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Immediate Implant Placement with and Without Sticky Bone in Freshly Extracted Socket of Single Rooted Tooth with Periapical Pathosis - A Clinico - Comparative Study

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Conflicts of Interest: Nil

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Abstract

The success of dental implants largely depends on the quality of bone into which they are placed. Immediate implant placement is increasingly favored for single-rooted teeth with peri-apical pathosis, as it reduces treatment time and maintains esthetics. However, challenges in implant stability and bone resorption often arise. This clinico-comparative study aims to evaluate the efficacy of using sticky bone versus not using sticky bone in the immediate placement of implants in freshly extracted sockets with peri-apical pathosis. The study enrolled 30 patients, who were randomly divided into two groups. Group 1 received implants with sticky bone, while Group 2 received implants without sticky bone. The primary outcome measures were implant stability, osseointegration, and bone volume. Radiographic analysis was used to assess bone levels and resorption around the implant site, while clinical assessment included implant mobility and patient-reported outcomes. Results showed that sticky bone significantly enhanced initial implant stability and reduced bone resorption. Additionally, there was improved osseointegration in the sticky bone may be a beneficial adjunct to immediate implant placement in cases of peri-apical pathosis, contributing to improved clinical outcomes.

Keywords: Immediate implant placement, sticky bone, single rooted tooth, peri-apical pathosis, clinico-comparative study, dental implants, socket preservation, osseointegration.

Introduction

Dental implantology has revolutionized restorative dentistry by providing long-term solutions for missing teeth. Immediate implant placement refers to the practice of placing an implant into a freshly extracted socket without delay, ideally within 1-2 weeks post-extraction. The advantage of this approach includes reduced treatment time, improved esthetic outcomes, and preservation of bone volume (1). However, when dealing with cases of periapical pathosis, implant placement can be more complicated due to the potential lack of adequate bone support and the risk of bone resorption.

Peri-apical pathosis, characterized by an infection around the apex of a tooth root, often compromises the surrounding bone and can lead to a decrease in bone volume, thereby affecting the stability and long-term success of dental Despite implants (2). these challenges, immediate implant placement is still considered a viable treatment option, especially in singlerooted teeth, which are easier to manage due to their smaller root structure.

To overcome issues related to bone stability and resorption, various techniques have been explored, one of which is the use of "sticky bone." Sticky bone refers to a mixture of autogenous bone, bone graft material, and platelet-rich plasma (PRP) that is used to enhance bone volume and improve the healing process (3). Sticky bone serves to increase initial implant stability, accelerate bone regeneration, and improve osseointegration by creating a more favorable biological environment.

This study aims to compare the outcomes of immediate implant placement with and without the use of sticky bone in freshly extracted sockets of single-rooted teeth with peri-apical pathosis. By assessing the clinical outcomes, radiographic changes, and patient satisfaction, we seek to determine whether the use of sticky bone offers any significant advantages in terms of implant stability, bone resorption, and overall implant success.

Aim and Objectives

Aim: To compare the clinical and radiographic outcomes of immediate implant placement with and without sticky bone in freshly extracted sockets of single-rooted teeth with peri-apical pathosis.

Objectives:

- 1. To assess implant stability and osseointegration in both groups using sticky bone and without sticky bone.
- 2. To evaluate the extent of bone resorption and changes in bone volume around the implant site over a 6-month period.

Materials and Methods

This prospective clinico-comparative study included 30 patients, aged 18-60, who required extraction of a single-rooted tooth with periapical pathosis. These patients were randomly divided into two groups, each consisting of 15 patients.

Inclusion Criteria:

- Patients aged between 18 and 60 years.
- Single-rooted teeth with peri-apical pathosis requiring extraction.
- Sufficient bone volume for implant placement (minimum of 4 mm of bone width and 10 mm of bone height).
- Systemically healthy patients with no contraindications to surgery.

Exclusion Criteria:

- Severe bone loss or inadequate bone volume that cannot support implant placement.
- Pregnancy or breastfeeding.
- History of uncontrolled systemic diseases (e.g., diabetes, hypertension).
- Active smoking or alcohol use.
- Inability to consent.

Procedure:

- For • Group 1 (sticky bone group). autogenous bone obtained from the extraction site was mixed with a bone graft material (xenograft or allograft) and platelet-rich plasma (PRP). The mixture was then applied around the implant during placement.
- For Group 2 (control group), the implant was placed without any bone graft or sticky bone augmentation.
- Implants were placed immediately into the fresh extraction sockets, and the site was closed using primary closure techniques.
- Implant stability was measured using resonance frequency analysis (RFA) immediately post-surgery, and again at 3 and 6 months.
- Radiographic assessments were performed at baseline, 3 months, and 6 months post-surgery to evaluate bone resorption and osseointegration.

Results

Table 1: Implant Stability										
Group	Initial	Stability	Stability	at	3	months	Stability	at	6	months
	(ISQ)		(ISQ)				(ISQ)			
Sticky Bone	75		85				90			
Group										
Control Group	70		75				78			

Table 1: Implant Stability

Table 2: Bone Resorption and Volume Changes	
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Group	Bone Resorption at 3 Months (%)	Bone Resorption at 6 Months (%)
Sticky Bone Group	5%	7%
Control Group	10%	12%

Short Description:

- Implant Stability: The sticky bone group showed significantly higher initial stability (ISQ) compared to the control group. Stability increased more rapidly in the sticky bone group, reaching an ISQ of 90 at 6 months.
- **Bone Resorption**: The sticky bone group experienced less bone resorption compared to the control group at both 3 and 6 months, indicating better bone preservation.

Discussion

Immediate implant placement in freshly extracted sockets with peri-apical pathosis has been well-documented as a safe and effective procedure for restoring teeth. However, the challenge of maintaining implant stability and preventing bone resorption in the presence of peri-apical pathosis remains. This study demonstrates that the addition of sticky bone significantly enhances the initial implant stability and reduces bone resorption compared to traditional implant placement without sticky bone.

The results are consistent with previous studies showing that autogenous bone grafts and PRP have positive effects on bone healing and osseointegration (4,5). The sticky bone mixture provides a scaffold for new bone formation, while the growth factors from PRP accelerate healing and improve vascularity at the implant site (6). These findings align with research by Chen et al. (7) and Fickl et al. (8), who demonstrated enhanced osseointegration with the use of sticky bone in immediate implant placements.

In contrast, the control group without sticky bone showed higher rates of bone resorption and lower implant stability over the same period. This suggests that the absence of sticky bone may hinder bone healing and compromise the long-term success of the implant. Although both groups showed favorable outcomes, the use of sticky bone provided superior results in terms of implant stability and bone preservation, making it a useful adjunct in cases of immediate implant placement, particularly in patients with peri-apical pathosis.

Conclusion

This clinico-comparative study concluded that immediate implant placement with sticky bone provides significantly better outcomes in terms of implant stability and bone preservation compared to the traditional method of implant placement without sticky bone. The sticky bone group demonstrated higher initial stability, resorption. reduced bone and enhanced osseointegration. These findings suggest that sticky bone may be a beneficial adjunct in immediate implant placement procedures, particularly in cases with peri-apical pathosis. Further long-term studies are required to confirm these results and assess the potential benefits over extended periods.

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