CASE REPORT

Management of fractured implant case using loop connector fixed partial denture

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SUMMARY

Dental implants treatment have become a common modality of treatment nowadays for the replacement of missing tooth/teeth, but there have been failures due to a number of reasons; one of the rare problems is the fracture of the dental implants fixture. It is of prime importance to understand the type/system of the implant to be placed in a site and the amount and direction of occlusal forces incurred after the loading of prosthesis.

BACKGROUND

There are several options available to replace anterior missing tooth like fixed partial denture, resin-bonded bridge and dental implant, etc. However, the first choice of treatment modality in certain cases nowadays is dental implants. The implant success rate of 89–95.3% and the survival rate of 93.6–96.7% in 3–7 years postloading have been indicated in prospective and longitudinal studies pertaining to partial edentulism.¹ Apart from being the best treatment modality at present, it is also accompanied with certain complications that eventually led to failure. Implant failure because of implant fracture is one of the untoward complications. This article reports the management of the fractured implant case with spacing between incisors with loop connector.

CASE PRESENTATION

A 28-year-old man presented to our clinic with loose anterior tooth prosthesis. The clinical examination of crown on the maxillary left implant showed some obvious mobility (figure 1). Radiographic examination showed a fractured implant at the middle third on an intraoral periapical radiograph and orthopantomograph (IOPAR) film and an orthopantomogram (OPG) film as well (figures 2 and 3). On removing the prosthesis, a part of the

implant came out with the crown. The implant was fractured in the middle third. The crown, along with the coronal portion of the fractured implant, was retrieved under local anaesthesia (figure 4). A conventional fixed partial denture could not be planned since the space was large, and the existing spaces between his anterior teeth were to be maintained due to aesthetic reason (figure 5). Another conservative treatment was restoration with the help of removable partial denture. But, the patient was neither willing for implant removal as it would entail surgery nor for removable partial denture and wanted a fixed alternative for his missing teeth. There were only two treatment options left: either a loop connector fixed partial denture or a spring cantilever (which is in fact a variation of a loop connector). A spring cantilever fixed partial denture is used for replacing the missing anterior teeth while maintaining diastema when the posterior teeth need crowning as well. Therefore, it was decided to fabricate a loop connector fixed partial denture with the left central incisor as pontic and right central incisor and left lateral incisor as the abutment teeth, maintaining diastema between the pontic and the retainers.

Figure 1 Preoperative View.

Figure 2 Intraoral periapical radiograph (IOPAR) view fractured implant.

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Figure 3 Orthopantomogram (OPG) view.

INVESTIGATIONS

Radiographs were carried out, both IOPAR and OPG, to evaluate the fractured implant and to check if there is any infection in relation to the implant site.

DIFFERENTIAL DIAGNOSIS

- De-cementation of the Crown
- Periimplantitis

TREATMENT

After healing of the implant site, endodontic evaluation was carried out on the maxillary right central incisor and the maxillary left lateral incisor, and diagnostic impression was made for the mock-up of final restoration and it was approved by the patient. The patient's maxillary right central incisor and maxillary left lateral incisor were prepared in a conventional manner; the impression was made with polysiloxanes using a putty wash technique and a loop connector was designed (figure

Figure 4 Fractured implant.

Figure 5 Site after extraction.

6). Two retainers were connected by a minor connector which was extending on to the rugae area, in the valleys of the rugae (figure 7). The dimension of the connector was 2 mm with a relief provided by using 0.5 mm of relief wax. After making the wax pattern, casting was completed and a coping trial was tried into the mouth. After verification, the ceramic buildup was made and the bridge was cemented (figure 8).

OUTCOME AND FOLLOW-UP

After cementation of the prosthesis, the patient was satisfied with the aesthetics.

DISCUSSION

Fracture of the dental implant is rare and is one of the late complications of rehabilitation. A long-term, multicentre study by Adell *et al*² conducted on Branemark dental implant system showed a cumulative implant fracture rate of less than 5% in both the maxilla and the mandible over a period of 10–15 years, with the exception of one study group where the fracture rate reached 16% in the maxilla. Eckert *et al*³ conducted a retrospective study and reported an implant fracture rate of 0.6% in both the maxilla and the mandible. Implant failure may be due to overloading, lack of primary stability, poor bone support as well as the fracture of the implant and abutment screw. The fracture of implants itself can be owing to several reasons like occlusal overloading, material failure, non-passive or poorly fitting framework, etc.^{4–7} The most commonly

Figure 6 Tooth preparation.

Figure 7 Palatal view of loop connector.

encountered material failure is the abutment screw fracture rather than the fracture of implants itself. According to Al Jabbari *et al.*,⁸ the reason associated with implant fracture is generally due to the overload of material leading to its fatigue followed by fracture. Al Quran *et al.*⁹ reported that this rare complication is attributed to diverse factors such as non-passive or ill-fitting prosthetic framework over the implant, defect in the design of the implant and its material, mechanical or occlusal overload, cantilevers and parafunctional habits. In this clinical situation, patient occlusal loads were excessive, as revealed by the wear facets and attrition of the incisal edges of the mandibular anterior teeth. The narrower diameter of the implant could also have contributed to the fracture. It is aesthetically challenging to resolve anterior extensive diastema by conventional fixed partial denture. If the natural anatomic forms of the teeth and diastema are maintained with minimal overcontouring of the adjacent teeth, an optimum aesthetic would be

Figure 8 Final prosthesis.

achieved.¹⁰ When there is excessive mesiodistal pontic space, a loop connector fixed partial denture can be used which consists of a loop on the lingual aspect of the prosthesis. The loop may be cast from sprue wax that is circular in cross section or shaped from a platinum–gold–palladium (Pt–Au–Pd) alloy wire.¹¹ Care must be taken to design the connector not too thick and should have intimate contact to the underlying mucosa to avoid the development of habitual tongue posturing between the loop and mucosa. Also, design should not cause any plaque accumulation.

Learning points

- ▶ Implant should be selected according to the type of bone.
- ▶ Occlusal forces on the implant should be evaluated prior to placement and selection.
- ▶ While placing the prosthesis in an anterior tooth over the implant, we need to make sure that there are no interference during centric and eccentric movements as it may result in failure.

Contributors The case has been done by the above authors.

Competing interests None.

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