The power of a multidisciplinary approach

Implant-supported rehabilitation of a compromised maxillary anterior region

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A young female patient presented to our clinic with a complaint of a missing upper left central incisor. This missing tooth significantly impacted her smile aesthetics, causing her self-consciousness and affecting her overall quality of life. She expressed a strong desire to restore her smile to its natural appearance and regain full oral function.

Upon comprehensive clinical and radiographic examination, a recurrent significant infection associated with the adjacent upper right central incisor was detected, it already had multiple root canal fillings, reducing its ability to be restored. This presented an additional challenge to the treatment plan, as the infection needed to be addressed before any definitive restorative procedures could be initiated.

After a thorough discussion of all available treatment options, including the risks and benefits of each approach, the patient elected to proceed with the extraction of the infected tooth followed by implant placement. This decision was made with the understanding that it would provide a predictable, long-term solution for restoring both function and aesthetics in the compromised maxillary anterior region.

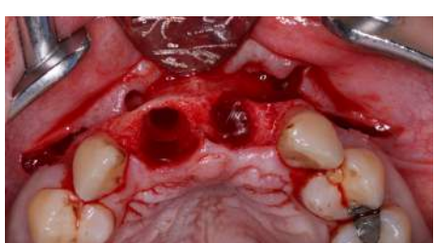
Challenges

This case presented a unique set of challenges that demanded careful planning and execution. The presence of an active infection in the upper right central incisor required meticulous management to ensure complete eradication and prevent any complications during subsequent implant placement. The upper left central incisor had been extracted three months prior and had left a significant bone defect that also required grafting. This is why it was decided that guided bone regeneration was to be carried out across both sites, rather than just a simple ridge preservation.

Achieving optimal soft tissue contours around the implants was crucial for both aesthetics and function, requiring careful consideration of the emergence profile, papillae development, and soft tissue thickness. Precise implant placement with optimal angulation and parallelism was essential for successful prosthetic rehabilitation and long-term implant stability, demanding the use of advanced imaging and surgical guide technology. Throughout the multi-stage treatment process, maintaining patient comfort and managing anxiety remained a priority, requiring clear communication, effective pain management strategies, and a compassionate approach to patient care.

Figure 1: Preoperative view showing the missing upper left central incisor, highlighting the aesthetic and functional challenge at presentation

Figure 2: Incisal view of the maxillary arch, highlighting the edentulous space of the missing upper left central incisor



Figures 3a and 3b: Bone defect

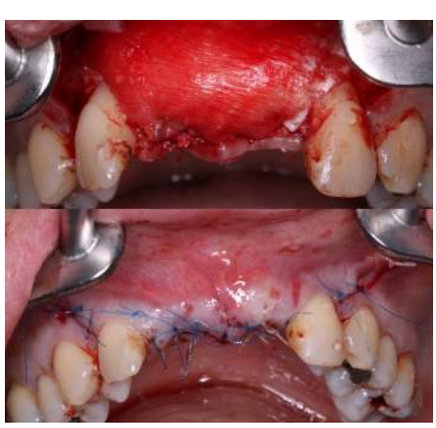


Figure 4: (Top) Intraoperative view demonstrating bone augmentation of both sites (Bottom) Following bone augmentation, the surgical site is meticulously closed with sutures, ensuring primary closure and promoting optimal soft tissue healing

Figure 5: Complete healing of the extraction site. The gingival tissue exhibits healthy colour and texture, indicating successful resolution of the initial infection

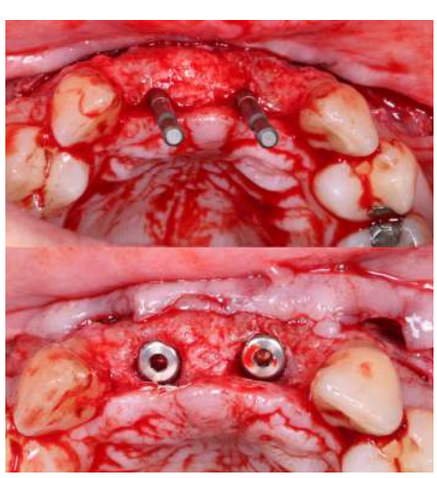


Figure 6: Intraoperative view showcasing the two 3.8x11mm conelog progressive implants placed in their final positions within the augmented bone

Technical work

The treatment plan was carefully staged to address each challenge systematically:

Figure 7: Frontal view of the temporary crowns, demonstrating the interim restoration's function in shaping the emergence profile and establishing optimal soft tissue contours

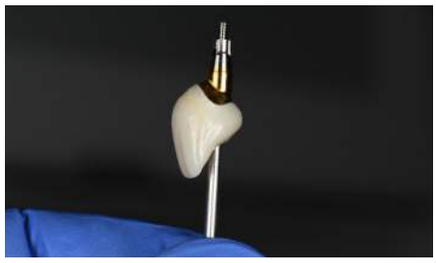


Figure 8: Proximal view of the final zirconia crown restoration

Figure 9: Buccal view of the final zirconia crown

Figure 10: 3D printed model showcasing the final implant-supported restorations in situ

Figures 11a-11f: A series of images showcasing the final results of the implant-supported restorations

1. Extraction and bone augmentation: The infected upper right central incisor was atraumatically extracted, and the socket was meticulously debrided to remove any infected tissue or debris. The bone material was a blend of cortical and cancellous mineralised human allograft.

The membrane was non-crosslinked, acellular Type I porcine collagen tacked apically using titanium pins and secured palatally using non-resorbing 6-0 polypropylene sutures to promote bone regeneration on both sites and provide a stable foundation for future implant placement.

The site was then carefully sutured to ensure primary closure and promote optimal healing.

2. Implant placement

After a six-month healing period, allowing for adequate bone maturation, two 3.8 x 11mm conelog progressive implants were placed. A surgical pilot drill guide, as well as a suck-down prosthetic stent, fabricated based on 3D imaging and planning, was used to improve precision of implant placement with optimal angulation and parallelism. This approach facilitated the subsequent prosthetic rehabilitation and ensured long-term implant success.

3. Soft tissue management

To enhance the aesthetic outcome and create a natural-looking emergence profile, a connective tissue graft was harvested from the palate and placed buccally around the implants. This helped to increase the soft tissue thickness before the contouring process.

4. Provisionalisation

Following osseointagration of the implants, splinted chairside provisional restorations were fabricated using non-index temp cylinders and memosil impressions of the prosthetic wax-up. These provisional restorations served multiple purposes, including developing the contour of the soft tissues, shaping the emergence profile, and providing the patient with fixed aesthetics and function prior to the final restorations. The emergence profile was meticulously refined every three weeks by adjusting the provisional restorations to achieve optimal scalloped margins and interdental papillae, creating a natural and harmonious transition between the restoration and the surrounding soft tissues.

5. Final restoration

After a period of contouring and tissue maturation, final restorations were fabricated by a skilled dental laboratory. Digital impressions were taken using an intraoral scanner (iTero), capturing the position of the implant, the precise contours of the surrounding soft tissues, and the fitting surface of the provisional restorations. Along with clinical photos, this comprehensive digital data allowed for the fabrication of highly accurate and aesthetic restorations that seamlessly integrated with the patient's existing dentition.

Final product

The final restorations were a resounding success, exceeding the patient's expectations. The implant-supported crowns blended seamlessly with her natural dentition, restoring her smile to its former beauty and function. The patient expressed immense satisfaction with the improved aesthetics, noting a significant boost in her self-confidence. She was also delighted with the restored oral function, allowing her to eat and speak with comfort and confidence.

Reflections

This case exemplifies the power of a multidisciplinary approach in addressing complex dental challenges. The successful outcome was a result of meticulous planning, precise execution, and seamless collaboration between the clinician, the dental technician, and the patient. The integration of digital technology, including 3D imaging, surgical guides, and intraoral scanning, played a pivotal role in enhancing accuracy, predictability, and efficiency throughout the treatment process. Furthermore, this case highlights the importance of effective communication and patient education. By clearly explaining the treatment plan, addressing the patient's concerns, and managing expectations, we were able to build a strong rapport and ensure her active participation in the treatment process.

This case has reinforced the value of continuous learning and refinement of techniques. By critically evaluating each step of the treatment process and reflecting on the outcomes, we can identify areas for improvement and further enhance our clinical skills to provide optimal patient care. D