

**Immediate and delayed implant placement in the era of covid-19 pandemic**

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**Conflicts of Interest:** Nil

**Abstract**

Immediate dental implants have greatly reduced the treatment time and the number of surgical interventions. Present case report describes the delayed and immediate placement of implants after extraction in 29 year old male patient during COVID-19 pandemic. After careful examination and treatment planning implant treatment was initiated by taking all necessary precautions. The tooth was extracted atraumatically and implant was placed into the extraction socket. It was found that the immediate implant therapy reduced treatment length, preserved soft

and hard tissues surrounding implant and minimum number of surgical procedures.

**Keywords:** Immediate implants, atraumatic, extraction sockets, corona virus.

**Introduction**

The aim of modern dentistry is restoration of normal contour, function, comfort, esthetics, speech, and health, regardless of the atrophy, disease, or injury of the stomatognathic system. The introduction of Dental Implants has created a paradigm shift in the orodental rehabilitation of partially and fully edentulous patients. In 2004, Hammerle and colleagues proposed a new

classification system for the timing of implant placement. This classification is based on the structural changes that

occur after extraction on and knowledge derived from clinical observations.<sup>[1]</sup>

Timing of Implant Placement			
Classification	Terminology	Time After Extraction	Clinical Findings
Type 1	Immediate Implant Placement	Immediately	Fresh Extraction Socket
Type 2	Early Implant Placement	4-6 Weeks	Healed Soft Tissue
Type 3	Delayed Implant Placement	3-4 Months	Healed Soft Tissue And Substantial Bone Healing
Type 4	Late Implant Placement	>4 Months	Completely Healed Bone

The gold standard technique of implant placement is delayed implant placement i.e type-3 implant placement. This technique requires several months of waiting period before implant placement.

Approaches like immediate implant placement have been focused to shorten the overall length of treatment period. The technique of immediate implant was first introduced in 1976, which involved the insertion of implant immediately after the tooth extraction, and in today's era, it has evolved as successful, predictable, and alternative treatment modality. There are various advantages conferred by immediate implant placement include reduced treatment time, maintenance of extraction socket, less crestal bone loss, along with increased patient satisfaction and treatment acceptance.<sup>[2]</sup> This approach helps to preserve alveolar bone dimension, allowing placement of longer and wider implants and improving the crown-implant ratio. As a result, the bone-implant contact surface area increases, which could decrease the amount of stress due to occlusal load at bone-implant surface and allow better stability and success.<sup>[3]</sup>

But implant dentistry is quite challenging during the COVID-19 pandemic. The recent spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and its associated coronavirus disease has gripped the whole international community and has caused widespread public health concerns.<sup>[4]</sup> The spread of coronavirus (COVID-19) has posed serious threats for dentistry and medicine, and dental and medical schools, in all affected countries.

It can spread through aerosols generated during dental procedures and apart from spreading for considerable distances it may also remain suspended in the air for several hours rendering the environment of workplace as a high risk area for nosocomial spread. The role of dental professionals in preventing the transmission of COVID-19 is critically important. We are very familiar in dentistry with the principle of universal precautions which should be followed for controlling cross infection based on an understanding that we may not know whether a patient is infected with the potentially transmissible diseases or not. Even though all routine dental care has been suspended in countries experiencing COVID-19 disease during the

period of pandemic, the need for organised urgent care delivered by teams provided with appropriate personal protective equipment takes priority.

We are hereby presenting a case of immediate and delayed implant placement/PROCEDURE during the pandemic period of COVID-19 taking all the necessary precautions.

### **Case Report**

A 29 year old male patient reported to the Department of Periodontics, Sri Guru Ram Das Institute of Dental Sciences and Research for the replacement of missing teeth. Upon patient arrival, the patient's body temperature was measured using a non-contact infrared thermometer. and oxygen saturation with a pulse oxymeter. Following which patient's complete medical, dental, travel history and exposure to any COVID positive patient were recorded, all of which were non-contributory.

Extraoral evaluation of the patient was non significant. While the intraoral examination revealed root stumps wrt 46, missing teeth wrt 22, 36 and restored 47. Patient exhibited good oral hygiene.

Pre surgical radiographic evaluation was carried out with extraoral radiographs (OPG). Clinical and radiographic evaluation revealed adequate alveolar bone, absence of periapical pathology.

### **Surgical Procedure**

**Patient Preparation:** On the day of surgery, patient's body temperature, oxygen saturation and all other vitals were recorded. Covid-19 screening questionnaire and informed consent was signed by the patient. After which patient was prepared for surgery which included proper handwashing and sanitization, wearing of surgical gown, disposable headcap, gloves and shoecover.

### **Operatory preparation**

- Proper air circulation and ventilation was maintained with natural air through frequent opening of windows and using an independent exhaust blower to extract

the room air into the atmosphere. A table fan was placed behind the operator and the airflow was directed towards the patient. A strong exhaust fan was so located to create a unidirectional flow of air away from the patient.

- Inanimate surfaces and floors were disinfected before the start of procedure using freshly prepared 10% sodium hypochlorite and dry environment was maintained to curb the spread minimise virus transmission.
- Dental chairs, door knobs etc were all covered with barrier tapes.

### **Surgeon Preparation**

All the surgeons and assistants wore PPE Kits, nitrile gloves, respirators, 3-ply surgical masks, head caps, face shields.

### **Dental Implant Procedure**

Patient was asked to rinse with 1% hydrogen peroxide prior to the procedure. After measuring the socket lengths, implants (MYRIAD PLUS) of sizes 3.8 X 11 mm , 4.5 X 13 mm and 3.7 X 11.5 mm were selected.

After injecting 2% lignocaine (1:80,000 conc.), full-thickness flap resulting from one crestal and two vertical incisions was elevated wrt maxillary left lateral incisor, and 2–3 mm of buccal bone was exposed. To render the flap more flexible and to allow for primary wound closure supraperiosteal incision was used. Osteotomy site was prepared with sequential drilling and copious irrigation. Surgical guide pins were inserted to demonstrate the proposed placement of the implant in the prepared socket. After the removal from the sterile vial using insertion tool implant was delivered into the osteotomy site. The insertion of the implant was initiated using a low-speed hand piece and was finalized manually by applying 45 Ncm of torque. The graft material was incorporated into the residual space between the implant surface and socket

walls. Primary closure was achieved by stabilization of the flap using 3-0 simple interrupted suture.

Patient was recalled after 1 week for implant placement in the mandible. After injecting 2% lignocaine (1:80,000 conc.), mandibular right first molar (46) was atraumatically extracted using a periosteal elevator to preserve alveolar bone. extraction socket was evaluated for any osseous defects, infection or granulomatous tissue. The socket was thoroughly debrided with curettes followed by irrigation with normal saline solution. Osteotomy site was prepared as discussed before and implant was placed (immediate placement).

For left mandibular 1<sup>st</sup> molar, same surgical procedure was carried out and implant was placed. (Delayed Placement).

Patient was provided with post-intervention instructions that included anti-inflammatory therapy if needed. The sutures were removed after 7 days and OPG was taken.

After the surgery, all instruments were immediately rinsed in running water to remove organic matter and as per standard sterilisation protocol. Flushing of all 3 in 1 syringe, water outlets, hand piece water pipelines, etc. was done with the disinfectant solution for 30-40 seconds. All water containers were removed and washed thoroughly and disinfected with 1% sodium hypochlorite using clean cotton/gauge piece and then filled with fresh 0.01% sodium hypochlorite solution and attached back to the dental chair. Hand pieces and instruments were cleaned using a hand piece cleaning solution to remove debris, followed by packing in the autoclave pouches for autoclaving.

### **Discussion**

Immediate implant concept is gaining popularity in this modern era for replacing missing teeth. Krump and Barnett reported that dental implants placed at the time of extraction show high success reports.<sup>[5]</sup>

It is well known that immediate implant placement can reduce the number of required surgical stages and indeed the entire treatment time. Some authors assert that better preservation of the marginal bone at the extraction site can also be achieved with the placement of implants immediately postextraction.<sup>[6]</sup>

In cases when tooth extraction is due to trauma, endodontic lesion, root fracture, root resorption, root perforation, unfavourable crown to root ratio (not due to periodontal loss) and bony walls of alveolus are still intact immediate implant are most commonly indicated. Contraindications includes presence of active infection, insufficient bone (<3 mm) beyond the tooth socket apex for initial implant stability and wide and/or long gingival recession.<sup>[7]</sup>

Prior to extraction of tooth it was aesthetically evaluated to comprehensively assess the potential implant placement site. A proper plan was made which included soft tissue treatment protocol and set of well defined aesthetic goals. Under three parameters the prospective implant site was evaluated to predict the peri-implant aesthetic outcome these are tooth position and shape, form and bio-type of the periodontium and position of osseous crest.<sup>[8]</sup>

The surgeon may wish to consider loading the newly placed implant immediately or early when anyone of the following condition exist at implant site: when primary stability is obtained, bone is type I or II, site can accommodate implant with a length of at least 13 mm or minimum 3 mm of apical bone present, diameter of the head of the implant closely matches the mesio-distal width of coronal aspect of the socket, no need for bone augmentation procedure, once placed the implant can be completely protected from function and occlusal forces.<sup>[9]</sup>

The initial stability of the implant is essential for early/immediate loading. The minimum insertion screw has to be equal or superior to 32 N/cm and the micro

movement of the implant should not exceed 150 um. In this case report, primary stability was achieved and no need for bone augmentation because the implant diameter closely matches the socket dimension.

Dental implants that are immediately placed and loaded into carefully selected extraction socket have high survival rates comparable to implant placed in healed site.<sup>[10]</sup>

In this case report we are pleased with the gingival aesthetic. Studies have confirmed that immediate loading will produce excellent gingival aesthetics. Our real goal in this case report is to show the potential to reduce time and improve patient satisfaction during the COVID-19 pandemic.

### Conclusion

Implant therapy must fulfill both functional and esthetic requirements to be considered a primary treatment modality. Aiming to reduce the process of alveolar bone resorption and treatment time, the immediate placement of endosseous implants into extraction sockets is known to achieve a high success rate of between 94 and 100 %, compared to the delayed placement.

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**Legend Figures**

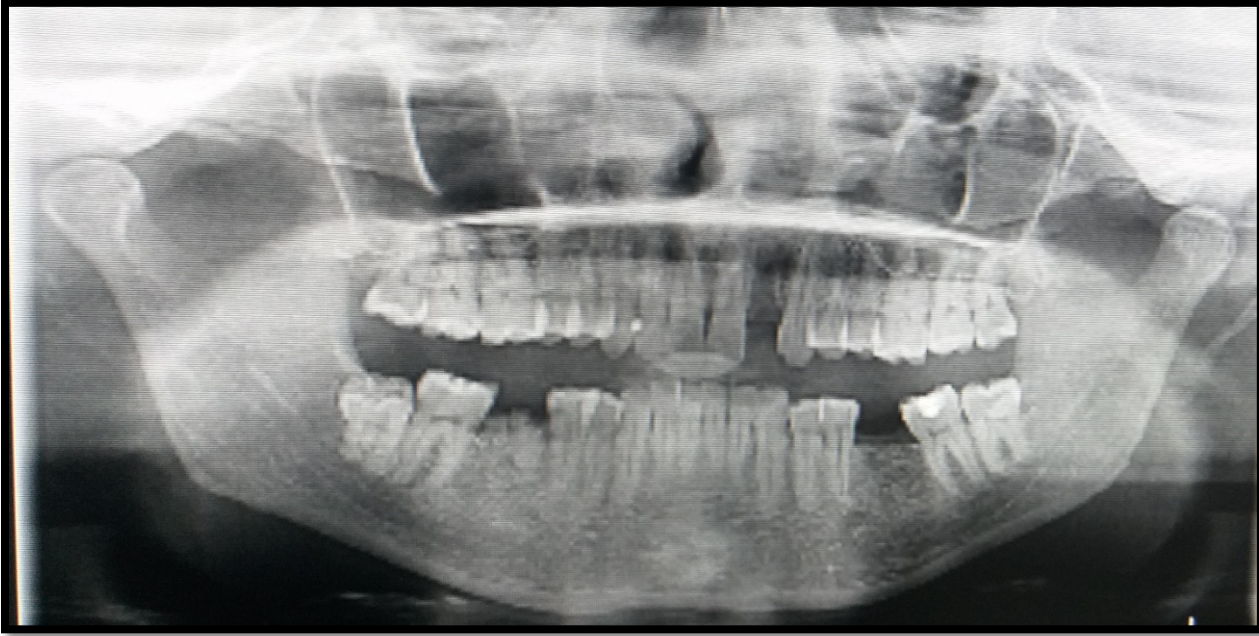


Figure 1: Pre-Operative Opg



Figure 2: Pre-Operative View W.R.T 22

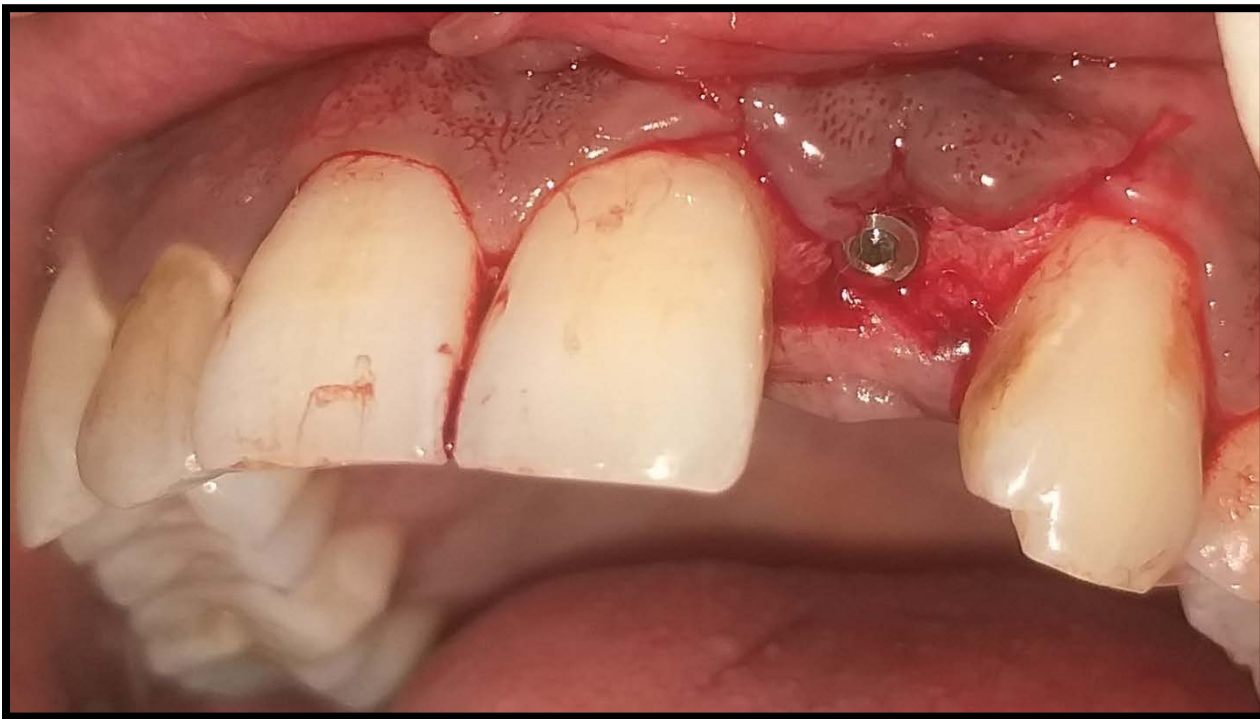


Figure 3: Implant Placement W.R.T 22

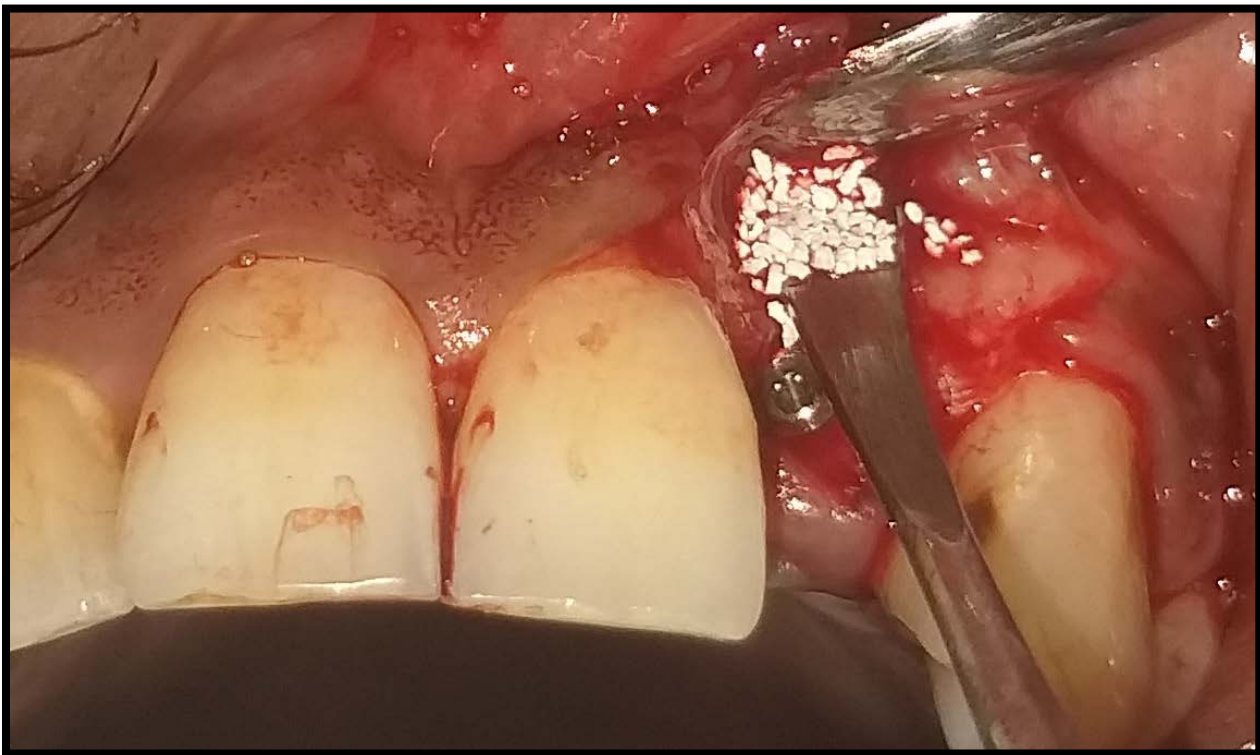


Figure 4: Grafting W.R.T. 22



Figure 5: Suturing W.R.T 22





Figure 6: Pre-Operative View W.R.T 46,36

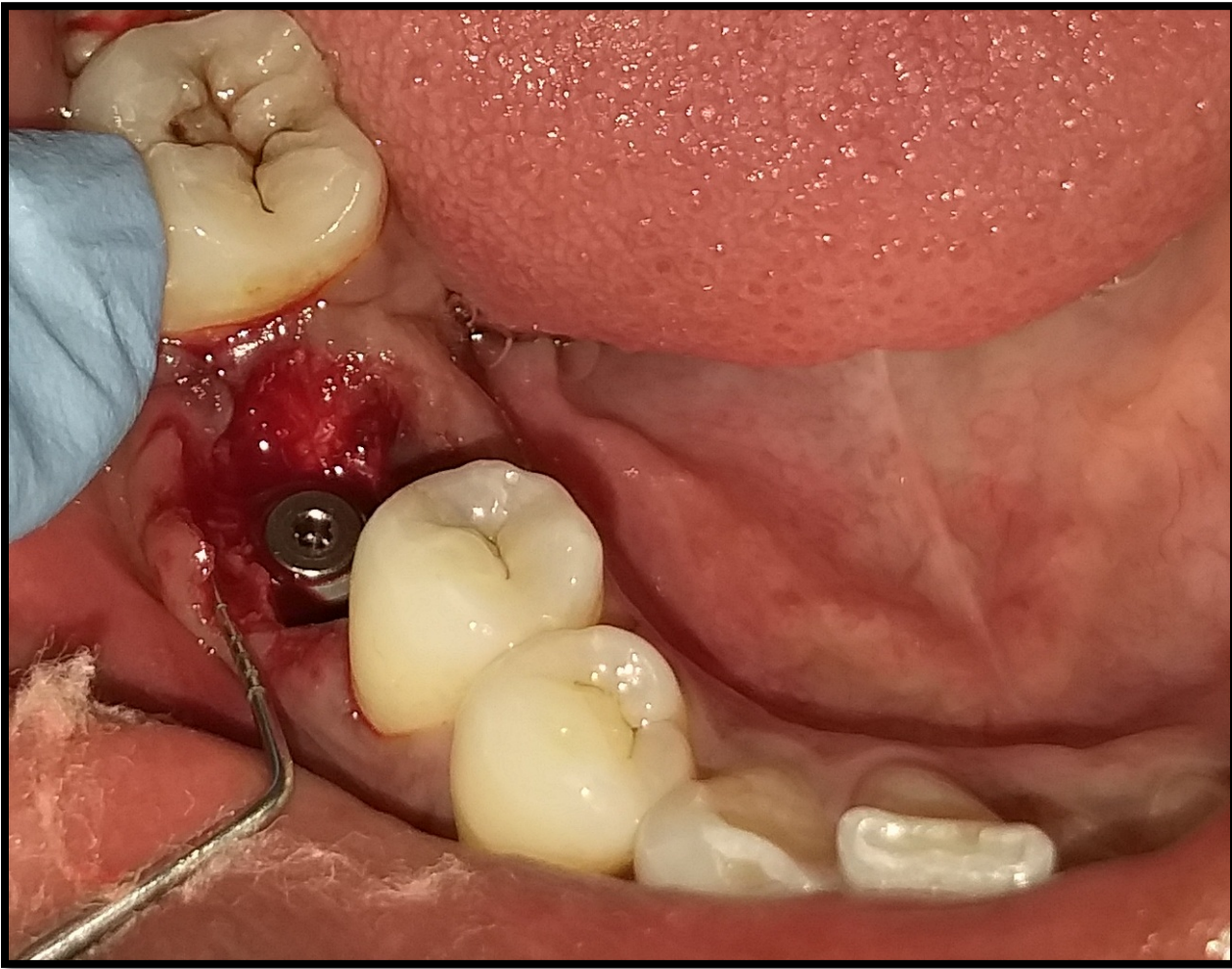


Figure 7: Implant Placement W.R.T 46



Figure 8: Implant Placement W.R.T 36



Figure 9: Suturing W.R.T 46, 36

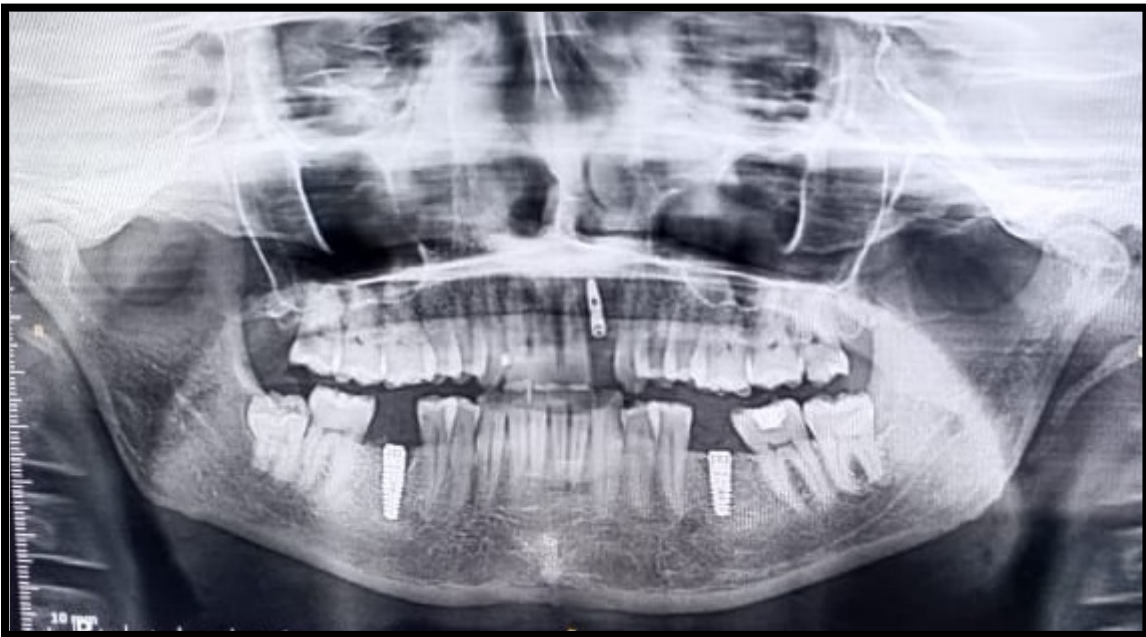


Figure 10: Post-Operative Opg



Figure 11: Post-Operative View With Prosthesis W.R.T 22



Figure 12: Post-Operative View With Prosthesis W.R.T 46,36