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Prosthetic rehabilitation with hybrid implants – A case report

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Abstract

In an edentulous patient the ultimate aim is replacement of missing teeth in order to restore function and, to certain extent aesthetics as well. Dental implants eliminate the need of deriving support for a stable denture base from an otherwise dynamic mucosa also, in a partially edentulous cases where one or more teeth may require replacement it tends to avoid the adjacent teeth and focuses on deriving the support from the underlying bone mimicking as a close replica of natural tooth. As they gather momentum in rehabilitation, various authors have come across obstacles significant enough to discourage the use of an otherwise efficient modality and resort to conventional means. So to overcome these problems hybrid implants were used.

Keywords: Hybrid Implant, atrophic ridges, full mouth prosthetic rehabilitation

Introduction

In an edentulous patient the main aim is replacement of missing tooth that has evolved from removable partial dentures to fixed partial dentures and recently to dental implants. Dental implants eliminates tooth preparation of adjacent teeth as needed for placement of fixed partial denture. Osseointegration is an important factor for stability in dental implants. In maxilla, sinus lifting procedure is required if bone is less than 5 mm, and it is a technique sensitive procedure. In the mandibular region if the height of bone is compromised, the placement of endosseous implant may lead to injury to anatomic structures. Taking this into consideration we have used hybrid implant instead of endosseous implant in our case to overcome the concept of sinus lift procedure and osseointegration.

Case report

Here we present a case report of 30 years old female patient who reported to our department of oral and maxillofacial surgery with chief complaint of missing teeth in both upper and lower teeth region since 6 months (Fig 1). She had missing 35, 36, 37, 45, 46, 47 in the lower arch and 16, 17, 26, 27 in the upper arch (Fig 2 and 3). She had no significant medical history. There was good amount of interocclusal space present between the molars. On examination, the molars present on the maxillary quadrants were supraerupted which were subsequently extracted followed by a period of uneventful healing. Patient informed and written consent with IDST institutional ethical board permission was taken prior to the study. All surgical implant placements was carried out under local anesthesia. Patient was followed up postoperatively at regular intervals at 1st month, 3rd month and 6 month postoperatively for pain and discomfort, implant exposure, infection, loosening of implant and wound dehiscence and the prosthesis was cemented after 3 months.

Design of implant and method

Hybrid implant consists of a long malleable plate having a length of 30-45 mm, thickness of 0.4-1 mm and breadth of 3-5 mm with screw holes and a stump called abutment, projecting from the flat surface of the plate. The implant is a prefabricated malleable thin elongated laminar plate having a vestibular anchoring part with at least three screw holes and a lingual or palate anchoring part with at least two screw holes for fixing at the most appropriate area of the jaw bone by means of screws.

Out of the three screw holes in vestibular region minimum of two holes are used for anchoring and one screw hole on palatal and/or linguallside. Two arms on either side of the abutment are of variable length. However number of holes on the plate and the diameter and length of the abutment are also variable and is in the range of 1.5-7 mm diameter with 4-8 mm length. The length of abutment can be cut to size as required. These variations are decided according to the site of placement of the implant on the jaw. The elongated laminar plate, abutment and screws are made of titanium. Screws of diameter 2 mm and length 6mm are used in both mandibular and maxillary arch. Under local anesthesia crevicular incision was given continued with a crestal incision followed by a vertical release incision in the anterior region is given (Fig 3 and 4). A triangular mucoperiosteal flap is elevated and the alveolar bone is exposed initially on the lower arch and then after reflection of the mucoperiosteal flap the implant blade was molded according to the arch shape and fixed using titanium screws on both buccal and lingual cortices in such a way that the abutment was projecting occlusally in the oral cavity and the same procedure was followed for the maxillary arch (Fig 5 and 6). Primary closure was done such that abutment remained exposed. The closure is done with 3-0 silk suture (Fig 7 and 8). Subsequent follow up did not reveal any significant complaint and uneventful healing followed. Patient was referred to prosthodontics department after satisfactory healing was achieved for prosthetic rehabilitation (Fig 9, 10 and 11). Radiographic evaluation was done at regular intervals till 6th month post operatively. (Fig 12, 13 and 14)



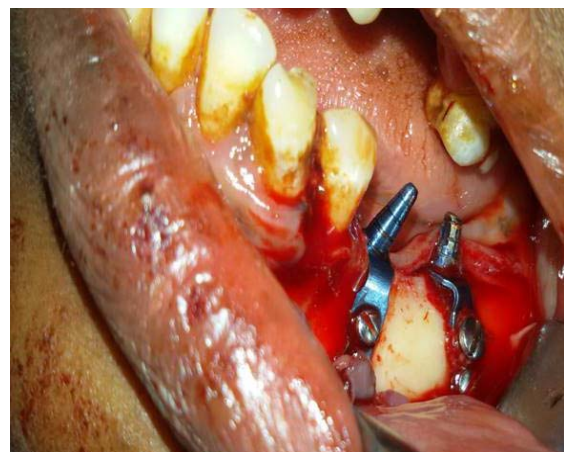
Fig 2-3



Fig 3-4: crestal incision given in mandibular and maxillary arch



Fig 1



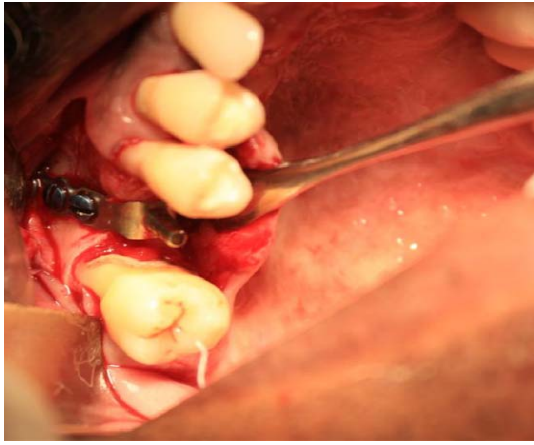


Fig 5-6: Placement of hybrid implants



Fig 7-8: Placement of 3-0 silk sutures



Fig 9-10-11: Prosthetic rehabilitation



Fig 12: pre-operative OPG

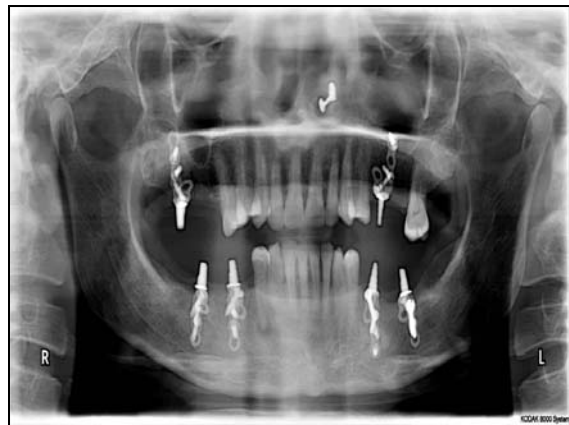


Fig 13: immediate post operative OPG



Fig 14-6th: month post operative OPG

Discussion

The concept of osseointegration proposed by Branemark *et al.* [1, 2] and the replacement of lost teeth by implants have revolutionized oral rehabilitation with a significant advancement in restorative dentistry. In 1937 Gustav Dahl proposed the original subperiosteal implant design and insertion protocol [3]. Many other authors also studied technique and designs of subperiosteal implants [4-9]. Dental implants have gained significant importance in tooth replacement. But certain limitations and drawbacks are there with conventional implants. Sufficient amount of bone is crucial for the placement of an endosseous implant. If the height of the crestal bone is not adequate there is a risk of involvement of neurovascular bundle in mandible. Keeping in mind the above limitations. So in 2014 Varghese Mani *et al.* [10] introduced Hybrid implant a novel implant system which can very well handle atrophic maxilla without sinus lift and grafting procedures and mandibular edentulous areas with minimal nerve injury. These are closest to a normal teeth for the time being and research is done to fine tune them to replicate more anatomical structure in order to make them more biocompatible and functionally stable The implant showed good stability with minimum postoperative complication It is placed subperiosteally onto the bone. During hybrid implant fixation the proximity to anatomic structure did not seem to be the concern as the screws were fixed subperiosteally well away from any predictable anatomical entity. In the sinus area of the maxilla the thickness of the bone between the sinus and oral cavity at the alveolar crest is often less to support the conventional implant. This is overcome by the proposed implant as it is subperiosteal and is directly fixed onto the bone. This avoids sinus lift bone grafting which is a very technique sensitive major surgical procedure with a varying recovery period. The conventional implant requires specific instrumentation and an elaborate set up in contrast to a basic maxillofacial surgical armamentarium required to place this proposed system. Intraoperatively, the osteotomy required to place a conventional system is measurement and a technique sensitive which potentially can change a treatment plan for subsequent prosthetic rehabilitation while in case of hybrid implant the osteotomy involves single drills with various point of fixation which otherwise are volume independent. Immediate post op requires primary closure which may or may not be achieved inspite of development of mucoperiosteal flap. However, in case of hybrid implant the abutment is already projecting in the oral cavity which eventually serves for immediate prosthetic rehabilitation. Postoperative course is more or less uneventful which may not be the scenario in case of

conventional implant which is accompanied by swelling and pain of varying intensity. In our case a total of 6 implants were placed in the patient with the eventual aim to rehabilitate her posterior occlusion. The rehabilitation seems to be working in good harmony with the natural teeth with minimal discomfort to the patient. Since the majority of the stability relies on the fixation by screws, osseointegration does not seem integral to the stability of this implant making it a relatively predictable modality as compared to other products in this age of implant consuming scenario. In this case we did not have to wait for the implant 'to be taken up' by the bone. Function rehabilitation seems to be less complicated than a conventional endosseous implant.

Conclusion

Hybrid implant system is an effective system for the rehabilitation of edentulous spaces with inadequate bone for endosseous implant placement and also cost effective and patient friendly. It proves to be a safer alternative for sinus lift and bone grafting. This implant system is economical, technically less sensitive requiring minimum armamentarium for implant placement. This system can lead to new prospects in the field of prosthetic rehabilitation Further long term studies are required and needed for a more confirmatory efficacy about the hybrid implant system.

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