



**RETRIEVAL OF BROKEN GINGIVAL FORMER: A CASE REPORT**

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**ARTICLE INFO**

**Article History:**

Received 16<sup>th</sup> August, 2017

Received in revised form 5<sup>th</sup>

September, 2017

Accepted 30<sup>th</sup> October, 2017

Published online 28<sup>th</sup> November, 2017

**Key words:**

Dental implants, Gingival former, Screw fracture, Carbide bur

**ABSTRACT**

Dental implants have been widely used these days for the replacement of missing teeth as they have high success rate, but they are not free of complications. Abutment screw fracture is the most common among all the mechanical complications. Retrieving broken screw conservatively is a great challenge, as there is high chance of damage to the implant threads. There are various kits available now a day for screw retrieval but there is lot of ambiguity among practitioners regarding their use. This case report describes the use of a carbide bur with aerotor handpiece and ultrasonic scaler for the removal of broken gingival former.

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**INTRODUCTION**

The use of dental implants to restore missing teeth, as a source of support and retention for fixed restorations has become a norm in the present age of dental practice. The longevity of an implant retained or supported prosthesis is dependent upon both biological and mechanical factors<sup>1</sup>. Biologically, long-term osseointegration is sensitive to atraumatic implant placement and restoration<sup>2</sup>. Mechanical complications include screw loosening, screw fracture, prosthesis fracture and problems with attachments for overdentures<sup>3</sup>.

Abutment screw or prosthesis screw loosening/fracture is the most frequent mechanical complication<sup>3</sup>. Complications were most common with single crowns, particularly in the premolar and molar areas. An incidence of 0.5% to 8% was reported for abutment screw fracture<sup>4</sup>. In most circumstances, the fractured end can be retrieved and replaced by a new abutment screw. When the screw cannot be removed conservatively, rotary instruments can be used to retrieve the fractured screw<sup>5</sup>. The present case report describes about retrieval of a broken gingival former using a carbide bur placed in a slow speed aerotor handpiece with a reverse rotation.

**Case report**

A male patient of age 24 years have attended the Department of Periodontics, St. Joseph Dental College, Eluru, with chief complaint of missing teeth in the lower front teeth region since 1 year. Patient gave a history of motorcycle trauma 1 year back

which caused fracture of the lower front teeth. The patient had undergone atraumatic extraction of the fractured root segment.

After clinical and radiographic examination, the patient was planned for implant placement in the region of 32. The patient was explained about all the possible risks and benefits of the treatment and signed informed consent was taken. Written informed consent was obtained from the patient for publication of this case report and accompanying images. Routine blood examination was carried out of which all blood parameters were in normal range. Full mouth scaling and root planing was carried out and oral hygiene instructions were given. Based upon the radiographic evaluation and clinical bone measurements with bone calipers, implant size of D3.3×L9.5mm (Myriad plus implant system, Equinox) was selected and placed in 32 region. The patient was recalled after 3 months for the placement of gingival former.

At 3 months visit, a radiograph was taken to ensure proper osseointegration. Then stage 2 surgical site was performed by opening the surgical site using diode laser (BIOLASE EPIC 10) under local anesthesia. Cover screw was removed using a torque driver. During the placement of the gingival former, due to excess torque, the gingival former got fractured (Fig 1). On radiographic examination, there was fracture of the gingival former in the lower third region (Fig 2).

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Fig 1 Broken gingival former



Fig 2 Screw fragment in radiograph

A low speed rotary motor with a carbide bur in reverse rotation and with continuous saline irrigation was used to retrieve the fractured gingival former. The tip of the carbide bur was placed on the head of the broken gingival former and a part of it was trimmed to create a trough between the gingival former and the implant, without damaging the implant threads. Then ultrasonic scaler with sub-gingival scaler insert was placed in the gap created between the implant and the broken fragment and is slowly vibrated to loosen the screw. The loosened fragment was removed with the help of a high volume suction (Fig 3). The cover screw is then replaced over the implant to ensure proper healing of the operated site.



Fig 3 Retrieved fragment

The patient was recalled after 15 days. After proper healing, final impressions were recorded with closed tray technique. The impressions were transferred to lab for fabrication of prosthesis. Metal ceramic crown was cemented over the abutment with the help of GIC restoration, after ensuring proper fit and occlusion. At subsequent review, the patient was asymptomatic and the prosthesis was functioning well.

## DISCUSSION

When screw fracture occurs, the most important consideration is to not damage the internal threads of the implant. If the screw fragments are loose, they are removed by a more conservative method by the use of a probe/explorer. If unsuccessful, an instrument specifically made for retrieval of broken screws, such as the forked instrument/screw removal kits, should be tried<sup>6</sup>.

In the present study, the broken gingival former fragment was removed with the use of a carbide bur in reverse rotation and ultrasonic scaler. These equipment are easily available in routine dental practice and also cost effective when compared to the screw removal kits. But care must be taken while placing the carbide bur over the screw head, as there is high chance of slippage, which causes damage to the implant threads.

If thread damage is present, then re-tapping of the threads may be attempted. This tap can be obtained from the manufacturer of the implant, as the thread design is specific to the particular implant type. To facilitate tapping of the threads, initially the screw fragment is displaced deeper into the implant for the proper application of the tap<sup>6</sup>.

Russell T. Williamson *et al*, 2001, reported the use of ¼ round bur placed into a high speed handpiece for removal of the broken screw fragment<sup>7</sup>. Ahmad Maalhigh-Fard *et al*, 2010, accomplished screw retrieval by creating a trough between the abutment screw head and the internal aspect of the implant using a high-speed handpiece with a no. 2 round rotary cutting instrument<sup>8</sup>. Parth Satwalekar *et al*, 2013, removed the fractured screw with the help of a spoon excavator which was modified by cutting the working end of the instrument perpendicularly to serve the purpose<sup>9</sup>. Joon-Ho Yoon *et al*, 2015, reported screw retrieval with reverse-tapping rotary instrument with customized drill guide to keep the position of the rotary instrument at the center of the broken screw, thus minimizing the damage of the internal threads<sup>10</sup>.

The number, position, dimension and design of implants, as well as the design of the prosthesis are critical factors to be considered during the treatment planning phase<sup>11</sup>. To withstand high bending stresses, implants should be as long and as wide as possible, used in adequate numbers, and be positioned such as to allow axial loading<sup>12,13</sup>. Studies show that implant abutment failure occurs when lateral forces exceed 370 N for abutment with a joint depth of at least 2.1 mm and 530 N with a joint depth of at least 5.5 mm<sup>14</sup>.

The methods employed to grasp the broken fragments or screws were determined according to the location of the fracture abutment-above or below the head of the implant. If an abutment screw fractures above the head of the implant, an explorer, a straight probe or hemostats might be successful<sup>15</sup>. The tip of the instrument is moved carefully in a counter-clockwise direction over the surface of the screw segment until it loosens<sup>16</sup>. If the screw fracture occurs below the head of the implant, other methods like screw retrieval kits have to be used. There are many commercially screw retrieval kits available which include: ITI Dental Implant System (Institute Straumann AG, Switzerland), IMZ TwinPlus Implant System1 (DentsplyFriadent, Germany), Screw Removal Kit Replace (Nobel Biocare, Yorba Linda, California, USA) and Certain - Screw Removal Kit (Biomet 3i, Florida, USA)<sup>17</sup>.

## CONCLUSION

The present case report describes about retrieval of broken gingival former retrieval technique using aerotor handpiece and a carbide bur along with an ultrasonic scaler. Although there is a high chance of slippage and damage to the internal threads during the usage of handpiece, if used cautiously, it is considered as one of the most reliable, cost effective and efficient method for screw retrieval

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### How to cite this article:

Pavuluri Aravind Kumar *et al* (2017) 'Retrieval of Broken Gingival Former: A Case Report', *International Journal of Current Advanced Research*, 06(11), pp. 7308-7310. DOI: <http://dx.doi.org/10.24327/ijcar.2017.7310.1121>

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