

Management of Fractured Ball Abutment : A Case Report

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Introduction

The resorbed mandibular ridge has always been a challenge for a prosthodontist. The difficulty one faces in the fabrication of a complete denture for a substantially resorbed mandibular ridge is no stranger to a clinician. For years, several methods and techniques have been suggested by various authors and several textbooks for this one particular condition. By the amount of techniques, methods and literature available for achieving a retentive stable mandibular denture we can understand the magnitude of troubles a clinician has faced over the past, up until recently.

The concept of osseointegration by Branemark and its integration in dentistry, has given dentistry a whole new face lift. The advent of dental implants has solved the problem of a highly resorbed mandibular ridge to a much greater extent when compared to the conventional methods. Implant supported prosthesis has not just provided the dental surgeon with a tool for management of resorbed ridge but also greatly enhanced patient acceptance and satisfaction. The patients using implant supported prosthesis also feel more confident for they know that their denture shall not pop out of their mouth creating an embarrassment for them in public. In 2002, an international symposium at McGill University concluded that a conventional denture was no longer the most appropriate option for restoring the edentulous mandible and that, a two implant retained overdenture should become the first choice for prosthodontics treatment.¹

Amongst the various modalities available for restoring mandibular edentulous ridge ranging from 2 to 5 implants in A B C D E region of implants for an overdenture to a completely fixed prosthesis involving as many as 7 to 8 implants,² the one that has found a remarkable acceptance by both the dentist and the patient is an overdenture supported by 2 implants with ball and socket attachments without any bar or clip attachment. The reason being (1) Cost effective when compared to 5 or 6 implants (2) Simplicity of design and ease of fabrication.

The survival rate of this 2 implant overdenture has been reported to be as high as 100%.¹

This case report, however, presents rare complication, wherein the ball abutment fractured in such a manner that a part of the fractured abutment was still embedded in the implant and the other half had come out.

Case Report

A 53 year old, male patient reported to the Dept. of Prosthodontics, Rama Dental College, with the chief complaint of difficulty in chewing food due to missing teeth in the lower jaw since past two and a half months and wanted replacement with the same.

On examination, the patient had full complement of maxillary teeth and in the mandible, a lone standing 38, which was firm and pathology free. The treatment was discussed with the patient and a consensus was reached to fabricate an implant supported overdenture over 2 implants with ball abutments. The implant placement was to be carried out in a 2 stage procedure wherein, following implant placement, the abutment attachment would be carried after 3 months once both the implants have been osseointegrated.

The implants were placed in B and D regions. After 3 months once the implants had well osseointegrated, 2 ball abutments were attached with a ball anchor key attachment instrument at 25 N-cm torque (Fig.1) & their corresponding double metal housing and O rings in the denture. In a span of less than two months the patient reported back to the authors with a fractured ball abutment in 2 pieces (Fig. 2), with one piece still embedded in the implant. The implant was well integrated (Fig.5). The second ball abutment had also become loose (Fig. 3). Radio-graphically, the implant was located and incision was made and the broken piece was then retrieved and replaced with new ball abutment with new corresponding metal housing and O ring. The other loose ball abutment was also replaced with the fear that this might also suffer the same consequence as the other one.

An analysis of the literature review enumerates the following causes for abutment fracture:^{1,3}

1. Abutment screw loosening.
2. Incorrect number of implants placed.
3. Improper angulation of the implant placed.
4. Parafunctional habits.

5. Premature occlusion.

Amongst the above mentioned reasons, the one which presumably most closely relates to this case is, abutment screw loosening, as it was observed that the contra lateral abutment had also become loose.

Since it is the screw which loosens, and subsequently leads to implant prosthetic failure, the MORSE TAPER^{4,5} design has been proposed as a better alternative to the external and internal hex designs.

This design includes a tapered projection from implant abutment, which fits into a tapered recess into the implant. There is friction fit and cold welding at the implant abutment interface. This design depends on friction fit for elimination for rotation at implant abutment interface and subsequent screw loosening. The high friction force is the result of slip between two friction surfaces occurring at high contact pressure. This results in surface oxide layer breaking down and causing cold welding at implant abutment interface.⁴

Summary & Conclusion

In all the various studies that have been conducted on implant abutment connections, Morse Taper has been documented to have the least failure rate⁶. Because there is friction fit between the implant and the abutment, there is hardly any incidence or chance of screw loosening which may further lead to abutment fracture. Since prosthetic failure accounts for as much as 74%, of which 6 % is attributed to abutment screw loosening² it is mandatory to have an implant abutment connection design which prevents the microleakage and screw loosening, and the Morse taper design seems to be the best currently available design.

Also, since no surgical stent or guide was used in this case to place the dental implants, cent percent parallelism could not be achieved for the 2 implants, which could also have been one of the contributory factor in the fracture of the ball abutments.

References

References are available on request at editor@healtalkht.com



Fig.1 : Intra Oral View of the 2 Ball Abutments (After Replacement of the Broken Abutment)



Fig.2 : Broken Abutment



Fig. 3 : Intra Oral View, With One Abutment Broken



Fig.4 : Retrieval of the Broken Abutment

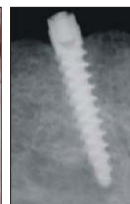


Fig.5 : Radiograph of the Osseointegrated Implant

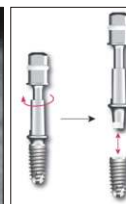


Fig.6 : Morse Taper