

Multiple Implant Placement : A Simplified Approach to Perfection

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Abstract

Success of an implant supported restoration depends on the passivity achieved and precision in each step of implant placement. Occasionally implants are placed in less than optimal position which may require modification in prosthesis design and increase the technical difficulty. In these instances pre-angled or customized abutments may be used. If more than one abutment has to be used accurate orientation of the hexed abutments can be placed in 6-12 different positions depending on the connection design. In addition the number of positions increases exponentially when more than one abutment is placed. The present paper focuses the use, fabrication and advantages of a multiple abutment positioning guide which helps in better seating of the abutment leading to a better prosthesis fit and ultimately better aesthetics and function.

Keywords: Multiple abutment positional guide, implant abutments, implant analogs.

Introduction

Recent goals for implant dentistry include simplifying the involved procedures, reducing the duration of therapy for the patient and clinician and enabling the use of conventional Prosthodontic techniques with precision and accuracy for implant supported restorations. The success of implant supported prosthesis depends in large part on the passivity achieved and stress distribution patterns. Occasionally implants are placed in less than optimal position which may require modification in prosthesis design or may increase the technical difficulty.¹ In these instances pre-angled or customized abutments can be used. The implant abutment that is set on the implant platform provides a standard axial angulation to the prosthesis placement. When more than 1 abutment is needed, the standard angulation may impair the insertion of the final prosthesis, depending on the implant orientation.² In addition to this, many factors may lead to prosthesis failure, such as an inaccurate impression or analog misplacement or a poor fit in the try-

in session. Another difficulty with implant abutment is that the same abutment can be positioned in 6-12 different positions, depending on the connection design. In addition, the number of positions increases exponentially when more than one abutment is to be placed. When seating the abutment, it must be held steadily in position while the abutment screw is tightened. This can also increase the complexity of an abutment installation.

This report presents the fabrication and use of a multiple abutment positional guide which not only reduces the chair time for construction of implant supported prosthesis by seating the abutments on their correct locations but also leads to better aesthetics and function.

Problems Associated With Multiple Implant Placements

Multiple implants are often placed at an angulation or a tilt. This may be due to the proximity to some anatomical structure like the inferior alveolar nerve or the mental nerve or may be due to the flaring of the bone. This tilt may lead to the impaired insertion of the final prosthesis.

Another problem associated with tilted implants is while impression making. On removal of the impression distortion may occur, ultimately leading to an incorrect master cast.

Multiple implants placed at an angulation offer different path of insertion of the prosthesis due to the variation in implant axis. Forces are not directed along the long axis of the implant fixture exerting undue stresses on underlying bone and thus leading to cortical bone loss.

So for these implants we have either the custom abutments or the prefabricated angled abutments.

Custom abutments are laboratory fabricated abutments that contributes direction for the prosthesis by milling of the interferences.

Advantages of The Custom Abutments

They help in correct placement of prosthesis in case of malpositioned implants.³

They have a specific fit to any position in the mouth.

They excel in the esthetic zone and gives

an optimal design.⁴

Problems Associated With Custom Abutments

These abutments can have 6-12 different positions on the implant platform depending on the connection design.

The no of positions increase exponentially as the number of abutments get multiple.

While screw tightening of these abutments because of the torque involved there can be an abutment rotation which may affect the passive fit of the prosthesis.

So to solve these problems, construction of an abutment template becomes beneficial.

Materials And Methods

Construction of the multiple abutment positional guide on the cast.

An accurate cast with the analogs and abutments in position is needed as the starting point of this technique.(Fig 1):

1. Place the abutments on the implant analogs on the cast.(Fig 2.)
2. Lubricate the custom abutment and adjacent structures with a separating medium.
3. Dispense adequate amounts of powder and liquid into each rubber cup.(Fig 3,4)
4. Moisten the tip of the brush with the liquid and pick up a small amount of powder, deposit this mixture around the abutments over the cast.
5. Progressively build up the positional guide linking all abutments. Clean the brush with liquid after the use or during the work, if necessary. After the resin has set (3 minutes: at 23°C/73°F), remove the positional guide carefully from the abutment and check the margin and internal surface.² (Fig 5)

In addition to the self cure resin we can use the light cure resin for the fabrication of multiple abutment positional guide.

Seating The Abutment In Position

1. First place 1 abutment on the implant platform. Check its position with the guide. Slightly tighten the screw just to keep it in place. Remove the multiple abutment positional guide. Note that if the multiple abutment template does not match with the other abutments locations, the first abutment should be

removed and reinserted in the correct position. Check it again with the multiple abutment guide.(fig 6)

2. Assemble another abutment on the implant platform and check the adaptation with the guide. If the guide is fully adapted to the abutment, tighten the screw slightly; if not, repeat this operation until it does.
3. Repeat step 2 with all the abutments, wrench the screws and check for adaptation radiographically.²(Fig 7)

Discussion

Achieving passive fit of a multiple abutment prosthesis is quite impossible because of the number of variables involved in prosthesis fabrication process. The lack of passive fit between prosthesis and implant may submit these components to strain and consequently result in their failure, fracture of the implant, or micro fracture of the bone that surrounds the implant and bone loss.^{2,5} In addition , a further possible effect of a poor cast abutment is screw loosening. Thus, one of the major concerns in the implant retained prosthesis is with regard to the accuracy of impressions. Thus plays an essential role in prosthesis implant adaptation. According to Lorenzoni et al, the original implant position must be reproduced in the working

cast so that the prosthesis fit may be achieved without interfering in the path of prosthesis placement. The use of multiple abutment guide can show discrepancies in the master cast when the abutments are not able to sit in place on the implant platform. This comprises a time reduction by the early identification of misplaced analogs, impression failure or poor casting, avoiding nonpassive prosthesis. A radiograph should be used to evaluate the seating of the abutments onto implant bodies. It was stated that a divergence of more than ± 10 degrees with the vertical plane resulted in missed open margins as large as 0.1mm. a less than optimal fit may result in bacterial aggregation, which leads to peri-implant inflammation. Therefore, all efforts should be made to check the proper seating of the abutments, because the radiograph may not have diagnostic potential. The positional guide described in the present report reduces the chair time for construction of implant supported prosthesis by seating the abutments on their locations.

Conclusion

A multiple abutment positional guide is useful to provide proper positioning, an accurate seat of the abutments and, consequently, a passive fit of the prosthesis or superstructure. Reduces the risk of undue

stress transfer and the risk of aspiration of the abutments by the patient.¹ The chair time for construction of multiple implant supported prosthesis can be considerably reduced by using the positional guide and therefore also reduces the no of clinical appointments.^{2,6}

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Legends

- Fig.1. Cast with implant analogs
- Fig.2. Abutments placed on implant analogs
- Fig.3. Self cure resin, powder and liquid mixed.
- Fig.4. Guide fabricated linking all the abutments
- Fig.5. Position of the abutments checked with help of guide in the mouth
- Fig.6. Abutments correctly adapted to the guide
- Fig.7. Abutments correctly placed in the mouth

