NIGEL SUGGETT
Nigel studied dentistry at Sheffield University, graduating in 2006. He owns two private dental practices (Seaham Smiles and Brunswick Dental) and is a key opinion leader for Denstply Sirona Implants.

EMMA ALLSOPP
Emma qualified in dental technology in 1992 after studying at South London college. She joined Nexus Dental Laboratory in 2022.

ENHANCED CPD

CPD hours: one

GDC development outcome: C

Topic: Aesthetic dentistry

Educational aims and objectives: To discuss achieving aesthetic excellence in a complex implant-supported bridge case with advanced soft tissue management.

This article qualifies for one hour of enhanced CPD; answer the questions on page 94 or scan the QR code.

Implant-supported restorations have become a cornerstone of modern dentistry, offering predictable and long-term solutions for replacing missing teeth. However, achieving optimal aesthetics, especially in the highly visible anterior maxilla, presents unique challenges.

This case report delves into a complex scenario involving multiple surgical interventions and intricate soft tissue management techniques to achieve a harmonious and natural-looking final restoration.

It underscores the critical role of interdisciplinary collaboration and meticulous attention to detail in overcoming the complexities of aesthetic implant dentistry.

FIGURE 1: *Initial clinical situation – severely compromised upper right central incisor*

FIGURE 2: *Temporary bridge in place, highlighting the visible 'black triangle' between the central and lateral incisor*

CASE OVERVIEW

The patient presented with a severely compromised upper right central incisor, displaying significant discolouration, a large buccal soft tissue defect, and a periodontally involved and mobile upper right lateral incisor, necessitating extraction (Figure 1).

The patient's primary concern revolved around the aesthetic rehabilitation of their smile, aiming for a restoration that seamlessly blended with their natural dentition.

The treatment plan encompassed:

- Extractions
- Guided bone regeneration (GBR)
- Implant placement
- Multiple connective tissue grafts (CTGs)
- Meticulous soft tissue manipulation using a temporary cantilevered bridge.

The ultimate goal was to fabricate an aesthetically pleasing implant-supported bridge, effectively addressing the initial aesthetic concerns and cultivating optimal soft tissue contours and papilla growth.

Challenges

The following challenges were identified in this case:

- Bone loss and regeneration: the extraction site of the upper right central incisor exhibited significant bone loss, requiring guided bone regeneration (GBR) to ensure long-term stability of the implant
- Soft tissue aesthetics: achieving harmonious soft tissue contours and regenerating the large buccal defect, and black triangle management requiring papilla growth in the aesthetic zone demanded meticulous planning and execution (Figure 2)
- Interdisciplinary communication: maintaining seamless communication and collaboration between the dentist and the dental laboratory throughout the extended treatment process was paramount.

Nigel Suggett and Emma Allsopp present a complex implant-supported bridge case with advanced soft tissue management that achieved aesthetic excellence

Aesthetic implant dentistry

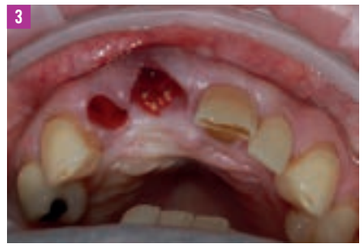

FIGURE 3: *Extraction sockets following the removal of the compromised teeth*

FIGURE 4: *View of the edentulous ridge after tooth removal and healing, illustrating the deficient bone volume prior to implant placement*

FIGURE 5: *Implant placement. The implant (4.2 x 8mm DS Primetaper) was placed in the correct vertical dimension (3.5mm below the proposed ginigval zenith)*

FIGURE 6: *GBR procedures to augment bone volume and support the implant, shows the Bio-Gide being stabalised with periosteal sutures in 5/0 Monocryl*

FIGURE 7: *Bone and soft tissue after implant placement and healing*

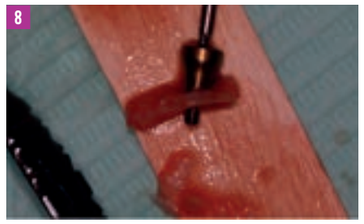

FIGURE 8: *Healing abutment placed through CTG to aid fixation of it*

FIGURE 9: *CTG procedure to enhance tissue thickness with periosteal sutures and healing abutment to fix the graft*

FIGURE 10: *One of the photos sent to the laboratory to start the fabrication of the temporary bridge*

The compromised upper right central incisor and lateral incisor were extracted

SURGICAL AND TECHNICAL WORK

Extraction

The compromised upper right central incisor and lateral incisor were extracted under local anaesthetic.

The soft tissue defects present made it high risk for immediate implant placement, so the teeth were removed and the site was left to heal for three months.

A temporary partial denture was used to manage the space during the healing period (Figure 3).

Implant placement and guided bone regeneration

Following a suitable healing period, a Primetaper EV 4.2mm x 8mm implant (Dentsply Sirona) was placed in the upper right central incisor space.

The buccal threads of the implant were exposed so guided bone regeneration (GBR) was carried out.

Autogenous bone (harvested bone chips from the left external oblique ridge with a Micross scraper from Geistlich) only was placed over the exposed threads, and then autogenous bone was mixed in a 50:50 mix with a Bio-Oss 0.25-1mm particles from Geistlich.

This was covered with a Bio-Gide resorbable membrane (also from Geistlich), and this was fixed with periosteal sutures using a 5/0 Monocryl resorbable suture (Figures 4 to 6).

First connective tissue graft

A connective tissue graft (CTG) procedure was performed to augment soft tissue volume. The mid-palate was chosen as the donor site to harvest the graft, which was then placed as a 'table-top' graft to enhance soft tissue thickness in a vertical dimension.

A mid-crestal split thickness flap was lifted in the recipient site, and the graft was secured to the underlying connective tissue bed using a heal-design 3.5mm x 4mm healing abutment and some periosteal sutures in 5/0 Monocryl (Figures 7 to 9).

The mid-palate was chosen as the donor site to harvest the graft, which was then placed as a 'table-top' graft to enhance soft tissue thickness in a vertical dimension

FIGURE 11: *Temporary bridge produced at the laboratory*

FIGURE 12: *Temporary bridge in situ*

FIGURE 13: *Second connective tissue graft*

FIGURE 14: *After second CTG, pontic adjustment and soft tissue manipulation a sling suture can be seen using seralon 6/0*

FIGURE 15: *Temporary bridge with one of the adjustments made to the basal area of the pontic to eliminate soft tissue pressure*

FIGURE 16: *Temporary bridge after soft tissue manipulation using pontic site development*

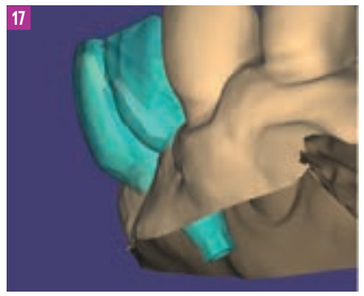

FIGURE 17: *Digital dental design showcasing the emergence profile and custom abutment shaping from a proximal view*

FIGURE 18: *Digital dental design of the custom abutment shape from the buccal view*

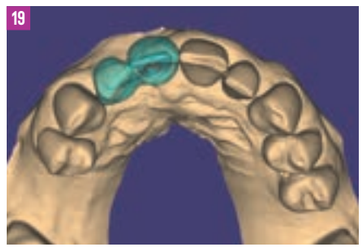

FIGURE 19: *Digital dental design of the custom abutment shape from the incisal view*

Temporary bridge fabrication

A temporary cantilevered bridge was fabricated at Nexus Dental Laboratory, with shade selection performed using visual shade matching (Figure 10).

This temporary restoration served as a crucial tool for shaping the soft tissue and guiding its maturation.

The bridge was fabricated with a stock temporary cylinder and composite, which allowed it to be adapted chairside (Figure 11).

Temporary bridge placement

The temporary bridge was placed, allowing soft tissue conditioning and guiding the emergence profile for the final restoration.

A 'black triangle' was evident when the bridge was placed, so further soft tissue work was needed (Figure 12).

The buccal flap was sutured over the embrasure and used to support a pseudo-papilla and close the visible 'black triangle'

Second connective tissue graft

A second connective tissue graft (CTG) was harvested, this time from the tuberosity. It was again placed as a 'table-top' graft, this time only over the pontic and midline papilla space.

5/0 Monocryl periosteal sutures were used to fix the CTG and then the buccal flap was sutured over the embrasure and used to support a pseudo-papilla and close the visible 'black triangle'.

The temporary bridge pontic basal surface was adjusted to eliminate the tissue pressure to over build the area (Figures 13 to 15).

Temporary bridge adjustments

Precise adjustments were carried out on the temporary bridge, meticulously shaping the basal surface of the pontic to create an ideal environment for soft tissue maturation (Figure 16).

Final bridge fabrication

After receiving the digital scan using a Trios 3 intraoral scan of both the implant and soft tissues and the temporary bridge, where the

FIGURE 20: *Close look at the gum tissue after shaping around the temporary bridge*

FIGURE 21: *Final restoration in situ*

FIGURE 22: *Final result*

correct emergence profile was established using the temporary bridge, the CAD team at Nexus Dental Laboratory meticulously replicated this emergence profile onto a titanium abutment (Atlantis abutment).

This precise shaping ensures that the soft tissue maintains its integrity and natural contours, preserving both aesthetics and function (Figures 17 to 19).

To further enhance soft tissue integration, the zirconia bridge placed on top of the abutment was carefully polished around the cervical area

This process highlights the critical role of custom abutments, which allow for a seamless transition from the temporary to the final restoration while maintaining the soft tissue architecture.

Additionally, the use of titanium was chosen for its biocompatibility, which promotes tissue attachment and long-term stability.

To further enhance soft tissue integration, the zirconia bridge placed on top of the abutment was carefully polished around the cervical area. This polishing minimises bacterial adhesion and encourages hemidesmosomal attachment, contributing to a healthier and more natural-looking restoration.

Ultimately, this approach ensures optimal aesthetics, stability and long-term success of the restoration by preserving the natural contours established during the provisional phase.

Placement

The final implant-supported bridge was fabricated. The upper right central was produced with a slightly squarer shape on the mesial proximal area to effectively close the remaining black triangle between the two central incisors.

The bridge was made of zirconia with buccal layering.

This case underscores the importance of a team-oriented approach and the invaluable role of persistent adjustments in achieving optimal results

To achieve the desired aesthetic outcome, dental technician Emma worked closely with the dentist (Figures 20 to 22).

FINAL PRODUCT

The final restoration achieved excellent aesthetic results, characterised by optimal soft tissue contours, harmonious papilla growth and complete closure of the black triangle.

The patient expressed profound satisfaction with the outcome, noting the natural appearance and enhanced smile aesthetics.

The final bridge was made of zirconia with buccal layering.

REFLECTIONS

This complex case presented numerous challenges, particularly in managing the soft tissue and eliminating the black triangle. However, through meticulous planning, precise execution, and unwavering commitment to interdisciplinary collaboration, an exceptional aesthetic outcome was realised.

This case underscores the importance of a team-oriented approach and the invaluable role of persistent adjustments in achieving optimal results.

In addition, it highlights the importance of perfect communication that is needed between the dentist and dental laboratory along the process to achieve this amazing result. CD

PRODUCTS USED

Monocryl Ethicon
Trios 3 3shape
Primetaper, Atlantis Dentsply Sirona
Bio-Gide, Bio-Oss, Micross Geistlich