

A Clinico-Radiographic Evaluation of Immediate Loading Dental Implants In Fresh Extraction Sockets vs Healed Sites

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Abstract:

One of the most common form of oral destructive disease leading to tooth loss has been attributed to Periodontal disease. Decisions still remain complex for situations whether to go for extraction of these periodontally compromised teeth and there subsequent replacement with implants. The study evaluated for the success of implant therapy in periodontally compromised tooth situation with early prosthetic rehabilitation. The results achieved indicated a successful osteointegration immediate placement and loading in periodontally compromised fresh extraction case as well as in healed sites.

Key words: Dental implants; immediate loading; delayed loading; periodontally compromised

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I. Introduction:

Historically, one of the major reasons for tooth extractions or tooth loss has been severe periodontitis either acute or chronic. A removable partial denture or a complete denture do often presents several problems and can even leads to loss of taste, feeling of premature aging and loss of self confidence.^{1,5} Furthermore, from a functional point of view, treated patients may not be able to cope with the removable prostheses during healing phases, due to bad retention of the provisionals, or may even ask for an immediate treatment solution for functional and esthetic reasons. Consequently, there has been a need or at least a wish for the development of routine implant protocols, decreasing or even eliminating the healing periods before loading inserted implants.³ Immediate implant placement and loading of implant reduces treatment time while providing high predictability and excellent esthetic outcome which are goals for the development of dental implant treatment in cases of severe periodontitis would benefit such a treatment modality especially if those teeth could be extracted and immediate implant and a prosthesis provided. However, information regarding immediate implant

placement in patient with severe periodontitis has been limited.⁷

II. Materials and Methods:

This study was done in Chandra dental college and Hospital Barabanki ; (U.P) in the Dept. Of Oral and Maxillofacial Surgery and Dept. Of Prosthodontics and Crown & Bridge between year 2020-2023 and was conducted on 30 extraction sites on patients who were diagnosed with periodontitis, hence being referred for extraction. Out of 30 patients included in study 15 implants were placed immediately post extraction and in 15 patients were placed after the extraction sites were healed Immediate prosthetic rehabilitation was carried month out in all the implants. At least 6 month follow up was carried out that included visits at 15th day, third month and sixth month. All patients included in the study were subjected to routine oral hygiene assessment and treatment a week prior to surgery. Pre-operatively, patients were advised medication: Amoxicillin 500 mg; Metronizole 400 mg; Ibuprofen 400mg 8 hourly, orally and medication was continued for a period of 5days in total. Strict aseptic protocol was followed and patients were also recommended for maintenance of oral hygiene post operatively.

Surgical procedure:

Fresh Extraction Group with immediate loading:-

Teeth were extracted atraumatically. Every attempt was made to have minimal trauma to alveolus during extraction and the extraction sockets were subjected to thorough debridement and curettage. Length and diameter of extracted tooth root was measured and implant was selected. Desired implant osteotomy was done in the extracted socket to gain primary stability and implant was inserted and 45 Ncm² of torque was achieved .Abutment was placed on subsequent appointments on subsequent appointments over the implant and soft tissue closure was done by 3-0 silk suture. Bone graft was used in situations where implant threads were exposed. Patients were recalled on next day for placement of temporary prosthesis.

Healed site group with immediate loading:




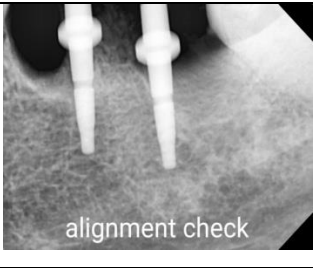

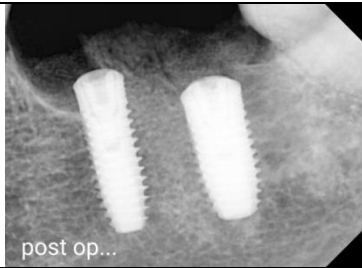
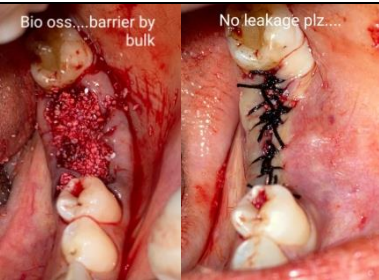


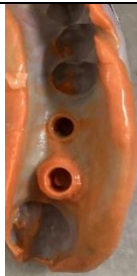


Crestal Incision was made little lingually which gives better exposure when buccal flap is retracted. A full thickness mucoperiosteal flap was raised. Indentation was made pilot drill at the implant placement site. Osteotomy preparation was started initially by 2mm drill. Sequential osteotomy preparation was done. Implant was placed and a torque of 45Ncm² was achieved. Abutment was placed over the implant and soft tissue closure was done by 3-0 silk suture. Patient was recalled on next day for placement of temporary prosthesis.

“Fresh Extraction site with immediate loading”

Figures of case:



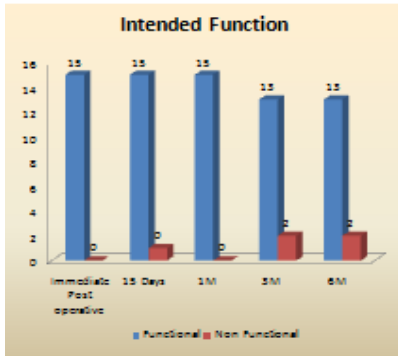
Fig 1,2: Pre – Operative Pic & IOPA 36,37 Root Stumps

<p>Fig: 3 Atraumatic Extraction</p>	<p>Fig: 4 extracted root stumps 36,37</p>	<p>Fig: 5 curettage of sockets</p>
		
<p>Fig: 6 Alignment Checking And Guide For Implants</p>	<p>Fig: 7 Implant Placement in 36,37</p>	<p>Fig: 8 RVG OF Implant Placement in 36,37</p>
		
<p>Fig: 9 Bone Graft Placement & Suturing</p>	<p>Fig: 10 Gingival Former Placement</p>	<p>Fig: 11 Abudment Placement</p>
		
<p>Fig: 12: Impressions Made</p>	<p>Fig: 13: Temporary Crown Cemented With Zinc Phosphate</p>	<p>Fig: 14: POST OP RVG</p>
		

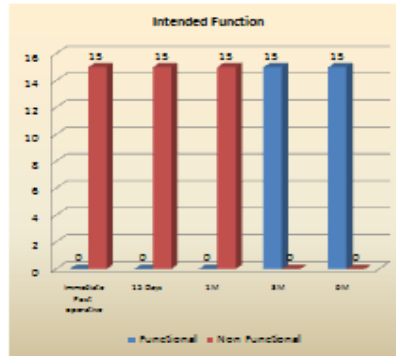
III. Results:

The purpose of this study is to determine the success of dental implant placed immediately into fresh extraction socket versus implant placed in healed site with immediate loading, by evaluating through following parameters such as pain (from immediate to 6 month), mobility (from immediate to 6 month), intended function (from immediate to 6 month), crestal bone resorption (from immediate to 6month), peri-implant radiolucency (from immediate to 6 month). A total of 30 implants were placed in 18 patients, 15 implants in fresh extraction group and 15 implants in healed site group with immediate loading. All the patients having at least one or more site for implant placement. After placement of implant with immediate loading, evaluation was done immediate post operative and in follow up visits.

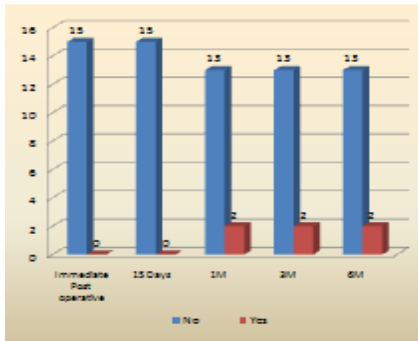
Graph No. 1 shows Intended function in fresh extraction group with immediate loading. Vertical column showing no. of implant placement site.



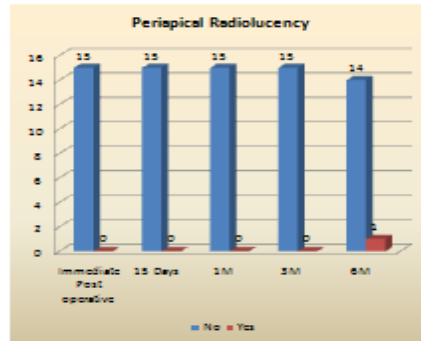
Graph no. 2 shows intended function in healed site with immediate loading. Vertical column showing no. of implant placement site.



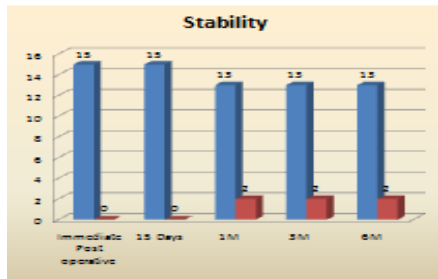
Graph 3 shows periapical radiolucency in fresh extraction group. Vertical column showing no. of implant placement site.



Graph 4 shows periapical radiolucency In healed site group. Vertical column showing no. of implant placement site.



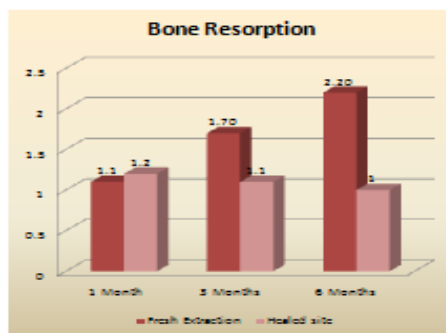
Graph no 5 shows stability in fresh extraction group. Vertical column showing no. of implant placement site.



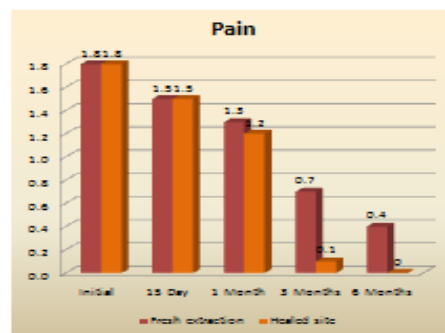
Graph no 6 shows stability in healed site group. Vertical column showing no. of implant placement site.



Graph no 7 shows bone resorption in fresh extraction group and healed site group with immediate loading. Vertical column shows resorption in mm.



Graph no 8 shows pain in fresh extraction group and the healed site group with immediate loading.



IV. Discussion:

Implant dentistry has improved dramatically in the last 20 years, providing clinicians with new opportunities for dental rehabilitation that were previously considered impossible. Dental implant therapy is one of the pioneering treatment modalities for replacement of missing teeth. This has gained popularity and acceptance among the patient, as well as among dentists. It is understandable that patients are more satisfied with implant supported prosthetic rehabilitation in terms of comfort, stability and esthetics compared to conventional prosthesis. Patients usually consider implant supported prosthesis as an integral part of their body that clearly enhances their daily lives. Osseointegration represents a direct connection between bone and implant without soft tissue layer. A 3 to 6 month healing period has been considered a prerequisite for the achievement of osseointegration. Researchers have demonstrated that, during first few weeks after implant insertion there were no sign of proper osseointegration. Three months after implant insertion there was relatively higher proportion of bone to implant contact and a clearly increased resistance to torque removal. This indicates osseointegration may be a time related phenomenon. In a study 91% survival rate at 5 years, for the retrospective group of implants placed in periodontally compromised area, is comparable with another study in which implants were placed in periodontally compromised patients using the 1- stage approach. This demonstrates that implants can be placed in fresh extraction socket with immediate function in these situations, but with lower levels of success when compared with noncompromised areas. Different prospective studies have evaluated the clinical outcome of immediately loaded implants versus delayed loaded implants in the anterior and premolar regions of the maxilla. Lindeboom et al reported no significant differences for radiographic bone loss or gingival esthetics between immediate unloaded and immediately loaded implants. No significant differences between delayed and immediate loading implants in restorations of partially edentulous patients were reported by Cannizzaro et al.⁴ In the study, the authors evaluated 92 dental implants and demonstrated a 100% success rate in the immediate loading group against 92.9% in the control group. According to Ong CT, Ivanovski S, Needleman IG 97.4% survival rate after 1 year and the high marginal bone level support the research hypothesis that the functional outcome of implant placement after extraction of teeth presenting endodontic and periodontal lesions or root fracture in the maxilla compares favorably to the results with noninfected sites.¹⁵ Limitations of the study include: data from 1 dental practice only, many variables such as type and extent of the pathology at the sites of implant placement, different surgical protocols, and different types of implants and prostheses provided. However, these variations, including the results from the previous study in the mandible¹² indicate that the present protocol may be generally applicable.

The placement of an implant immediately after tooth extraction could result in a defect between the implant surface and the surrounding bone walls. The use of barrier membranes with or without graft materials has been recommended to obtain bone regeneration and to prevent soft tissue growth at the bone-implant interface. However, the use of barrier membranes may be associated with clinical complications such as bacterial colonization, infection, and impaired bone healing. Several authors have reported high rates of membrane exposure with immediate placement of implants in extraction sockets. Gelb found that 39% of treated sites showed membrane exposure and required premature removal of the membrane. Becker and coworkers¹⁴ had to remove 41% of membranes used because of premature oral exposure. Moreover, other authors¹⁶ evaluating the effects of GBR procedures in experimental animals found the greatest bone gain in sites not protected by membranes. This was probably related to the reduced risk of oral exposure and the associated detrimental effects on bone healing. The need for barrier membranes should therefore be carefully evaluated. More recently, some authors⁴⁷ have demonstrated through a histologic analysis that implants placed immediately after extraction without any regenerative procedures could heal like implants placed in healed or mature bone. In the study¹⁸, periodontal and non-periodontal patients did not differ in implant failure rate. Several studies did not find statistically significant differences in both short-term and long-term implant survival between patients with a history of periodontitis and healthy individuals. Thus, a prospective study of periodontal patients by Wennstrom et al found a failure rate of only 2.7% after a 5-year follow-up¹⁰. Other authors, however, have reported significantly more implant loss in periodontally compromised patients compared with non-periodontal patients, including Karoussis et al in 2003 (9.5% versus 3.5%) and Hardt et al in 2002 (8% versus 3%). These results could be caused in part by differences in the definition of periodontitis, which has varied among the studies on implant survival/success and periodontitis. On the other hand, the absence of any difference in the present sample may be attributable to the supportive periodontal care received by most patients and their motivation to maintain adequate oral hygiene. In fact, Quirynen et al recently concluded that the lack of proper supportive periodontal therapy may explain the rather high incidence of failing implants in patients with a history of periodontitis reported in some studies. According to this, Ong et al¹³ suggested that heterogeneity in supportive therapy might influence the outcomes and differences between studies. However, few studies are available evaluating the relative outcome of long-term supportive programs for implant patients, and there is no evidence to support the impact of these programs for implants as for periodontally compromised teeth, even considering the reported association between periodontal status and peri-implant conditions in

patients with a history of periodontal disease. Overall, all these studies have been highly heterogeneous and recent consensus documents have called for authors to provide a definition of periodontitis and more data on the periodontal disease of patients to facilitate comparison of results. The value of some well-designed studies is reduced by their failure to define periodontitis, their main study variable. Other common factors limiting comparisons between studies are small patient samples, short follow-up periods, or the absence of controls for potential confounders (eg, tobacco use). The small number of studies accepted for inclusion in the most recent reviews reflects these shortcomings.¹⁸

V. Conclusion:

The present study gives the following inferences: The study of all 30 implants, demonstrate a successful Osseointegration which was evaluated through radiograph and clinically stability, except 2 implants in a single patient showed unsuccessful Osseointegration which resulted in failure. No significant findings were noted in all 30 implants except 2 implants in single patient with respect to peri-implant radiolucency. P a in at the implantsite was mild and moderate in initial follow up visits in both fresh extraction group and healed site group with immediate loading. All the implant placed in both the group were made non functional (out of occlusion) during healing time and was made functional after osseointegration of 3 months. This study had the limitation of sample size and short duration of follow up. With 6 month follow up the survival rate of 92% in cases of immediate placement of implant in fresh extraction socket which presents no significant change against those cases where implants was placed healed site with immediate loading may be considered to be a predictable procedure.

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