Hybrid Implant-supported Prosthesis in the Lower Arch: A Case Report

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Abstract

The protocols for the implant dentistry has improved at a very extreme pace. To conduct implant dentistry in a manner that is beneficial for the society requires an impeccable diagnosis, a treatment plan that takes into consideration surgical and prosthetic parts too. For any implant driven prosthesis to be successful requires that clinicians adhere to the basic principles ignoring which can lead to a prosthodontic nightmare. Following is a case report describing the methodology followed for hybrid lower implant-supported prosthesis.

Keywords: *Hybrid lower implant-supported prosthesis, Diagnosis, Treatment planning, surgical guide.*

Introduction

Modern dentistry requires that all the treatment goals like normal contour, function, esthetics, speech and health of the patient is achieved irrespective of atrophic changes, any underlying systemic diseases or trauma to the stomatognathic system.[1] Although, if fewer teeth are presently coupled with the fact that the ridges are highly resorbed then achieving these goals with basic Implantology is not possible. Implantology in its basic element means placing an alloplastic material in the jaws that provide anchorage and retention for the prosthetic part.[2] The experiences gained and the information acquired thus far has helped establish endosteal implants as a commonly used dental protocol. As a virtue of advancement in research, designing implants, dental materials, and techniques have aided in better predictability and outcomes as a result of which various types of implants and clinical techniques are available for rehabilitation of different clinical problems.[3] Implantology provides acceptable treatment outcomes that better the conventional and traditional restoration protocol.

Replacement of hard and soft tissue structures includes a lot of challenges and thereby requiring proper case selection, diagnosis, and execution of the treatment plan. Following is a case report describing the treatment protocols followed for one such case.

Case Report: The Patient, a 78 years old-man, wearer of a removable partial denture in the maxillary and mandibular arch, presented to the Department of Prosthodontics and crown and bridge, at Institute of Dental Sciences, to undergo rehabilitation of the loose lower removable partial denture with a fixed implant dental prosthesis.

Figure 1. O.P.G of the patient at the time of reporting to the department

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Patients case history revealed that he is wearing the upper and lower removable prosthesis for 7 years and has been facing problems with lower denture since the last 2 years like pain and mobility of the lower teeth along with loosening of the denture and inability to eat. The patient after clinical examination was advised with an Orthopantomograph which was duly carried out in the institution itself. Examination of the Orthopantomograph along with clinical correlation suggested a root stump in 38, vertical defect in 34 and 46 along with grade 2 mobility of 42 and generalized loss of lower ridge height. Upper dentition also suffered from supraeruption and cervical attrition in 15. The patient was given the treatment option of upper plane correction as well as replacement of the upper prosthesis but he insisted on the treatment of the lower arch only and to maintain the status quo in the upper arch as he was not facing any difficulties in the upper prosthesis and was satisfied with it.

It was then decided to extract 38(root stumps), 34, 42 and 46 while retaining 47 and 48 to provide stability to the prosthesis. An implant-supported RP-5 Prosthesis was planned for the patient which will be supported by both implants and soft tissues and will provide lower lip support as patients age ruled out any extensive ridge augmentation procedure given the high chances of morbidity.

Figure 2. Patients pic post-extraction and healing of 38, 34, 42, and 46.

Extraction of 38, 34, 42, and 46 was done along with curettage and irrigation. Interrupted suture with 3-0 mersilk was given to achieve uneventful healing. Complete oral prophylaxis along with pocket therapy of remaining teeth was also done during the post-extraction healing phase.

After healing based on the patient's C.B.C.T (Cone-beam computerized tomography) it was decided to put four I.C.E (Implant classic esthetics) internal hex designed implants of Alpha biotech (Israel) of the dimension of 3.7x 11.5mmin the region of 33, 34, 43 and 44. A Bone stabilized surgical guide was used for determining the exact position and spacing between the implants during implant placement surgery. Good primary stability of 45N was achieved during torquing of implants and alloplastic augmentation of the ridge was not required. Multi-unit temporary Healing caps were given along with interrupted mattress sutures that were given to contour the soft tissues around the healing caps to allow for uneventful healing.

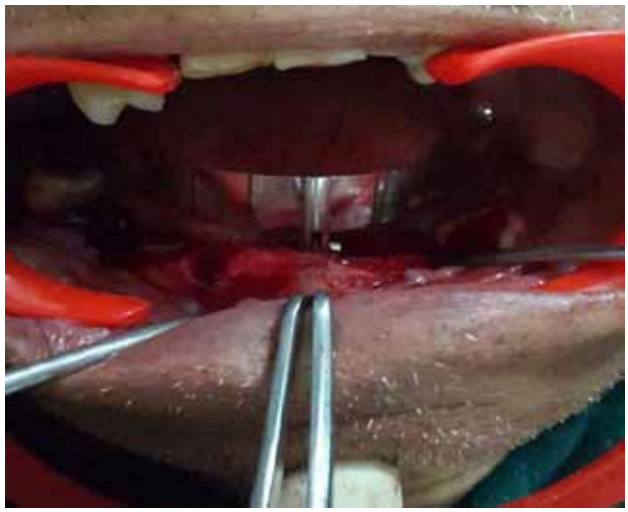

Figure 3. Bone stabilized surgical guide to ensure correct implant spacing and position.

Prosthetic phase: Post healing a preliminary impression of the upper and lower arch was taken with Chromatic alginate (Tropicalgin, Zhermack) and a special tray was fabricated for the lower arch. Borders were then molded using a green stick compound (DPI) and the second impression was made using medium body polyvinyl siloxane (Aquasil ultra monophase, Dentsply). A removable partial denture for the lower arch was prepared using the normal protocol and to match the upper occlusal plane. The coping cylinder was screwed onto implants and corresponding screw channels were made in the prepared removal partial denture to allow for the cylinders to pass through without any interference. These cylinders were then milled to the appropriate size to get incorporated within the removable partial denture. A 0.006 inch (adult size 6x6 inch, Nictone company) rubber dam was used to block out any undercuts and the screw channel access to prevent any self-cure resin to flow into it. R.P.D Prosthesis was placed over the coping cylinders and the pink color self-cure resin was used to fill up any gaps between the coping cylinders and the

prosthesis. Patient was asked to close his mouth in centric occlusion with articulating paper in place to identify any occlusal discrepancies if present. The prosthesis is then unscrewed with cylinder copings now attached to the intaglio surface of the prosthesis. The prosthesis was then screwed back into the patient's mouth after occlusal adjustments and any other discrepancies were corrected in the patient's mouth. Denture flanges were also reduced to prevent any soft tissue impingements. Composite resin (Te-Econom, Ivoclar Vivadent) was then used to block out the screw channels and maintenance instructions were given to the patient.

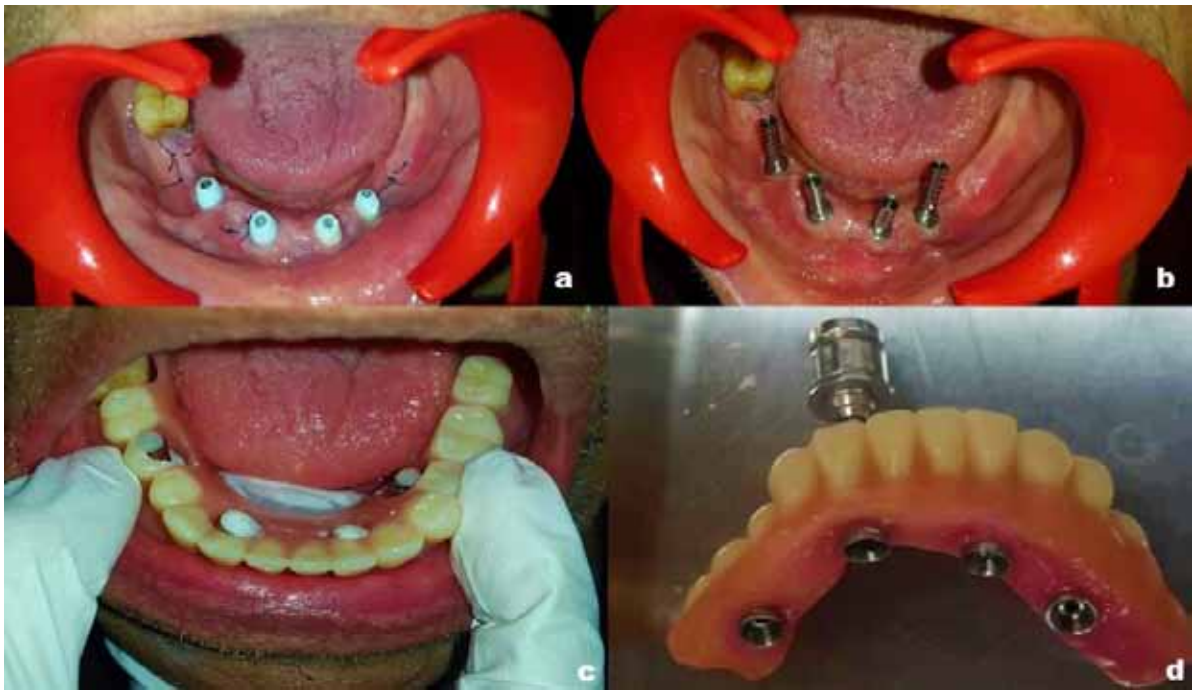

Figure 4a, 4b, 4c, 4d: Temporary healing abutment with continuous mattress sutures given.

Figure 5.

Periodic Recall: The patient was asked to come for a follow up at a frequency of 1,2,6 and 12 months after delivery of the prosthesis and Annual radiographic examination were also carried out. The following benchmarks for success were kept like lack of implant mobility, no tenderness or any symptomatic observations at each visit, Absence of peri-implantitis,and absentia of periapical lesion around the implants. Also, prosthodontic problems and outcomes were assessed. Very less bone deterioration was observed with radiological tools, but no implants failed after prosthetic rehabilitation after 1 year follow up. Occlusal access filling dislodged but was rectified and no other complication was noted during 1 year follow up. The patient also realized that his new denture looked good, his phonetics was vastly better and it was relatively easy to cleanthe prosthesis and his capability to chew had greatly increased. The progressive mentality of the patient and his happiness with the prosthesis that answered his main problems and requirement added to a fair prognosis.

Discussion

Dental Implantology requires exact and accurate planning to come over any clinical problems and to

foresee the final result before initiation of the treatment.[4] Planning for esthetic cases requires different diagnostic perspectives and includes additional factors like smile patterns and lip size etc.[5] Besides, the restorative space for the prostheses, which is measured from the platform of the implant to the opposing dentition, is often overlooked when the implant position is planned. The intra-arch distance which implants components, metal, the acrylic resin, and the denture teeth are placed plays a major role in selecting appropriate restoration. With mandibular implant-supported fixed prostheses, a minimum of 12–15 mm of space has been suggested.[3] When sufficient intra-arch space is observed, a hybrid prosthesis is recommended.[7] Reconstruction of the atrophic jaws for implant placements is usually staged with implant placement after graft healing.[7] Moreover, areas to be treated with dental implants are mostly affected with either acute or chronic infections.[8] Overall length of the cantilever is paramount for that itis to be assessed when constructing an implant-supported hybrid prosthesis.[9]The researchers suggested that the mandibular span should be between 15 and 20 mm to reduce the chances of failure of the framework.[9] Other researchers suggesta cantilever span of 1.5 or 2 times of the anterior, posterior curve of the implants.[3] Also to be considered is the opposing dentition and the number and distribution of implants, before the determination of cantilever span.[4] One more essential objective during the construction of implant-supported hybrid prosthesis is achievinga passive fit of the framework. If there is no passive fit then biological and mechanical problems likeperi-implantitis bone, screws loosening or fracture of the abutment or the implant were noticed.[3]No implant failure, peri-implantitis, soft-tissue complication related to prosthesis design, fracture of prosthesis frameworks, screw fractures or screw loosening, or difficulty in sustain ability were observed in the patient during the periodic recall time. Although, the occlusal access filling material dislodged it is considered to be the most common problem plaguing the mandibular hybrid prosthesis.[10] On an added note, it was also observed that, though the restoration survival rates remained high, the denture teeth underwent significant wear & tear.[10] Also, the clinicians found that tooth fracture anteriorly was more commonly observed than the posteriors.[10] In the present study, the loss of filling material from the prosthetic screw access occurred only once. These results are incomplete contra indications to the increased incidence of tooth fracture presented inthe previous report.[10]

Conclusion

The present case has shown that a very respectable esthetics and satisfactory functionality for a patient can be achieved with an implant-supported hybrid prostheses. The only drawback of this case study is the follow-up timeline of only 1 year which might undermine the proper assessment of these results. Although, it is safe to conclude that hybridrestoration can give optimum outcomes wherein implants were placed irrespective of careful treatment planning. It is also paramount to assess the patient not only with a surgical aspect, but also from a prosthodontic point of view.

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Ethical Approval: Approved

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