loaded. Atraumatic extractions, flapless approach, Implant site preparation following surgical protocol achieving bicortical stabilization implemented in all situations where possible. No additional bone grafting other than using autogenous bone from the osteotomy were performed. One-peace implants restored as one stage protocol. Two peace implants restored as one stage protocol, when one abutment utilized at all times [3,4]. Protective occlusal scheme utilized for the interim prosthesis as well as a permanent restoration [5]. One-piece implants advantage.

Keywords: Post-Extraction Implant; Bone Regeneration

Introduction

Bone is comprised of complex mineralized connective tissue characterized by constant remodeling. Bone tissue also has considerable potential for healing, which involves the cooperative action of bone forming and resorptive cells to restore the architecture and function of damaged tissue [6]. Among the specialized bone tissues, the alveolar bone is characterized by distinctive features such as the continuous and rapid remodeling in response to stimuli by force. After extraction, two opposite process take place and depends on stimulus and current condition bone begins the healing process. Maintaining the blood clot, repositioning the tissue if needed, achieving and maintaining good primary stability of the implant, are key factors for the success [7].

Clinical Evaluation Protocol

Implants are subdivided in two categories based on implants design. Monolithic or one peace implants and Two peace implants, where implant/abutment interface present. The difference between one-piece and two-piece integrated implants observed. As a common knowledge, the vast majority of the forces concentrated in the implant neck, or coronal area, the first signs as well as latest of the bone changes will be related to the same area [8]. Bone turn over, maturation and densification at the coronal implant area is verified on the x-rays [9]. Analyzing 7000 dental implant cases collected x-rays, demonstrated that the bone level stabilized and maintained close to the original pre-extraction level or with minimal non-significant changes in situations where monolithic (one-piece) implant were used [10]. Similar result where with two-piece implants with stable internal connection [11]. However, two-piece implants with external connection revealed bone resorptions below the implant/abutment connection (interface).

Clinical Case Presentation

Patient presented with complains; pain upon chewing and tooth mobility. X-ray reveled large periapical pathology with tooth root resorption (Figure 1). Clinically gingival inflammation around tooth, mobility cl. 2. Tooth is painful upon percussion. Treatment plan includes atraumatic extraction, immediate implant placement and immediate load by means of an interim prosthesis (fixed temporary crown).

Operative report: Infiltration anesthesia Septocaine® with epinephrine 1:100,000. Intracural incision, atraumatic tooth extraction with periotomes and surgical elevators. Following thorough socket debridement, irrigation with antiseptics. Implant site preparation following surgical protocol utilizing assorted implant drills for the implant size (Figure 2). One-piece implant placed into the osteotomy. Apical portion of the implant engaged into the sinus floor (Figure 3). Achieved good primary stability. Harvested bone utilized for the site grafting. Surgical site closed with simple interrupted sutures silk 3.0. Temporary crown cemented with temporary cement. Permanent crown fabricated and cemented with permanent cement in 4 months. X-rays assessment in period of 18 month (x-ray #3) (Figure 4).
Figure 3

Figure 4

Crestal bone level at the preoperative and at the time of the surgery x-rays (2, 3, 4 and 5). Distance measured from CEJ of adjacent teeth to the crest of the bone. Crestal bone level 18 month later (7, 8). Very insignificant difference, slightly increased distance in a ≤ 1 mm. Considering different angulation of the x-ray tube would be acceptable to say non-significant increase. Stabilized crestal bone level will assured stable soft tissue level. Soft tissue level is enhanced with gingival restorative interface. By controlling the distance between crest of the bone interproximal contact point. Optimal distance 5 - 6 mm achieved.

Discussion and Conclusions
Clinical observation of this case and large amount similar cases signifying predictable positive outcome following up with suggested protocol and materials. Suggested protocols for the atraumatic extraction, thorough socket debridement, proper implant site preparation, achieving good primary stability, correct immediate load as proper occlusion scheme and utilizing one-piece implant design will substantiate:

1. Proper implant integration
2. Complete bone regeneration
3. Adequate bone remodeling
4. Restorable and maintainable architecture of the bone, soft tissue and implant interface [12-18].

Bibliography
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