Managing complex anatomy and correcting arch asymmetry

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In the following case presentation, I take the reader step by step through the treatment of a challenging case, including a mandible treated according to the All-on-4 treatment concept.

Case presentation

A 64-year-old female patient presented for treatment with an asymmetric arch due to progressive tooth loss. She had controlled hypertension, but no other significant medical history. She had been wearing maxillary and mandibular partial cobalt–chromium–molybdenum dentures for many years, with individual teeth added when crowns or bridges failed. The patient presented with a severely atrophic maxilla and mandible, with a mandibular immediate prosthesis on a shortened dental arch.

As a result of the patient's progressive tooth loss, I approached this case with the All-on-4 treatment concept (Nobel Biocare) in mind. For both 3-D diagnostics and treatment planning, we used Nobel-Clinician Software (Nobel Biocare). The case, which presented with some significant arch asymmetry, required a staged approach to ensure that the complexity of the planned treatment could be managed successfully.

My colleagues at the Queensway Dental Clinic (consultant oral and maxillofacial surgeon Dr Rob Banks, Queensway Laboratory managing partner Richard Elliot, and prosthodontic manager John Blenkey) and I carried out the prosthetic planning, the All-on-4 surgery, immediate provisionalisation and the laboratory work.
As demonstration of the importance of careful planning, the successful outcome of this case was accomplished through the use of NobelClinician, 3-D prosthetic-driven treatment planning software. The full 3-D case planning approach was streamlined using the online collaboration tool NobelConnect. It involved the surgeons, prosthetist and prosthetic technicians, who used NobelProcera to make this graftless solution (which could be delivered to the patient in a primary care environment) possible.

Dr Banks carried out the All-on-4 treatment surgery in the mandibular arch with a fixed temporary acrylic prosthesis and provided the patient with immediate function on the day of the surgery at the clinic in Billingham in the UK. The maxillary arch treatment was then carried out over a period of six months to allow implant placement and healing in a severely atrophic alveolar ridge.

During this six-month period, we took a staged implant placement approach. Owing to the 3-D diagnostic features, the placement of the implants into the available bone in this manner avoided sinus grafting or extensive block grafting. Both pterygoid and anterior implant placement took place prior to delivery of the immediate temporary prosthesis. This cautious approach was adopted owing to the poor bone quality.

The final prostheses were carefully designed after a phase of temporisation to correct the arch asymmetry. This was made possible by using some of the techniques we had learnt for managing complex occlusal schemes and facial symmetry from Dr John Kois, a prominent prosthodontist and educator.

Editorial note: For more information on the All-on-4 treatment concept, visit www.nobelbiocare.com/all-on-4. The All-on-4 treatment concept is a registered trademark of Nobel Biocare.

Fig. 3 Pre-op status: progressive tooth loss and addition to an existing prosthesis yielded significant arch asymmetry.

Fig. 4 Significant arch asymmetry: hard- and soft-tissue ridge modification was an essential component of planning to improve arch alignment.

Fig. 5 Severely atrophic maxilla: after 30 years of the left maxillary region being edentulous, the remaining alveolar ridge was severely atrophic.

Figs. 6a–c Three views of the final restoration: left (a), centre (b) and right (c). In order to achieve the correct alignment of both arches, we had to move from the provisional prostheses and their associated asymmetry to something much more aesthetic. The sharing of 3-D planning and the diagnostic set-up between dentist, surgeon and laboratory was streamlined by using NobelClinician and NobelConnect.

Fig. 7 The satisfied patient was very happy with the results of her oral rehabilitation, despite the complexity of the case.

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