Customised Zirconia Abutments: Enhancing the Soft Tissue - Restorative Interface

Mohit G Kheur1, Tania Sethi2, Shantanu S Jambhekar3, Sumit Sethi4

ABSTRACT:
In the esthetic zone, proper preservation and contouring of the peri implant soft tissue is of utmost importance. Contouring of these soft tissues by use of customised healing abutments and provisional restorations is a commonly followed practice. However, after the soft tissue has been shaped, the use of a stock metallic abutment emerging out of the mucosa may not represent the best solution for long term desirable support of the soft tissue. Crowns placed with margins on such metallic abutments may lead to poor control of the margin geometry and location.

Nowadays titanium abutments can have their per mucosal part customised using Zirconia. This represents a positive step in allowing good tissue contour, good control on the margins of the crown and use of a material that elicits a documented desirable tissue response.

Key words: Customized- Zirconia Abutments, Ceramic abutments, Single-Implant Esthetics in the Anterior Maxilla

An esthetically pleasing restoration is one of the ultimate challenges for implantology in the anterior maxilla. There are many factors that contribute towards this end. Some of these include ideal three dimensional positioning of the implant at the surgical stage, good soft and hard tissue maturation and proper choice of the abutment and restorative material.1 Proper long term support of the peri implant soft tissue and an optimal location of the crown margin also contribute vitally to giving a long lasting esthetic result.

Dental implants and abutments are usually fabricated out of commercially pure titanium, primarily because of its well-documented biocompatibility and mechanical properties.1, 2

However, conventional metal abutments have the disadvantage of metallic components showing through.2 The presence of a greyish gum can be due to a thin gingival tissue around the abutment which cannot block the reflected light from the metallic abutment.3

Gingival biotype switching has been suggested when using a metal abutment to increase the thickness of the gingiva to improve the mucogingival esthetics. However this requires an additional surgical procedure, which is unpleasant for most patients.1 To achieve optimal mucogingival aesthetics, ceramic abutments were developed.1, 3

Due to the optimal esthetic, mechanical properties and biocompatibility, Zirconia has been suggested as material of choice for implant abutments.1-5

A stock titanium abutment can be modified by cementing a custom-milled Zirconium oxide coping in the per mucosal area. This modification can be customised to the patient’s existent soft tissue profile in order to provide better support to the soft tissue drape.

Applications:
Customised Zirconia abutments are mainly used...
in the esthetic zones i.e. Maxillary anterior region.\textsuperscript{6} Zirconia allows the use of All-ceramic crowns and thereby results in highly esthetic restorations. The Zirconia added onto an existent standard metallic abutment can be used to bulk up the soft tissue to get a good contour and emergence profile.\textsuperscript{1} This helps in placing the margin at desired depths for the best esthetic outcome.

Zirconia abutments have been recommended especially in patients with rehabilitations with implant-supported single-tooth restorations in maxillary anterior region with a thin gingival biotype.\textsuperscript{3}

\textbf{Methodology:}

CAD CAM technology is used to generate a Zirconium oxide coping which is bonded to a metal implant abutment.\textsuperscript{4}

The stock metal abutment is milled inorder to create clearance for the zirconia coping.[Fig1]

The cast obtained from the impression along with the milled metal abutment is scanned. A three dimensional view of the same is obtained on the computer screen.[Fig2] A second scan is made with the wax up of the custom abutment placed on it.[Fig3]

Various modifications can be made using the CAD software .This includes adding or subtracting material, polishing of the surface and repositioning of the gingival finish line of the restoration. Also the margin geometry of the abutment can also be controlled according to the soft tissue contours.[Fig4]

After the designing of the coping is done to satisfaction, the data is transferred to a milling unit which mills the final coping. This is then sintered for 8 hours where it shrinks by approximately 20% to the final desired size. The coping is bonded to the standard abutment using a resin cement.

This assembled abutment has the dual advantage of a machined titanium close-tolerance fitting surface with the implant and with the titanium retaining screw.

\textbf{Case Presentation:}

A twenty-five year old female patient reported to the Dept of Prosthodontics with a non-salvageable fractured tooth number 11. This was extracted and an implant was placed.

A customised healing abutment was placed to get adequate soft tissue contours and maintain the papilla in its natural position.

Figure five shows a good soft tissue contour and shaping of the peri implant tissue that will help attain good emergence profile of the final restoration. [Fig5]

Transposition of crown margin for correct geometry can be obtained by using customised abutments. Also a subgingival margin prevents any metal show and provides a good and natural emergence profile resulting in good esthetics. [Fig6]

Dental implants require a biologic sealing to inhibit the epithelial recession and the bacterial invasion of the sub epithelial soft tissue and implant interfaces.\textsuperscript{3}

Zirconia is said to have a superior soft tissue response as compared to that of metal. It is also biocompatible and is less prone to plaque accumulation and hence minimal or no tissue reaction.\textsuperscript{3, 7, 8}

They allow use of all-ceramic crowns, which improves not only the esthetic outcome but also the biocompatibility. [Fig7]

\textbf{Conclusion:}

Thus it is evident that customising a Zirconia abutment is a large step towards an esthetically pleasing outcome. Besides upgrading esthetics of the overall rehabilitative outcome, the creation of an ideal emergence profile also makes a vital contribution to the biologic integrity of the peri-implant soft tissue.

\textbf{References:}


Fig.1: Stock titanium abutment

Fig.2: Scanned image of Milled Metal Abutment

Fig.3: Scanned image of wax pattern for Custom Abutment.

Fig.4: Customised abutment showing the marginal geometry in accordance to the soft tissue contours.

Fig.5: Healed Situation

Fig.6: Customized abutment in situ

Fig.7: Final restorations in situ

Customised Zirconia Abutments