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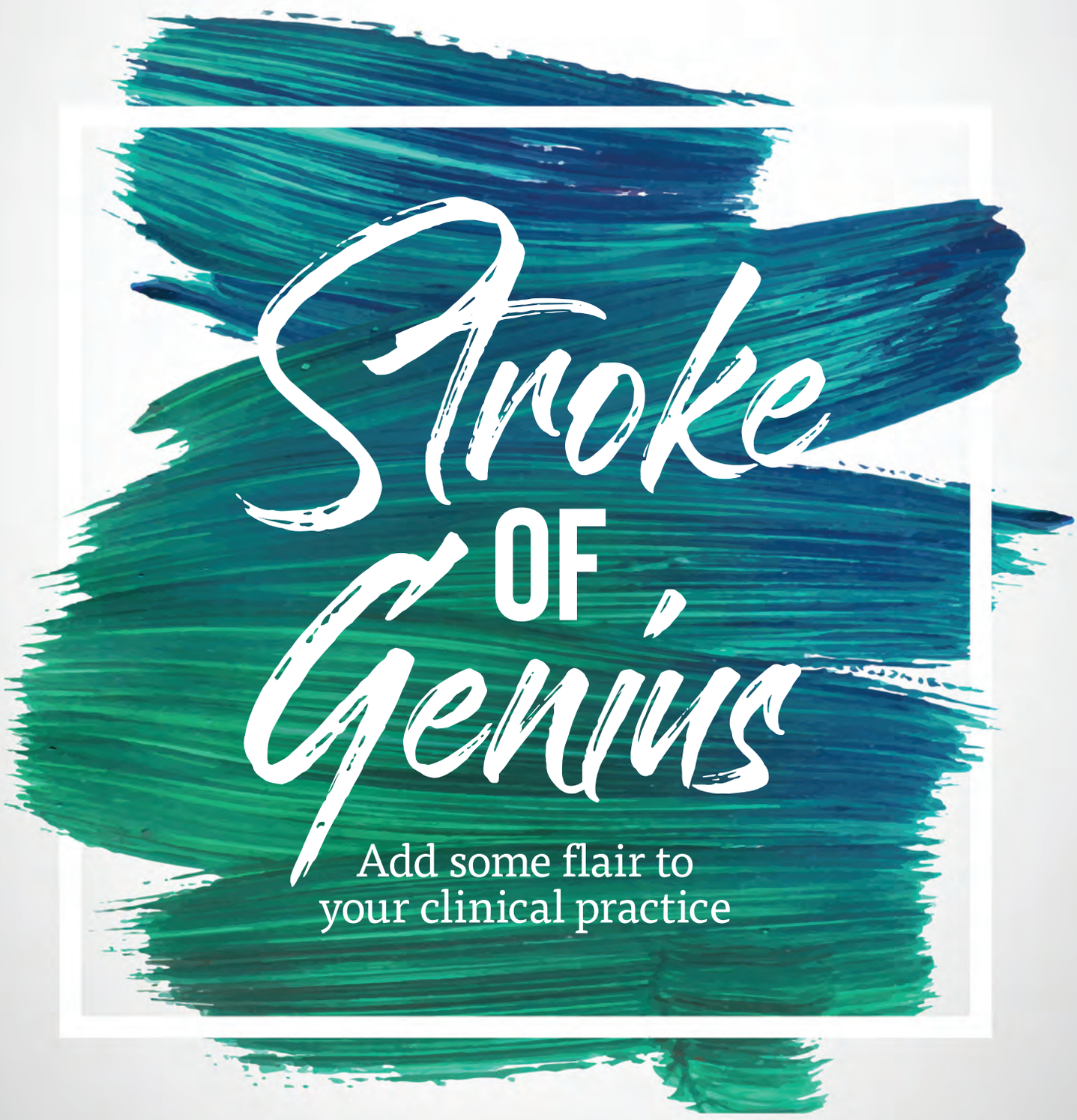

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MISSIONSTATEMENT

Clinical Dentistry is committed to the advancement of practical clinical skills in dentistry. Through its focus on inspirational clinical casework, its sole aim is to help general dental practitioners enhance their skills and techniques across every facet of dentistry in an easy-to-assimilate and practical way.

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PROACTIVE PRACTICE

As we ready ourselves to turn the page to a new year, the dental profession once again finds itself at a pivotal moment – one defined not only by technological shifts and changing patient expectations, but by the conversations we choose to have about our future. Dentistry's dialogue often centres on constraints: workforce shortages, compliance pressures, rising costs, the pace of digital transformation. But while these realities matter, they are not the full story.

For 2026, I invite you to join us in rewriting the conversation, moving from reactive thinking to proactive vision. Let's refuse to let challenges dominate the narrative when opportunity is just as present – if we choose to see it. Across dentistry, we have the chance to redefine what 'progress' looks like. Let's stop asking: 'How do we keep up?' Instead, let's say: 'How do we lead?'

What if we shifted discussions about technology from fear of complexity to excitement about capability? Digital workflows, AI-assisted diagnostics and connected devices are no longer abstract innovations – they're tools enabling better patient outcomes, smarter resource management and more empowered clinical teams. Reframing the dialogue around tech adoption helps practices move beyond hesitation and toward meaningful integration.

What if our conversations about workforce challenges focused less on scarcity and more on redesigning roles, cultivating talent and building environments where teams feel valued and inspired?

Every successful practice knows that culture is not a buzzword; it's a strategic asset. By rewriting how we speak about leadership and team development, we create space for more sustainable, human-centred growth.

What if we recast the topic of patient expectations – from seeing them as demanding consumers to viewing them as partners who are increasingly engaged, informed, and eager to participate in their oral health journey? This reframing helps us build trust, enhance communication, and elevate the patient experience in ways that benefit both sides of the chair. Above all, rewriting the conversation means acknowledging that our language shapes our mindset – and our mindset shapes our future.

As a profession, we have every reason to approach the coming year with confidence, curiosity and creativity. Here's to a year defined not just by what happens, but by how boldly we choose to talk about what's possible.

Siobhan Hiscott
Group Managing Editor
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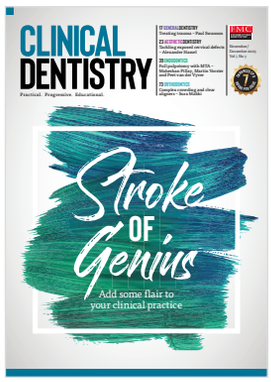

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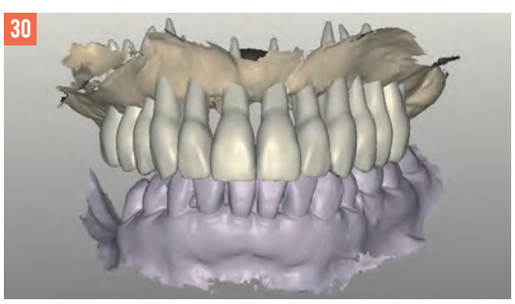

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GENERALDENTISTRY

Photobiomodulation (PBM) has emerged as an effective adjunct to oral surgery. By delivering specific wavelengths of light at low intensity, PBM enhances cellular activity, modulates inflammation and promotes faster tissue regeneration – Kate Monteith-Ross, p13

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Patient Case Study – Before

Patient presented with Stage 4 Grade B Generalised Periodontitis.
Treatment: RSD Q&Q.
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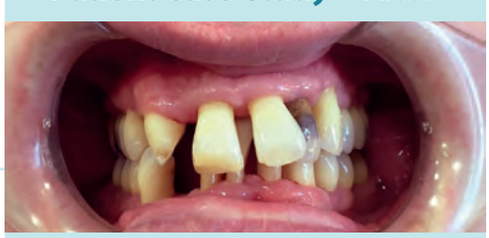
Patient Case Study – After



Recall at 12 months

Case study and photographs courtesy of **Pat Popat**
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KATE MONTEITH-ROSS
Kate is an award winning aesthetic nurse practitioner, educator and clinic owner. She is the founder, clinical director and lead aesthetic nurse at The Clinic by La Ross, and also directs the Urban Aesthetics Academy UK. As a recognised industry expert, Kate serves as a regional associate trainer for Teoxane, faculty member for Dermafocus, and is a key opinion leader for brands including Dermalux and Neogen Plasma.

ENHANCED CPD

CPD hours: one

GDC development outcome: C

Topic: General dentistry

Educational aims and objectives: To discuss the use of LED phototherapy to encourage post-surgical recovery following extraction of an infected molar.

This article qualifies for one hour of enhanced CPD; answer the questions on page 80.

Postoperative pain, swelling, bruising and delayed healing are frequently observed after dental extractions, particularly when infection is present. These symptoms typically peak within 48 to 72 hours and may persist for 10 to 14 days, significantly affecting patient comfort and functional recovery.

Evidence from a recent systematic review and meta-analysis indicates that low-level light therapies can reduce pain, swelling and trismus after third-molar surgery (González et al, 2025).

Standard management using non-steroidal anti-inflammatory drugs (NSAIDs) or opioids addresses pain but does not promote tissue repair or modulate the inflammatory cascade.

Photobiomodulation (PBM) has emerged as an effective adjunct to oral surgery. By delivering specific wavelengths of light at low intensity, PBM enhances cellular activity, modulates inflammation and promotes faster tissue regeneration.

Mechanistically, visible to near-infrared light stimulates mitochondrial chromophores such as cytochrome c oxidase, increasing ATP production and initiating downstream repair pathways (Karu, 1999). Clinically, immediate post-extraction PBM has been shown to improve pain, oedema and trismus in a randomised, double-blind split-mouth trial (Camolesi et al, 2025).

Dermalux Tri-Wave MD is a class IIa medical LED device delivering the three most clinically validated wavelengths:

- 415nm (blue)
- 633nm (red)
- 830nm (near-infrared).

The 830nm wavelength penetrates soft tissue and is widely used for post-surgical recovery programmes.

This case describes the application of Dermalux Tri-Wave MD LED phototherapy in the postoperative management of a patient who underwent surgical extraction of an infected molar.

The patient's recovery was clinically uneventful, with a significantly shortened healing period and reduced symptom burden.

CASE STUDY

A 41-year-old female presented with persistent pain and swelling around a lower right molar. Clinical examination revealed severe localised inflammation and tenderness, with radiographic imaging confirming infection involving both the tooth and surrounding bone (Figure 1).

Based on the extent of infection, significant postoperative swelling, bruising and discomfort were anticipated, with recovery expected over 10 to 14 days.

TREATMENT PROTOCOL

The patient underwent surgical removal of the infected molar. Following standard irrigation and debridement, primary closure was achieved with sutures. Immediately postoperatively, the patient received a 20-minute session of near-infrared LED phototherapy (830nm) using the Dermalux Tri-Wave MD device. The LED panel was applied externally along the lateral aspect of the jaw to target the surgical site.

Subsequent LED therapy sessions were delivered on postoperative days three and five using the same protocol (Figure 2).

In addition to LED therapy, the patient received standard analgesic care with NSAIDs and post-surgical hygiene instructions. No antibiotics were prescribed, as the infection had been localised and resolved with extraction.

Kate Monteith-Ross explores the use of LED phototherapy to encourage post-surgical recovery following extraction of an infected molar, showing reduced swelling, pain and faster healing compared with conventional care

LED phototherapy: aiding recovery

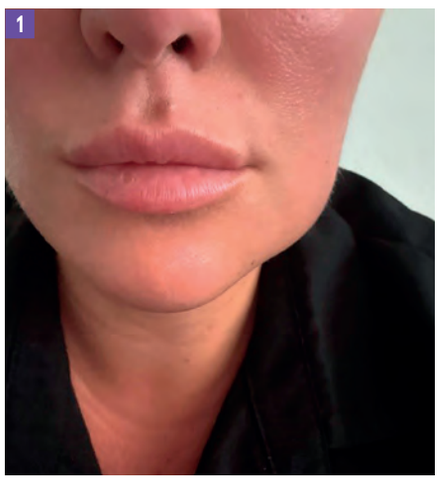

FIGURE 1: *Before treatment*

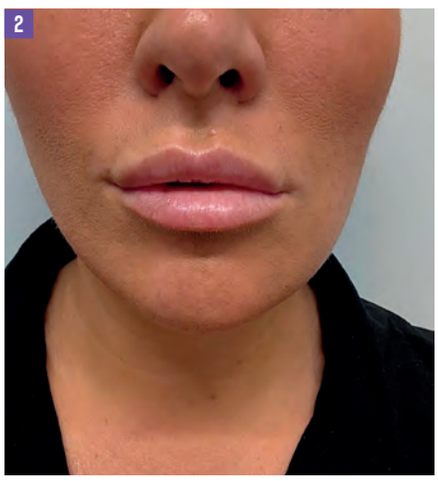

FIGURE 2: *During treatment*

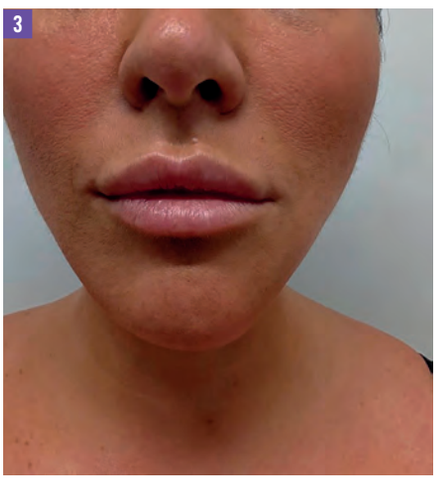

FIGURE 3: *After treatment*

RESULTS

Thanks to the use of the Dermalux Tri-Wave MD, the patient's postoperative recovery progressed rapidly and without complication.

On day one, she reported only mild discomfort and required minimal analgesic intake. Clinically, swelling was significantly reduced compared with typical post-infected extraction trajectories.

By day three, there was no visible bruising and minimal residual oedema. The patient was fully functional, with no reports of pain and no signs of delayed healing.

By day five, full resolution of pain and swelling was observed, and soft tissue healing at the surgical site was advanced for the time point. Clinical photographs taken at each visit corroborated the patient-reported outcomes (Figure 3). The patient noted that recovery was markedly easier than previous extractions and described the experience as 'straightforward and comfortable'.

DISCUSSION: MECHANISM OF ACTION

The biological effects observed in this case are consistent with the known mechanisms of photobiomodulation.

At 830nm, near-infrared light stimulates cytochrome c oxidase within mitochondria, enhancing ATP production, which supports fibroblast activity, collagen synthesis and cellular turnover (Karu, 1999). Additionally, PBM modulates the expression of pro-inflammatory cytokines, including IL-1β, IL-6 and TNF-α, contributing to reduced tissue oedema and improved healing.

Nitric oxide release further enhances vasodilation and lymphatic drainage, supporting rapid clearance of inflammatory by-products.

CLINICAL EVIDENCE

High-level evidence now supports PBM as an adjunct in third-molar surgery. A 2025 systematic review and meta-analysis reported reductions in postoperative pain, swelling and trismus with low-level light therapies following mandibular third-molar extraction (González et al, 2025).

In addition, a randomised, double-blind, split-mouth clinical trial showed that PBM applied immediately after lower third-molar extraction improved pain, oedema and trismus outcomes compared with placebo (Camolesi et al, 2025).

The present case aligns closely with this evidence base, with the patient achieving complete resolution of symptoms by day five – considerably faster than the expected 10 to 14-day recovery period thanks to the use of LED phototherapy with the Dermalux Tri-Wave MD device.

PRACTICE INTEGRATION

The Dermalux Tri-Wave MD is designed with clinical practicality in mind. Its treatment protocol is non-invasive and compatible with standard surgical workflows. Each 20-minute session can be administered chairside, requiring no consumables, anaesthesia or special preparation.

With high energy output (up to 240J/cm^2), optimal dose delivery and precision wavelength control, the device delivers reproducible, evidence-based treatment outcomes.

The patient experience is painless, relaxing and well tolerated, making it suitable for wide-ranging dental applications, and the level of treatment satisfaction cannot be underestimated.

CLINICAL BENEFITS

Integrating PBM into post-extraction protocols provides measurable benefits including reduced pharmacological pain management requirements, decreased risk of secondary complications, and enhanced patient satisfaction.

Faster healing reduces postoperative appointment needs and improves practice efficiency. The anti-inflammatory effects may help prevent tissue damage associated with prolonged inflammatory responses.

SHEDDING MORE LIGHT

Known for its safety and minimal side effects, the Dermalux Tri-Wave MD delivers three of the most clinically-evidenced light wavelengths – red, blue and near-infrared, each capable of targeting specific skin concerns:

- Blue light (415nm) has effective antimicrobial properties and reduces the formation of biofilms, making it perfect for infection control during the Inflammation stage of wound healing. It is also effective in wound healing through stimulating cellular proliferation and migration, enhancing collagen synthesis, and modulating inflammatory responses
- Near-infrared light (NIR) (830nm) encourages the proliferation and migration of fibroblasts and keratinocytes in wound healing (Barolet and Boucher, 2009). It is also proven to offer effective pain relief by modulating pain signalling pathways and reducing the release of pain mediators (Gupta et al, 2005), assisting during the important proliferation stage
- Red light (633nm) stimulates collagen production, reduces inflammation and promotes overall skin health. Using the red light during the final remodelling stage of healing supports the aesthetic result by reducing the fibrotic tissue and aiding in the improvement of the scarring (Kurtti et al, 2021).

CONCLUSION

This case highlights the potential for Dermalux Tri-Wave MD LED phototherapy to enhance postoperative recovery following surgical extraction of an infected molar. The patient experienced minimal discomfort, no bruising and complete resolution of swelling and pain within five days, which is a markedly faster recovery than typically observed with conventional care.

The treatment protocol involved near-infrared LED therapy at 830nm, delivered for 20 minutes immediately after surgery and repeated on postoperative days three and five. The LED panel was applied externally along the jawline, targeting the surgical site. Sessions were well tolerated, painless and easily integrated into routine postoperative appointments.

Photobiomodulation offers dentists a non-invasive, evidence-based adjunct to standard surgical protocols. Its ability to reduce inflammation, accelerate healing and limit pharmacological pain management contributes not only to improved patient outcomes but also to greater practice efficiency.

The Dermalux Tri-Wave MD system provides a clinically reliable platform with validated wavelengths and high energy with optimal dose delivery, making it a practical and reproducible tool for routine dental use.

Further research will help standardise treatment parameters across indications, but this case supports the growing evidence base for LED phototherapy as an effective and accessible enhancement to dental surgical care. CD

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Treating trauma

Paul Swanson shares an unusual implant case, treating a young patient in his 20s who experienced tooth avulsion as the result of trauma as a child

While unintentional tooth avulsion is fairly rare among the population, almost 1,800 cases were reported in London dental hospitals between 2012 and 2018. The most common reasons for traumatic injuries were falls, sports injuries, cycling accidents and traffic accidents, with the most at-risk teeth being the central maxillary incisors (Djemal et al, 2022).

Dental trauma is also common in children and young adults, with around 25% of school-age children experiencing it in some form (Laforgia et al, 2025). Consequently, it's important that dental professionals offer a myriad of treatment solutions to help restore young patients' dentition.

Implant placement in young people is a rare and somewhat controversial issue. Typically, the minimum age for dental implants has been considered as 18 to 21 for males and 16 to 18 for females (Chrcanovic, 2018), although effective treatment in younger patients has been documented (Casaña-Ruiz et la, 2023). Factors such as the patient's general health, the likelihood of further jaw growth, the number of teeth needing to be replaced and their anatomical features can all contribute to treatment success (Elagib et al, 2023).

In appropriate situations, the procedure can significantly improve a young adult's quality of life, as well as their dental aesthetics and functionality. This is especially relevant when a patient presents who has been without an anterior tooth for many years. As such, dental implants should be considered on a case-by-case basis.

The following presentation demonstrates the successful provision of implant treatment for a patient in his early 20s, following several years of a missing central incisor.

PATIENT PRESENTATION

A 22-year-old man requested dental rehabilitation some years after his father had successfully received implant treatment. The patient had lost his upper left central tooth in a sporting accident as a nine-year-old, which had had a negative impact as he grew up, especially during adolescence.

He had undergone comprehensive orthodontics for several years – this was provided through a teaching hospital and had been disrupted due to COVID-19.

ASSESSMENT

A full clinical assessment was conducted, including clinical photographs and a CT scan. Evaluation of the bone level around the UL1 demonstrated sufficient volume for implant placement but indicated the need for supplementary simultaneous bone augmentation at the site, at the time of implant placement.

Significant gingival recession was also identified on the upper left canine.

The patient was made aware of all treatment options, including the benefits and risks of each – no treatment, anterior bridge and implant placement. The latter remained the procedure of choice, offering a fixed and permanent solution.

FIGURE 1: *Presentation*

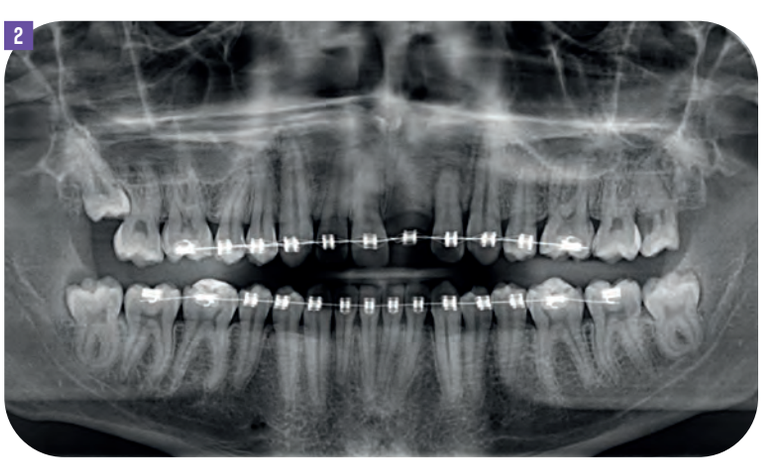

FIGURE 2: *Radiograph taken during orthodontic treatment*

DR PAUL SWANSON

Paul is the principal of Rose Lane Dental Practice in Liverpool. Following his qualification from the University of Liverpool in 2000, Paul continued his studies to obtain a diploma in general practice from the Royal College of Surgeons in 2003. In 2008, he achieved the diploma in implant dentistry and advanced certificate in bone grafting from the Royal College of surgeons of England. In 2010, he received an MSc in implant dentistry from Queen Mary University of London. Paul accepts referrals from other practices for implant dentistry.

FIGURE 3: *Pre-surgical treatment retracted anterior view*

FIGURE 4: *Pre-surgical treatment upper occlusal view*

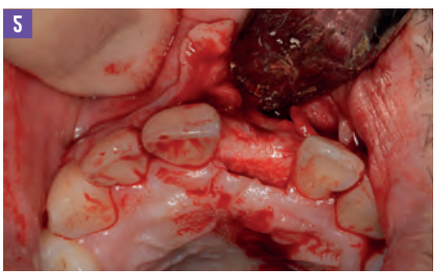

FIGURE 5: *A full thickness flap was raised*

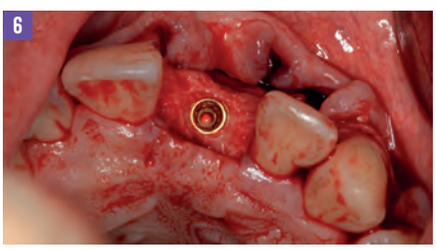

FIGURE 6: *Tapered Pro Conical implant placed*

FIGURE 7: *GBR performed to stablise the implant and increase bone volume*

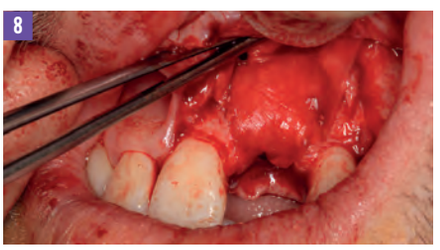

FIGURE 8: *Bone graft secured with Mem-Lok resorbable membrane*

FIGURE 9: *Soft tissue regeneration performed with a Novamatrix*

FIGURE 10: *Surgical site sutured closed tension-free*

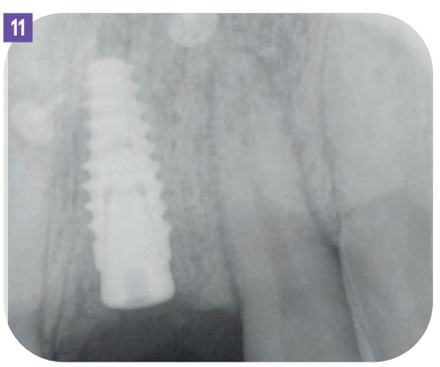

FIGURE 11: *Radiograph immediately postoperative*

FIGURE 12: *Original aligner with denture tooth replaced while surgical site heals*

FIGURE 13: *Implant site one-month postoperative*

FIGURE 14: *Final restoration three-months postoperative*

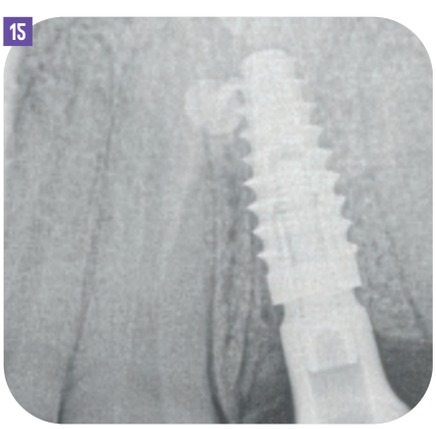

FIGURE 15: *Radiograph showing good integration of implant*

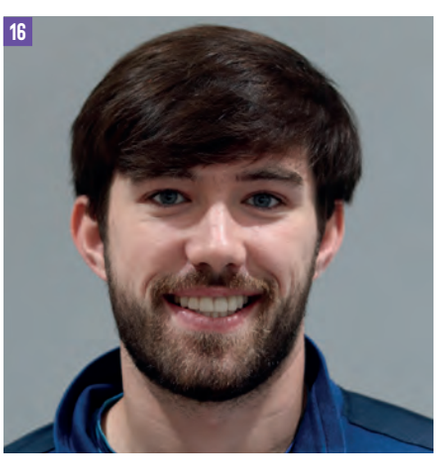

FIGURE 16: *Post-treatment*

The guided surgical approach was integral in maintaining the level of accuracy required

TREATMENT PLAN

The diagnostic imaging was used to plan treatment digitally. A guided approach was selected in order to optimise accuracy of implant placement for ideal functionality and aesthetics. This would be combined with simultaneous guided bone regeneration (GBR), increasing stability for the implant and augmenting the buccal contour.

Soft tissue augmentation would also be required. This would enable the clinician to increase the soft issue thickness in the proposed peri-implant tissues and to address the gingival recession in the anterior zone, reducing any further recession following implant surgery.

The images, scans and digital mock-up were sent to the laboratory for fabrication of the surgical guide and the temporary crown.

SURGICAL TREATMENT

On the day of surgery, local anaesthesia was administered around the UL1. A full thickness flap was raised to gain access to and better visualise the underlying bone. The guide was seated in the mouth and a Tapered Pro Conical implant 4.2mm diameter 10.5mm length was placed according to the exact position, angle and depth determined in the plan. GBR was performed using Mineross X, which delivers a combination of cancellous and cortical particles for efficient turnover into bone. This was packed densely around the implant and secured in place using a Mem-Lok resorbable collagen membrane.

Soft tissue regeneration involved placing a Novomatrix to rebuild the gingival thickness and achieve a good contour around the implant and neighbouring teeth. A 2mm height healing abutment was fitted to support the grafting material and to enable easier access to the fixture at the time of exposure.

Tension-free passive closure was then ensured via periosteal release to cover the graft and allow a coronal repositioning of the gingival tissues at the UL3 site. The patient was provided with standard post-surgical oral hygiene instructions to aid healing. He returned to the practice for an initial surgical review, at which time radiographic evidence was collected to suggest successful bone remodelling and effective healing.

RESTORATIVE TREATMENT

The patient returned to the practice three months later for the second stage surgery, during which the implant was exposed. A lab-made provisional crown was placed, which had been designed to contour the soft tissues and enhance the aesthetic outcome.

He was then referred to the restorative dentist for the final screw-retained crown. This was provided alongside composite bonding and tooth whitening, enhancing the shape and colour of all the anterior teeth for optimal smile aesthetics. As a semi-professional football player, the patient was strongly advised to wear a custom-designed mouthguard to protect his implant and his natural teeth moving forward.

OUTCOME AND DISCUSSION POINTS

It is unusual for patients as young as this to require and be suitable for implant treatment. In this particular situation, the patient had experienced a missing anterior tooth for many years, and so he was keen to find a solution.

Despite the atypical patient age, treatment depended on following the basic principles involved with any implant case.

Working on the site of the central incisor, it was crucial to place the implant 3-4mm below the proposed gingival margin, ensuring the buccal bone was at least 2mm in width. The guided surgical approach was integral in maintaining the level of accuracy required to achieve this confidently.

The Tapered Pro Conical implant with conical connection was selected to enable stability of the peri-implant hard and soft tissues in the long-term. CD

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PRODUCTS USED

Tapered Pro Conical, Mineross X, Novomatrix
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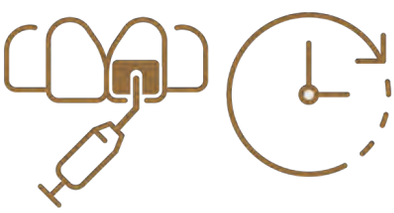

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AESTHETICDENTISTRY

ALEXANDER HASSEL
Tackling exposed cervical defects

23

Hybrid ceramic is a proven solution for restoring the original shape and shade of anterior dentition, particularly in the case of multiple wedge-shaped defects in combination with moderate recessions – a common occurrence, particularly in the aesthetic zone. At the same time, this type of restoration is minimally invasive, or even non-invasive in comparison to complete veneers, thanks to the properties of the hybrid ceramic material – Alexander Hassel, p23

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PROFESSOR ALEXANDER HASSEL
Alexander practises in Mannheim, Germany and is an adjunct professor at the University Hospital in Heidelberg.

ENHANCED CPD

CPD hours: one

GDC development outcome: C

Topic: Aesthetic dentistry

Educational aims and objectives:
To describe the restoration of a cervical defect using a hybrid ceramic cervical veneer that does not simply cover the defect but also has a cosmetic effect, in terms of shape and shade.

This article qualifies for one hour of enhanced CPD; answer the questions on page 80.

Alexander Hassel discusses how to treat exposed cervical defects with hybrid ceramic in practice

Tackling exposed cervical defects

It might seem trivial at first glance: achieving aesthetic and durable cervical restorations can be a tricky matter that comes up all too often in everyday practice. These types of defects are not only unsightly, they also can result in hypersensitivity.

Since wedge-shaped defects of this kind no longer have a protective enamel layer, they are often accompanied by acid-related erosion and defects caused by brushing. These defects can now be restored to the shade of the tooth with composite. However, modelling along the gingival margin is often very difficult and requires clinical compromises.

In addition, directly layered composite is prone to discolouration during the clinical course and often detaches from the tooth again. What are the alternatives?

STRINGENT MATERIAL REQUIREMENTS

The digital workflow is ready and available with new types of indirect material options. But what must a fabricated alternative using CAD/CAM technology offer in order to really improve on a direct composite?

It should be possible to seat the ideal restoration material for cervical veneers quickly and easily, without the need for preparation. This requires thin layers and precise, thinly tapered edges.

It should be possible to attach it reliably using fully adhesive bonding and, at the same time, it should be able to withstand shear forces.

The polymerisation reaction should be as complete as possible with few open bonds so that discolouration is less likely to develop.

Finally, a distinct chameleon effect should ensure that the restoration blends in visually with the natural tooth substance.

HYBRID CERAMIC

Hybrid ceramic comprises a porous sintered feldspar ceramic block (86 wt%) that is infiltrated under pressure and heat with a polymer (14 wt%) and subject to industrial polymerisation. This creates a dual network structure that, in addition to all other single-tooth restorations, is also ideally suited to cervical veneers (Della Bona, Corazza and Zhang, 2014).

Vita Enamic (Vita Zahnfabrik) is built according to this blueprint. Many of the other materials that claim to be hybrid ceramic are composites; in other

FIGURE 1: *The patient was unhappy with the wedge-shaped defect on UR3*

FIGURE 2: *The tooth shade was determined digitally using Vita Easyshade V*

FIGURE 3: *The corresponding shade tab was also documented in photographs*

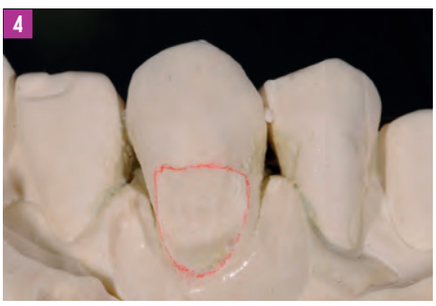

FIGURE 4: *The master model with the preparation margin drawn for orientation*

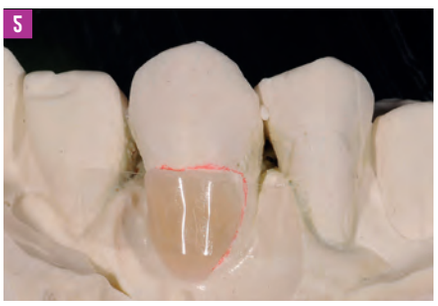

FIGURE 5: *The final hybrid ceramic inlay, as delivered to the dental practice*

FIGURE 6: *The restoration prior to fully-adhesive seating*

FIGURE 7: *The bonding surface was etched using hydrofluoric acid*

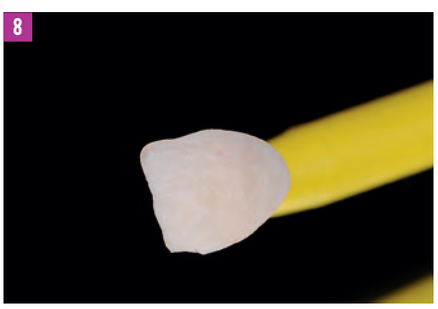

FIGURE 8: *The microretentive surface after etching*

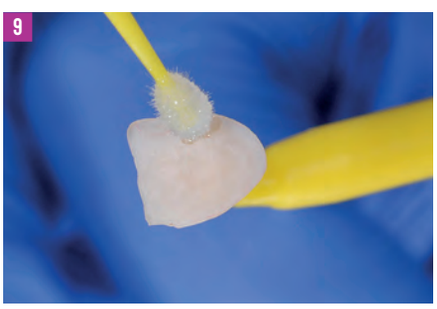

FIGURE 9: *Vita Adiva C-Prime silane was applied using the microbrush*

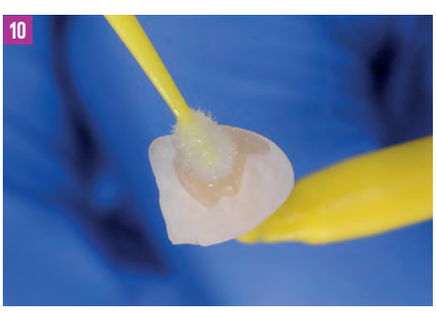

FIGURE 10: *The entire bonding surface was coated with silane*

FIGURE 11: *The cleaned cervical defect with a retraction cord inserted*

FIGURE 12: *Phosphoric acid was applied for a microretentive etching pattern*

words, finely ground fillers embedded in a polymer matrix (Spitznagel et al, 2014).

HYBRID CERAMIC MATERIAL PROPERTIES

Due to the polymer, hybrid ceramic is not as brittle as full ceramics. This means that results with CAD/CAM fabrication can also be up to 0.2mm thinner and offer precise edges, without fracturing or fraying at the margins (Awada and Nathanson, 2015; Spitznagel, Boldt and Gierthmuehlen, 2018).

Minimally thin layers ensure non-invasive use, meaning that cervical defects only need to be cleaned or have caries removed.

For virtual construction with hybrid ceramic, the healthy enamel in the incisal area and the marginal edge of the wedge-shaped defect at the cementum can generally be used as a natural preparation margin.

As a result of the dominant ceramic surface, a reliable bond is ensured by etching with hydrofluoric acid and silanisation (Conejo et al, 2020; Niizuma et al, 2020). Controlled industrial polymerisation ensures a high number of chemical bonds, which minimises discolouration and subsequent release of monomers (Grenade et al, 1998; Al Amri et al, 2021).

TOOTHLIKE DEFORMATION

As a result of the dual network structure, the flexural modulus or flexibility of the material is between that of enamel and dentine (Lucsanszky and Ruse, 2020; Kawajiri et al, 2021).

If the tooth is subject to lateral forces of leverage, the restoration can flex with the rest of the tooth substance, preventing stress peaks and counteracting the possibility of the restoration breaking off.

The idea of a monoblock is also used in the context of fully adhesive post and core build-ups, where, for the same reason, fiberglass posts and composite build-ups with a toothlike flexural modulus are used in order to prevent a fracture of the prosthetic base (Bitter et al, 2014).

Simply put, if you bond a rigid object to a flexible object and then apply a deforming force to the flexible object, the rigid object will become detached after a short time because it is not able to adapt to the various deformations.

RESTORATION WITH A CERVICAL VENEER

The following clinical case study describes the restoration of a cervical defect using a hybrid ceramic cervical veneer that does not simply cover the defect but also has a cosmetic effect, in terms of shape and shade.

A 72-year-old patient was unhappy with the aesthetic appearance of her canine tooth (UR3). The defect had already been treated with composite several times, but the restoration did

FIGURE 13: *Application of the dual-curing adhesive Vita Adiva T-Bond I+II*

FIGURE 14: *The adhesive (no fillers) was dispersed with air to create a very thin layer*

FIGURE 15: *Light-curing of the adhesive using the dental polymerisation light*

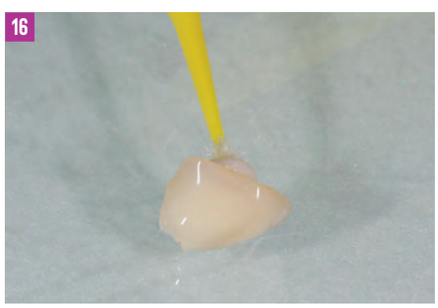

FIGURE 16: *The luting composite Vita Adiva F-Cem on the bonding surface*

FIGURE 17: *Controlled cementation using a microbrush as an application aid*

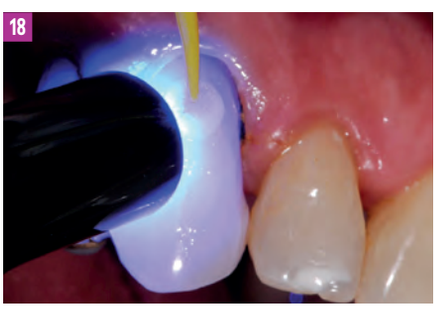

FIGURE 18: *Light-curing after initial removal of excess material*

FIGURE 19: *The result prior to final finishing and polishing*

not last. She wanted a durable restoration that reproduced the original aesthetics and reliably restored the defect.

After a detailed consultation, the patient chose a CAD/CAM fabricated cervical veneer made from Vita Enamic hybrid ceramic.

DIGITAL TOOTH SHADE DETERMINATION

For selection of the appropriate block, the tooth shade was determined digitally at the touch of a button using the Vita Easyshade V spectrophotometer.

The probe was placed flat on the intact part of the tooth above the wedge-shaped defect and the measurement carried out by pressing the button. Standardised white LED light was sent to the interior of the tooth. The remission spectrum reflected by the dentine core was then recorded by the probe and analysed in the device to determine and display the tooth shade.

The determined tooth shade (3M3) was also documented in photographs using the corresponding Vita System 3D-Master shade tabs. Based on the findings, highly translucent Vita Enamic 3M3 HT was selected.

DIGITAL WORKFLOW

Once the defect had been cleaned and exposed, an impression was taken using polyether in order to create a master model. The model was digitised with an Imetric laboratory scanner, in order to construct the cervical veneer using Exocad software.

The tapered and wafer-thin construction extended consistently into the healthy enamel in the incisal area, in order to include as much enamel surface as possible in the fully adhesive seating. Following nesting of the restoration, it was subtractively fabricated using milling unit N4 (VHF) and then manually finished and polished to a high-gloss finish using rubber polishers, polishing brushes and polishing paste.

FULLY ADHESIVE INTEGRATION

The bonding surface of the cervical veneer was etched using Vita Adiva Cera-Etch hydrofluoric acid, cleaned using water spray and then the air-dried surface was silanised using Vita Adiva C-Prime.

After a dry environment was established, the cervical defect was etched using Vita Adiva Tooth-Etch, and the dual-curing and unfilled bonding agent Vita Adiva T-Bond I+II were applied twice and polymerised in a controlled fashion.

The fit was not compromised, as the adhesive

FIGURE 20: *The hybrid ceramic restoration reestablished the tooth's original shape and shade*

FIGURE 21: *Restoration with a cervical veneer after one year*

did not contain filler. The Vita Adiva F-Cem luting composite in the shade A3 was then applied to the bonding surface of the cervical veneer and inserted using an application aid.

Vita Adiva Oxy-Prevent avoided the formation of an inhibition layer during light curing.

Following removal of excess material and final polishing of the edges of the restoration, the hybrid ceramic cervical veneer blended in well with the natural tooth substance, thanks to the distinct chameleon effect.

SUMMARY

Hybrid ceramic is a proven solution for restoring the original shape and shade of anterior dentition, particularly in the case of multiple wedge-shaped defects in combination with moderate recessions – a common occurrence, particularly in the aesthetic zone.

At the same time, this type of restoration is minimally invasive, or even non-invasive in comparison to complete veneers, thanks to the properties of the hybrid ceramic material. It offers a real alternative to direct composites. CD

PRODUCTS USED

Vita Easyshade V, Vita Adiva F-Cem, Vita Adiva T-Bond Vita Zahnfabrik

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DIGITALDENTISTRY

NAIL DIA & CHÉRINE ZARINI
Elevating full-arch implant aesthetics

30

Full-arch implant rehabilitations have long prioritised function and longevity. Yet today's patients demand more: natural aesthetics, personalised design, and seamless facial integration. This shift has ushered in a new era – where digital workflows empower clinicians and technicians to blend precision with artistry – Nail Dia and Chérine Zarini, p30

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NAIL DIA
DMD
Nail is a dental surgeon and owner of the Le Diadentaire centre. Graduate of the Université de Montréal (2015), Nail completed a multidisciplinary residency at McGill University (2016), followed by a clinical internship in oral and maxillofacial surgery at the University of Michigan (2017).

CHÉRINE ZARINI
OTPADQ DT
Chérine is a dental technician and master ceramist. She is co-founder of Quintessence Atelier Dentaire (Montreal, Canada), and specialises in full-arch restorations and digital workflows.

ENHANCED CPD

CPD hours: one

GDC development outcome: C

Topic: Digital dentistry

Educational aims and objectives: To present a case that embodies the digital evolution: a maxillary full-arch implant prosthesis realised entirely through digital tools – from facial scanning to prosthetic design – with an outcome that rivals the finesse of single-unit restorations.

This article qualifies for one hour of enhanced CPD; answer the questions on page 80.

Full-arch implant rehabilitations have long prioritised function and longevity. Yet today's patients demand more: natural aesthetics, personalised design, and seamless facial integration. This shift has ushered in a new era – where digital workflows empower clinicians and technicians to blend precision with artistry.

This article presents a case that embodies this evolution: a maxillary full-arch implant prosthesis realised entirely through digital tools – from facial scanning to prosthetic design – with an outcome that rivals the finesse of single-unit restorations.

When technology is guided by a clear clinical vision, precision becomes the foundation, and aesthetic excellence, the inevitable result.

CASE REPORT

A female patient presented for the definitive rehabilitation of a previously restored maxillary arch.

The initial prosthesis had been delivered following an immediate loading protocol, but it lacked both functional stability and aesthetic precision. The occlusal plane was improperly oriented, and the dental midline was visibly deviated from the facial midline, resulting in a noticeable disharmony when smiling.

In the first place, digital impressions of the final scan-bodies as well as of the existing immediate prosthesis were captured and received at the lab, which allowed the team to retain essential reference points while preparing the groundwork for a completely digital redesign.

DIGITAL PROTOCOL: FACE-GUIDED IMPLANT PROSTHETICS

3D facial data was captured using Zirkonzahn Face Hunter 3D facial scanner and the Planefinder. This provided a natural head position, true midline and occlusal plane, essential for aligning the prosthesis with facial symmetry.

FIGURE 1: *Interim full-arch prosthesis in place*

FIGURE 2: *Intraoral scan of the final scan bodies*

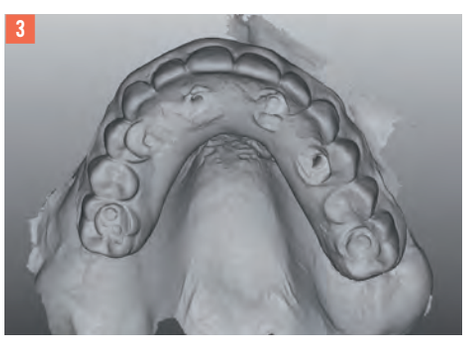
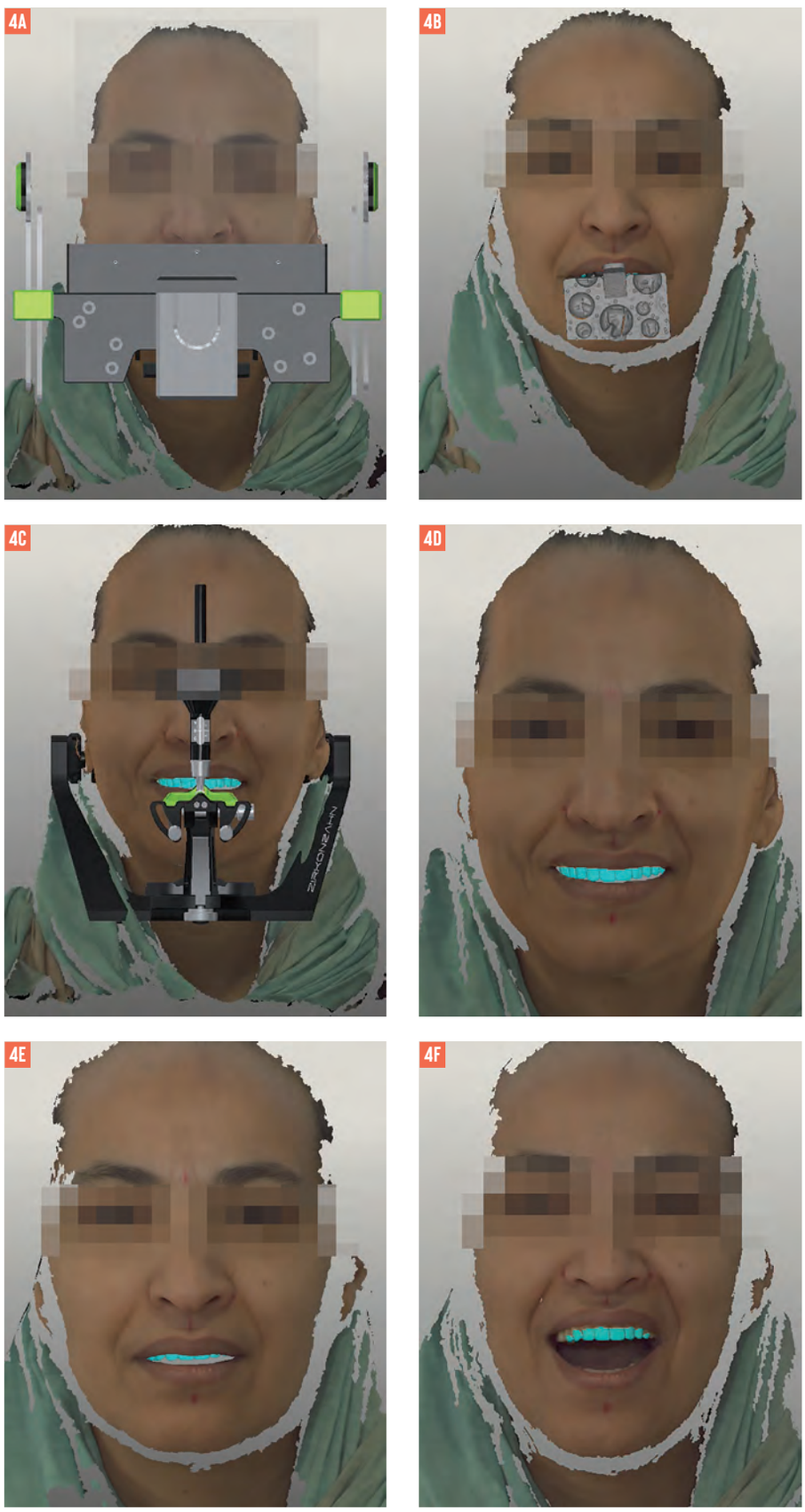


FIGURE 3: *Intraoral scan of the existing immediate prosthesis*

Nail Dia and Chérine Zarini discuss improving implant aesthetics through a refined digital workflow

Elevating full-arch implant aesthetics



FIGURES 4A *to* **4F:** *Capturing patient information using the Face Hunter 3D facial scanner, the Planefinder and the Transfer Fork*

The digital impression of both the immediate prosthesis and the final scan bodies was integrated within the patient's cranium using the Face Hunter's Transfer Fork. The fork – while not used for stabilisation – serves as a spatial key, anchoring the intraoral scans within the 3D facial environment. This enables ultra-precise cranial matching for aesthetic-driven alignment.

Prosthetic 3D design and 2D design validation

Using Zirkonzahn's virtual articulator, the prosthetic design was digitally mounted and calibrated. The occlusal plane, inclinations and functional paths were automatically mapped based on the facial plane defined by the Planefinder.

The prosthetic setup was developed in harmony with individual functional dynamics, using the virtual articulator's slope data and occlusal modelling tools allowing visualisation of both smile types (light and broad) in 3D dimension.

The 3D design of the prosthesis was then superimposed into 2D facial photos, allowing visualisation of 2D. This facial simulation ensured that incisal edge position, tooth shape, and gingival contour matched the patient's morphology.

CONFIRMING THE ACCURACY OF THE DIGITAL PLANNING

A plaster verification jig was manufactured directly from the digital workflow – not based on any physical model. The plaster jig was milled and inserted intraorally. Its integrity confirmed full passivity, ensuring that no distortion was present in the digital impression. Full passivity was confirmed by the absence of any fracture of the jig before proceeding to the next phase.

A monolithic PMMA prototype was milled for both arches based on our last design, faithfully replicating the initial virtual project while incorporating the updated intraoral scans and new facial data. This allowed for a complete in situ verification of facial midline, occlusion and soft tissue support.

No adjustments were required, confirming the accuracy of the digital planning and the reliability of the previous steps. The passive fit, functional harmony, and aesthetic outcome were validated clinically and approved by the patient, allowing us to proceed to the fabrication of the final restorations with full confidence.

ZIRCONIA STRUCTURE AND TITANIUM BAR

The final zirconia framework was a direct continuation of the digitally validated PMMA prototype, which had been guided by the initial design guided by facial and functional analysis. The tooth morphologies, incisal edges

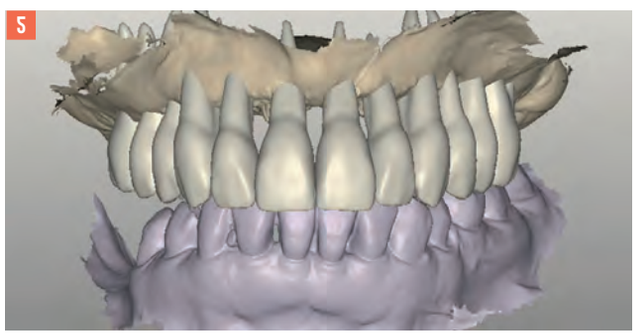
and occlusal scheme were preserved without deviation, ensuring full continuity and consistency across the entire workflow.

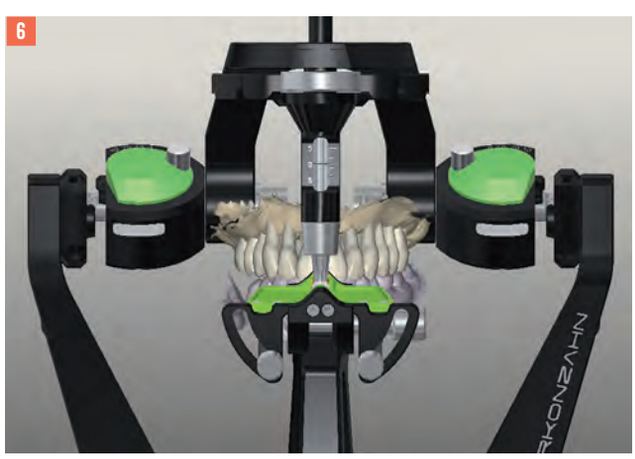
To reinforce the monolithic zirconia restoration while preserving its aesthetic and anatomical integrity, custom titanium bars were digitally designed and precisely milled in-house (Titanit 5, Zirkonzahn).

This substructure followed the internal contours of the tissue surface and was adapted to the implant positions. Its integration remained entirely internal, maintaining the emergence profiles and soft tissue contours established during the provisional phase.

By combining the aesthetic translucency and structural properties of zirconia with the mechanical resilience of titanium, this design strategy provided a final restoration that was not only biologically respectful and visually seamless, but also highly stable and long-lasting.

The titanium support bar was meticulously designed and milled





FIGURES 5 *to* **7:** *The prosthetic design in virtual articulator*

FIGURES 8 and **9:** *The prosthetic setup was developed in harmony with individual functional dynamics, using the virtual articulator's slope data and occlusal modelling tools*

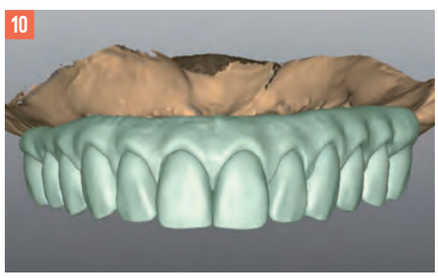


FIGURE 10: *The final 3D design of the prosthesis*

FIGURE 11: *The 3D design superimposed into 2D patient photos for simulation*

FIGURE 12: *Plaster verification jig manufactured directly from the digital workflow. Its integrity confirmed full passivity, ensuring that no distortion was present in the digital impression*

FIGURE 13: *The PMMA prototype confirmed the accuracy of the digital planning and the reliability of the previous steps*

in-house using the M1 Wet Heavy milling unit (Zirkonzahn). Its geometry was engineered to precisely match the internal dimensions of the final zirconia framework, ensuring a seamless fit with the implant platforms while preserving the emergence profile defined by our initial digital design.

To enhance both biological integration and visual aesthetics, the bar underwent anodisation using the Titanium spectral-colouring Anodiser – a proprietary electrochemical process that enriches the titanium oxide layer with a warm, golden tone. This anodisation improves corrosion resistance and reduces subgingival reflection, creating a more harmonious transition between the zirconia and peri-implant tissues.

LIFELIKE MONOLITHIC ZIRCONIA RESTORATIONS

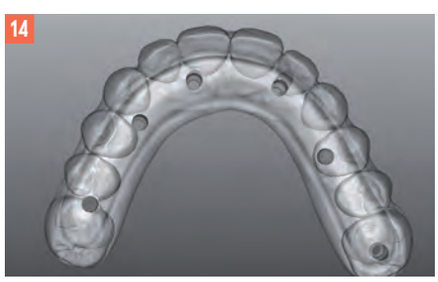
The final prosthesis was fabricated using Prettau 3 Dispersive zirconia, selected for its built-in Gradual-Triplex-Technology, which incorporates a continuous vertical gradient in translucency, chroma and strength.

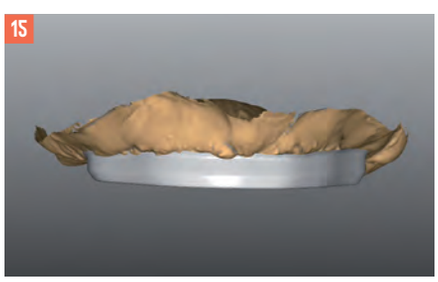
This innovative material enables the reproduction of natural enamel-to-dentine transitions directly within the zirconia disc – eliminating the need for manual layering and ensuring both aesthetic consistency and structural reliability across the full arch.

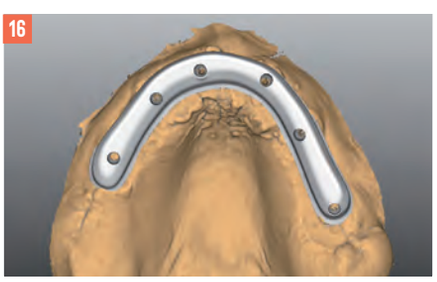
Although the restorations were designed as full-contour monolithic frameworks, liquid ceramic was selectively applied to both the gingival and dental surfaces to refine the visual outcome. This additive technique allowed for subtle enhancements in colour depth, surface vitality and light transmission, without compromising the mechanical integrity of the monolithic structure.

On the gingival side, translucent and slightly opaque pink ceramic shades were carefully layered to recreate soft tissue nuances such as vascularisation, chromatic variation, and anatomical features like labial frenulum effects and underlying root prominence.

These artistic refinements brought depth and realism to the restoration, blending seamlessly with the patient's facial morphology







FIGURES 14 to **16:** *To reinforce the monolithic zirconia restoration while preserving its aesthetic and anatomical integrity, custom titanium bars were digitally designed and precisely milled in-house*

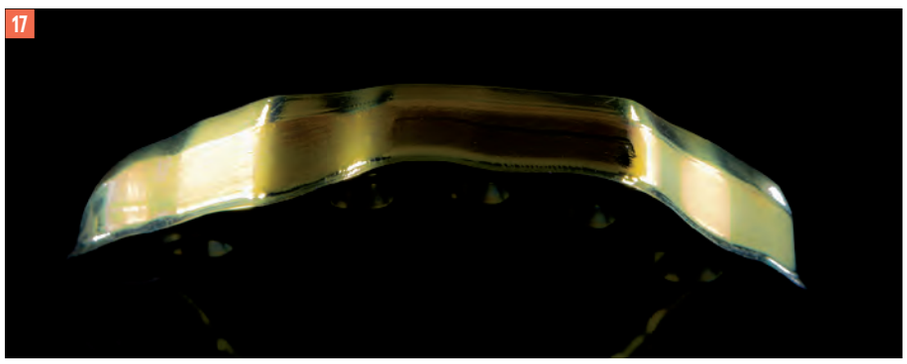


FIGURE 17: *To enhance both biological integration and visual aesthetics, the bar underwent anodisation, creating a more harmonious transition between the zirconia and peri-implant tissues*

FIGURES 18 *to* **20:** *The final restoration in Prettau 3 Dispersive zirconia on titanium bar. The zirconia incorporates a continuous vertical gradient in translucency, chroma and flexural strength*

and soft tissue profile. This conservative ceramic approach delivered the final artistic touch – transforming a digitally manufactured prosthesis into a restoration that was not only structurally durable and functionally precise, but also emotionally resonant and lifelike in its expression.

CONCLUSION

This case highlights the strength of a truly facially driven workflow, made possible by the advanced digital tools. Although an initial treatment plan was in place, it was not fully tailored to the patient's facial morphology and aesthetic needs.

The prosthetic phase – redefined by facial scans, skeletal orientation and virtual articulation – enabled a recalibration of the entire case from the outside in. Each step was digitally verified and anchored to the patient's anatomy, resulting in a final restoration that combined passive precision with natural aesthetics.

Beyond the technical achievements, the most rewarding moment came from the patient herself, who expressed deep emotional satisfaction at seeing her smile restored in a way that felt true and familiar. 'It feels like me again,' she said. CD

FIGURE 21: *Final result*

PRODUCTS USED

Face Hunter 3D facial scanner, Planefinder, Prettau 3 Dispersive, M1 Wet Heavy Metal, Titanit 5, Titanium spectral-colouring Anodiser Zirkonzahn

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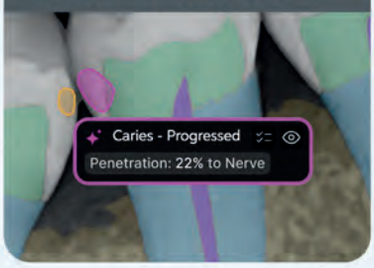
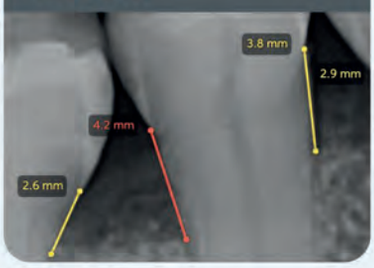
KEY FEATURES

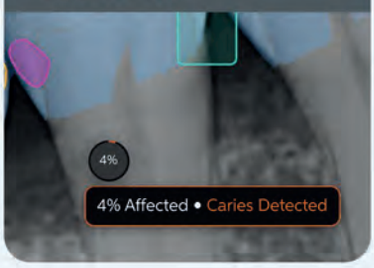
Decay Penetration %



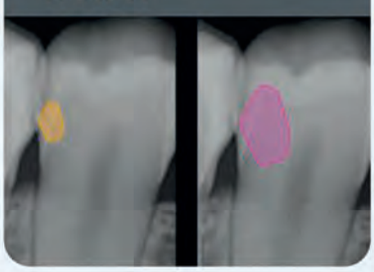
Bone Levels



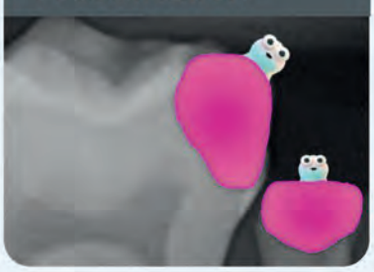
Affected Tooth %



Progression Viewer



Kid-Friendly Case Presentation



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ENDODONTICS

MAHESHAN PILLAY, MARTIN VORSTER & PEET VAN DER VYVER
Full pulpotomy with MTA

39



Contemporary endodontics is witnessing a significant shift from traditional concepts of complete pulp removal to a more biologically conservative approach that emphasises pulp preservation. One of the most compelling developments in this regard is the choice of full pulpotomy as a definitive treatment modality in mature permanent teeth with symptomatic irreversible pulpitis – Maheshan Pillay, Martin Vorster and Peet van der Vyver, p39

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** Taha et al. 2018

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PEET VAN DER VYVER
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MARTIN VORSTER
Martin is a lecturer at the University of Pretoria School of Dentistry.

ENHANCED CPD

CPD hours: one

GDC development outcome: C

Topic: Endodontics

Educational aims and objectives: To explore the use of full pulpotomy with MTA as a treatment option for carious mandibular molars that presented with symptomatic irreversible pulpitis.

This article qualifies for one hour of enhanced CPD; answer the questions on page 80.

Contemporary endodontics is witnessing a significant shift from traditional concepts of complete pulp removal to a more biologically conservative approach that emphasises pulp preservation.

One of the most compelling developments in this regard is the choice of full pulpotomy as a definitive treatment modality in mature permanent teeth with symptomatic irreversible pulpitis.

Once considered strictly an emergency or interim measure, full pulpotomy is now gaining traction as a biologically credible alternative to conventional root canal therapy (RCT), particularly with the advent of advanced bioactive materials and supportive clinical evidence.

RCT has long been proven the conventional gold standard for the management of teeth with symptomatic irreversible pulpitis, with a 10-year survival rate of 85% (Dammaschke et al, 2003). However, RCT also has drawbacks, such as requiring a high level of clinical skill, high costs, multiple appointments and complete pulp removal resulting in substantial dentine loss, weakened coronal structure and reduced long-term survival of the tooth due to fracture susceptibility (Zhang et al, 2025; Caplan et al, 2005).

In contrast, full pulpotomy – involving the amputation of only the inflamed coronal pulp and preservation of the radicular pulp – offers a minimally invasive alternative that prioritises the preservation of pulp vitality, structural integrity and function.

Full pulpotomy is now considered as an accepted treatment modality for symptomatic cariously exposed teeth by the European Society of Endodontology (ESE) and the American Association of Endodontists (AAE) (Kahler et al, 2023).

Recent studies have consistently demonstrated that full pulpotomy using mineral trioxide aggregate (MTA), Biodentine (Septodont), or calcium-enriched mixture (CEM) cement can yield clinical and radiographic success rates comparable to or exceeding those of RCT, in teeth diagnosed with irreversible pulpitis (Asgary et al, 2015; Taha and Abdulkhader, 2018; Cushley Set al, 2019).

The use of MTA is recommended in non-aesthetic zones due to potential discolouration, with Biodentine being the suitable choice for use in aesthetic zones (Zhang et al, 2025).

For example, Taha and colleagues (2018) reported a 92.7% survival rate at three years post-treatment with Biodentine. While in a series of studies by Asgary and colleagues (2017; 2013; 2014), 98% of cases with teeth with irreversible pulpitis treated with MTA or CEM achieved clinical success at the five-year recall.

FIGURE 1: *Preoperative periapical radiograph illustrating caries extending into pulp of the right mandibular first molar*

Maheshan Pillay, Martin Vorster and Peet van der Vyver discuss full pulpotomy as a conservative endodontic treatment option for carious molars with irreversible pulpitis

Full pulpotomy with MTA

FIGURE 2: *Preoperative clinical image that shows the occlusal outline of the carious lesion*

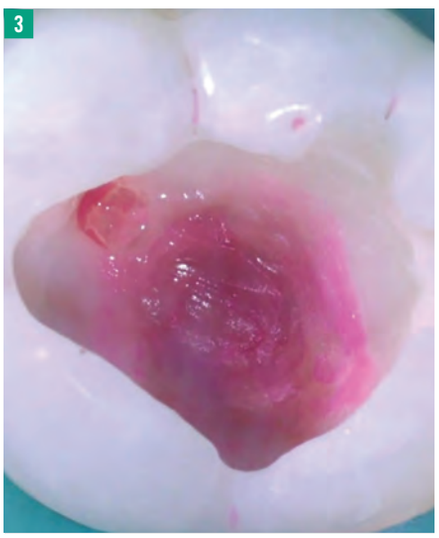

FIGURE 3: *Clinical image illustrating the extend of the caries infected dentine as stained with caries indicator*

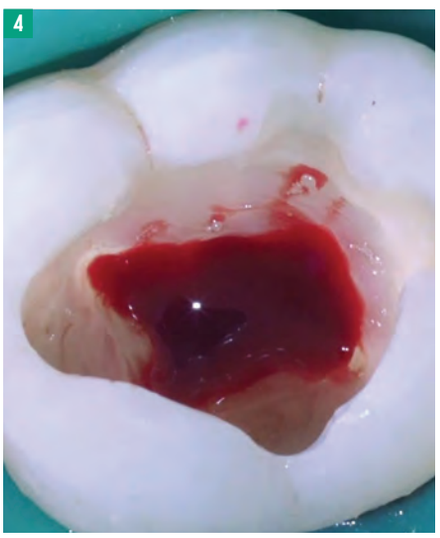

FIGURE 4: *Clinical image showing the pulp exposure after removal of the caries infected dentine*

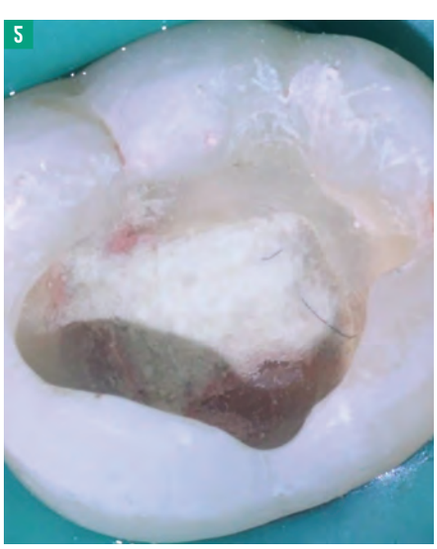

FIGURE 5: *Clinical image showing the pulpotomy with MTA*

FIGURE 6: *Periapical radiograph illustrating the MTA placement*

FIGURE 7: *Periapical radiograph illustrating the glass ionomer layer over the set MTA*

These materials have emerged as the preferred materials for not only their excellent biocompatibility and sealing ability but also their potential to actively stimulate dentine bridge formation, pulp cell proliferation, and tissue regeneration.

However, a key challenge in the clinical application of full pulpotomy lies in diagnostic uncertainty. Many symptomatic teeth may be non-responsive to sensibility testing, yet histological studies (Eghbal et al, 2009) show an absence of inflammation in the radicular pulp if the coronal inflammation is promptly managed. This highlights the importance of clinical judgment, careful case selection, and effective haemorrhage control – a step often cited as a proxy for pulpal viability (Ricucci et al, 2019; Hafez et al, 2002).

Moreover, long-term pulpotomy success is highly dependent on coronal sealing. The most frequently cited cause of pulpotomy failure is microleakage due to compromised restorations (Yazdani et al, 2014). Therefore, clinical protocols must emphasise restoration quality and periodic assessment to ensure marginal integrity.

Full pulpotomy also presents significant advantages in terms of cost, chair time, patient compliance and technical simplicity, particularly in settings with limited access to specialist endodontic care or for patients who decline RCT for financial reasons (Sadaf, 2020; Wells, Dulong and McCormack, 2019).

This makes it especially appealing in public health contexts and low-resource environments, where the burden of untreated endodontic disease is high.

The following clinical case presentations explore the use of full pulpotomy with MTA as a treatment option for carious mandibular molars that presented with symptomatic irreversible pulpitis.

CASE REPORT ONE

A 19-year-old female presented with a main complaint of spontaneous sharp pain on her right mandibular first molar (LR6), often painful at night. The patient had no previous history of dental treatment on the tooth.

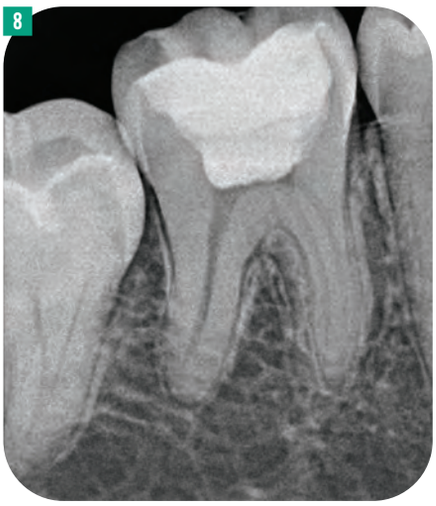

FIGURE 8: *Periapical radiograph illustrating completed full pulpotomy and final restoration*

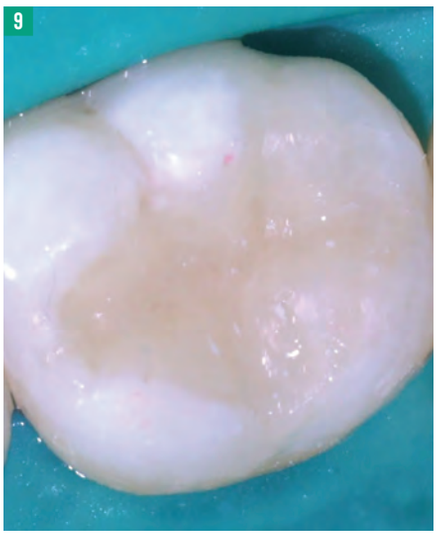

FIGURE 9: *Occlusal view of the final composite restoration*

FIGURE 10: *Periapical radiograph at follow-up visit at 13 months*

FIGURE 11: *Preoperative periapical radiograph illustrating caries extending into pulp of the left mandibular first molar*

FIGURE 12: *Periapical radiograph – full pulpotomy using MTA*

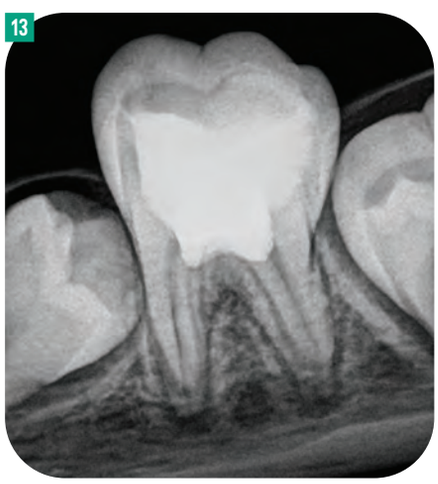

FIGURE 13: *Periapical radiograph – full pulpotomy and final restoration*

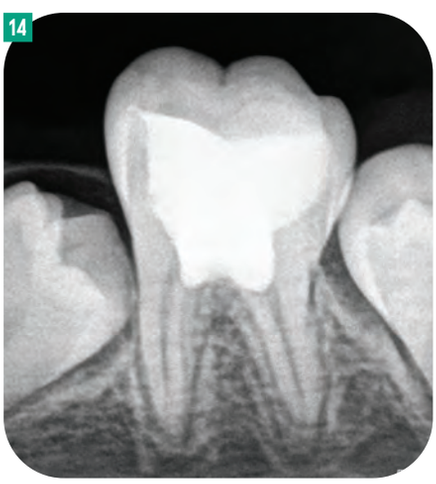

FIGURE 14: *Periapical radiograph at 11-month follow-up visit*

Radiographic and clinical examination revealed a large carious lesion extending into the pulp chamber of the tooth (Figures 1 and 2). A clinical diagnosis of irreversible pulpitis was made.

After informed consent was obtained, Lignospan 2% (Septodont) was administered and a rubber dam placed.

The caries on the lateral walls was removed first, with the aid of Red Detector caries indicator (Cerkamed) (Figure 3).

Following this, a round diamond bur was used to remove the caries on the floor of the cavity, resulting in the exposure of a hyperaemic pulp (Figure 4).

The entire content of the pulp chamber was removed with the round bur.

Haemostasis was achieved using pressure with a cotton pellet moistened with 3.5% sodium hypochlorite for two minutes.

A 2mm layer of Proroot MTA (Dentsply Sirona) was placed over the pulpal exposure (Figures 5 and 6), then covered with a 2mm layer of glass ionomer Ionostar Plus (Voco) (Figure 7), followed by a 2mm layer of SDR Plus (Dentsply Sirona) and 2mm layer of Tetric N Ceram composite (Ivoclar) (Figures 8 and 9).

The tooth was assessed after 13 months (Figure 10) for pulpal and apical signs and symptoms, restorative marginal integrity, and periodontal health.

The treatment was considered successful as both the clinical and radiographic presentations were normal or showed reduced radiolucency.

Furthermore, there were no clinical signs or symptoms of pain, pulpal pathosis, tenderness to percussion, soft tissue swelling, internal or external resorption and sinus tracts.

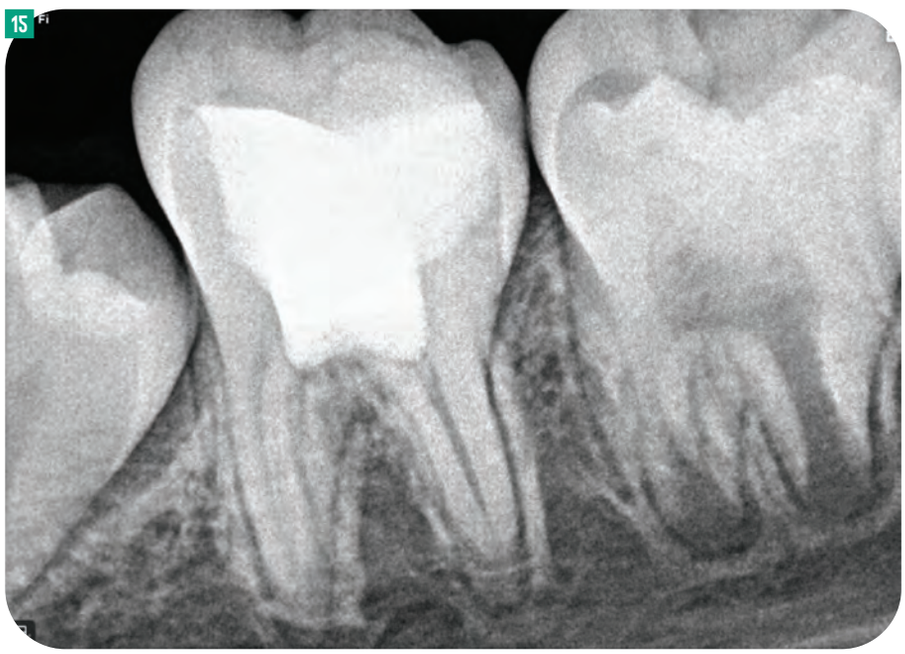

FIGURE 15: *Periapical radiograph at 26-month follow-up visit*

FIGURE 16: *Periapical radiograph at 43-month follow-up visit*

CASE REPORT TWO

An eight-year-old male child presented with a main complaint of spontaneous sharp pain on his left mandibular first molar (LL6), which the patient reported was often painful at night.

The patient had no previous history of dental treatment on the tooth.

Radiographic and clinical examination revealed a large carious lesion extending into the pulp chamber of the left mandibular first molar (Figure 11).

A clinical diagnosis of irreversible pulpitis was made.

After informed consent was obtained, the same clinical protocol and materials were used as prescribed in the previous case presentation (case report one).

A 2mm layer of Proroot MTA (Dentsply Sirona) was placed over the pulpal exposure (Figure 12). Teflon tape was placed over the MTA layer followed by a composite layer as a temporary restoration.

The patient was recalled two weeks later for a final restoration as the tooth was asymptomatic.

The MTA was covered with a 2mm layer of glass ionomer Ionostar Plus (Voco), followed by a 2mm layer of SDR Plus (Dentsply Sirona) and 2mm layer of Tetric N Ceram composite (Ivoclar) (Figure 13).

The tooth was assessed after 11 months (Figure 14), 26 months (Figure 15) and 43 months (Figure 16) for pulpal and apical signs and symptoms, restorative marginal integrity and periodontal health.

The treatment was considered successful as both the clinical and radiographic presentations were normal or showed reduced radiolucency.

There were no clinical signs or symptoms of pain, pulpal pathosis, tenderness to percussion, soft tissue swelling, internal or external resorption and sinus tracts.

CONCLUSION

Full pulpotomy in mature permanent teeth – when performed with contemporary bioceramic materials and strict clinical protocols – challenges the traditional view that irreversible pulpitis necessitates complete pulp extirpation.

By preserving radicular pulp vitality, maintaining dentinal architecture, and reducing procedural complexity, pulpotomy embodies the principles of minimally invasive dentistry and opens new possibilities for biologically based endodontic care.

As the literature base grows, this treatment may soon become standard in cases previously thought to require full RCT – a paradigm shift with far-reaching clinical implications. CD

REFERENCES

siobhan.hiscott@fmc.co.uk

Acknowledgement
Reprinted with permission from International Dentistry – African Edition. Pillay M, Vorster M, Van der Vyver PJ (2025) Full pulpotomy as a conservative endodontic treatment option for carious molars with irreversible pulpitis. Int Dent Afr Ed 15(4): 6-12

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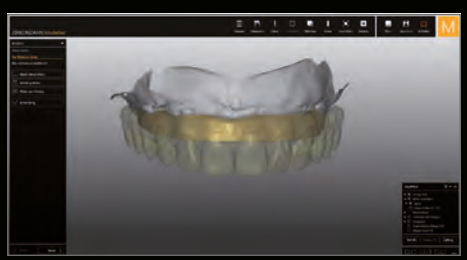

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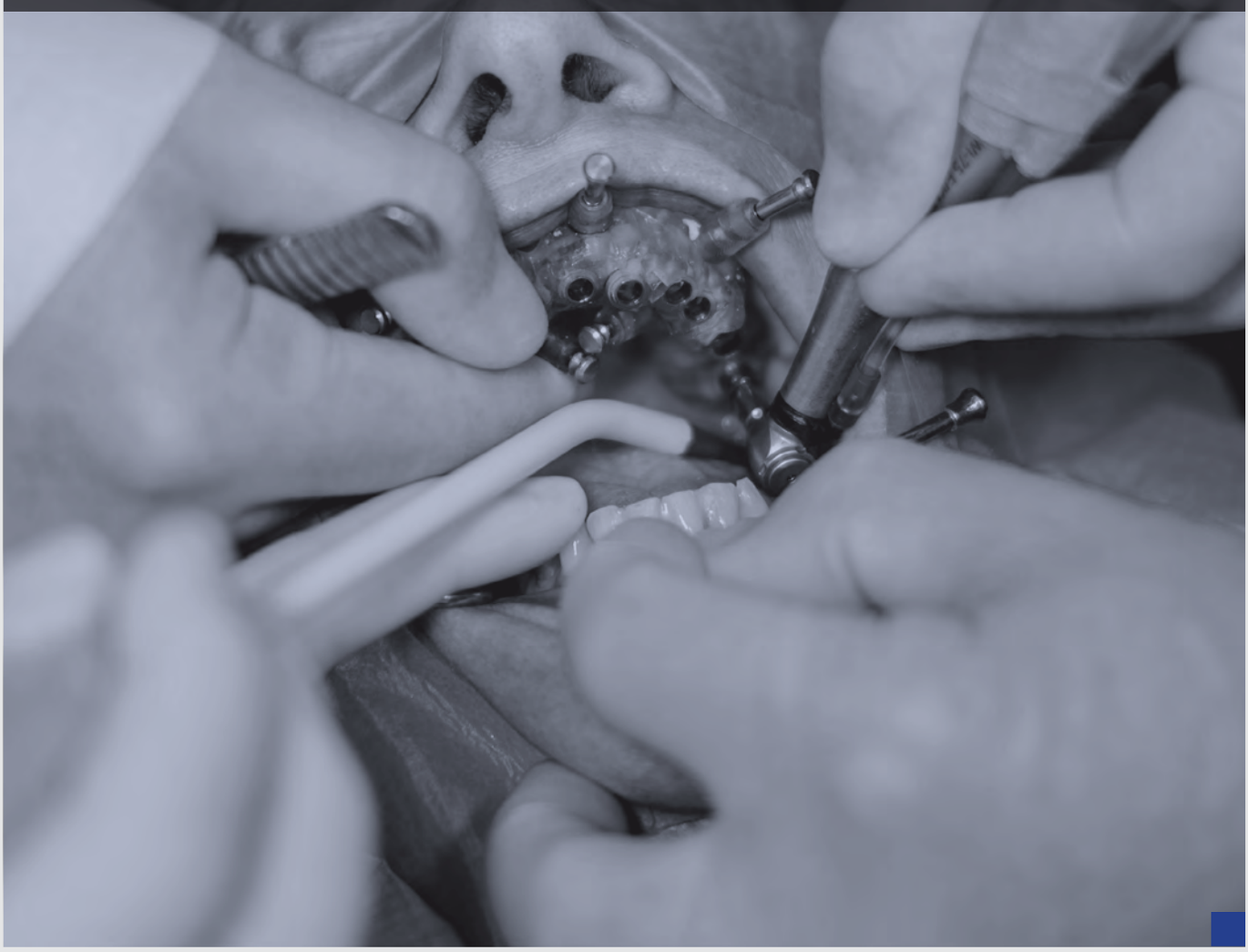
A key factor in this case was the patient's occlusion. The deep overbite made immediate loading a higher risk, so a guided workflow was crucial to ensure primary stability was not lost – Imran Nasser, p57



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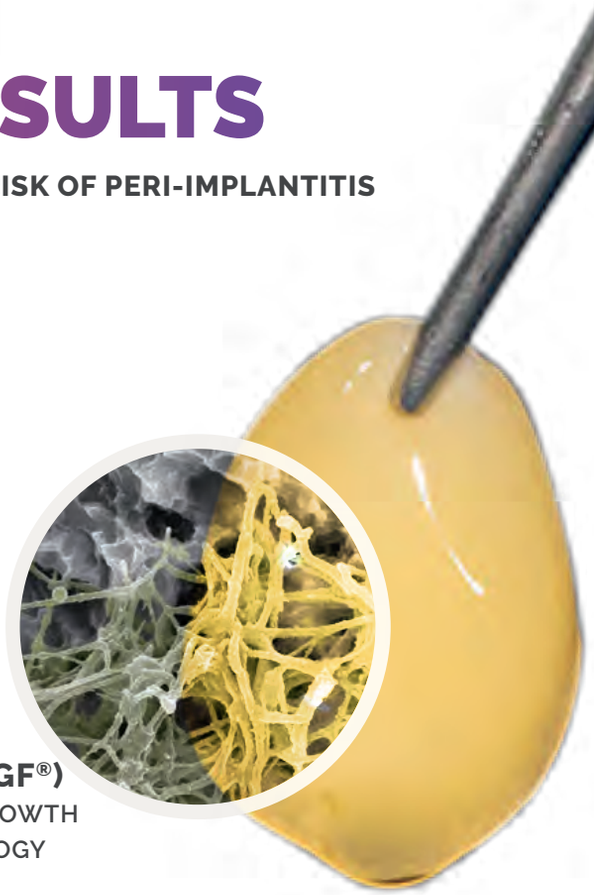

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EDUARDO ANITUA
DDS MD PHD
Eduardo is in private practice at Eduardo Anitua Institute in Spain. He is also the director of the University Institute of Regenerative Medicine and Oral Implantology of the University of the Basque Country, and scientific director of BTI Biotechnology Institute. He is the president of the Eduardo Anitua Foundation for Biomedical Research.

ENHANCED CPD

CPD hours: one

GDC development outcome: C

Topic: Implant dentistry

Educational aims and objectives: To describe a rehabilitation performed 20 years ago using the surgical techniques available at that time to treat a case of extreme maxillary and mandibular atrophy with a minimally invasive, conservative approach.

The step-by-step treatment is presented, including its long-term evolution and updates – particularly in prosthetic management – and its stability over 20 years.

This article qualifies for one hour of enhanced CPD; answer the questions on page 80.

Tooth loss leads to progressive alveolar bone resorption, which becomes irreversible unless biomechanical stimulation is restored – typically through dental implants – to preserve the residual bone (Mays, 2014; Bodic et al, 2005).

The resorption process is gradual and highly variable among individuals, lacking a predictable pattern regarding volume and speed of loss.

Notably, maxillary and mandibular resorption differ significantly due to variations in (Bodic et al, 2005):

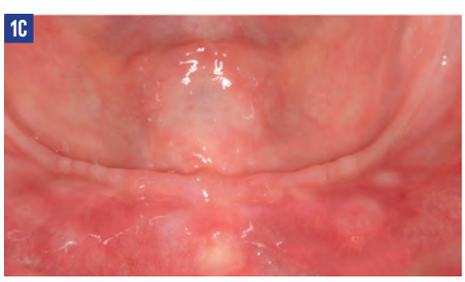
- Bone density (greater corticalisation in the mandible)
- Anatomical landmarks
- Muscle insertions
- The influence of perioral soft tissue forces.

It has been estimated that patients wearing removable prostheses without any socket preservation lose approximately 21% of bone volume within three months post-extraction, 36% after six months, and up to 44% after 12 months (Carlsson and Persson, 1967; Carlsson and Persson, 1970).

Over 25 years, the mandibular ridge may lose 10 to 12mm in height, often resulting in superficialisation of the inferior alveolar nerve in the posterior regions.

Maxillary bone loss is usually slower, sometimes half the rate observed in the mandible (Bodic et al, 2005, Carlsson and Persson, 1967; Carlsson and Persson, 1970; Sennerby et al, 1988).

FIGURES 1A *and* **1B:** *Images of the patient wearing complete removable dentures, with a reduced lower facial third evident in the lateral view*



FIGURES 1C *and* **1D:** *After removing the mandibular prosthesis, the severe resorption of the alveolar ridge becomes apparent, showing a nearly absent residual crest and the facial impact of prosthesis removal on the lower third*

Eduardo Anitua presents a 22-year follow-up clinical case report detailing the management of severe maxillomandibular atrophy

Severe maxillary and mandibular atrophy

These patterns are further influenced by co-factors such as age, bone density, sex and systemic conditions affecting bone metabolism (Atwood and Coy, 1971).

In long-term edentulous patients using complete removable prostheses, severe resorptive patterns are common.

In the mandible, this often results in both vertical and horizontal atrophy, with the inferior alveolar nerve becoming submucosal.

In the maxilla, resorption leads to superficialisation of structures such as the nasal fossa and maxillary sinuses, complicating implant placement (Alsaggaf and Fenlon, 2020; Adell et al, 1990).

Managing such cases requires thorough knowledge of surgical and prosthetic options, often combining multiple techniques within the same patient (Alsi, Deshpande and Pande, 2023).

In the maxilla, common approaches for vertical atrophy include short implants, sinus lift procedures (via lateral window or transcrestal techniques), nasal floor elevation, and guided bone regeneration (Lombardo et al, 2022; Felice et al, 2015; Hadzik et al, 2021; Carelli et al, 2021; Anitua, Flores and Alkhraisat, 2016; Anitua et al, 2016).

Short implants have become increasingly favoured in recent years due mainly to their clinical versatility and simplified prosthetic planning.

For horizontal atrophy, solutions include ridge expansion, grafting procedures (particulate, block, or mixed), and reduced-diameter or platform implants (Chiapasco and Casentini, 2018; Mendoza-Azpur et al, 2019; Elnayef et al, 2015; Antiua, Escuer and Alkhraisat, 2022; González-Valls et al, 2021).

In the mandible, vertical atrophy is often managed using short or ultra-short implants, sometimes combined with bone regeneration. Lateralisation of the inferior alveolar nerve is generally reserved for severely resorbed cases where other approaches are not feasible (Altaib et al, 2019; Camps-Font et al, 2016).

Horizontal bone loss is typically managed using narrow-diameter implants, sometimes combined with ridge-splitting techniques (Camps-Font et al, 2016; Anitua, 2022).

The following clinical case describes a rehabilitation performed 20 years ago using the surgical techniques available at that time to treat a case of extreme maxillary and mandibular atrophy with a minimally invasive, conservative approach.

The step-by-step treatment is presented, including its long-term evolution and updates – particularly in prosthetic management – and its stability over 20 years.

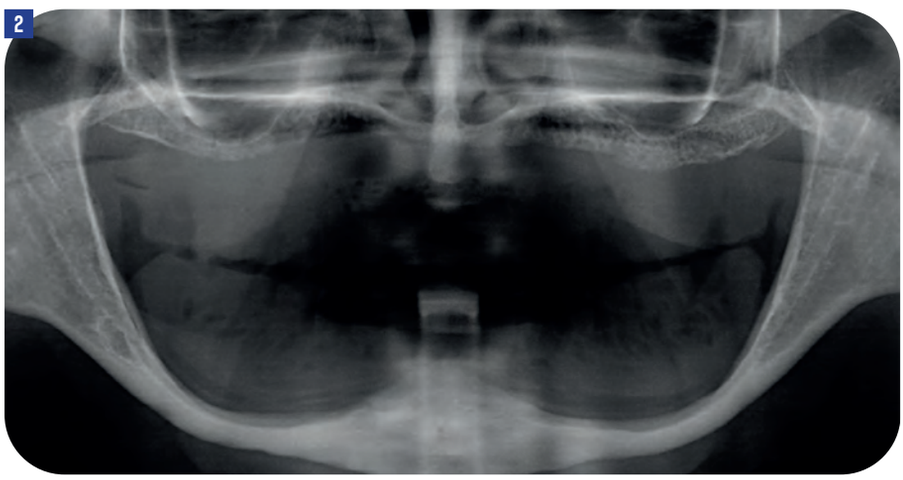
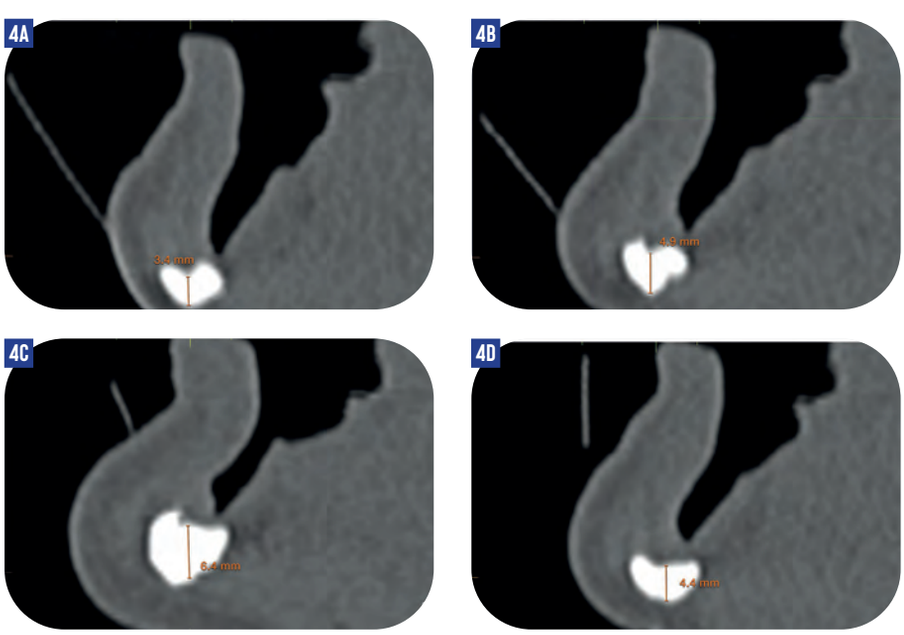


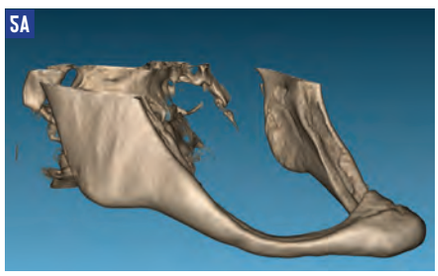
FIGURE 2: *Initial panoramic radiograph confirming severe horizontal and vertical bone resorption in both maxilla and mandible*

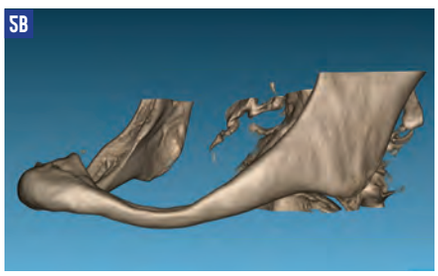
FIGURE 3: *Panoramic CBCT slice showing extreme mandibular resorption, with only basal bone remaining*



FIGURES 4A *to* **4D:** *Panoramic CBCT slice showing extreme mandibular resorption, with only basal bone remaining*

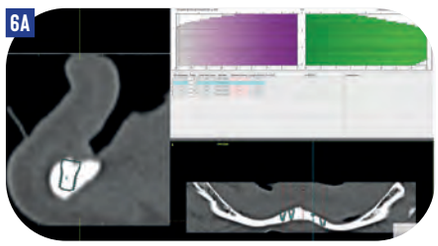
Clinical examination revealed fractured denture teeth and reduced lower facial height

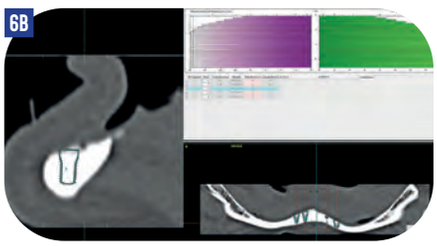


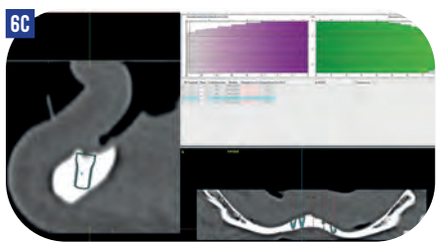


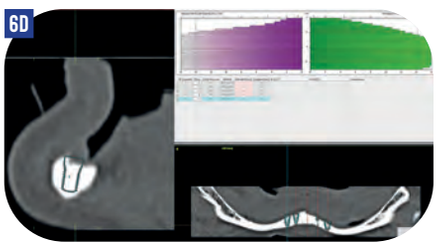
FIGURES 5A *and* **5B:** *Three-dimensional reconstructions of the mandible showing pronounced bone atrophy in lateral views*

Panoramic radiography confirmed severe maxillary and mandibular atrophy, including pneumatisation of the sinuses and nasal floor, and a submucosal IAN









FIGURES 6A *to* **6D:** *Implant planning showing apical stabilisation in the inferior cortical (basal bone) and three-dimensional positioning in the crest*

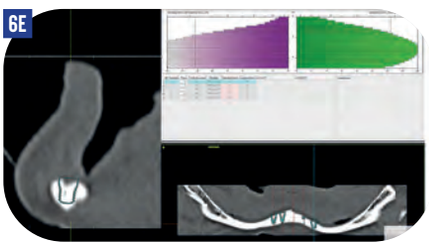


FIGURE 6E: *Planning of a fifth implant distal to the mental foramen using inferior alveolar nerve lateralisation*

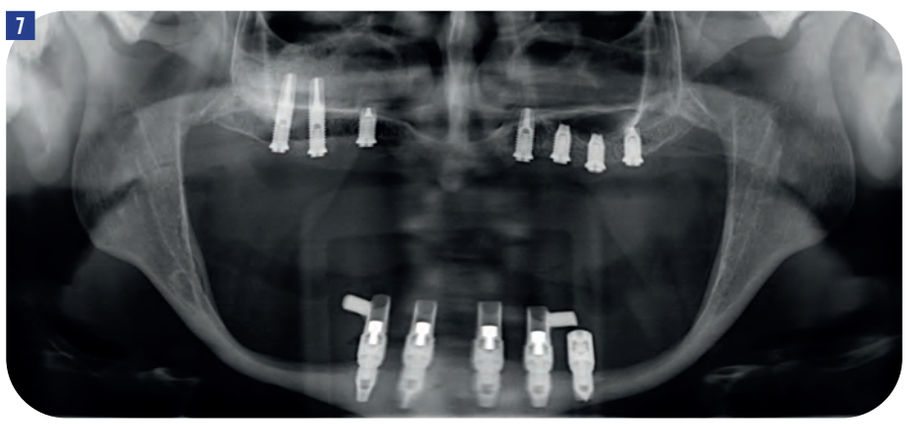


FIGURE 7: *Radiographic image of the immediate loading of the mandibular implants, except for the distal implant in the third quadrant, which remained unloaded due to nerve transposition*

CLINICAL CASE

A 69-year-old female patient presented with poorly fitting complete removable dentures that compromised speech and mastication due to instability.

Clinical examination revealed fractured denture teeth and reduced lower facial height.

Upon removal of the dentures, severe mandibular atrophy was noted, with minimal residual ridge volume, making prosthesis retention nearly impossible (Figure 1).

Panoramic radiography confirmed severe maxillary and mandibular atrophy, including pneumatisation of the sinuses and nasal floor,

FIGURE 8A: *Custom-milled abutments*

FIGURES 8B *and* **8C:** *Hybrid prosthesis with friction-retained telescopic design*

and a submucosal inferior alveolar nerve (Figure 2).

A cone-beam CT was performed to complete the diagnosis and guide surgical planning. Panoramic and cross-sectional views revealed extreme mandibular atrophy with only basal bone remaining (Figures 3 and 4), compromising mandibular integrity and increasing surgical complexity.

Three-dimensional reconstruction further demonstrated mandibular thinning (Figure 5).

Based on the scans, four implants were planned in the anterior mandible, the only area with residual height before the emergence of the nerve at the crest. These short implants (5.5 to 7.5mm) were anchored in the apical and crestal regions (Figure 6). Additionally, in the third quadrant, a transposition of the inferior alveolar nerve was performed to place a distal implant. The surgery was successful, with immediate loading (Figure 7), and definitive prostheses were initiated three months later.

At that time, a telescopic friction-retained hybrid prosthesis was selected for the mandible, offering reliable retention and removability for hygiene. Custom-milled posts were used, onto which a gold-galvanised substructure was cemented, generating retention through friction (Figure 8). Today, a different prosthetic approach would be used: CAD/CAM-fabricated, screw-retained prostheses on transepithelial abutments, using castable interfaces for passive fit and retrievability.

Following mandibular treatment, the patient requested rehabilitation of the maxilla. Cone-beam sections showed mixed atrophy: vertical in some areas and horizontal in others. In the first quadrant, the extensively pneumatised maxillary sinus precluded direct implant placement, requiring lateral sinus lift and simultaneous implant insertion (Figure 9).

In the maxillary arch, a screw-retained hybrid prosthesis was fabricated over transepithelial abutments, serving as a progressive loading prosthesis (Figure 10). This transitional phase allowed the patient to adapt musculoskeletal structures to the new vertical dimension.

A 22-year comparison revealed significant bone volume gain in the mandibular implant regions

FIGURE 8D: *Final prosthesis exhibiting excellent retention and removability for maintenance, a common choice at the time of treatment*

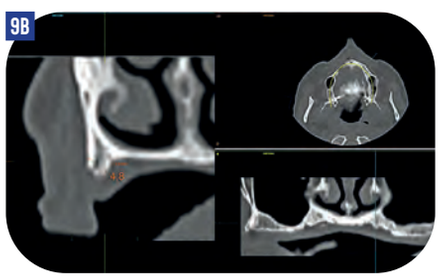


FIGURE 9B: *Premaxilla area showing combined horizontal and vertical atrophy*

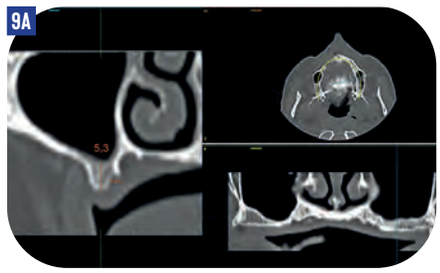


FIGURE 9A: *Second quadrant with sufficient volume for short implant placement despite limited bone height*

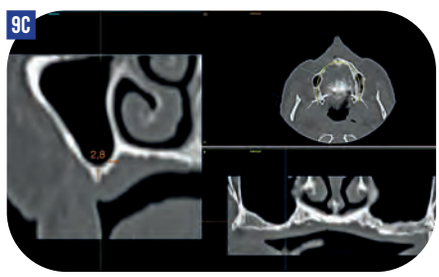


FIGURE 9C: *First quadrant with excessive sinus pneumatization leaving only 3mm of crestal height; traditional lateral sinus lift with simultaneous implant placement was planned*

FIGURES 10A *and* **10B:** *Provisional upper resin prosthesis for progressive loading. Used for several months to allow adaptation to new occlusal and vertical dimension parameters. The lower prosthesis extends to the second premolar; the upper is all resin*

FIGURES 11A *and* **11B:** *Fabrication of definitive prostheses prior to placement*

FIGURES 11C *and* **11D:** *Upper and lower prostheses in position after five years of follow-up, with fully restored aesthetics and function*

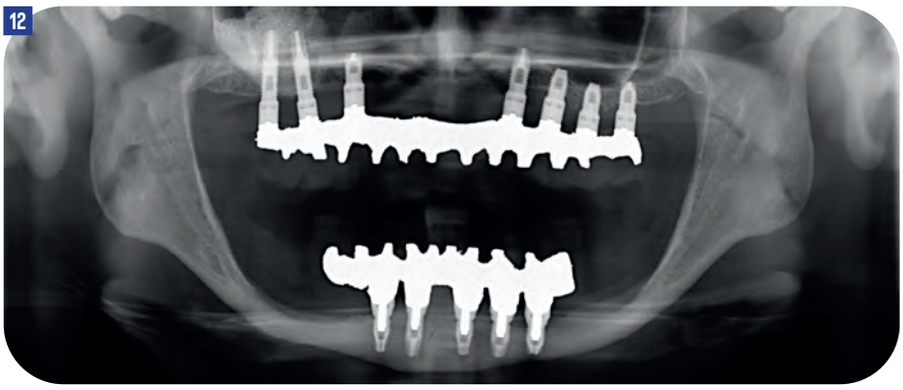
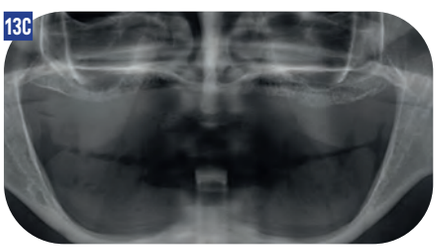
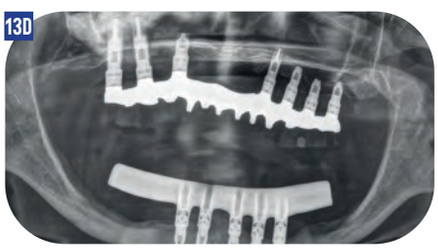


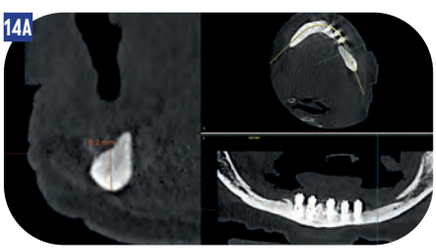
FIGURE 12: *Radiograph at five-year follow-up showing stable treatment outcome*

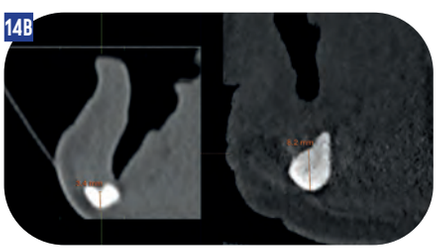
FIGURES 13A *and* **13B:** *Intraoral images of the new prostheses fabricated 22 years after treatment initiation*



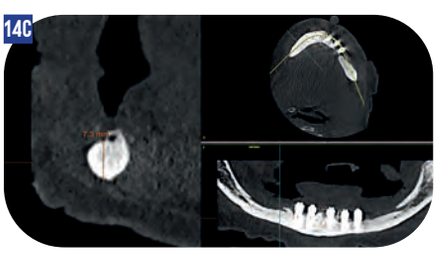


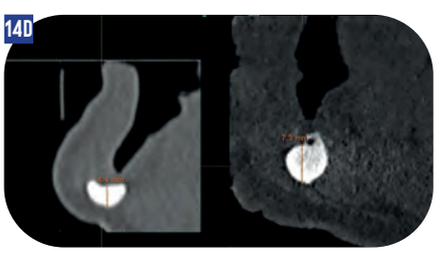
FIGURES 13C *and* **13D:** *Radiographic comparison between baseline and 22 years showing significant mandibular changes, particularly increased horizontal bone volume due to implant loading*





FIGURES 14A *and* **14B:** *Bone volume comparison in the third quadrant, 1cm adjacent to the implants, showing height gain from <4mm to 8.2mm over 22 years*





FIGURES 14C *and* **14D:** *Cross-sectional images 1cm distal to the last implant in the fourth quadrant, with vertical bone gain from 4.4mm to 7.3mm and reconstruction of a new bony roof over the inferior alveolar nerve, previously absent*

Adjacent non-implanted areas also showed vertical bone gain, especially in the third and fourth quadrants – doubling initial bone height

Adjustments were made during this adaptation, and fabrication of the definitive prostheses began two months later.

At this stage, the mandibular telescopic prosthesis was replaced with a screw-retained hybrid design due to retention loss. Both final prostheses consisted of resin hybrid structures with metal frameworks, screw-retained via transepithelial abutments. Five years later, the treatment remained stable (Figures 11 and 12).

Fifteen years post-treatment, the mandibular prosthesis was replaced with a CAD/CAM hybrid design extending to the molar region, as the telescopic version had lost retention. The maxillary prosthesis remained unchanged due to proper function and fit. Cone-beam images showed remarkable crestal bone stability and notable changes in mandibular structure. A 22-year comparison revealed significant bone volume gain in the mandibular implant regions (Figure 13).

Interestingly, adjacent non-implanted areas also showed vertical bone gain, especially in the third and fourth quadrants – doubling initial bone height. Remarkable findings included reconstruction of the inferior alveolar canal roof, initially submucosal, now encased in bone (Figure 14).

This generalised mandibular thickening was confirmed in 3D reconstructions (Figure 15). Sectional cone-beam comparisons confirmed over two times bone gain in all implant regions (Figure 16).

DISCUSSION

Implant dentistry continues to evolve, both surgically and prosthetically, in pursuit of long-term success (Darcey, 2016). Treating cases with extreme atrophy, such as the one described here, is challenging even today – and was even more so two decades ago (Di Gianfilippo et al, 2022; Torrella et al, 1998).

The advent of short and ultra-short implants has improved treatment options for resorbed jaws. However, at the time this case was treated, the shortest available implants would now be considered nearly standard length (Anitua, 2022; Moraschini et al, 2021; Araki et al, 2020).

Maxillary sinus augmentation techniques have also progressed significantly, moving from lateral window approaches to transcrestal techniques – even for cases with residual bone less than 3mm (Anitua, Flores and Alkhraisat, 2016; Anitua et al, 2016; Anitua, 1999).

Implant length is another key point: 20 years ago, longer implants were favoured to gain apical stability, particularly in sinus lift cases.

Today, it's well established that excessive implant length offers no biomechanical advantage and may limit future retreatment options (Anitua, 2022; Anitua, Eguia and Alkhraisat, 2023; Anitua et al, 2010).

Our current philosophy emphasises a 'less is more' approach: conservative surgical sites, reduced implant dimensions, and retrievability.

If this case were treated today, many aspects would differ based on these updated principles.

Prosthetic designs have also improved dramatically, shifting from telescopic options to screw-retained hybrid designs with superior seal, hygiene access, and retrievability (Hernández-Marcos, Hernández-Herrera and Anitua, 2018).

This case benefited from ongoing integration of evolving techniques, including prosthetic upgrades built over the original implants.

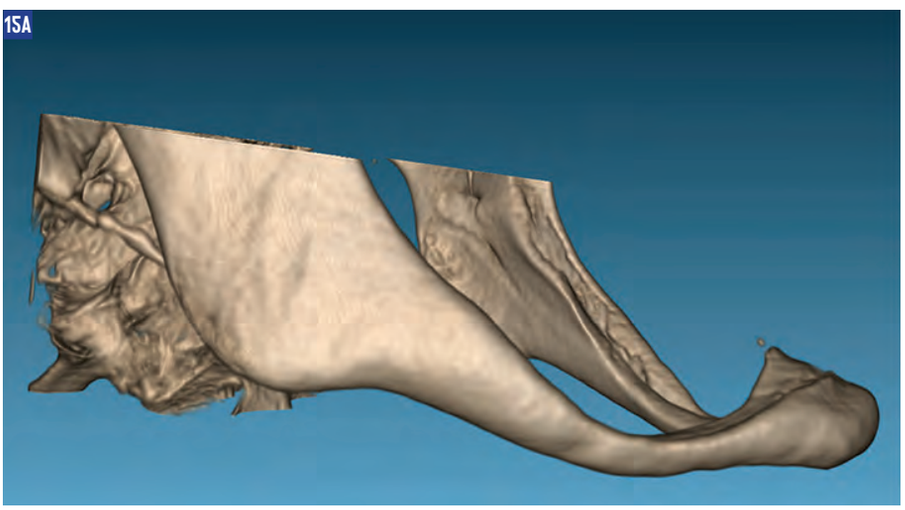
CONCLUSION

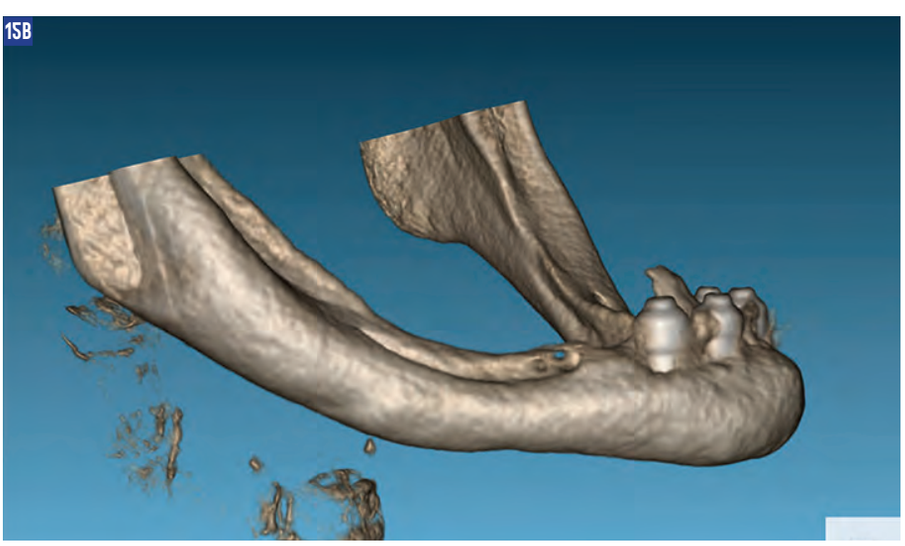
The rehabilitation of a case involving extreme maxillomandibular atrophy using implants of varying lengths, diameters and surgical techniques resulted in successful long-term outcomes over a 22-year follow-up.

The gradual incorporation of evolving prosthetic concepts allowed the treatment to remain current at each stage. Careful planning and patient compliance were key to achieving sustained success without complications. CD

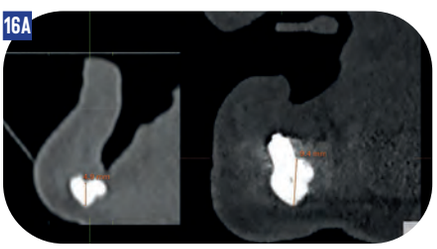
REFERENCES

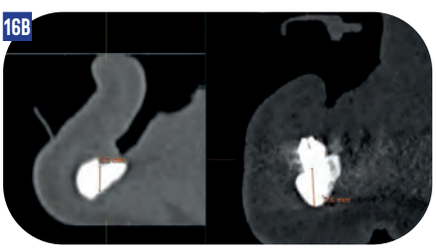
siobhan.hiscott@fmc.co.uk

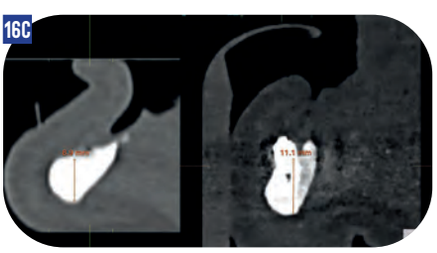


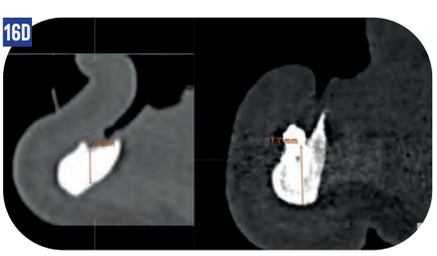


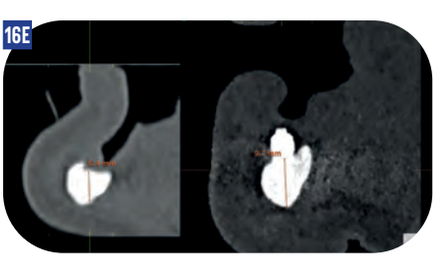
FIGURES 15A *and* **15B:** *Three-dimensional reconstructions of the mandible showing pronounced bone atrophy in lateral views*











FIGURES 16A *to* **16E:** *Comparative cross-sections of all mandibular implants at planning versus 22-year follow-up, showing doubling of crestal bone height at all sites due to long-term implant loading*

CANINUS: THE PRODUCTION SITE FOR PRETTAU® AND ICE PLUS ZIRCONIA

ZIRCONIA PRODUCTION AT CANINUS FACTORY

Caninus, the newest Zirkonzahn's production facility overlooking the Dolomites Mountains

Example of a case made of Prettau® 2 Dispersive® (full arch) and ICE Plus zirconia (substructure)

ZIRKONZAHN

In addition to Caninus, Zirkonzahn owns another four production sites, all located in South Tyrol in the vicinity of the company's headquarters. Zirkonzahn's doors are always open to visitors.

Contact Zirkonzahn to arrange a guided tour of its premises in South Tyrol and learn more about the company work philosophy! **www.zirkonzahn.com / +39 0474 066 660 / info@zirkonzahn.com**.

Caninus is Zirkonzahn's most recent factory located in the heart of the Dolomites Mountains, built specifically to broaden the company's zirconia production. Zirconia restorations are meant to stay in the patient's mouth for long times, or in most cases permanently, which makes the matter of quality even more important. Zirkonzahn's zirconia is manufactured with no compromises, using raw materials accurately selected from reliable suppliers. Upon arrival, the powder undergoes strict controls for quality assurance and, working without constraints, much time can be dedicated to the development of the most refined working processes, in close collaboration with the in-house R&D department. In order to achieve high homogeneity, the raw material is pressed biaxially and/or isostatically, and the most advanced technologies are used to obtain the best aesthetic and mechanical properties. Each production batch is accurately checked after every production step, via specific tests and measurements. In this way, the blanks' properties of hardness, dimensions, density, milling, colour and translucency are controlled, as well as the materials' shrinkage factor, using close-tolerance instruments. Once the production step is concluded, final controls are run on each blank.

Zirconia blanks production. Each production batch is accurately checked after every production step, via specific tests and measurements to control hardness, dimensions, density, milling, colour, translucency as well as the material's shrinkage factor, using close-tolerance instruments

PRETTAU® AND ICE PLUS ZIRCONIA

Zirkonzahn's Prettau® zirconia, their classic, takes its name from the farthest village of the Aurina Valley in South Tyrol and was conceived for aesthetic restorations, from single crowns to monolithic full arches – the so-called Prettau® Bridges. The Prettau® line includes different zirconia typologies, available in white blanks for further characterisation, pre-coloured, and with colour gradient for optimal aesthetics. Blanks are available in different heights (from 5 mm to 40 mm) and diameters – Ø 95, Ø 98 with step, Ø 106 mm, as well as mini blanks to mill single crowns in hardly used colours. In the last few years, the company's range of Prettau® zirconia has embarked even more on the path of monolithic design with the new Dispersive® line, which includes materials that are already characterised with a natural colour gradient during the manufacturing process, making manual colouring no longer necessary. Along with Prettau®, Zirkonzahn's zirconia range has recently been extended with ICE Plus, a new material with excellent flexural strength (~ 1,650 MPa without HIP; 1,900 MPa with HIP), ideal for the fabrication of metal-free, reduced structures. Using a special solder, a secondary zirconia structure can be bonded onto the ICE Plus primary structure. CD

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LEARN MORE

Immediate loading: anterior implant

Imran Nasser presents a case and offers advice on how to mitigate the potential challenges that can arise from immediately loading an anterior tooth

Immediate implant protocols have been proven safe and effective in a number of clinical scenarios. For optimal outcomes, clinicians must take precautions to mitigate potential complications with each case they treat.

Occlusal considerations must be included in the assessment and planning phases of treatment, for example, to determine the implant's ability to withstand the forces it will be placed under if loaded immediately.

The literature suggests no significant difference in success of non-occlusal and occlusal modalities of implant loading (Kourkoutis et al, 2025), when case selection and techniques are sound.

The following case demonstrates how implant placement alongside a deep overbite may be effectively managed.

CASE PRESENTATION

A female patient in her mid-50s was referred due to pain around the gingival margin of the UR1. The tooth had previously been root filled and crowned, and was now unrestorable.

External root resorption was confirmed with a periapical radiograph, which showed that the distal bone peak was absent.

Located in the aesthetic zone, the missing distal peak meant that the remaining papilla would disappear after the tooth was extracted, and thus needed addressing to avoid the formation of a black triangle.

ASSESSMENT AND PLANNING

The comprehensive assessment revealed tight interocclusal space and an increased overbite. The occlusion could present a risk of complications

FIGURE 1: *Initial presentation upon referral*

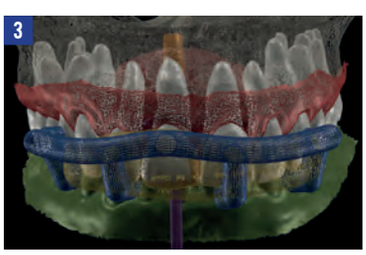

FIGURE 3: *Digital planning for surgical guide*

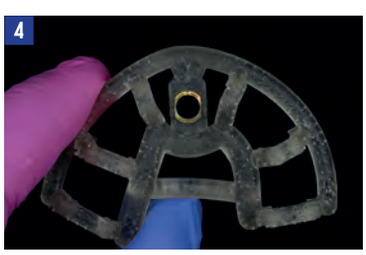

FIGURE 4: *SMOP guide featuring 3.8mm implant sleeve included*

FIGURE 2: *Preoperative radiograph*

DR IMRAN NASSER
Imran is practice principal at Cheltenham & Cotswold Dental. He completed his MFDS in 2009 and his master's degree in implantology in 2014. He runs regular courses in the UK on implant and ceramic restoration, ridge preservation and immediate placement and soft tissue grafting. For more details, visit www.ap15c.com.

alongside immediate loading protocols, but the implant chosen offers excellent primary stability and confidence that it can withstand the loading forces, eliminating any concerns.

A CBCT scan was taken, using cotton rolls to keep the teeth separated during image capture for maximum accuracy and seamless digital integration with the intraoral scan. This was used to evaluate the volume of apical and palatal bone available to stabilise an immediately loaded implant, and to determine the appropriate implant size for a jump gap of at least 3mm.

The buccal plate thickness was also assessed – improved outcomes and reduced resorption are achieved when this is at least 1mm. For optimal success with immediacy, the implant should be placed 1mm below the buccal plate, 4mm below the level of the proposed CEJ of the final tooth, and palatally positioned.

An intraoral scan was taken, including the entire palate to provide a precise reference for the CBCT scan. This enabled the accurate merging of the intraoral and CBCT scans to create a diagnostic wax-up for the provisional restoration.

Smilecloud software with AI-driven smile design features was used to assist treatment planning and provide short animations for use in patient communication. The same data was put into SMOP software to design the surgical guide, which is essential to optimise primary stability for immediate loading.

Two temporaries were requested from the laboratory. One was fabricated from the SMOP guide affording high visualisation to increase precision of fit. The second temporary had a stent that sat over the incisal edges, which could be used to confirm accurate positioning.

IMPLANT PLACEMENT

On the day of surgery, the post crown was removed, and the tooth sectioned to ease extraction while preserving the buccal plate. Forceps were used to deliver the fragments, with extensions to simplify pick-up. The granulation tissue was removed using a Lucas curette (Hu-Friedy).

A guided workflow was crucial to ensure primary stability was not lost

FIGURE 5: *Verification jig if original crown were to be used*

FIGURE 6: *Post crown removed, distal resorption visualised and root sectioned*

FIGURE 7: *Forceps used to remove fragments*

FIGURE 8: *Granulation tissue removed*

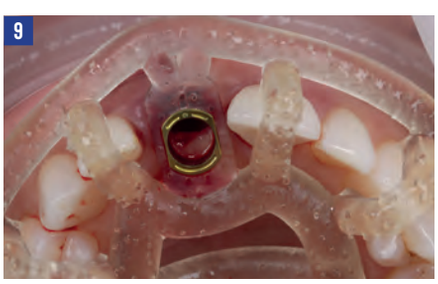

FIGURE 9: *Surgical guide fit check to ensure accurate seating*

FIGURE 10: *Conelog 3.8mm implant placed through guide*

FIGURE 11: *Implant placed in close contact to palatal bone with jump gap visible*

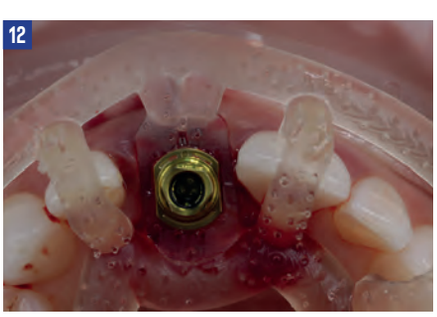

FIGURE 12: *Implant delivered fully guided*

FIGURE 13: *Temporary restoration created prior to grafting to ensure material is not contaminated with composite*

FIGURE 14A: *Lab temporary tried in with SMOP verification*

FIGURE 14B: *Second guide tried in mouth, demonstrating the accuracy of implant placement with regards to planning*

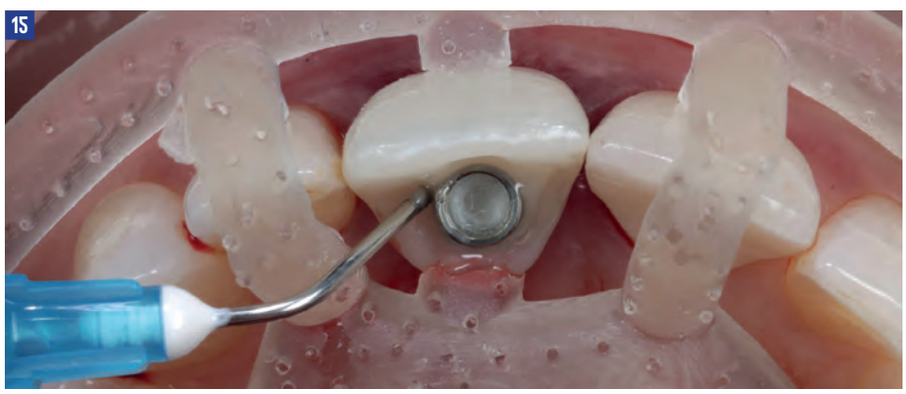

FIGURE 15: *Flowable composite attaching temporary to abutment*

FIGURE 16: *CTG placed from papilla to papilla*

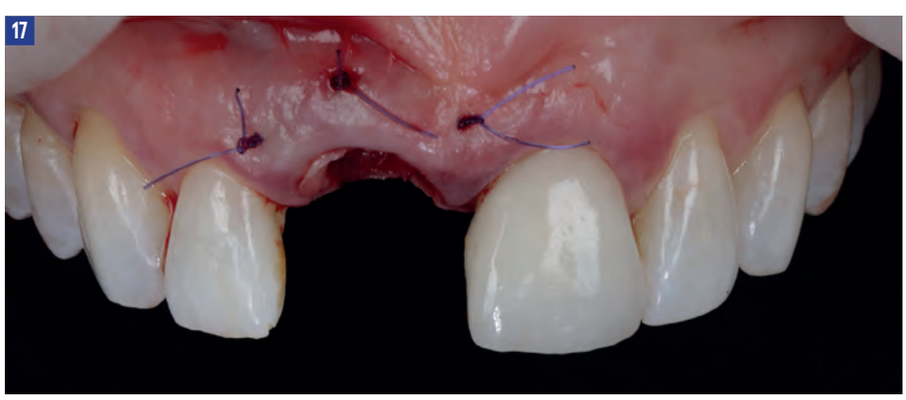

FIGURE 17: *CTG stabilised from papilla to papilla*

The surgical guide was checked in the mouth, ensuring it was fully seated and not in contact with the adjacent teeth.

The standard Conelog (Biohorizons Camlog) guided drill sequence was followed. The guided surgical kit is very simple to use with a streamlined number of drills. The Conelog drills support primary stability, with side-cutting features and apical threads that engage the native bone.

The Conelog Progressive-line implant maximised primary stability and in this case the implant was inserted at 70Ncm. The pre-made temporary was used as the temporary restoration; however, there would also be the option of modifying the existing crown.

The implant was placed in close contact with the palatal bone, 1mm below the buccal bone height. A temporary cylinder abutment was connected, with flowable composite placed to attach the temporary restoration.

The composite resin was used to create the optimal emergence profile, ensuring a highly polished restoration in the transition zone.

SOFT TISSUE REGENERATION

A free gingival graft was harvested from the palate, allowing enough tissue to reach between the base of each papilla and this was de-epithelialised to obtain the connective tissue.

A thickness of 1mm is adequate, but in this instance, it was made intentionally thicker at the distobuccal aspect to help plump up the papilla where bone loss was greater.

The connective graft tissue was stabilised with three resorbable sutures placed, positioning the connective tissue graft 1mm below the free gingival margin.

A bone graft was then performed, adding Mineross Blend (Biohorizons Camlog) to the jump gap. This affords an ideal combination of cortical and cancellous bone, delivering high bone density and reliable revascularisation to ensure the fast and predictable turnover of bone.

The temporary restoration was then reintroduced and the surgical site closed tension-free.

Vertical sling sutures were placed through both papillary areas over the contact points to hold the tissue up, create a prosthetic seal and to combat natural shrinkage.

A postoperative radiograph was taken to confirm that the crestal bone was not compressed and there was no convexity in the area to allow space for the soft tissue graft to expand, proliferate and grow.

Upon review eight weeks later, healing had been uneventful. The temporary restoration will be left in place for six months to allow the tissues to mature prior to final restoration.

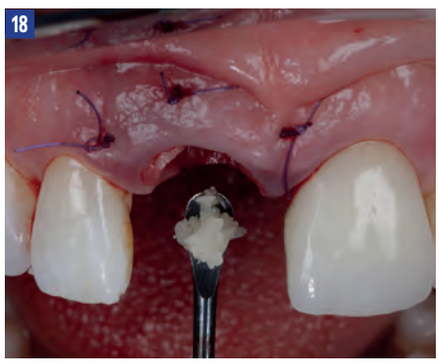

FIGURE 18: *Mineross Blend added to jump gap*

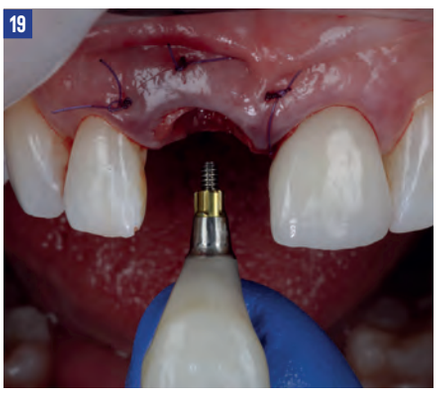

FIGURE 19: *Temporary restoration try-in*

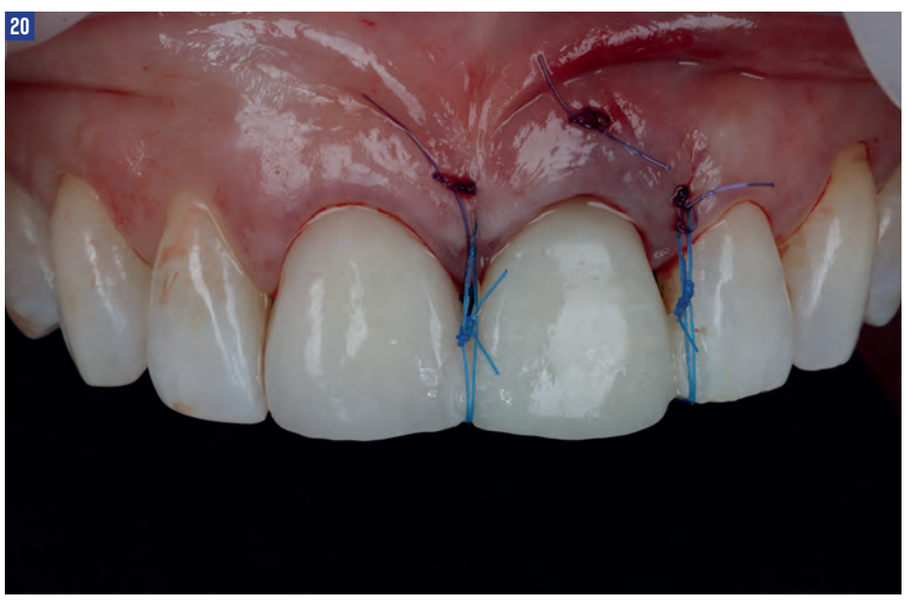

FIGURE 20: *Site is closed with vertical sling suture, placing the soft tissue in close approximation to the subgingival profile of the restoration*

REFLECTIONS

A key factor in this case was the patient's occlusion. The deep overbite made immediate loading a higher risk, so a guided workflow was crucial to ensure primary stability was not lost. Occlusion, parafunction and bruxism are all critical factors when assessing for implant placement, especially alongside immediate loading.

The Conelog implant system is my go-to for immediate cases, particularly where strength and function must be balanced with aesthetics. Its long conus reduces micromovements and it affords greater positional stability than other conical systems I have used. The 3.8mm diameter is the ideal combination of surgical strength and aesthetic considerations. The guided surgical kit is simple to use and has a streamlined workflow for increased efficiency. CD

REFERENCES

Kourkoutis P, Shado R, Novo Pereira I, Madruga D, Hassan H (2025) Occlusal vs non-occlusal modality of the loading protocol for oral implants in partially edentulous patients: a systematic review and meta-analysis. *BDJ Open* 11(1): 63

PRODUCTS USED

Smilecloud Straumann
Conelog, Mineross Blend Biohorizons Camlog
Lucas Hu-Friedy

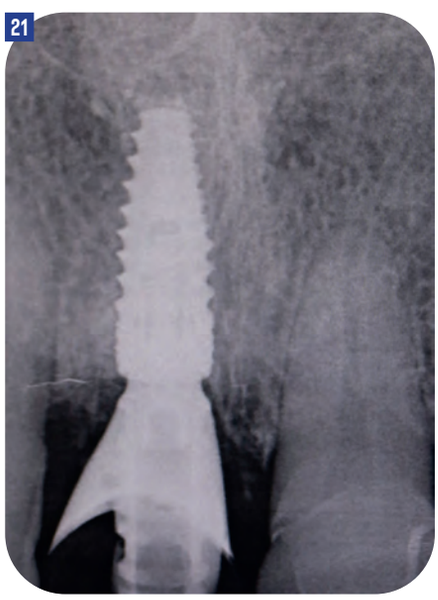

FIGURE 21: *Postoperative radiograph without compressing crestal bone*

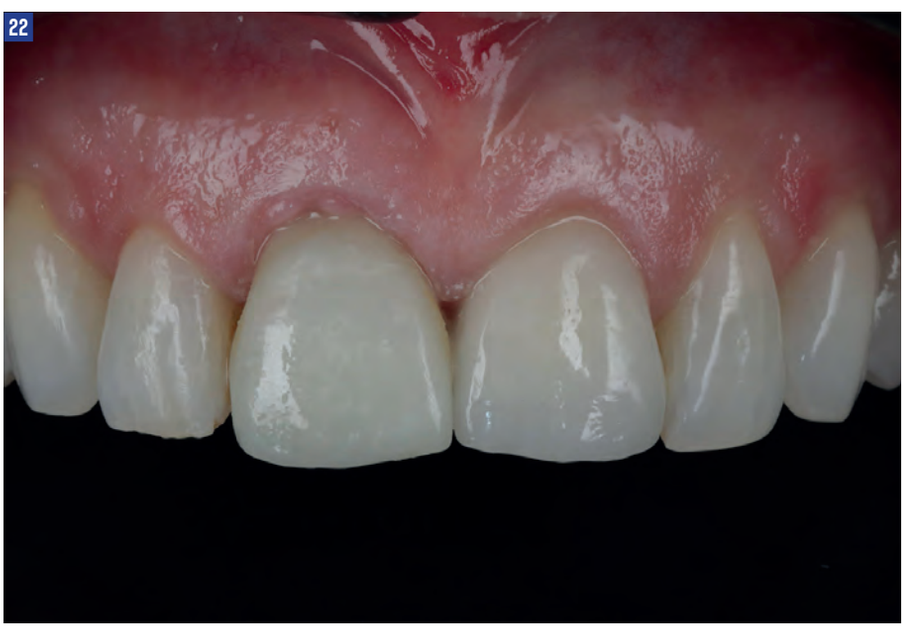

FIGURE 22: *Eight-week postoperative review*

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BSC
Dylan is a clinical herbalist and is currently the director of herbal medicine at Nature's Laboratory.

ENHANCED CPD

CPD hours: one

GDC development outcome: C

Topic: Oral health

Educational aims and objectives:
To discuss the oral microbiome – and present several considerations for dental hygiene practices, including mouthrinse recommendations.

This article qualifies for one hour of enhanced CPD; answer the questions on page 80.

Samantha Jugdev, Munir Ravalia, Elizabeth Cooper and Dylan Parry discuss the importance of maintaining the oral microbiome

The oral microbiome and mouthrinses

The oral microbiome is a collection of microbes plus their functions and genes that reside on the teeth and soft tissues of the oral cavity. Unsurprisingly, given the mouth's vital role as our first line of defence from the outside world, it's the second largest and most diverse microbiome after the gut.

It's estimated that approximately two billion bacteria made up of more than 700 species, as well as up to 101 species of fungi, plus archaea, viruses and protozoa form a normal oral microbiome.

Just like the gut, when the mouth is in a healthy state, the microbes residing there can live very happily together, helping to maintain homeostasis and preventing disease onset.

However, it's important to consider that every time we eat, drink, clean our teeth or even breathe, it's having an effect on this intricate network of microbes.

Environmental insults such as sugar, smoking, vaping, alcohol and some medications can cause an imbalance in beneficial and non-beneficial microbes and the activities they perform. This is better known as dysbiosis.

DYSBIOSIS

Dysbiosis can initially lead to inflammation in the oral cavity and conditions such as periodontal disease. However, if this progresses, it can profoundly impact the wider body too.

Pathogenic bacteria plus their enzymes and other metabolites can compromise the circulatory system and travel through the bloodstream, invading, inhibiting, disarming and hijacking the immune system, and provoking an inflammatory cascade. This results in a significantly increased risk of many chronic diseases, including diabetes, rheumatoid arthritis, multiple sclerosis, inflammatory bowel disease, cardiovascular disease, cognitive decline and some types of cancer.

In fact, more than 40 years of research has revealed that there are currently more than 50 systemic conditions associated with gingival and periodontal inflammation. So, in order to maintain this crucial ecosystem, it's vital we give careful consideration to our dental hygiene practices.

MOUTHWASHES ADVICE

A common question asked of the dental team is about what mouthwashes we might recommend. Of course, our advice might be related to what our patient wants to achieve. Often this is as a breath freshener and as an adjunct to routine oral hygiene regimes. Alternatively, it may be to aid the management of inflammation, infection and to promote healing after surgery.

Many commercially available mouthwashes often contain alcohol or chlorhexidine as the active ingredients. We know that alcohol can alter the environment and delicate microbiome in the mouth and long-term use not only disrupts the microbiome but also carries the risk of cancer.

Chlorhexidine's action is as a cytotoxin and disrupts the cell membrane causing leakage of the cytoplasmic components. This action does not uniquely affect bacteria but can also disrupt the function of our own cells which can then, in turn, affect our ability to heal.

In order to preserve the health of our mouths and our valuable microbiome, what alternatives can we recommend to our patients?

Herbal mouthrinses

Herbal medicine is the oldest form of medicine present throughout the world, as it predates 2500BC.

Herbal medicine uses different plants and their active pharmacological constituents to exert a physiological effect on the body. Herbal medicine can be a beneficial and gentler alternative to chemical-based products, which are frequently used to maintain oral health.

Herbal medicine is particularly beneficial for using as mouthrinses. Herbs can be easily implemented into a daily dental health routine, as

they can be made into herbal teas, floral waters, or the essential oils diluted in water. These can all be used as a mouthwash.

Commonly used herbs for oral healthcare include:

- Neem
- Clove
- Tea tree oil
- Chamomile
- Myrrh
- Sage.

All the above herbs contain constituents, which are antimicrobial, astringent, inflammation reducing, pain relieving and antioxidants.

These therapeutic properties can be beneficial in oral healthcare, as they can be used to help reduce dental plaque, as the active constituents have been shown to be able to disrupt the bacterial biofilms present in the mouth, due to their antimicrobial activity.

Furthermore, all of the above properties help to prevent gingivitis, soothe inflamed gums, and combat halitosis (bad breath), making herbal mouthrinses effective in addressing a variety of oral health issues.

The appeal of herbal mouthrinses lies not only in their efficacy but also in their safety and biocompatibility. They are free from alcohol, synthetic additives, and harsh chemicals, making them suitable for individuals with sensitive oral tissues or those seeking a more natural approach to dental care. Furthermore, ongoing research supports the potential of herbal formulations to serve as effective adjuncts to regular brushing and flossing.

As awareness of the side effects associated with some conventional oral care products increase, consumers are increasingly turning to herbal alternatives. With continued scientific validation, herbal mouthrinses may play an important role in the future of preventive dentistry and integrative oral health practices.

Propolis

Propolis is a natural medicine produced by the honeybee. Propolis is known for its antibacterial and anti-inflammatory properties. It's a natural substance, produced by honeybees from plant and tree resins.

Propolis is a natural way to protect your body from infection and help support your body's natural immunity. It does not work like pharmaceuticals by simply attacking and killing bacteria or viruses or fungi.

It is not an anti-medicine; it is a pro-medicine. It works by stimulating and tuning up your whole immune system. So, instead of killing bacteria, it disables them and stops them from multiplying. Propolis also stops bacteria getting together as biofilm like MRSA (methicillin resistant staphylococcus aureus).

Propolis mouthwash is a good way to line the oral cavity with the healing attributes of propolis. Propolis is sometimes called an adaptogen because it helps your body to adapt or balance forces in the body, for example by keeping harmful bacteria in their place, or sealing up viruses and preventing them from becoming active in the body.

Taking a daily dose of propolis in capsule or tablet form can help maintain this kind of balance. Propolis mouthwash is very mild and has a slightly analgesic effect, making it great for patients after any form of oral/implant/periodontal surgery. Patients report finding it very 'soothing' to use.

CONCLUSION

The above alternatives to conventional mouthwashes are readily available and easy to use for our patient and us.

They are not only gentle on the soft tissues, often promoting healing and good health but can also help balance our oral microbiome, maintaining its diversity and strengthening our first line of defence for our gut and whole-body health. CD

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Treating severe gingival recession

Selvaraj Balaji presents a complex case that addresses severe gingival recession in the upper right quadrant in which the key aims were to restore aesthetics and reduce sensitivity while ensuring a long-lasting solution

A 34-year-old woman presented to the practice for treatment. The patient had severe gingival recession in all areas of the mouth and a very thin gingival biotype. The UR3 to UR6 were showing a large amount of the roots and causing root resorption too.

Her primary concern was the aesthetic appearance of her teeth, though she wanted to address the sensitivity she was experiencing.

The patient was also keen to achieve a long-term and durable treatment result for her natural teeth.

TREATMENT PLANNING

To treat the severe gingival recession, it was important to discuss all available treatment options, including the possibility of doing nothing.

The option of orthodontic treatment (which the patient had already undergone previously) was discussed, which the patient declined. However, she wanted to improve the appearance of the soft tissue.

FIGURE 1: *Pre-treatment smile*

FIGURE 2: *Pre-treatment upper right quadrant*

FIGURE 3: *Multi-tooth flap design*

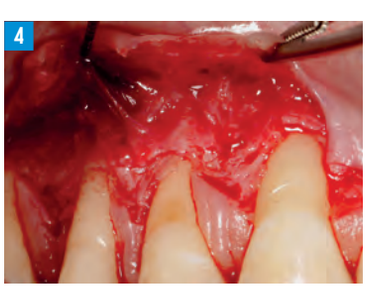

FIGURE 4: *Mucogingival split thickness flap raised*

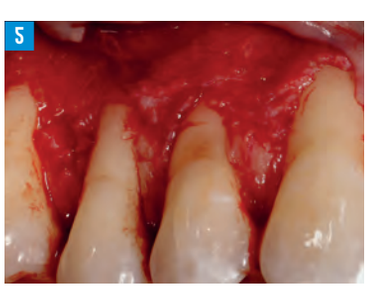

FIGURE 5: *Surgical site post root planing*

DR SELVARAJ BALAJI
BDS MFDS RCPS(GLA) MFD SRCS(ED) LDS RCS(ENG)
Selvaraj is the principal dentist of The Gallery Dental Group which is made up of Meadow Walk Dental Practice and The Gallery Dental & Implant Centre. He is also the founder of the Academy of Soft and Hard Tissue Augmentation (ASHA) and runs courses, lectures and study clubs in the UK and around Europe for aspiring implant dentists.

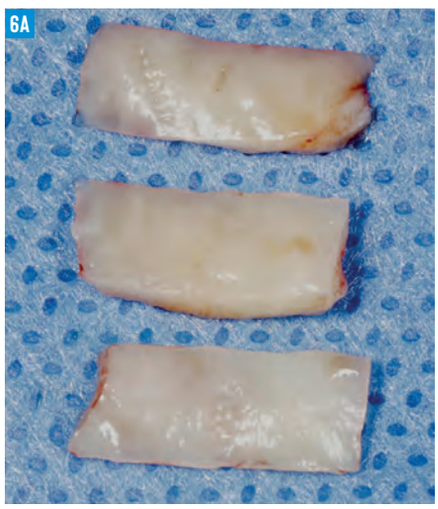

FIGURE 6A: *Connective tissue grafts harvested*

FIGURE 6B: *Connective tissue grafts de-epithelialized*

FIGURE 6C: *Connective tissue graft donor site*

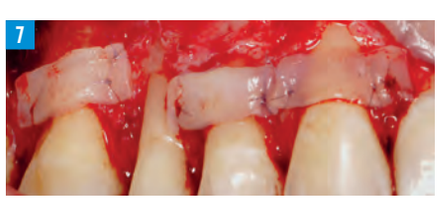

FIGURE 7: *Connective tissue grafts placed on root surfaces*

FIGURE 8: *Buccal flap advanced to cover the roots*

Due to the thin gingival biotype, it was important to consider soft tissue augmentation in order to produce a stable functional and aesthetic outcome.

As such, the patient consented to gingival grafts to cover the recession and restore gingival thickness in the mouth. It was agreed that the upper right quadrant would be treated as a starting point, meaning that the area with the most severe recession (UR3 to UR6) would receive treatment first.

TREATMENT PROVISION

Recession coverage was performed for multiple teeth, as planned. To begin, local anaesthesia was administered to numb the area and a mucogingival split thickness flap designed for multiple teeth was raised. Gingival planing was then undertaken using EDTA and amelogenin.

Three connective tissue grafts were harvested from the palate, which were de-epithelialized and sutured onto the root surfaces of the UR3, UR4 and UR6. Connective tissue grafts offer the benefits of aesthetics as well as offering effective outcomes. This technique ensures the gingivae are restored to optimal height while providing an excellent colour match – addressing the patients key concerns in this case.

Once stabilised, the buccal flap was advanced tension-free to cover the roots. The connective tissue donor sites were covered to protect them from infection and promote healing.

The patient was then provided with postoperative instructions to minimise the risks of complications and encourage a smooth healing journey.

REFLECTION

On reflection, the treatment was successful. Follow-up photos show an excellent aesthetic outcome and good root coverage. Currently, we are planning to treat the upper left region too. The patient is very happy with the outcome. CD

FIGURE 9: *Surgical site healing*

FIGURE 10: *Final treatment outcome*

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ORTHODONTICS

SURA MAKKI
Complex crowding: clear aligners

73

A female patient presented to the practice with a primary concern of dental crowding in the lower anterior region, which had led to the overlapping of teeth. This was an aesthetic issue for the patient but also compromised the oral hygiene routine due to limited access to interdental spaces and surfaces across the dentition – Sura Makki, p73

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DR SURA MAKKI
Sura is a dentist at Wantage Oasis Dental Practice. She offers a wide range of general dentistry treatment, and has a special interest in cosmetic dentistry, implant dentistry, periodontology and endodontics. She has been an Invisalign provider since 2017.

ENHANCED CPD
CPD hours: one
GDC development outcome: C
Topic: Orthodontics
Educational aims and objectives:
To present a case report detailing an approach to treating complex crowding and rotations in both arches with clear aligners.
This article qualifies for one hour of enhanced CPD; answer the questions on page 80.

A female patient presented to the practice with a primary concern of dental crowding in the lower anterior region, which had led to the overlapping of teeth. This was an aesthetic issue for the patient but also compromised the oral hygiene routine due to limited access to interdental spaces and surfaces across the dentition.

A complete examination of her dental health was conducted to assess whether treatment would be suitable. Overall, the dental condition was excellent, with minimal bone loss and only a small amount of gingival recession.

The high standard of oral hygiene was especially commendable, as gingival recession can complicate routines, and compromise effective plaque debridement for some individuals.

She exhibited a class III molar relationship and a class I incisal relationship, with severe anterior crowding and displacement. Alongside this, she had an increased overbite of approximately 4mm.

The level of crowding in the mandible had led to the rotation of the incisors. The UL1 was affected to such an extent that it was almost rotated by 90°. As expected in many orthodontic cases, the maxilla was also affected, though rotations were not observed to the same extent.

The patient had undergone fixed orthodontic treatment when she was younger, which involved the removal of all first premolars. No retainer had been used, prompting relapse.

Dental health was deemed acceptable for orthodontic treatment to treat both arches, and the options available were discussed.

Various approaches to treatment were presented

FIGURE 1: *Pre-treatment, anterior view*

Sura Makki presents her approach to treating complex crowding and rotations in both arches with clear aligners over the course of 12 months

Complex crowding: clear aligners

FIGURE 2: *Crowding and subsequent rotation of the lower incisors, occlusal view*

FIGURE 3: *Crowding of the upper incisors, occlusal view*

FIGURE 4: *Pre-treatment, left lateral view*

FIGURE 5: *Pre-treatment, right lateral view*

TREATMENT OPTIONS

Various approaches to treatment were presented to the patient. This included no treatment and monitoring of the dentition, which was not preferred, and the use of fixed orthodontic appliances. These would help enact targeted, effective orthodontic movements.

Invisalign was also discussed as an option, and was preferred due to having a discreet appearance and improved comfort. The removability of Invisalign also appealed, with an opportunity to complete a conventional oral hygiene routine.

Patient compliance and a predictable approach to care ensured results were achieved in a timely fashion

Fixed appliances were considered to be too visible, and the patient was concerned that they would be painful against buccal tissue.

After orthodontic care, the opportunity for composite bonding would become available. This was not decided upon at this point, as the patient wished to see the outcome of the orthodontic care before engaging with further treatment.

Once fully informed consent was received, treatment could begin.

TREATMENT OVERVIEW

The patient was provided with both upper and lower clear aligners across a 12-month period. Invisalign Comprehensive was used, as this was suitable for a more complex case.

Aligners were provided regularly at consistent check-ins, which were used to assess the progression of treatment and also monitor aspects such as oral hygiene. The patient experienced no severe issues, aside from minimal discomfort, which was expected.

Interproximal reduction (IPR) of 0.5mm was performed between the UL3 and UR3 to aid the anterior crowding and to improve the overbite. This minimally invasive approach prioritises the conservation of the dentition, only enacting removal of the enamel where it is functional, aesthetic and required to create space for alignment.

To aid the reduction of the posterior open bite, vertical elastics were employed in a 'box' configuration on the posterior teeth. This was the only notable challenge that had to be managed.

Buttons were placed on the buccal surfaces of the premolars and molars, covering six teeth on each side, with medium strength elastics connecting these. Elastics were only needed for a couple of months, and the patient experienced no significant difficulties.

The complexity of this case meant that an extended treatment time was necessary, as well as a large quantity of aligners. Throughout the year, 31 aligners were provided for the maxilla, and 45 aligners for the mandible.

Success was only possible with exceptional compliance and commitment from the patient, which she displayed in abundance. The patient wore the aligners for the recommended duration and followed all oral hygiene instructions, which maximised orthodontic tooth movement and minimised the risk of problems, such as caries development.

FIGURE 6: *Alignment in the lower arch post-treatment, occlusal view*

FIGURE 7: *Alignment in the upper arch post-treatment, occlusal view*

FIGURE 8: *Post-treatment, right lateral view*

FIGURE 9: *Post-treatment, left lateral view*

FIGURE 10: *Post-treatment, anterior view*

FIGURE 11: *Final result, smile view*

POST-TREATMENT PHASE

Following the successful orthodontic treatment, composite bonding was anticipated to address black triangles in the anterior region.

Following a course of whitening treatment, the patient turned down the proposal of further restorative care, as she preferred the natural appearance of the teeth. The case was completed with professional airflow cleaning and scaling, further enhancing the aesthetic result.

In order to preserve results, retainers were provided to the patient at the end of treatment, with advice on how often to wear them.

REFLECTION

This case was a great success, and one I am proud to have completed. The patient was happy with the outcome, which always makes the case feel truly successful.

Patient compliance and a predictable approach to care ensured results were achieved in a timely fashion.

This case also paralleled my journey through clinical photography, highlighting the impact of the IAS photography online course. The first images in this case were basic, taken without professional equipment. In contrast, the final case documentation was captured using a Canon DSLR camera with a macro lens and ring flash, significantly improving the quality and presentation of the records.

The IAS Academy training provided a valuable enhancement to case documentation and communication. CD

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TRYCARE EXPLAINS THE BENEFITS OF TOKUYAMA'S PATENTED SPHERICAL FILLER PARTICLES

IN A SPHERE OF THEIR OWN!

Tokuyama Dental are pioneers in the field of light-cured sub-microscopic spherical filler particles, resulting in composites of outstanding aesthetics, reliability and user-friendliness. The only manufacturer to use patented spherical filler particles, each variant utilises different diameter particles to maximise their optical and physical properties for the indication. In addition to optimised optical properties resulting in enhanced aesthetic restorations, Tokuyama's spherical filler particles offer other advantages to irregularly shaped filler particles. They are quicker and easier to pack, reducing the risk of voids; easier to sculpt and carve; and have a much smoother surface finish with a natural high lustre requiring minimal, if any, polishing. Tokuyama's spherical filler particles produce the highest gloss in the shortest time. Not easily dislodged, they create smooth surfaces that are highly resistant to abrasion. Tokuyama's spherical fillers ensure smooth restorations that stay smooth; diffuse and transmit light for optimal aesthetics; produce mirror reflection and high abrasion resistance that ensures a long-lasting polish, lustre, durability and colour stability.

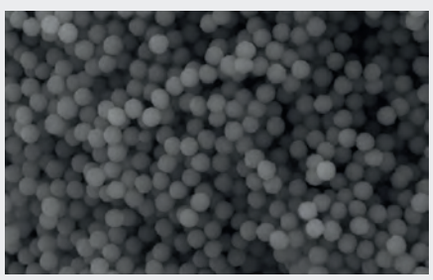

FIGURE 1: *SEM of Tokuyama's spherical filler particles*

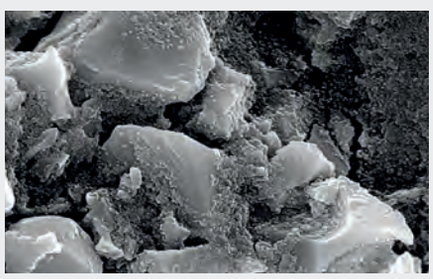

FIGURE 2: *SEM of irregular filler composite material*

A PEARL OF AN IDEA

Utilising patented Sol-Gel technology, Tokuyama 'grow' spherical filler particles to diameters optimised for their desired colour adaptation and outstanding physical properties. Some manufacturers grind their glass materials until the individual filler particles are within a desired, but random, size range, resulting in irregularly sized and shaped filler particles.

Advantages include:

- Mirror reflection and lustre: with identically shaped spherical particles, Tokuyama composites reflect light just like natural enamel, giving a natural lustre. Unlike rough-surfaced composites that scatter light diffusely, producing a dull matte appearance
- Abrasion resistance: Tokuyama composites' uniform and small spherical filler particles are not easily dislodged and produce a very smooth surface that is highly resistant to abrasion. This abrasion-resistant surface remains smooth permanently, so that the initial lustre of remains permanent too. Unlike other manufacturers' irregularly shaped filler particles, which can become dislodged by polishing etc, leaving a rough and irregular pitted surface which is very abrasive and difficult to polish
- Light diffusion and transmission: high light diffusion and transmission properties of Tokuyama composites ensure a uniform and gradual transition between tooth and composite. Unlike conventional composites, which exhibit minimal light diffusion and transition, resulting in visible margins
- Faster polishing: Tokuyama composites produce a high gloss in the shortest time
- Radical Amplified Polymerisation (RAP) technology: this patented technology enables them to reuse camphorquinone repeatedly, not only speeding up the curing time, but also dramatically reducing the amount of camphorquinone required by other composites
- Longer working time, faster cure: RAP technology ensures faster curing plus high resistance to ambient light to ensure a generous working time, when required, followed by short curing time. Consequently, Tokuyama composites offer ease of placement, sculpting and finishing, which remains completely under your control until the moment you want it to cure, at which point it cures virtually instantaneously
- Deep cure: RAP technology ensures a higher degree of polymerisation, resulting in lower residual monomer, which leads to stronger, deeper and more complete curing
- Minimal shade change: when camphorquinone light cures, its shade changes to a yellowish hue. The RAP technology means there is a much lower proportion of camphorquinone, which ensures an imperceptible shade change after light curing. CD

TRYCARE

For details about the Tokuyama range, contact your local Trycare representative, call **01274 885544** or visit **www.trycare.co.uk**.

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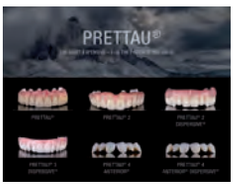

Zirkonzahn
Human Zirconium Technology

Zirkonzahn's zirconia range has grown over time into a material line consisting of six different types of Prettau zirconia:

- With a very wide range of applications – from partial crowns to full arches – Prettau solves common problems such as narrow spaces, bruxism or ceramic chipping for functional and aesthetic restorations
- Prettau 2 and Prettau 2 Dispersive are translucent with excellent flexural strength. Their aesthetic properties allow the design of monolithic restorations, preventing the risk of ceramic chipping. With Prettau 2 and Prettau 2 Dispersive, patients receive biocompatible, individual and stable dental restorations, from single crowns to full arches. Dispersive has a slight natural colour gradient
- With the new Prettau 3 Dispersive zirconia, the concept of Gradual-Triplex-Technology was introduced. In addition to the colouring, translucency and flexural strength levels change. In this way, while the incisally increasing translucency results in a highly translucent incisal edge, the cervically increasing flexural strength leads to an extremely high flexural strength at the tooth neck
- Prettau 4 Anterior and Prettau 4 Anterior Dispersive have been specially designed for the anterior region and are therefore characterised by a particularly high translucency. Both materials are suited for the posterior region. These two types of zirconia are suitable for the production of single crowns, inlays, onlays, veneers and three-unit bridges.

Zirkonzahn Shade Guides are composed of monolithic zirconia sample teeth in the shape of premolars, upper and lower incisors. They are available in Prettau 2 Dispersive, Prettau 3 Dispersive and Prettau 4 Anterior Dispersive zirconia.

www.zirkonzahn.com

RESINS VALIDATED FOR RAYSHAPE 3D PRINTERS
Vita Zahnfabrik

Efficient material solutions for digital dentures: Vita Zahnfabrik and Chinese technology company Rayshape have announced the successful validation of selected Vita Vionic materials on Rayshape's dental 3D printing systems. The validation demonstrates a shared commitment to safe, economical and precise digital denture workflows.

As part of the collaboration, two key materials from the Vita Vionic Solutions portfolio were successfully tested and validated for use with Rayshape printing systems:

- Vita Vionic Dent Resin validated for: Shape 1+Dental, Edge E2, Edge mini
- Vita Vionic Base Resin Impact validated for: Shape 1+Dental, Edge E2.

These coordinated components provide a reliable foundation for high-performance, integrated digital manufacturing processes – from abrasion-resistant denture teeth to stable, durable denture bases. Dental laboratories gain new possibilities for precise and reproducible results based on proven Vita material quality. The validation of Vita Vionic resins on Rayshape systems expands the network of system partners for additive manufacturing in the dental sector. Users benefit from perfectly coordinated components that meet the highest standards of aesthetics, efficiency and process reliability. The open Rayshape architecture and the Vita Vionic portfolio offer new flexibility for individual laboratory workflows and modern production strategies.

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GENERAL DENTISTRY
CD/NOV/DEC/MONTEITH-ROSS/PAGE 13

1. **According to the case report, when do postoperative symptoms such as pain and swelling typically peak after a dental extraction?**
   - ☐ a. Within the first 12 hours
   - ☐ b. Within 24 hours
   - ☐ c. Within 48 to 72 hours
   - ☐ d. After five days
2. **What mitochondrial component is stimulated by near-infrared light during photobiomodulation?**
   - ☐ a. ATP synthase
   - ☐ b. Cytochrome c oxidase
   - ☐ c. NADH dehydrogenase
   - ☐ d. Succinate dehydrogenase
3. **How long was each postoperative LED phototherapy session delivered in this case?**
   - ☐ a. 10 minutes
   - ☐ b. 15 minutes
   - ☐ c. 20 minutes
   - ☐ d. 30 minutes
4. **What was the patient's healing status by postoperative day five?**
   - ☐ a. Moderate swelling with early signs of healing
   - ☐ b. Persistent bruising but reduced pain
   - ☐ c. Full resolution of pain and swelling with advanced soft tissue healing
   - ☐ d. Pain-free but with significant residual oedema

AESTHETIC DENTISTRY
CD/NOV/DEC/HASSEL/PAGE 23

1. **Why are wedge-shaped cervical defects often associated with hypersensitivity?**
   - ☐ a. They usually contain residual amalgam
   - ☐ b. They lack a protective enamel layer
   - ☐ c. They always extend into the pulp
   - ☐ d. They are caused by bacterial infection only
2. **What characteristic of hybrid ceramic helps minimise discolouration over time?**
   - ☐ a. Its high water absorption
   - ☐ b. Manual polymerisation performed by the clinician
   - ☐ c. Controlled industrial polymerisation producing many chemical bonds
   - ☐ d. Its ability to be layered directly on the tooth
3. **According to the text, what allows hybrid ceramic restorations to flex with the tooth under lateral forces?**
   - ☐ a. Their low bonding strength
   - ☐ b. Their dual network structure
   - ☐ c. Their high brittleness
   - ☐ d. Their thick preparation margins
4. **In the clinical case, why was the cervical veneer design extended into the healthy incisal enamel area?**
   - ☐ a. To mask deep staining
   - ☐ b. To improve retention without adhesive bonding
   - ☐ c. To include more enamel surface in fully adhesive seating
   - ☐ d. To avoid using a digital workflow

DIGITAL DENTISTRY
CD/NOV/DEC/DIA/PAGE 30

1. **What primary issue in the initial maxillary prosthesis prompted the need for a full digital redesign?**
   - ☐ a. Poor implant integration
   - ☐ b. Excessive wear of the prosthetic teeth
   - ☐ c. Incorrect occlusal plane and deviated dental midline
   - ☐ d. Lack of retention due to loose abutments
2. **What was the purpose of capturing 3D facial data during the digital workflow?**
   - ☐ a. To evaluate speech patterns
   - ☐ b. To determine bone density before implant placement
   - ☐ c. To establish natural head position, midline and occlusal plane
   - ☐ d. To assess temporomandibular joint movement
3. **What confirmed that the digital planning was accurate before fabricating the final restorations?**
   - ☐ a. The absence of patient discomfort during appointments
   - ☐ b. The monolithic prototype requiring no intraoral adjustments
   - ☐ c. The presence of sufficient keratinised tissue
   - ☐ d. A reduction in the number of aligners needed
4. **What was the main benefit of using a digitally produced verification jig?**
   - ☐ a. It allowed the clinician to test multiple aesthetic designs simultaneously
   - ☐ b. It confirmed full passivity and ensured there was no distortion in the digital impression
   - ☐ c. It reduced the need for soft tissue evaluation
   - ☐ d. It eliminated the requirement for intraoral scanning

ENDODONTICS
CD/NOV/DEC/PILLAY/PAGE 39

1. **What is the primary advantage of full pulpotomy over conventional root canal therapy in mature permanent teeth with irreversible pulpitis?**
   - ☐ a. Requires fewer dental instruments
   - ☐ b. Preserves radicular pulp, structural integrity and function
   - ☐ c. Eliminates the need for local anaesthesia
   - ☐ d. Guarantees 100% long-term tooth survival
2. **According to the article, what is the most frequently cited cause of full pulpotomy failure?**
   - ☐ a. Use of inappropriate anaesthetic
   - ☐ b. Incomplete pulp removal
   - ☐ c. Microleakage due to compromised restorations
   - ☐ d. Patient non-compliance with diet
3. **Which materials are mentioned in the article as preferred for full pulpotomy due to their biocompatibility and ability to stimulate dentine bridge formation?**
   - ☐ a. Amalgam and glass ionomer
   - ☐ b. Mineral trioxide aggregate (MTA), Biodentine, and calcium-enriched mixture (CEM) cement
   - ☐ c. Composite resin only
   - ☐ d. Zinc oxide eugenol and calcium hydroxide

4. In the case reports, how was haemostasis achieved after pulp chamber amputation?

- ☐ a. With a haemostatic agent gel applied for five minutes
- ☐ b. By pressure with a cotton pellet moistened with 3.5% sodium hypochlorite for two minutes
- ☐ c. Using electric coagulation
- ☐ d. By applying cold saline for 10 minutes

IMPLANT DENTISTRY CD/NOV/DEC/ANITUA/PAGE 49

1. What is the main consequence of tooth loss if biomechanical stimulation is not restored?

- ☐ a. Increased tooth mobility in adjacent teeth
- ☐ b. Progressive alveolar bone resorption
- ☐ c. Development of periodontal pockets
- ☐ d. Increased salivary flow

2. According to the article, why does mandibular resorption often differ from maxillary resorption?

- ☐ a. The mandible has greater corticalisation, different anatomical landmarks, muscle insertions, and perioral soft tissue forces
- ☐ b. The maxilla has a higher rate of bone turnover and thinner mucosa
- ☐ c. Mandibular teeth erupt earlier than maxillary teeth
- ☐ d. Maxillary resorption is influenced only by age and sex

3. In cases of extreme mandibular atrophy, which surgical approach was used in the third quadrant to allow distal implant placement?

- ☐ a. Sinus lift
- ☐ b. Ridge expansion
- ☐ c. Lateralisation of the inferior alveolar nerve
- ☐ d. Use of ultra-short implants only

4. What was a key reason for transitioning from a telescopic mandibular prosthesis to a screw-retained hybrid design in this case?

- ☐ a. To reduce the vertical dimension
- ☐ b. Loss of retention with the telescopic design
- ☐ c. To allow simultaneous sinus lift
- ☐ d. Patient preference for metal-free restorations

ORAL HEALTH CD/NOV/DEC/JUGDEV/PAGE 64

1. Approximately how many bacterial species are estimated to form part of the normal oral microbiome?

- ☐ a. Around 200
- ☐ b. More than 700
- ☐ c. About 50
- ☐ d. Less than 500

2. What term describes the imbalance in beneficial and non-beneficial oral microbes caused by factors such as sugar, smoking, vaping, alcohol and medications?

- ☐ a. Metaplasia
- ☐ b. Dysphagia
- ☐ c. Dysbiosis
- ☐ d. Xerostomia

3. Which of the following is identified in the article as a risk of long-term use of alcohol-containing mouthwashes?

- ☐ a. Increased calculus formation
- ☐ b. Increased salivary buffering
- ☐ c. Risk of caries development
- ☐ d. Disruption of the microbiome and increased cancer risk

4. According to the article, which property of herbal mouthrinses contributes to their effectiveness in managing oral health issues such as plaque and gingivitis?

- ☐ a. Their ability to calcify bacterial cell walls
- ☐ b. Their antimicrobial, astringent, anti-inflammatory and antioxidant properties
- ☐ c. Their high alcohol content
- ☐ d. Their ability to neutralise all oral bacteria completely

ORTHODONTICS CD/NOV/DEC/MAKKI/PAGE 73

1. What was the patient's molar and incisal relationship at the initial examination in the case report?

- ☐ a. Class I molar, class II incisal
- ☐ b. Class II molar, class III incisal
- ☐ c. Class III molar, class I incisal
- ☐ d. Class I molar, class I incisal

2. According to the author, which factor contributed to the patient's relapse following her previous orthodontic treatment?

- ☐ a. Inadequate IPR during earlier treatment
- ☐ b. Lack of a retainer after fixed orthodontics
- ☐ c. Overuse of elastics in adolescence
- ☐ d. Failure to extract premolars

3. How much interproximal reduction (IPR) was performed in this case, and between which teeth?

- ☐ a. 1.0mm between LR3 and LL3
- ☐ b. 0.25mm between UL1 and UR1
- ☐ c. 0.5mm between UL3 and UR3
- ☐ d. 0.75mm between LR2 and LR3

4. How many aligners were used for the maxillary and mandibular arches during treatment?

- ☐ a. 20 upper, 36 lower
- ☐ b. 31 upper, 45 lower
- ☐ c. 40 upper, 20 lower
- ☐ d. 45 upper, 31 lower

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