Deformation of internal thread of dental implants on repeated abutment screw tightening

Mohammed Novman  
Postgraduate student, Department of Prosthodontics and Implantology, AECS Maaruti College of Dental Sciences and Research Centre, Bangalore

Divya Hegde  
Professor, Department of Prosthodontics and Implantology, AECS Maaruti College of Dental Sciences and Research Centre, Bangalore

Lakshmikanth K.  
Associate Professor, Department of Prosthodontics and Implantology, AECS Maaruti College of Dental Sciences and Research Centre, Bangalore

Chandrasekharan Nair K.  
Professor and Head of the Department of Prosthodontics and Implantology, AECS Maaruti College of Dental Sciences and Research Centre, Bangalore

Sadhvi K.V.  
Senior Lecturer, Department of Prosthodontics and Implantology, AECS Maaruti College of Dental Sciences and Research Centre, Bangalore

Abstract

Objective: To evaluate the surface changes of internal threads of the implant that occurs after repeated tightening and loosening of the abutment screw.

Methodology: MIS implant analogue of dimension 13x3.5 mm were mounted. Light body impression was made to copy the internal threads of dental implant before abutment screw tightening. The impression surface was then studied under a stereomicroscope to visualize the surface of implant threads. Abutment screw was tightened and removed eight times from the implant, followed by making a light body impression of the internal threaded surface of the implant to visually analyse the surface changes under stereomicroscope.

Results: The distance between four threads measured before and after screw tightening using Progres image pro software, the values were before screw tightening 1.923 mm and 1.861 and after screw tightening 1.901 mm 1.843 respectively. No significant difference was observed.

Conclusions: It can be concluded that there is no change in the internal threads of the implant on repeated screw tightening and loosening.

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Keywords: deformation of internal threads, light body impression, screw tightening and loosening, stereomicroscope.

Abutment screw loosening is recognized as a common complication with cemented implant restorations and which occurs on functional loading. When the abutment is fixed by tightening the screw, threads of the screw and the internal threads of the implant can get deformed. Extensive research has been carried out on deformation of abutment screw but changes on the internal threads of dental implants have not been studied. Hence, the present study was carried out in this context.

Methodology: MIS implant analogues of dimension 13x3.5 mm were selected and embedded in an acrylic block (Fig 1). Light body impression material was injected to copy the internal threads of the dental implant. The light body impression material filled the internal hex and covered the platform. This helped in the removal of the impression. The impression surface was then observed under a stereomicroscope to visualize the surface of implant.
threads (Fig 3a & b). Then the abutment screw was tightened and removed. This was repeated eight times (Fig 4). The internal threads were once again copied with light body impression material. The impression surface was then observed under a stereomicroscope once again (Fig 5). The distance between four threads as seen in the impression at a selected location was used as the test parameter. Measurement was done with progres image pro software.

Results:
The impression provided a negative replication of the internal threads of the implant. The distance between four selected threads was considered as the measuring parameter to indicate thread deformation (Fig 6 & 7). Results obtained from two implants are given in Table 1.

The changes observed were very negligible it ranged from 0.022 to 0.027 mm.

Discussion:
The internal threads of dental implant is part of the dense metal body and hence it is not subjected easily to deformation. Where as the abutment screw is easily deformed. References are available on abutment screw deformation but not on internal threads. If the abutment screw is deformed on repeated use, it can be replaced with a new screw and it will match with the internal thread which seldom deforms drastically.

Conclusions:
It can be concluded that there is no change in the internal threads of the implant on repeated screw tightening and loosening.

References:

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