Evaluation of the retention characteristics and micro stress analysis of different attachment systems in regard to implant retained obturator

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Introduction: In maxillectomy patient, the use of an obturator can result in improvement in speech, mastication, swallowing and aesthetics. Retention is the basic requirement of any dental prosthesis. Also, stress analysis plays a vital role as undesirable axial forces have proven to be harmful for the implant. The purpose of this study was to compare and evaluate the retention characteristics and micro stress analysis around the implant while using three different types of attachments (ball, bar, locator) to retain an obturator.

Methodology: A 3-d printed stereo lithographic skull model replicating the partial maxillectomy was fabricated. Commercially available implants (MIS-3.75/11.5) were placed on the canine and first molar region of non-defective site of maxilla. The implants were retained using resin cement to simulate Osseo integration. Heat cure acrylic resin obturator were fabricated and provision was made to receive three different prefabricated attachment systems i.e. ball attachment (MIS), bar and clip attachment (CEKA), and locator attachment stud type (zest anchors, USA).

Result: Amongst all three attachments tested, the bar/clip design attachment shows the highest retention with statistical significant difference when compared with the ball and locator attachment (p<0.05) and locator attachment shows least micro stress around implant with statistical significant difference when compared with bar and ball attachment (p<0.05).

Conclusion: Within the limitations of this study, it is concluded that the maximum retention can be attained by...
bar & clip attachment and the lowest stresses were obtained through locator attachment.
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