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Dental

F. No.SU/2019/2019(3) Dated: 26/12/2019

Subject: Sanction of Financial Research Grant to the Faculty Member for the Year 2019-20 by the Santosh Deemed to be University - Dr. Priyanka Thukral, Professor, Department of Prosthodontics.

******

With reference to his/her request on the subject cited above, **Dr. Priyanka Thukral, Professor, Department of Prosthodontics** is informed that his/her request for a Financial Research Grant has been considered by the Research Co-Ordination Committee and sanctioned a sum of Rs. 3,30,000/- on December 2019. The details thereof is as under: -

S. No	Name of the Faculty & Designation	Research project title	Duration	Financial grants sanctioned
1	**Dr. Priyanka Thukral, Professor, Department of Prosthodontics**	A randomized clinical trial to evaluate the Clinical and radiographic success of immediate implants using various types of bone augmentation materials: A two-year follow-up study.	24 months	Rs. 3,30,000/-

The above is informed accordingly to **Dr. Priyanka Thukral, Professor, Department of Prosthodontics.**

[Dr. V.R Gupta]
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Distribution:

1. **Dr. Priyanka Thukral**
2. The Finance Department

Copy to:

1. The Chancellor
2. The Vice-Chancellor
3. Dean, Santosh Medical College & Hospital
4. Dean – Research
5. HOD of Prosthodontics

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F. No. SU/2019/1487(2) Dated: 12.10.2019

Subject: Grant of Ethical Clearance for the Project "A randomized clinical trial to evaluate the Clinical and radiographic success of immediate implants using various types of bone augmentation materials: A two-year follow-up study." **-Dr. Priyanka Thukaral, Professor, Department of Prosthodontics.**

*****

With reference to his/her request for a grant of Ethical Clearance for the Project entitled "A randomized clinical trial to evaluate the Clinical and radiographic success of immediate implants using various types of bone augmentation materials: A two-year follow-up study." - **Dr. Priyanka Thukaral, Professor, Department of Prosthodontics** is informed that the Project submitted by him/her was considered by the **Screening Committee** of the Santosh Medical College & Hospitals in its meeting held on 17.07.2019. The recommendations of the **Screening Committee** were considered in detail by the Institutional Ethics Committee in its meeting held on **14.09.2019** and the same was **approved** by the **Ethics Committee.**

He/she is informed accordingly for further necessary action.

[Dr. V.P. GUPTA]
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Dr. Priyanka Thukaral,
Professor,
Department of Prosthodontics

Copy to:

1. The Vice Chancellor
2. The Dean, SDC&H
3. The Dean – Research
4. The Dean – Academics
5. The Director - IQAC
6. HOD of Prosthodontics

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Office of Dean Research
Application for Intramural Funding
E-mail ID: dean.research@santosh.ac.in
Year & Department

Application for the financial assistance (seed money) under the Short-term Research Project Scheme
(Application should be sent through proper channel)

Title- A randomized clinical trial to evaluate the Clinical and radiographic success of immediate implants using various types of bone augmentation materials: A two-year follow-up study

1	Particular of the Principal Investigator: 1. Name of Principal Investigator 2. Designation 3. Address 4. Telephone/ Mobile No. 5. E-mail address	 Dr Priyanka Thukral Professor, Dept of Prosthodontics and Crown & Bridge A-188, Inder Puri, I.A.R.I., Central Dental, 110012 9818494444 priyankathukral@icloud.com
2	6. Name of Co-PI (if any) 7. Designation 8. Address 9. Telephone/ Mobile No. 10. E-mail address	
3.	11. Name of Co-PI 2 (if any) 12. Designation 13. Address 14. Telephone/ Mobile No. 15. E-mail address	
3	Gender of PI (M/F)	F

4	Academic qualifications of the PI (give details about Medical College/University and the year of passing)	MDS from Rajiv Gandhi University of Health Sciences Bangalore, Karnataka in year of 2001
5	Research experience	22+ yrs
6	No. of research papers published during last five years (Please give full details of the citation).	5
7	Name of the institution/organization in which the study will be carried out.	Santosh Dental College
8	Financial implications of the entire study including duration of study and breakdown of expenditure for every year separately in respect of i. Equipment ii. Chemicals, drugs, etc. iii. Contingencies iv. Administration v. Miscellaneous, etc. vi. Total	Duration of study :24 months Implants 1,50,000/- Accessory Components 20,000/- Bone Graft 90,000/- Radiographic Assessment 40,000/- Statistical Analysis 20,000/- Miscellaneous 10,000/- Total 3,30,000/-
9	Do you need any additional equipment? If so, give complete details of the equipment. Its estimated cost and name of the country if it is not available locally.	No

Signature of the Principal Investigator Priyanka Thukral

Name of the Principal Investigator Dr Priyanka Thukral

Place: Ghaziabad

Dated: 26.12.2019

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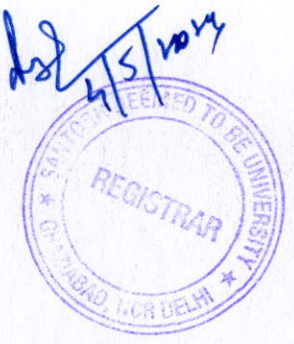
PROFORMA FOR ETHICAL CLEARANCE OF THE INSTITUTIONAL ETHICS COMMITTEE FOR THE FACULTY RESEARCH PROJECTS TO BE SUBMITTED

Note: 1. All columns should be clearly filled up by the Principal Investigator.

2. **One Copy of Protocol** and **one copy of Ethical Clearance Proforma** duly signed by the Principal Investigator and forwarded by the Head of the Department need to be attached

1	Name of the Principal investigator with designation	Dr Priyanka Thukral, Professor
2	Name of the Department	Prosthodontics and Crown & Bridge
3	Title of the Research Project	A randomized clinical trial to evaluate the Clinical and radiographic success of immediate implants using various types of bone augmentation materials: A two-year follow-up study
4	Name, designation, and address of the Co- investigator/s	
5	Name of the Department(s) where research will be conducted.	Santosh Dental College
6	Brief description of work to be undertaken, material methods etc.	Enclosed
7	A) Consent is necessary from the participating subject. A copy of the proposed Consent Form in English and Hindi or in the local Language is to be enclosed. Consent form • Does it have the name of the principal Investigator • Does it also have the name, address institution at the top and telephone No. of the Principal Investigator / Co-Investigator, etc. B) Patient Information Sheet informing patient about • Freedom of individual to withdraw • Publication, if any including	N/A 

	• Duration of participation in study • Case Record Form	
8	Any other information which may be useful for consideration of the project by the IEC (Institutional Ethical Committee)	N/A

Signature of the Principal investigator with date: Priyanka Thakur

Signature of HOD with date: Singh.

Signature of Dean Research: Jyoti Batra

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Updated Proposal format

SEED MONEY PROJECT PROPOSAL

DEPARTMENT OF PROSTHODONTICS AND CROWN & BRIDGE

TOPIC- A randomized clinical trial to evaluate the Clinical and radiographic success of immediate implants using various types of bone augmentation materials: A two-year follow-up study

INTRODUCTION

Immediate implant placement following tooth extraction has gained significant attention in recent years due to its potential to reduce treatment time and preserve alveolar bone [1]. This approach offers advantages such as reduced surgical procedures, shorter healing periods, and improved esthetic outcomes. However, achieving predictable clinical and radiographic success relies heavily on proper bone augmentation techniques to enhance osseointegration and stability [2]. Bone augmentation procedures play a crucial role in enhancing the bone volume and density necessary for successful immediate implant placement [3]. Various augmentation materials have been developed to address bone deficiencies and optimize implant stability and osseointegration. These materials encompass a wide range of options, including autogenous bone grafts, allografts, xenografts, and alloplastic materials, each with its unique properties and clinical applications [4]. Despite the growing interest in immediate implants and bone augmentation techniques, there remains a lack of consensus regarding the optimal approach and choice of augmentation material [5]. While numerous studies have investigated the efficacy of different bone augmentation materials in immediate implant placement, there is still a need for well-designed randomized clinical trials with adequate follow-up periods to provide robust evidence and guidelines for clinical practice [6]. In this randomized clinical trial, we aim to evaluate the clinical and radiographic success of immediate implants using various types of bone augmentation materials over a two-year follow-up period. The study will assess parameters such as implant stability, peri-implant bone formation, soft tissue health, and patient satisfaction. By comparing the outcomes of different augmentation materials, we seek to identify the most effective and predictable techniques for enhancing bone volume and quality in immediate implant procedures [7]. This research endeavor holds the potential to advance our understanding of bone augmentation in immediate implant placement and guide clinicians in selecting the most appropriate augmentation material based on clinical needs and patient factors. Ultimately, the findings of this study will contribute to improving the long-term success and predictability of immediate implant therapy, thereby benefiting both patients and practitioners.

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AIM - To evaluate the clinical and radiographic success of immediate implants utilizing various types of bone augmentation materials over a two- year follow- up period.

OBJECTIVES

1. To assess and compare the clinical outcomes of immediate implants augmented with B-Ostin, Novabone Putty, and Bio-Oss bone augmentation materials.
2. To compare crestal bone level among implants augmented with B-Ostin, Novabone Putty, and Bio-Oss at baseline and during the two-year follow-up period.
3. To evaluate the long-term stability of implants augmented with B-Ostin, Novabone Putty, and Bio-Oss by monitoring peri-implant bone levels.
4. To record and analyze any complications associated with the use of B-Ostin, Novabone Putty, and Bio-Oss bone augmentation materials during the study period.

METHODOLOGY

- A total of 30 patients with defective sockets requiring extraction will be selected and divided into 3 groups of 10 patients each by random allocation.
- Patients ranging from 18 to 60 years having defective extraction socket after extraction and willing to be treated with implant placement will be included in the study.
- Patients having extraction sockets with no bony defects, medically compromised patients, presence of acute periapical pathology, alcoholics, and tobacco abusers will be excluded from the study.
- In group 1 B-Ostin Bone graft will be used followed by conventional immediate implant placement.
- In group 2 Novabone Putty Bone graft will be used followed by conventional immediate implant placement.
- In group 3 Bio-Oss Bone graft will be used followed by conventional immediate implant placement.
- Data will be collected at base line, 3 months, 6 months, 12 months and 24 months and statically analyzed.

EXPECTED OUTCOME

Immediate Implant placement with Novabone Putty Bone graft will show the significant results.

BIBLIOGRAPHY

1. Esposito M, Grusovin MG, Felice P, et al. The efficacy of horizontal and vertical bone augmentation procedures for dental implants—a Cochrane systematic review. Eur J Oral Implantol. 2009;2(3):167-184.

2. Chen ST, Buser D. Clinical and esthetic outcomes of implants placed in post extraction sites. Int J Oral Maxillofac Implants. 2009;24 Suppl:186-217.
3. Araújo MG, Lindhe J. Dimensional ridge alterations following tooth extraction. An experimental study in the dog. J Clin Periodontol. 2005;32(2):212-218.
4. Misch CE, Dietsh F. Bone-grafting materials in implant dentistry. Implant Dent. 1993;2(3):158-167.
5. Smith DE, Zarb GA. Criteria for success of osseointegrated endosseous implants. J Prosthet Dent. 1989;62(5):567-572.
6. Lang NP, Pun L, Lau KY, Li KY, Wong MC. A systematic review on survival and success rates of implants placed immediately into fresh extraction sockets after at least 1 year. Clin Oral Implants Res. 2012;23 Suppl 5:39-66.
7. Schwarz F, Herten M, Sager M, Wieland M, Dard M, Becker J. Histological and immunohistochemical analysis of initial and early osseous integration at chemically modified and conventional SLA titanium implants: preliminary results of a pilot study in dogs. Clin Oral Implants Res. 2007;18(4):481-488.

Thrust Areas of the Project

- Design and merit of projects - The project will be able to generate a quality publication in the index journal

  Result outcome for outreach activity

- Quality publication (minimum one) in indexed journals (Scopus/Web of Science/PubMed/UGC-care list)- high possibility as no such work is mentioned in the literature till now
- Generation of patent- Possible
- Generation of revenue - Possible
- Generation of extramural funding- Will Apply
- Translational Research

A randomized clinical trial to evaluate the Clinical and radiographic success of immediate implants using various types of bone augmentation materials: A two-year follow-up study

INTRODUCTION

The replacement of a lost natural tooth by an osseointegrated implant represents one of the most significant advancements in dentistry. Implant supported restorations not only allows a patient to function with confidence but also helps enjoy a better quality of life [1]. Immediate implant placement following tooth extraction has gained significant attention in recent years due to its potential to reduce treatment time and preserve alveolar bone [2]. This approach offers advantages such as reduced surgical procedures, shorter healing periods, and improved esthetic outcomes. However, achieving predictable clinical and radiographic success relies heavily on proper bone augmentation techniques to enhance osseointegration and stability [3]. Bone augmentation procedures play a crucial role in enhancing the bone volume and density necessary for successful immediate implant placement [4]. Various augmentation materials have been developed to address bone deficiencies and optimize implant stability and osseointegration. These materials encompass a wide range of options, including autogenous bone grafts, allografts, xenografts, and alloplastic materials, each with its unique properties and clinical applications [5]. Despite the growing interest in immediate implants and bone augmentation techniques, there remains a lack of consensus regarding the optimal approach and choice of augmentation material [6]. While numerous studies have investigated the efficacy of different bone augmentation materials in immediate implant placement, there is still a need for well-designed randomized clinical trials with adequate follow-up periods to provide robust evidence and guidelines for clinical practice [7]. Various bone regeneration procedures and materials are utilized to provide adequate bone and soft tissue support for dental implants. It includes alveolar bone augmentation techniques such as guided bone regeneration, onlay grafting, particulate grafting, onlay block grafting, distraction osteogenesis, ridge splitting, application of various growth factors to stimulate bone formation, and in severe defects; a combination of above-mentioned techniques can be used in a staged manner [8]. In this randomized clinical trial, we aim to evaluate the clinical and radiographic success of immediate implants using various types of bone augmentation materials over a two-year follow-up period. The study will assess parameters such as implant stability, peri-implant bone formation, soft tissue health, and patient satisfaction. By comparing the outcomes of different augmentation materials, we seek to identify the most effective and predictable techniques for enhancing bone volume and quality in immediate implant procedures [9]. This research endeavor holds the

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potential to advance our understanding of bone augmentation in immediate implant placement and guide clinicians in selecting the most appropriate augmentation material based on clinical needs and patient factors. Ultimately, the findings of this study will contribute to improving the long-term success and predictability of immediate implant therapy, thereby benefiting both patients and practitioners.

RESEARCH HYPOTHESIS

NULL HYPOTHESIS

Immediate Implant placement with Novabone Putty Bone graft will show the significant results.

ALTERNATE HYPOTHESIS

Test materials exhibit similar results under standardized test conditions.

LITERATURE REVIEW

The literature review of the article by Schwarz et al. (2007) focuses on histological and immunohistochemical analysis of early osseous integration at chemically modified and conventional SLA titanium implants in dogs. Previous studies have shown that surface modifications like acid-etching can enhance bone-to-implant contact and promote early bone healing around implants. Immediate loading of implants with fixed dental prostheses has also been studied, showing higher osseointegration rates compared to delayed loading. Additionally, zirconia implants with modified surfaces have demonstrated predictable osseointegration and high bone-to-implant contact ratios. Furthermore, supplemental acid-etching on implant surfaces has been found to positively influence osseointegration parameters, enhancing bone-to-implant contact and torque-out resistance at early stages.

The literature review on implant placement in post-extraction sites by Chen ST, Buser D et al (2009) focuses on various techniques to enhance esthetic and functional outcomes. Studies emphasize the importance of preserving alveolar bone and soft tissues to prevent complications post-extraction. Techniques like socket shield, orthodontic extrusion, and regenerative surgery have shown promising results in maintaining implant sites' integrity and improving esthetic outcomes. Minimally traumatic approaches during tooth extraction, such as immediate implant placement with non-functional immediate provisional restoration, have been successful in achieving satisfactory esthetic results. Additionally, post-extraction tissue

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changes play a crucial role in prosthetic rehabilitation, highlighting the significance of alveolar ridge preservation techniques to enhance esthetic and prosthetic outcomes.

The literature review article by Lang et al. (2012) focuses on the survival and success rates of implants immediately placed into fresh extraction sockets after at least 1 year. Immediate implant placement in sockets with periapical pathology shows high survival rates, especially when adequate curettage and debridement are performed. Immediate implants exhibit similar survival rates to delayed implants placed in healed sites, with both options demonstrating predictable treatment outcomes. The success of immediate implant placement has evolved into a predictable procedure, preserving socket integrity for precise implant positioning and shortening treatment time compared to conventional methods. Factors like implant system and gender significantly influence immediate implant failure rates, emphasizing the importance of careful patient selection and treatment planning.

The literature review of Vandeweghe et al.'s (2011) article on immediate placement in molar extraction sockets using a wide body implant can be enriched by incorporating findings from related studies. Immediate implant placement in compromised sockets has shown comparable survival rates to non-compromised sites. Immediate implantation in fresh extraction sockets has demonstrated excellent clinical, radiographic, and aesthetic outcomes, emphasizing the importance of patient selection and clinical factors for successful treatment. Furthermore, immediate implant placement in infected extraction sockets, following proper decontamination protocols, has resulted in high survival rates, especially in healthy patients without harmful habits. These studies collectively highlight the significance of immediate implant placement in various clinical scenarios, showcasing promising outcomes and patient satisfaction.

MATERIAL AND METHODS

A clinical study was conducted in 30 patients with defective sockets requiring extraction and immediate implant placement in the Department of prosthodontics and Crown & Bridge of our Institute. Study was divided into 3 groups of 10 patients each by random allocation. Patients ranging from 18 to 60 years having defective extraction socket after extraction and willing to be treated with implant placement were included in the study. Patients having extraction sockets with no bony defects, medically compromised patients, presence of acute periapical pathology, alcoholics, and tobacco abusers were excluded from the study.

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ADIN, Dental Implant System, Israel, were used for all the selected patients in this study.

A complete case history was taken making use of a standard case history pro forma. Routine blood investigations were carried out. The patients were informed about the potential risks and benefits and a consent was obtained for the procedure. Preoperative cone beam computed tomography was used for the evaluation of surgical site, amount of augmentation required and to decide the length and diameter of the implant to be used based on the regional anatomy.

One hour before the surgery, 2 g amoxicillin or 600 mg clindamycin (if allergic to penicillin) was given. Before the surgical procedure, patients were instructed to rinse the mouth with 0.2% chlorhexidine gluconate. Surgical site was prepared and extraction was done. Following extraction and elevation of full thickness flap, defect was visualized.

In Group 1 B-Ostin Bone, in Group 2 Novabone Putty Bone graft, in Group 3 Bio-Oss Bone graft was used. Then implant was then inserted through the bone graft subcrestally, obtaining primary stability from the local bone and using its crestal portion to keep the bone graft in place and cover screw was placed. Totally, tension-free wound closure was done. All patients were prescribed amoxicillin 500 mg TID, metronidazole 400 mg TID, and diclofenac 50 mg BID, along with chlorhexidine 0.20% mouth rinse twice daily for 5 days. After 1 week of surgery, sutures were removed.

After 3 months, second-stage surgery was performed. Flap was raised to access marginal portion of implant and cover screw was replaced with gingival former. Gingival former was subsequently replaced with permanent abutment and implant was loaded with final restoration.

All patients were followed up for 3momths, 6 months, 12 months & 24 months after implant placement during which patients were evaluated clinically for infection (pus discharge), pain, soft tissue dehiscence (cover screw exposure, bone ring exposure), loss of sensation, periodontal parameters, and implant mobility and radiographically for changes in crestal bone level. To measure the changes in crestal bone level, we have adopted the method described by Yoo et al.

Corrected crestal bone level = measured crestal bone level × actual implant length/measured implant length.

A horizontal line tangential to the coronal border of the implant was used as reference. The

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baseline value was considered 0 at the reference plane. Measurements from this line to the most coronal height of the crestal bone on the proximal surfaces around the implants were done to evaluate the mesial and distal vertical crestal height of the bone. Values coronal to reference plane were considered negative and apical were considered positive.

STATISTICAL ANALYSIS

All data were subjected to statistical analysis (Table 1, 2 and 3). The statistical analysis was performed with software SPSS 18 for windows. Student's *t*-test for the continuous variables and two-tailed Fisher's exact test or Chi-square test for categorical variables were used for analysis. $P< 0.05$ was accepted as indicating statistical significance.

S. No	SITE	3 MONTHS	6 MONTHS	12 MONTHS	24 MONTHS
1.	41	0.6mm	0.5 mm	0.1mm	0.1 mm
2.	14	0.23 mm	0.27 mm	0.06 mm	0.05mm
3.	36	0.6mm	0.69 mm	0.37 mm	0.36 mm
4.	13	0.31mm	2.59 mm	0.07 mmm	0.07 mmm
5	15	2.75mm	2.75mm	1.26mm	1.02mm
6	24	2.37mm	2.31mm	0.89mm	0.08mm
7.	26	1.9mm	1.0 mm	0.58 mm	0.34 mm
8.	17	0.44mm	0.58 mm	0.51 mm	0.35 mm
9.	21	0.6mm	0.1mm	0.07 mm	0.05 mmm
10.	32	1.6mm	0.5 mm	0.07 mmm	0.05 mm

Table 1: Crestal Bone Level of Immediately Placed Dental Implants with B- Ostin at 3, 6, 12 and 24 months

S. No	SITE	3 MONTHS	6 MONTHS	12 MONTHS	24 MONTHS
1.	42	1.6mm	0.75 mm	0.5 mm	0.05 mm
2.	15	0.26mm	0.18 mm	0.11 mm	0.07 mm
3.	37	0.69mm	0.58mm	0.19 mm	0.08 mm
4.	14	2.02mm	2.07 mmm	1.59 mm	1.06 mm
5	37	1.26mm	1.16mm	0.75mm	0.16mm
6	17	2.39mm	1.28mm	1.31mm	0.52mm
7.	27	1.58mm	0.44 mm	0.12 mm	0.07 mm
8.	22	1.6mm	1.25 mm	0.58 mm	0.32 mm
9.	13	0.06mm	0.05 mm	0.1mm	0.1mm
10.	34	0.7mm	0.5mmm	0.07 mm	0.007 mm

Table 2: Crestal Bone Level of Immediately Placed Dental Implants with Novabone Putty at 3, 6, 12 and 24 months

S. No	SITE	3 MONTHS	6 MONTHS	12 MONTHS	24 MONTHS
1.	43	1.7 mm	0.6 mm	0.5 mm	0.1mm
2.	14	0.25 mm	0.16mm	0.07 mm	0.06 mm

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3.	37	0.69mm	0.69 mm	0.37 mm	0.19 mm
4.	14	1.42mmm	1.27 mmm	1.09 mm	0.7 mm
5	17	2.76mm	2.35mm	1.75mm	1.26mm
6	33	2.31mm	1.89mm	1.34mm	0.79mm
7.	23	1.58mm	1.38 mm	1.0 mm	0.58 mm
8.	17	1.6mm	1.05 mm	0.58 mm	0.51 mm
9.	32	1.2mm	0.07 m5	0.7mm	0.05 mm
10.	41	1.6mm	0.55 mm	0.5 mm	0.07 mmm

Table 3: Crestal Bone Level of Immediately Placed Dental Implants with Bio- Oss at 3, 6, 12 and 24 months

RESULTS

A total of 30 patients were selected and divided into 3 groups. The implants were placed immediately after extraction in defective sockets with conventional technique. 17 patients were male (50%) and 13 were female (50%). Mean age of the patients was 30.35 ± 7.13 years with a range of 20–42 years. Around 50% of the patients were between the age of 20 and 30 years. Out of 30 implants placed, 18 were placed in the maxilla (12 anterior and 6 in posterior) and 12 in the mandible (7 anterior and 5 in posterior). In maxillary anterior region, the chief cause of extraction of teeth was trauma while in mandibular posterior region, chief cause of extraction was caries. Diameter of implants used was 3.75 mm (80%) and 4.2 mm (20%). In Group 1 B-Ostin Bone, in Group 2 Novabone Putty Bone graft, in Group 3 Bio-Oss Bone graft was used. All patients were followed up for 3momths, 6 months, 12 months & 9 months after implant placement during which patients were evaluated clinically for infection (pus discharge), pain, soft tissue dehiscence (cover screw exposure, bone ring exposure), loss of sensation, periodontal parameters, and implant mobility and radiographically for changes in crestal bone level. In our study, NovaBone Putty Bone Graft has shown better results but statistically there was no significant difference found between other bone graft material used.

DISCUSSION

Originally, Brånemark recommended a protocol for implant placement that involved waiting 6–8 months after a tooth extraction before placing the implant. This waiting period was intended to enhance the primary stability of the implant when placed [10]. However, after tooth extraction, the alveolar ridge may undergo bone resorption, potentially losing up to 50% of its width and some height, which could jeopardize the feasibility of placing dental implants. To address this issue, ongoing research led to the development of an immediate placement protocol, which involves installing the implant simultaneously with the tooth extraction [11].

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Novabone putty, a premixed composite of bioactive calcium phosphosilicate particles, is an osteoconductive bioactive material suitable for grafting bone defects. Studies comparing bioactive glass to hydroxyapatite have shown superior results in bone and cementum formation with Novabone putty. Additionally, it has proven more effective in preventing epithelial downgrowth than the hydroxyapatite group [12].

The stability of the graft's volume plays a crucial role in the survival of implants, and the amount of Bio-Oss used significantly impacts the graft. This aligns with findings from other studies that utilized Bio-Oss exclusively as a graft material, which noted better maintenance of dimensions than autogenous bone over both short and long periods. Furthermore, Bio-Oss has shown high levels of volume retention and new bone formation [13].

B-OstIN is synthetic biocompatible material composed of elements that occur naturally in the bone i.e hydroxapatite (HAP). B-OstIN is made by wet chemical methods and thereafter converted into porous mass through ceramic processing routes. Similarly to the bone mineral make B-OstIn biocompatible and most Osteo conductive Material. Froum also compared bone regeneration in bilateral maxillary sinus lift, using only two materials, and observed greater formation of new bone with BCP. Briefly, following elevation of the lateral sinus walls, one material was placed in the right sinus and the other material was placed in the left sinus [14].

The ideal extraction site for immediate implant placement is one with little or no periodontal bone loss on the tooth that is to be extracted. However, defective sockets resulting from either periodontal disease or surgical trauma during extraction may have an insufficient quantity of bone for successful implant placement. Several classification systems have been proposed for classifying such defects [15].

In our study, NovaBone Putty Bone Graft has shown better results but statistically there was no significant difference found between other bone graft material used.

SUMMARY AND CONCLUSION

In conclusion, the two-year follow-up study comparing B-Ostin, Novabone putty, and Bio-Oss bone augmentation materials for immediate implants demonstrates promising outcomes. With Novabone putty showcasing good clinical and radiographic success rates, it emerges as a compelling choice in implant procedures. These findings suggest that Novabone putty may offer enhanced efficacy and stability, potentially improving patient outcomes and satisfaction. Athough, statistically there was no significant difference found between other bone graft

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material used.Further research could delve into the mechanisms behind Novabone putty's advantageous performance and explore its applicability across diverse patient demographics and implant scenarios. Overall, this study underscores the importance of selecting appropriate bone augmentation materials to optimize implant success.

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2. Esposito M, Grusovin MG, Felice P, et al. The efficacy of horizontal and vertical bone augmentation procedures for dental implants—a Cochrane systematic review. Eur J Oral Implantol. 2009;2(3):167-184.
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GRANT UTILIZATION DETAILS

S.no	Name of the Faculty	Research Project title	Duration	Financial Grants (Sanctioned)
1.	Dr. Priyanka Thukral	A randomized clinical trial to evaluate the Clinical and radiographic success of immediate implants using various types of bone augmentation materials: A two-year follow-up study	24 months	3,30,000/-

***List of Expenditure:**

S.no	Item/s	Grant Received (In Rupees)	Expenditure (In Rupees)	Balance if any (In Rupees)
		3,30,000/-		
1	Implants		1,50,000/-	
	Accessory components		20,000/-	
2	Bone graft		90,000/-	
3	Radiographic assessment		40,000/-	
4	Statistical Analysis		20,000/-	
5	Miscellaneous		10,000/-	
		Total (In Rs.) 3,30,000/-		

UTILIZATION CERTIFICATE

Certified that out of **3,20,000/-** of grants-in-aid sanctioned during the year 2019- 2020 in favor Dr Priyanka Thukral under Letter No ..... a sum **of Rs 3,30,000/-** has been utilized for the purpose of "**A randomized clinical trial to evaluate the Clinical and radiographic success of immediate implants using various types of bone augmentation materials: A two-year follow-up study**" for which it was sanctioned.

Priyanka Thukral

Signature of Principal Investigator with date

Signature of Dean (Medical/Dental) with date

(Finance Officer)

Signature of Accounts Officer with date

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