ESTHETIC REHABILITATION OF MISSING MAXILLARY CANINE WITH IMMEDIATE NON-FUNCTIONAL LOADING OF IMPLANT

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ABSTRACT
Over the last few decades, dental implantology has evolved significantly and the original protocols have been modified which include: single-stage surgery, immediate post-extraction implant placement and immediate loading. There is always an element of risk in the rehabilitation of canine heightened by the importance of esthetic and functional roles they are destined to play. Missing a tooth, like canine, is of serious concern in social life of a patient in most of societies. No question exists regarding the replacement of tooth, and financial constraints are less important. 1, 2

Restorative dentist should view the prosthetic rehabilitation of a canine tooth as a process that is situated at the confluence of occlusal, mechanical, functional, aesthetic, periodontal, and surgical imperatives. 2

Replacing a canine tooth with dental implant is the optimal treatment plan. The key roles canines play in maintaining normal function and the high visibility of these teeth, especially in the maxilla, necessitate a restoration that provides uncompromised function as well as esthetics. 3

It has been recommended that after placing implant, the surgical site should be undisturbed for 3 to 6 months before loading with prosthesis to enhance osseointegration. 4 However, the treatment time of implants needs to be reduced to augment patient's comfort and satisfaction. Immediate loading with provisional restoration within a week after implant placement has been reported in many literatures. 4-8

Present case report describes the step by step procedure for esthetic rehabilitation of missing canine tooth by means of dental implant with immediate loading by provisional restoration.
CASE REPORT

A 35 years old female patient was reported to department of Prosthodontics at King George’s Medical university, Lucknow for replacement of missing tooth in upper front region of the jaw. Patient was worried about her appearance and desires this to be improved by instant replacement of missing teeth. Intraoral observation revealed missing left maxillary canine, mild gingival inflammation, sufficient residual bone volume to receive implant (Fig.1). Treatment plan includes placement of implant with immediate non-functional loading by means of acrylic temporary crown. All the necessary pre-surgical and radiological investigations had been carried out to rule out any underline pathology or abnormality. With the help of CT dentascan, an endo-osseous threaded implant (Touareg-OS, ADIN dental implant system, Afula, Israel) measuring 4.2 x 13mm was selected. Before surgery, the vital signs of the patient were recorded (B.P. 120/90 mm of Hg, Pulse 77/min, Respiratory rate 16/minute) so as to avoid any complication that might occur during surgery. She was pre-medicated with 2g Amoxicillin one hour prior surgery. Following injection of 2% Lignocaine hydrochloride solution (XICAINE, ICPA health products ltd. Ankleshwar, India), soft tissue flap was raised (Fig.2) and osteotomy site was prepared with sequential order of drills as recommended by the manufacturer. Implant was threaded in place (Fig.3) with an insertion torque of 45 Ncm. Adequate initial stability was obtained. Following attachment the abutment was prepared intraorally for adequate space (Fig.4). Implant was immediately loaded with laboratory fabricated and custom modified acrylic (Pyrex polymers, Roorkee, India) temporary restoration (Fig.5,6) which was adjusted to make free of incisal contacts with opposite dentition. Flap was sutured back with 3-0 vicryl. Appropriate antibiotic and analgesic medications were prescribed and standard post-operative instructions were given to the patient. After 4 month temporary restoration was removed, implant was evaluated for stability, transfer coping was attached to the abutment and soft tissue impression was taken by injecting soft liner within the gaps around transfer coping (Fig.7) and definite impression was taken by using light body and putty polyvinyl siloxane impression material (Aquasil, Dentsply,Surrey, UK). In response to patient’s high esthetic expectation, an all-ceramic crown was fabricated and cemented to the abutment (Fig.8).

DISCUSSION

Loss of anterior teeth is a common form of injury to stomatognathic system, particularly in children and young adults. For cosmetic-esthetic and functional reasons patients with lost anterior teeth often require immediate attention for restoration.

Fixed dental prosthesis replacing maxillary canine can be difficult because the canine often lies outside the interabutment axis. Such kind of fixed dental prosthesis is subjected to stresses as the forces are transmitted outward (labially) on the maxillary arch, against the inside of the curve (its weakest point). For example, a bridge having as its only abutments the lateral incisor and a premolar will eventually cause the loss of the lateral because the root structure and investing periodontal tissues of this tooth resist lateral forces weakly.2,9

Apart from removable dental prosthesis, a missing maxillary permanent canine tooth, as a rule, is best replaced by a prosthetic crown placed on an implant.

The surgical placement of a single dental implant to replace a missing maxillary canine does not usually pose any problems.
When a large quantity (height and width) of bone is available and the space between the lateral incisor and the first premolar is adequate, access is easy.²

Immediate loading of implant, especially in the esthetic zone, has gained recognition due to less tissue trauma, reduced overall treatment time, decreased patient’s anxiety and discomfort, high patient acceptance and enhanced aesthetics and function.⁷

Immediate-loading protocols have two separate prerequisites. The first is biologic: the achievement of osseointegration, despite of the forces exerted during the healing phase, in conjunction with maintenance of a pleasing esthetic response of the surrounding soft tissues. The second confront is logistic: the prosthetic phase should follows the surgical phase as swiftly as possible. In effect, apart from the biologic aspect, the most idiosyncratic disparity between the protocols for immediate loading and those for conventional loading is chronologic, that is, the shortened interval between the surgical and the restorative phases.¹⁰

The ideal conditions for immediately loaded implants would include adequate bone quality, threaded implants, rough implant surface, and minimum implant length of 10 mm, adequate primary stability and avoidance of lateral forces.¹¹ Primary stability of implant seems to be important factor in immediate loading. Implants could survive immediate loading predictably if suitable primary stability was achieved.

In the present case report threaded implant with rough surface was used and primary stability of 45 Ncm (evident by torque wrench) was achieved which was done by keeping the osteotomy one size smaller than the width of the implant and by threading the implant into the osteomy site.

Misch (2005)⁴ suggested that functional force should not be applied to provisional prosthesis during bone healing in an immediate loading procedure. Consequently, provisional restoration in the present report was fabricated not to contact opposing teeth during maximum intercuspation as well as during lateral excursion (non-functional loading).

Immediate function in partially edentulous patients was investigated in many studies.⁴,¹²

Schnitman et al. (1997)¹² followed 28 immediately loaded implants in partially edentulous patients for 10 years and reported 84.7% success rate in 10 years.²¹

Hartog et al. (2011)⁶ carried out a randomized clinical trial and concluded that the treatment outcome of immediate non-occlusal loading of a single implant in the maxillary anterior zone is not less favorable than conventional loading. After 18 months of follow-up, both treatment modalities showed an equal amount of peri-implant marginal bone loss and no differences in survival rate, soft tissue aspects, esthetic outcome and patient satisfaction.

In the present report excellent results were obtained with the provisional crown regarding soft tissue profile and esthetics. Patient desires exactly same contour, size and visibility of the final prosthesis. So, definitive all ceramic restoration, which was exact replica of the provisional crown, was fabricated. Gingival emergence profile of the interim restoration was duplicated in the definitive prosthesis by taking the impression of soft tissue contour created by aforesaid restoration. Finally, patient was very satisfied with the final outcome of the treatment as well as procedure followed.

**CONCLUSIONS**

As immediate loading reduces the treatment time and could offer more comfort and
satisfaction to the patient, we advocate this approach to be considered as an alternative to delayed loading protocol. The concept of immediate non-functional loading should be performed according to a specified protocol with concentration to adequate primary implant stability and careful patient selection.

Figure 1 - Pre-operative photograph

Figure 2 - Intra-operative photograph

Figure 3 - Implant placement

Figure 4 - Attached abutment to the implant body

Figure 5 - Abutment prepared for provisional restoration

Figure 6 - Immediate loading with provisional restoration
REFERENCES


