EFFECTIVENESS OF IMMEDIATE IMPLANT PLACEMENT WITH PLATELET RICH FIBRIN- A CASE SERIES

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ABSTRACT
Implant can be defined as "any object or material such as alloplastic substance or other tissue which is partially or completely inserted into the body for therapeutic, diagnostic, prosthetic or experimental purpose".
The goal of implantology is to restore the normal contour, function, comfort, esthetics, speech and health of the patient.
Replacement of missing tooth with dental implant offers more advantages including preservation of the alveolar crest, improved aesthetics and function.

1. INTRODUCTION

The quantum leap in dental implantology was achieved with the discovery of the concept of osseointegration which refers to direct structural and functional connection between the living bone and the surface of a load bearing implant - professor **Per Ingvar Branemark** in 1952.

The placement of implants into fresh sockets was first described by **Schulte and Heimke [1]** in 1976 who referred this procedure as "Immediate implant".

In an effort to improve and accelerate both soft and hard tissue healing following immediate implants substitutes including growth factors and biomaterials have been traditionally employed .regenerative potential of platelets was introduced by **Ross et al [2]** in 1974 when it was observed that they contain growth factors that are responsible for increased collagen production, cell mitosis, blood vessel growth, recruitment of other cells that migrate to the site of injury and cell differentiation.
PRF belongs to a new generation of platelet concentrates which is obtained without addition of anticoagulants like heparin, bovine thrombin thus eliminating any risk of disease transmission[3] besides the consistency of PRF favours stability of the clot[4] and of the grafting material. This natural material seems to accelerate the physiologic wound healing, PRF also seems to regulate inflammation and to stimulate the immune process of chemotaxis[5].

2. MATERIALS AND METHODS

Patients at the Department of oral and maxillofacial surgery, sree Balaji dental college and hospital chennai with missing teeth were screened for eligibility to participate in the present clinical trial.

3. INCLUSION CRITERIA:

- Patients aged 14 – 45 years medically fit to undergo surgery.
- Patient consent to participate in the study.
- Patients in need of one or more implants replacing missing or non restorable teeth.
- the absence of any lesions in the oral cavity

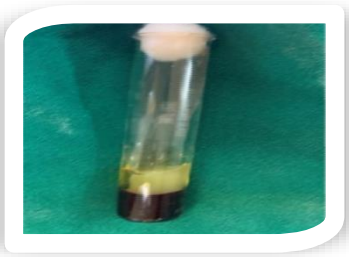
4. EXCLUSION CRITERIA:

- Insufficient bone volume
- parafunctional habits
- smoking more than 10 cigarettes per day
- excessive consumption of alcohol
- localized radiotherapy of the oral cavity
- antitumor chemotherapy
- liver, blood, and/or kidney diseases
- immunosuppression
- current corticosteroid or bisphosphonate use
- pregnancy
- poor oral hygiene.
- Completely edentulous patient.

5. ARMAMENTARIUM

The armamentarium for the study was as follows:

- Local Anaesthesia
- Syringe
- Extraction forceps
- B.P. Blade (No.15)
- Mouth mirror
- Periosteal elevator
- Bone file
- Alley's tissue holding forceps
- Mouth prop
- Suction tube
- Stainless Steel bowl
- Gauze
- Saline
- Betadine solution
- Physio dispenser
- Implant kit
- Suture material and needle holder Suction tip.



SURGICAL PROCEDURE: The Institutional ethical committee, Sree Balaji Dental College and Hospital, approved the study. Patients who were selected for the study were informed about the study schedule in detail and provided written informed consent.

All the patients were given antibiotic prophylaxis before the start of the procedure. The patients were draped and an extra oral scrub procedure with povidione iodine solution was done as an asepsis protocol. All surgical procedures were carried out with local anaesthesia. The anaesthetic agent used was lignocaine with adrenaline 1:80,000. Full thickness flap was elevated and the tooth was carefully mobilized and atraumatic extraction was done using luxator periotome and forceps. After extraction the sites were examined for any bone defects and the root measurements of the extracted teeth were taken to decide the implant size.

For PRF Preparation Blood samples were taken with a 24-gauge needle from the patient's antecubital vein. Samples were collected in 9 -mL glass-coated plastic tubes without anti-clotting agent and immediately centrifuged at 2,700 rpm for 12 minutes with a table centrifuge. The fibrin clot that was formed in the middle part of the tube was removed, and remnants of red blood cells were scraped off with gauze and the PRF membranes were obtained.

In this study standardized implant system was used. The implant site was prepared under copious saline irrigation with surgical drill bits in increasing order as per manufacturer's guidelines. The length and width of the implant used varied depending on the available bone height and width of the extracted socket. In the study group patients, coronal margin of the endosseous implant was placed apical to the extraction socket followed by the placement of PRF around the peri implant defects.

The horizontal bone width of the socket was also noted for all the patients. Closure screw was placed and flaps were sutured. Following the surgery, patients were advised to apply cold compresses to decrease oedema. Medications prescribed for postsurgical use by the patients included antibiotics (amoxicillin 500 mg, three times per day), analgesic (flurbiprofen tablet, 550 mg two times per day),andantiseptic oral rinse (0.12%chlorhexidine gluconate mouthwash two times per day) for a week.

Immediate post op radiograph was taken for all the cases. With radiological measures crestal bone height were measured. Sutures were removed after seven days.

Re-entry procedure was carried out after 12 -16 weeks in the mandible and 16 - 24 weeks in the maxilla of healing period. Full thickness flap was elevated, the width of the socket was noted, the closure screw was removed and abutment was connected to implant. Post operative radiographs using intra oral peri apical radiographs were taken and evaluation was done at 4^{th} week, 3^{rd} month and 6^{th} month. Once the healing is completed the prosthetic treatment was completed.

The reason for extraction, the implant length, primary stability, soft tissue healing, radiographic interpretation , the abutments used and type of prosthetic reconstruction delivered were noted.

6. SURGICAL TECHNIQUE:

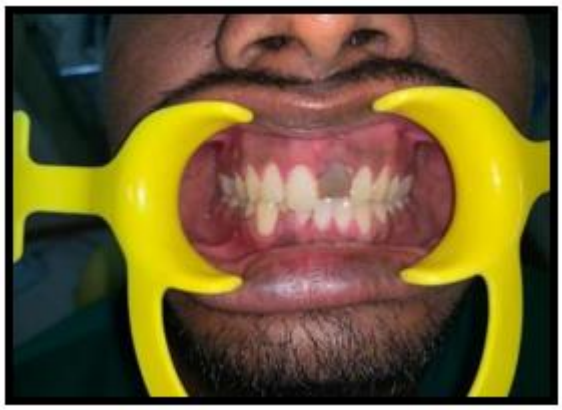
Pre- operative radiographs were taken and patient assessment was done for all the cases. Pre-operative oral prophylaxis and was carried out for all the patients. Treatment was carried out under local anaesthesia.

Parameters:

1. Bone formation around the implant
2. Crestal bone loss
3. Presence/absence of radiographic periapical radiolucency.
4. Soft tissue healing
5. Implant mobility
6. Plaque mucositis.

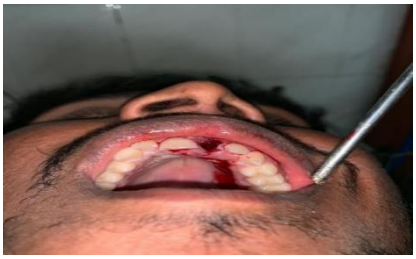
Standard IOPA radiographs were taken pre operatively and post operatively as routine investigation in the concerned study group and results were published.

7. CASE REPORTS

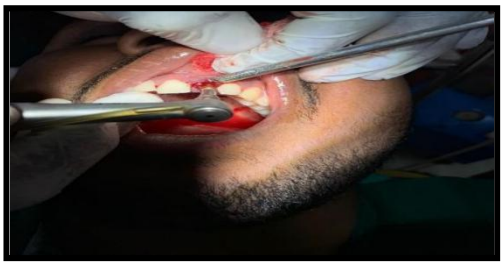


PRE OPERATIVE INTRA ORAL VIEW

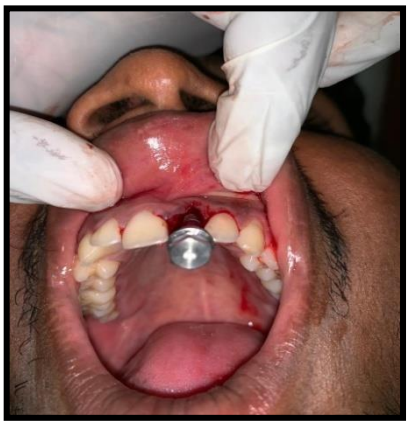
ATRAUMATIC EXTRACTION



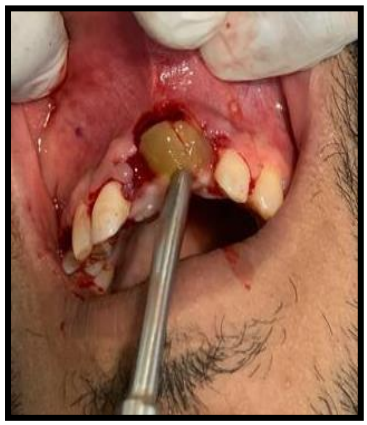
EXTRACTION SOCKET



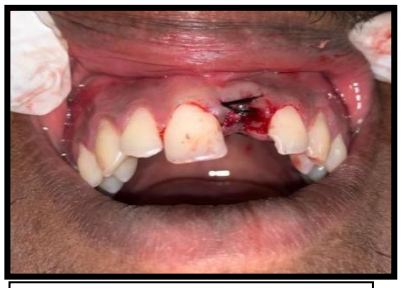
OSTEOTOMY PREPARATION



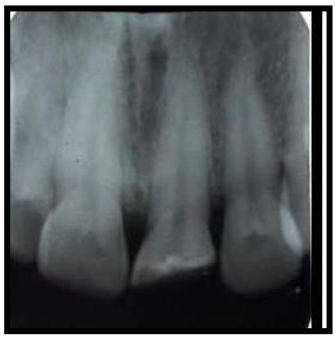
IMPLANT PLACED



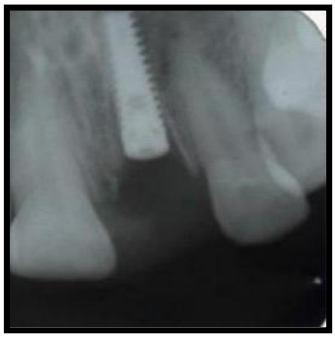
IMPLANT PLACED WITH PRF



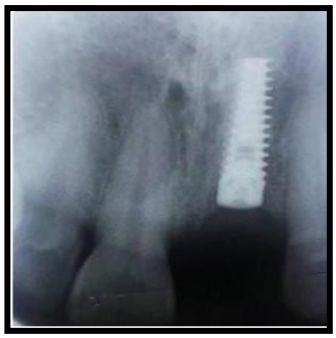
SUTURES PLACED



PRE OPERATIVE IOPA

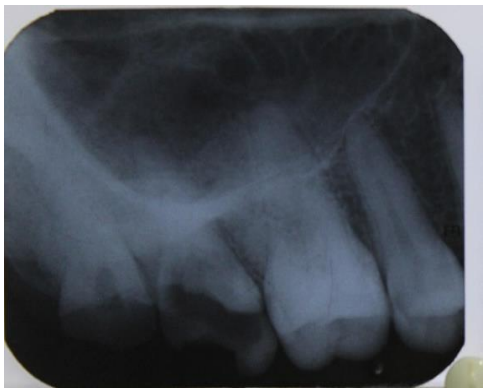


4TH WEEK IOPA RADIOGRAPH



3RD MONTH IOPA RADIOGRAPH

CASE REPORT - 1



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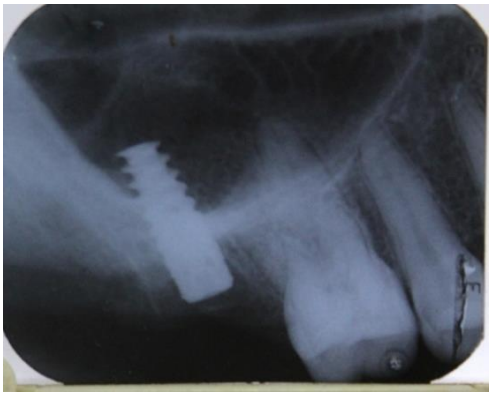
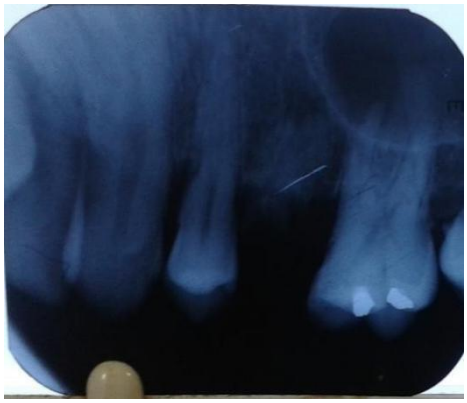


POST OPERATIVEIOPA

CASE REPORT - 2



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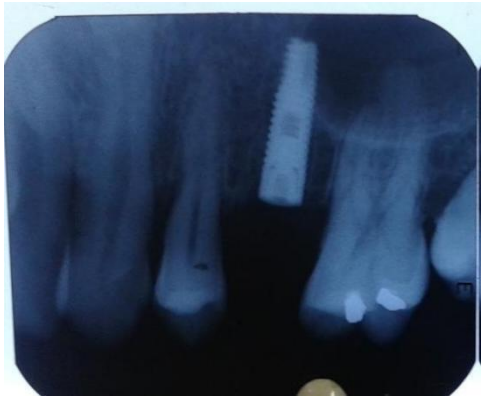

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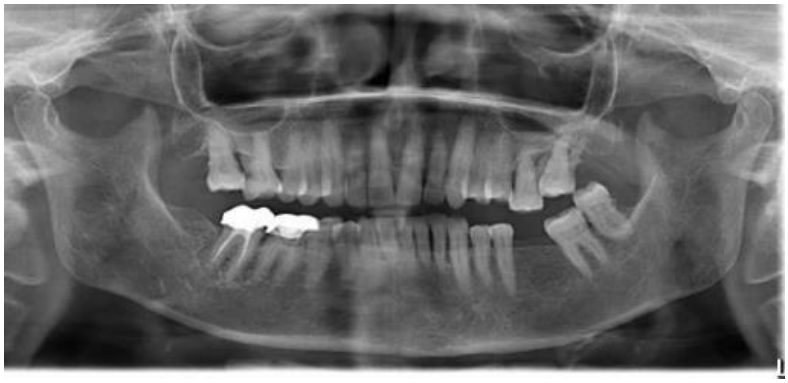
CASE REPORT - 3

PRE OPERATIVEOPG



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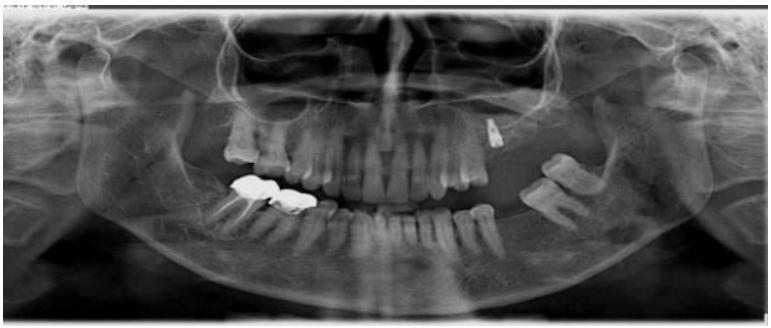

CASE REPORT – 4

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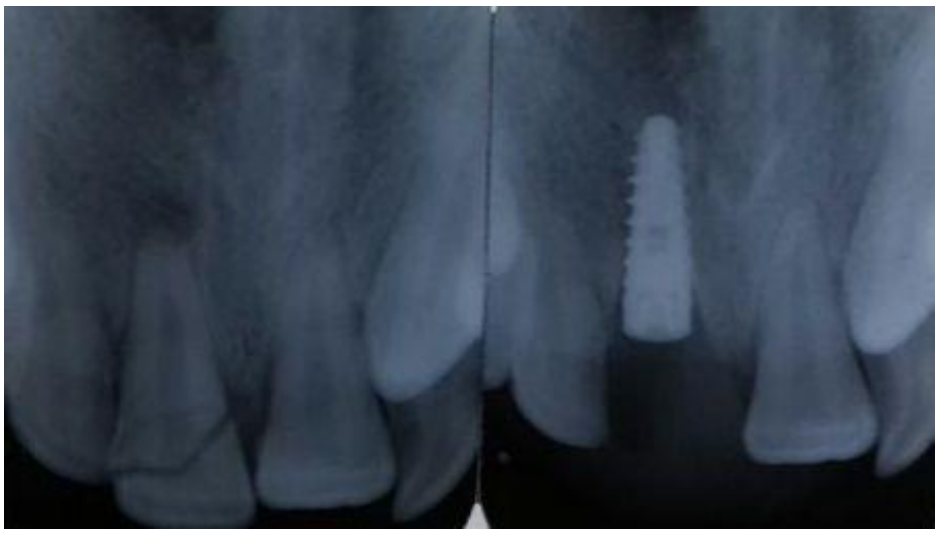

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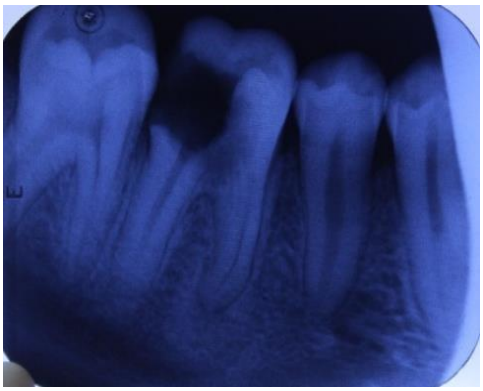

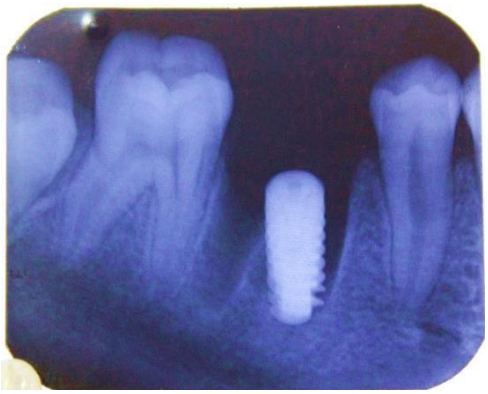

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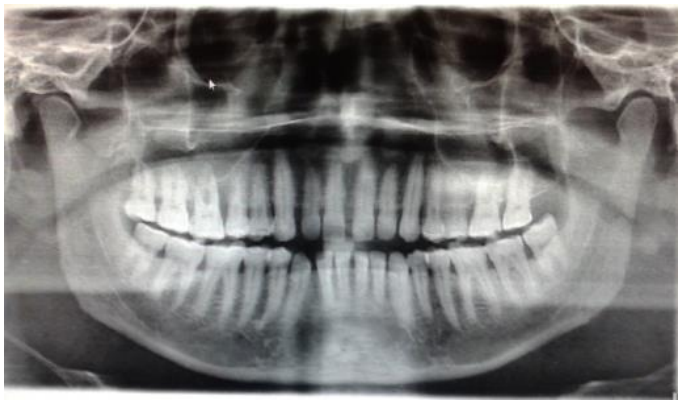

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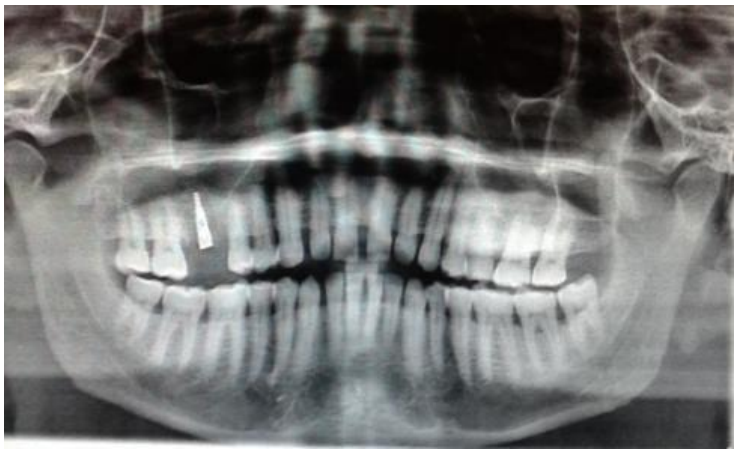

CASE REPORT - 7

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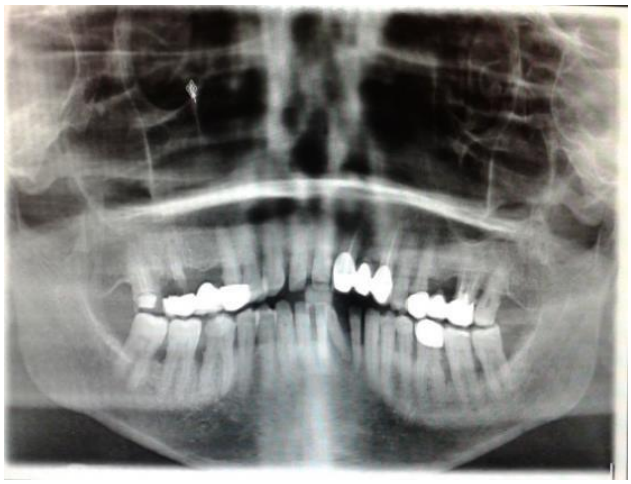

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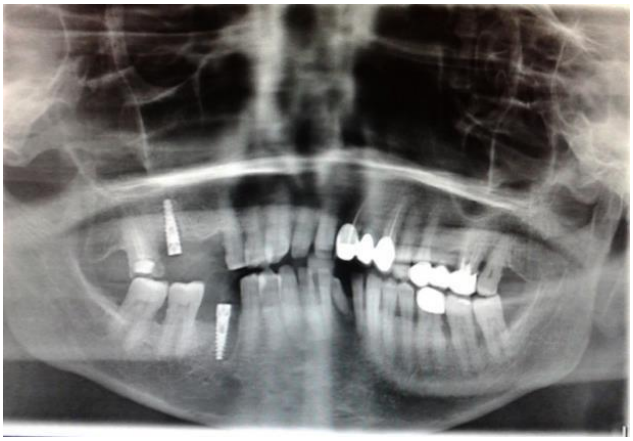
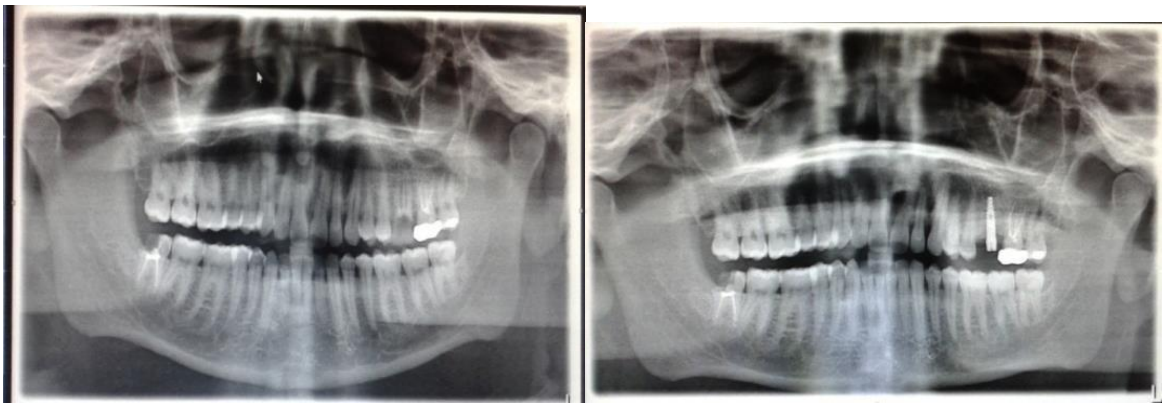


CASE REPORT - 8

PRE OPERATIVEOPG **POST OPERATIVE OPG**



CASE REPORT - 9

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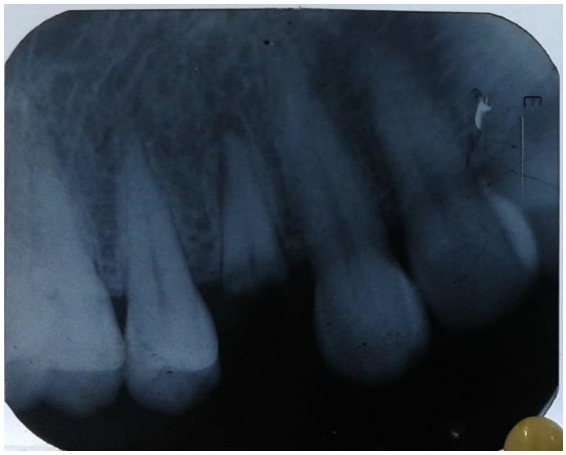

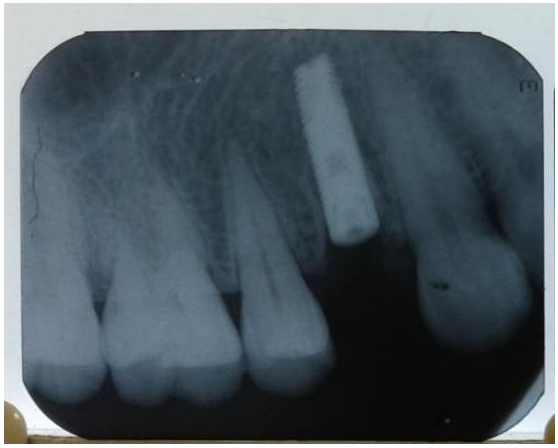

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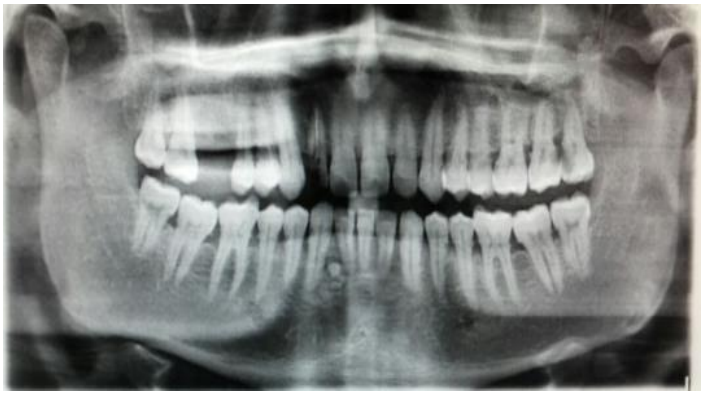

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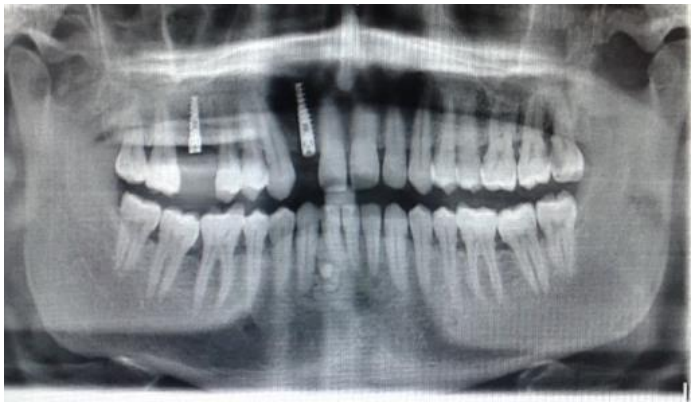


8. RESULTS

In the traditional protocol of implant to remain unloaded for an extended period to achieve osseointegration, was based on initial clinical observations rather than experimental date[6]. Therefore, it was reasonable to question whether this restorative delay was essential for implant success.

A major drawback associated with implant therapyis the comparatively long healing period necessary before the final prosthetic restoration can be replaced[7]. To overcome ethis problem, PRF is used in this study to decrease the healing period of the implant[8] and to load the prosthesis as early as possible[8,9].

Demographic data:

The detailed characteristics of the subject population at baseline are presented in Table 1. After screening, a total of 10 subjects fulfilling the inclusion criteria were enrolled for the study.

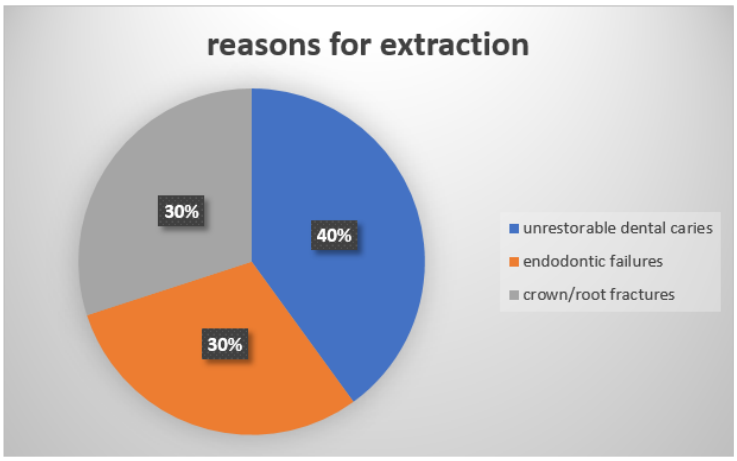
1	AGE	32.1(MEAN AGE)
2	GENDER	7 MALES (70%) 3 FEMALES (30%)

TABLE 1: DATA OF THE SUBJECT AT THE TIME OF IMPLANT PLACEMENT

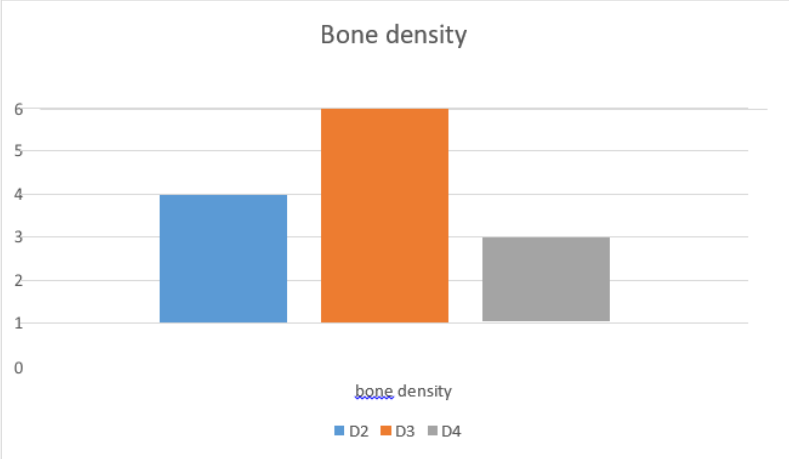
Surgical outcomes:

In the present study, it was observed that there was comparatively quick healing and dense bone formation noticed inless period of time, occlusal restoration with the prosthesis was carried out earlier as compared to normal immediate implant without any grafts being used where prosthesis are given after 12 - 16 weeks in mandible and 16-24 weeks in maxilla.

Reasons for extraction: The most frequent cause was Dental caries (i.e. 40%), followed by endodontic failures (i.e. 30%) and crown or root fractures (i.e. 30%).



Bone quality around the implants were judged based on misch's protocol; five implants were placed in D3 bone, two implants in D4 bone and 3 implants in D2 bone.



In the follow up period of 6 months, all the patients were instructed to maintain good oral hygiene by brushing teeth at Least twice daily along with interdental tooth brushing, frequent mouth rinse with 0.12% chlorhexidine gluconate and advised professional scaling at every 3 month.

In all the patients primary stability was achieved and immediate post-operative radiograph showed that the implants were placed 3 -5mm beyond the extractionsocket.

All the 10 patients were given prosthesis successfully. Appreciable outcome of this short - term study conducted is the definite positive result and quickprostheticrehabilitation in all patients treated using PRF.

In all the patients, crestal bone resorption was found to be less than 1mm in only 3 cases after 12 weeks of implant placement; whereas after 12 weeks, crestal bone resorption less than 1mm was noticed in 7patients.

Reverse torque test done at the second stage was negative for all the patients and hence none of theimplants wereremoved.

No implants were lost during this observation period, yielding a survival rate of 100%. No post-surgical wound- healing complications (i.e. bacterial infections) were observed. However, on the palatal aspects of all implants placed in the maxillary molar area, the collagen membranes were exposed at the time of flap suturing due to the impossibility of soft tissue mobilization.

9. CONCLUSION

The results of the present study demonstrate that the application of platelet rich fibrin during implant surgery enhanced the stability of implants.

10. REFERENCES

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