The multidisciplinary approach

Mahesh Kumar presents a recent case study.

A 73-year-old retired engineer, JG, was referred by his general dental practitioner requesting implants in posterior mandible quadrants.

The patient stated he didn't want false teeth anymore and was "fed up" wearing his lower Cobalt chrome partial denture. He wasn't overly concerned about appearance but wanted to be able to eat a meal without dentures.

At the assessment, JG had a class II, division II incisor relationship with a complete overbite on a skeletal II base. He had loss of posterior support and, therefore, reduced occlusal vertical dimension and loss of lower facial height with significant tooth wear. Detailed restorative and orthodontic assessments were carried out with cone beam CT scan analysis. Despite JG's age, he wished to pursue a complete and comprehensive option. As he was an engineer he was keen on the most mechanical and functionally stable outcome.

After a multidisciplinary meeting and much discussion, a treatment plan was decided. This would start with upper incisor decompensation and opening up of the severely overclosed bite (Dahl effect) over a period of six months.

The lower jaw required careful planning and various options were discussed. The remaining lower anteriors were heavily worn and compromised. The two main options were discussed as a lower clearance and an implant supported denture or an implant supported bridge. Each stage was discussed with the patient and as he was a retired civil engineer his interest in the mechanical loading was recognised.Initially, we felt due to his age the risks of orthognathic surgery➲

Fig 1: Jaw pre-op.

Fig 2: Remaining compromised lower anterior teeth.

Fig 3: Lower anterior tooth wear and loss of posterior dental support.

Fig 4: The upper dental arch largely intact although a failing bridge replacing the upper right first premolar was present.

Fig 5: The presenting left buccal occlusion.

Fig 6: The presenting right buccal occlusion.

Fig 7: The complete overbite with traumatic occlusion.

Fig 8: Final dental occlusion.

Fig 9: Final left buccal occlusion.

Fig 10: Final right buccal occlusion.

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Fig 11: Final dental occlusion.

(a bilateral sagittal split osteotomy) were too high. There would be almost certainly a permanent numbness of his lower lip which was of grave concern to the patient. With informed consent on a number of visits the final treatment plan with the patient was decided.

A complex and innovative surgical approach was planned:

- general anaesthesia
- lower dental clearance
- bilateral mental nerve lateralisation
- anterior mandibular subapical osteotomy
- interpositional sandwich block bone grafts miniplate fixation of segments
- insertion of six lower and one upper implant.


Fig 12. Jaw post-op.

The anterior mandibular subapical osteotomy was first described by Hullihen in 1849, popularised by Hofer in 1942 and modified by Kole in 1959, to close an anterior open bite by interpositional bone graft. The surgery was uneventful and the patient was happy with the result.

We would like to extend our thanks to Stephen Salt and Sumithra Hewage for their collaboration on this case.

References available on request.

Root canal treatments overhauled through new device

A new method of detecting bacteria during root canal treatments could eradicate the need for follow up appointments and prevent treatments from failing, according to a study published recently in the *Journal of Dental Research*. The SafeRoot device, created by a team of researchers at King's College London, enables rapid bacterial detection inside the root canal, ensuring the procedure has been successful and reducing the need for tooth extraction or surgical intervention.

Root canal treatments remove bacterial infections from the root canal space, while retaining as much of the natural tooth as possible. Around a quarter fail over time due to secondary infections, and most procedures require one or two visits to the dentist.

The first appointment is used to remove infected material in the tooth and to administer an antibacterial treatment. During the second appointment, dentists visually assess the canal to check if the infection has been removed, but this process cannot guarantee that treatment has been successful. Each visit involves drilling and the removal of part of the tooth.

The SafeRoot device was created to detect any existing bacteria once the root canal treatment has been completed, with the aim of eliminating persistent or secondary infections and reducing the need for further treatments. Through florescent dyes and fluorescence microscopy/spectroscopy, SafeRoot can optically detect minute amounts of residual live bacteria in the root canal space. Indeed, during trials the team were able to successfully detect bacterial cells after just three minutes of testing.

The process is performed during the treatment using conventional sterile endodontic paper points, thereby preventing any impact on clinical treatment time and minimising additional clinical steps.

"The resilient nature of bacteria, combined with often complex root canal structures, makes disinfection challenging, leading to a considerable number of persistent infections. This is one of the main causes of root canal treatment failures," explained Francesco Mannocci, professor of endodontics at the Dental Institute at King's College London.

"SafeRoot will reduce the time for root canal completion and will increase the success rate of treatments by letting the dentist know when it's safe to proceed with filling the tooth. This should produce fewer acute 'flair-ups' and failed root treatments, as any residual infection in the root canal will be identified," said Professor Tim Watson.

"The treatments are not only time consuming and painful for the patients, but cost the NHS a significant amount. If we can reduce the number of root canal treatments and re-treatments required, it could mean sizeable savings to the NHS," added lead researcher, Frederic Festy. "SafeRoot could be applied to a wide range of biological infections as well, ranging from wound or respiratory, to implant related infections and contaminations."

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