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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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A MOMENT OF REFLECTION

Welcome to the March issue of *Clinical Dentistry*!

With spring on the approach, we've decided to have a little freshen up – and I'm not just talking about the cupboards at FMC headquarters!

We're not looking to reinvent anything major in this issue, but we are taking the opportunity to present something a little different.

Manrina Rhode is renowned as one of the UK's top aesthetic dentists, so when she told me she had a veneer case for publication, I was over the moon! However, when she submitted it for review, it came with the warning: 'Some dentists won't like it'.

We discussed the 'controversy' of the case – in which Manrina fits 20 veneers to provide the bigger, whiter teeth that the patient desired.

We knew that some dental professionals would argue the treatment was unnecessary. Indeed, that was dentist Clive Brazier's response when he first saw the case, questioning whether a different approach would have achieved a satisfactory result for the patient.

But we also recognised that the case was the perfect catalyst for starting a conversation around treatment options and the nature of choice – both those of the clinician and the patient.

So, in a break from the norm, straight after the case report on page 19, you'll find a discussion between Manrina and Clive in which they reflect on the case and discuss patient expectation, ethics and whether a different treatment approach would have led to a better outcome for the patient.

I'm delighted to be able to publish both the 'how' (the full case report) and the 'why' (the case reflection on page 25) in this issue. By presenting both, we hope to highlight the importance of reflection and discussion in clinical practice. What would you have done in this instance? Would you still do the same after reading Manrina and Clive's discussion?

Reflective practice underpins exceptional clinical dentistry. It's a privilege to have it play out in these pages.

How often do you take the time to reflect on completion of a case? To analyse the findings, and use any lessons learned to make improvements? Next time, give it a try: the results might surprise you.

Here's to reflection, analysis – and keeping an open mind.

Siobhan Hiscott
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This year's ceremony is taking place at Athena in Leicester on Friday 6 June, making the 2025 Dentistry Awards a summer party!

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  - Clinical dental technician
  - Practice manager
  - Receptionist
  - Apprentice
- Practice of the Year
- Sustainable Dental Business Award
- Dental Laboratory of the Year
- Website of the Year.

Entry is easy! Once you've registered at dentistry.co.uk/awards, simply prepare your entry following the criteria for the corresponding category in the entry guide and submit it by 19 March. You have up to 750 words to tell the judges why you should be an award winner! Be sure to include any supporting evidence, including testimonials from patients and colleagues, case studies and relevant videos and marketing literature.

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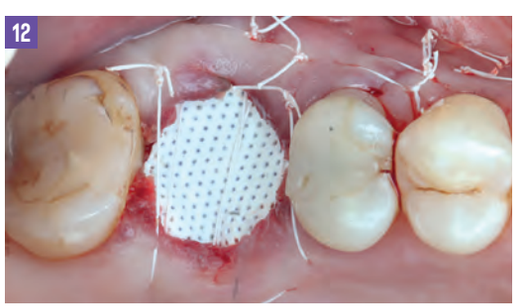
Treating a significant bony defect and oroantral communication with augmentation protocols that deliver predictable outcomes in preparation for future restoration with dental implants – Imran Nasser



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FEATURES

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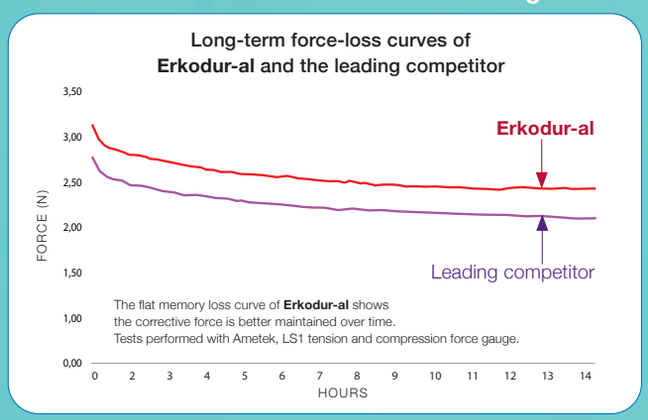

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GENERALDENTISTRY

IMRAN NASSER
Ridge preservation treatment

12

This case provides an excellent example of how strict protocols and good products can be utilised to treat significant bony defects. Ridge preservation is an essential skill for clinicians treating compromised sites. For colleagues placing implants in these patients, it is also crucial to have a good understanding of the grafting materials available – Imran Nasser, p12

DR IMRAN NASSER
Imran qualified in 2006 from Bristol University and then completed hospital posts in oral & maxillofacial surgery. He completed his Master of the Faculty of Dental Surgery in 2009 and his master's degree in implantology in 2010-2014. He is passionate about sharing his experience and runs various training courses for colleagues.

ENHANCED CPD

CPD hours: one

GDC development outcome: C

Topic: General dentistry

Educational aims and objectives: To present a case discussing the delivery of ridge preservation treatment in preparation for future restoration with dental implants. This article qualifies for one hour of enhanced CPD; answer the questions on page 66 or scan the QR code.

Though preservation of the natural dentition is the primary goal for all clinicians, extraction is unavoidable in some situations. Restorative options must then be considered, for which implant treatment has become the gold standard.

Implant-retained prostheses are associated with improved oral health related quality of life for patients in the short- and long-term (Ali et al, 2018). However, this treatment modality is not without potential complications and it's essential for the clinician to mitigate these.

When a tooth cannot be saved and is indicated for extraction, the condition of the resulting socket must be optimised in preparation for successful implant placement. The extraction procedure is itself linked to both atrophy of the periodontal tissues and resorption of the alveolar bone. As such, augmentation procedures are indicated in order to enhance bone height and volume, in turn creating adequate foundations for a future implant.

Ridge preservation techniques, in particular, have been shown to effectively prevent dimensional loss in the alveolar ridge after tooth extraction (Avila-Ortiz, Chambrone and Vignoletti, 2020).

CASE PRESENTATION

A female patient presented to the practice as an emergency with pain in the upper left molar, gingival swelling and a bad taste in her mouth (Figure 1). A periapical radiograph and CT scan were taken to assess the pathology (Figure 2).

The infection was present on all three walls, having completely destroyed the buccal aspect and perforated the sinus to create a large oroantral communication (OAC). The UL6, therefore, had a hopeless prognosis.

All potential treatment options were discussed with the patient, including the benefits, risks and likely outcomes. There was a risk that extraction

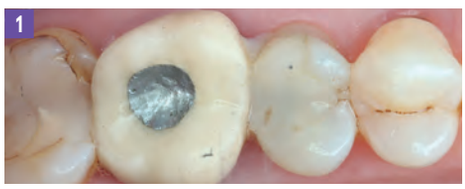
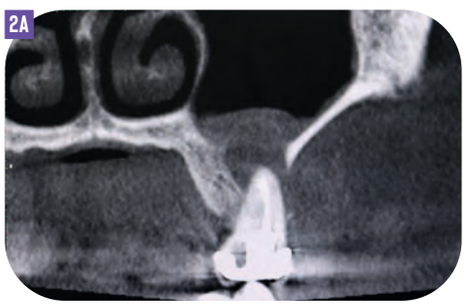
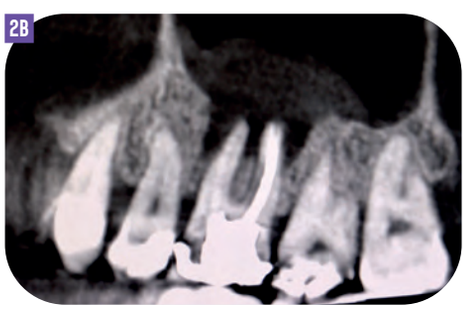
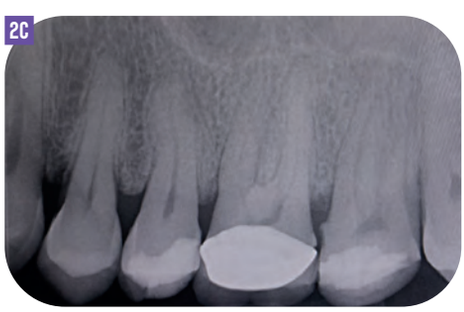


FIGURE 1: *Presenting situation*







FIGURES 2A *to* **2C:** *Pathology assessment*

Imran Nasser treats a significant bony defect and oroantral communication with augmentation protocols that deliver predictable outcomes in preparation for future restoration with dental implants

Ridge preservation treatment

FIGURE 3: *UL6 sectioned to facilitate atraumatic extraction*

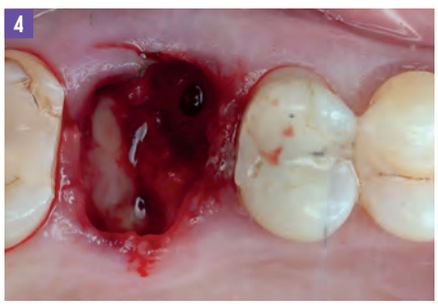


FIGURE 4: *UL6 extracted*

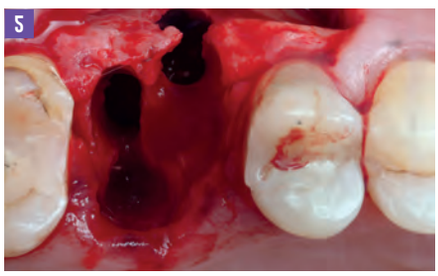
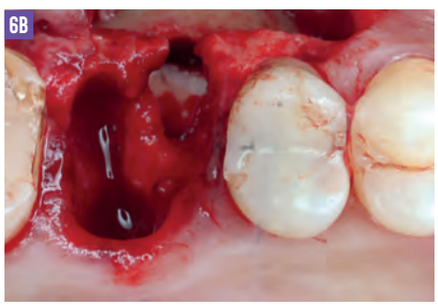


FIGURE 5: *Flap raised for improved visualisation and disinfection*



FIGURES 6A *and* **6B:** *Collagen sponge placed to seal off the OAC*

FIGURE 7: *Mineross Blend grafting materials placed over defect*

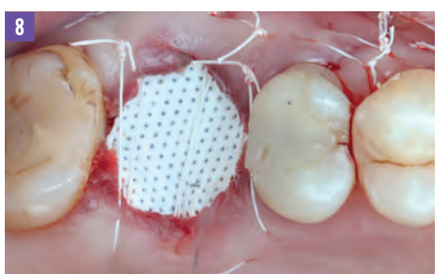


FIGURE 8: *Grafting material stabilised with a PTFE membrane, which is held in place by PTFE sutures*

of the UL6 would lead to substantial bone loss, requiring hard tissue augmentation, as well as a possibility that odontogenic infection could lead to sinusitis (Areizaga-Madina, Pardal-Peláez and Montero, 2023) or infect the graft material, compromising the creation of new bone. Clinician experience and meticulous treatment planning would minimise these risks.

Atraumatic extraction of the tooth would be important but moderately difficult to achieve

TREATMENT PLANNING

The clinical photos, periapical radiograph and CT scan provided adequate data to anticipate the size and location of the OAC, affording confidence that it could be sealed effectively.

The UL6 would be extracted atraumatically by sectioning it first. A collagen membrane and allograft would be placed to seal the sinus and build up the buccal bone.

An allograft material was favoured in this instance, facilitating implant placement approximately six months postoperatively. While both xenograft and allograft have proven effective in ridge preservation procedures (Serrano Méndez et al, 2017; Atieh et al, 2021), allograft exhibits faster bone formation, making it more appropriate for this case. Post augmentation, a secondary (open) healing approach was preferred in this case to encourage the growth of new soft tissue. The literature shows similar outcomes between primary and secondary closure, though secondary is associated with less initial swelling (Azab et al, 2022).

There were several challenges to consider with the treatment plan, including:

- Atraumatic extraction of the tooth would be important but moderately difficult to achieve
- Enough access would need to be gained to ensure complete removal of the infection
- Complete debridement of all the granulation tissue would be crucial to ensure no remnants were left behind
- Regarding the OAC, it was necessary to confirm there was not extensive damage to the sinus membrane
- The membrane would need to be placed high enough to restore the buccal wall, which was missing all the way beyond the apex
- When suturing everything closed, it would be vital to ensure that neither the membrane nor graft material are compressed in order to protect the volume of the graft
- It would also be important to ensure no distortion of the mucogingival junction – especially using an open healing technique
- Closure of the OAC via the socket would be essential
- It would be vital to ensure the graft material did not extrude into the sinus.

TREATMENT PROVISION

The UL6 crown was isolated to improve visualisation of the roots. The UL6 was luxated from the centre of the tooth to allow elevation of each individual root (Figures 3 and 4).

Though typically a flapless procedure, a lack of bone height on the mesial-buccal aspect in this case meant that mesial vertical release was indicated (Figure 5).

The incision was positioned to avoid the papilla for improved postoperative healing and aesthetics, and was located away from where the membrane would be placed.

The socket was repeatedly degranulated with a Lucas curette and irrigated with saline to remove the fluid and pus. The author's protocol concludes with a local antibiotic paste to ensure complete disinfection of the site.

Once the OAC was visible in the mesial-buccal space, the area was sealed with a collagen

sponge shaped to size (Figure 6). A second collagen sponge was placed between the graft material and the apices, alongside the Schneiderian membrane.

A Mineross Blend (Biohorizons Camlog) bone graft was placed, chosen because the combination of particles achieves the density of cortical bone and the revascularisation of cancellous bone for highly effective yet controlled bone remodelling (Figure 7).

It is important to ensure that the material is densely packed apically and laterally to achieve volume, while allowing good blood flow around the graft. The material should also be packed only as high as the buccal and palatal bone crest, avoiding the soft tissue layer. Otherwise, there will be loss of bone granules and reduced tissue keratinisation.

Due to the amount of buccal bone loss, a resorbable collagen membrane was placed on the buccal aspect. This collagen membrane was covered upon closing the buccal flap, which was not advanced to avoid any distortion of the mucogingival junction.

A dense PTFE membrane (Cytoplast Titanium-Reinforced PTFE membrane, Biohorizons Camlog) was then placed on the occlusal aspect and secured with PTFE sutures, which have a high tensile strength to accommodate postoperative swelling and they don't adhere plaque (Figure 8).

Due to the size of the original OAC, a postoperative CBCT scan was taken to confirm that no grafting material had entered the antrum (Figures 9 and 10).

Ridge preservation is an essential skill for clinicians treating compromised sites

FIGURE 9: *Periapical taken immediately postoperative*

FIGURE 10A: *Postoperative imaging to assess bone contour and no extrusion into antrum*

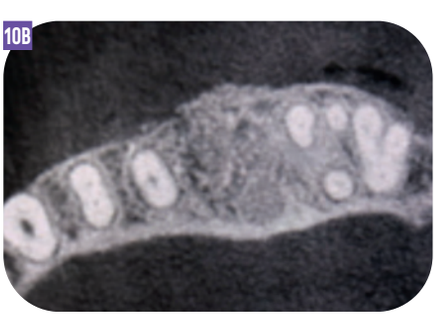


FIGURE 10B: *Postoperative imaging to assess bone contour*

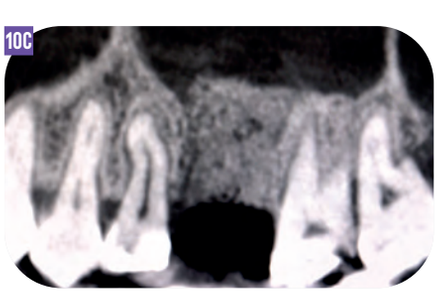


FIGURE 10C: *Postoperative imaging to assess bone density and no extrusion into antrum*

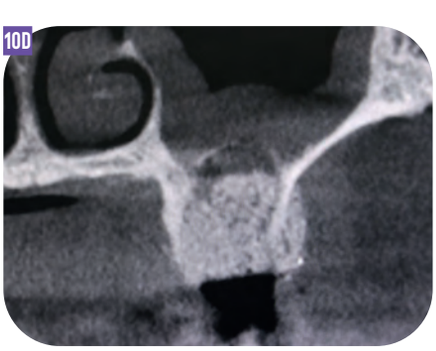


FIGURE 10D: *Postoperative imaging*

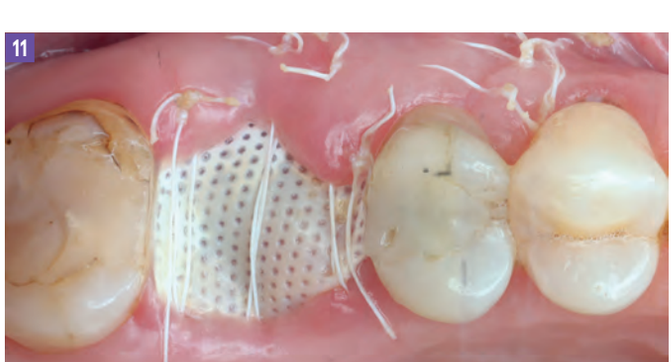
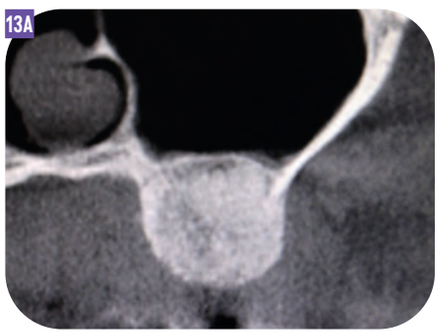
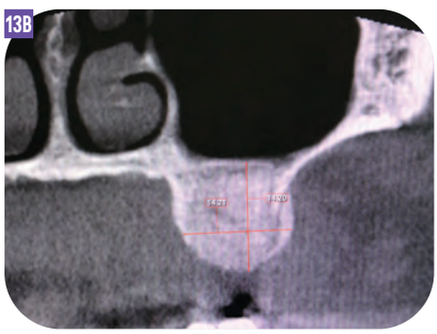


FIGURE 11: *PTFE membrane five-weeks postoperative*

FIGURE 12: *PTFE membrane removed to reveal dense connective tissue*





FIGURES 13A *to* **13C:** *Post healing imaging to show bone remodelling*

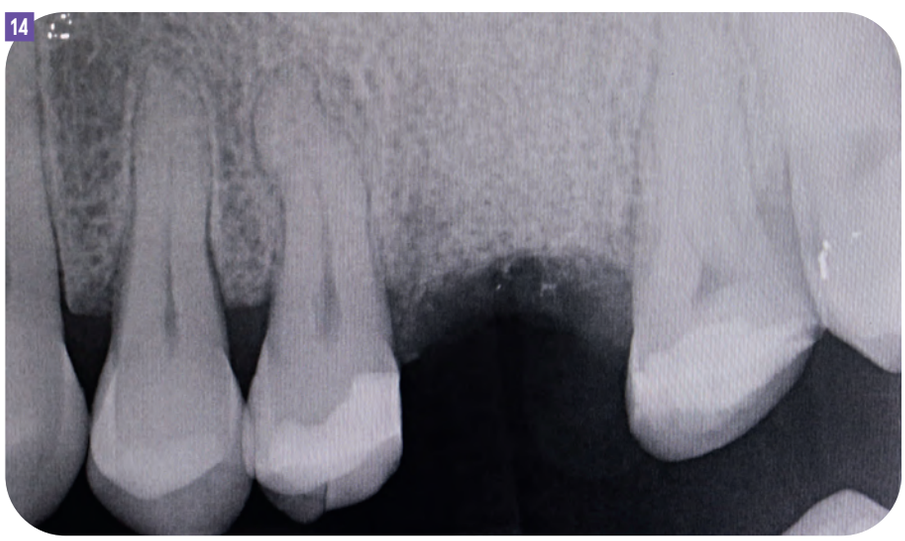


FIGURE 14: *Postoperative CT scan demonstrating healed bone ready for implant placement*

The patient was given postoperative advice, including not brushing the UL4 to UL7 site for two weeks and rinsing with warm salt water during this time.

REVIEW

At the two-week review, the vertical sutures were removed. The sutures securing the PTFE membrane were left in place to ensure stability of the granules for the efficient turnover of bone. The PTFE membrane was also left alone.

The author's protocols recommend the PTFE membrane to remain in place for four weeks in simple cases, five in moderate cases and six in complex situations. For this case, the membrane was left for five weeks (Figure 11). Upon removal, dense connective tissue had formed underneath, ready to keratinise over the following weeks (Figure 12). The buccal soft tissue had also effectively healed over the collagen membrane to ensure no exposure of this or the bone granules.

At the four-month review, a repeat CBCT demonstrated good healing, good bone turnover and relative density, and adequate ridge dimensions (Figure 13). The sinus had healed completely with an intact sinus floor. The site was ready for implant placement if the patient wished to proceed (Figure 14).

REFLECTIONS

This case provides an excellent example of how strict protocols and good products can be utilised to treat significant bony defects. Ridge preservation is an essential skill for clinicians treating compromised sites. For colleagues placing implants in these patients, it is also crucial to have a good understanding of the grafting materials available.

I choose from the Biohorizons Camlog biomaterial portfolio because the Mineross Blend and the Cytoplast Titanium-Reinforced PTFE membrane facilitate the ridge preservation protocols I have developed and deliver consistent results. I have found Mineross Blend, in particular, to be superior to any other products I've used for building bone.

For the best outcomes, it's important to follow the principles of guided bone regeneration (GBR): place the graft material at a site of sound, clean bone; pack it at the right density; and stabilise the bone granules for successful socket preservation. CD

PRODUCTS USED

Mineross Blend, Cytoplast Titanium-Reinforced
Biohorizons Camlog

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AESTHETICDENTISTRY

A conservative and minimally invasive approach can also be applied for veneer preparation. The Galip Gürel technique is a simple yet precise process that requires the removal of less tooth structure, preserving enamel with reliable and predictable results – Manrina Rhode, p19

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DR MANRINA RHODE
BDS
Manrina graduated from Guy's Hospital, London in 2002. She has an interest in aesthetic dentistry and is recognised as one of the top cosmetic dentists in the UK. Manrina sits on the editorial board for *Clinical Dentistry*, has been a judge for the Private Dentistry Awards and Dental Industry Awards and included in the Dentistry Top 50 for the past five years. She is a director of the British Association of Private Dentistry and past director of the British Academy of Cosmetic Dentistry. Manrina runs a cosmetic dentistry teaching academy (www.drmr.co.uk/courses).

ENHANCED CPD

CPD hours: one

GDC development outcome: C

Topic: Aesthetic dentistry

Educational aims and objectives: To present a custom-made, minimally invasive smile transformation using 20 IPS Emax lithium disilicate glass-ceramic veneers. This article qualifies for one hour of enhanced CPD; answer the questions on page 66 or scan the QR code.

Pressed ceramic veneers are the treatment of choice for patients wanting improvement in the shape, size and colour of their teeth. The material offers exceptional strength, resists stains and chipping, and creates restorations that are highly aesthetic and durable.

A conservative and minimally invasive approach can also be applied for veneer preparation. The Galip Gürel technique (Gürel, 2007) is a simple yet precise process that requires the removal of less tooth structure, preserving enamel with reliable and predictable results.

CASE REPORT

A 32-year-old patient presented at DRMR in 2020 for consultation. His main complaint was the aesthetics of his smile (Figure 1), and he was concerned his teeth were letting him down.

He wanted a makeover that would give him larger, brighter, whiter teeth and a more perfect-looking, 'Hollywood' smile (Figure 2).

PATIENT EXAMINATION

A full examination was carried out. Photographs and X-rays were taken.

The orthodontic and functional assessment revealed canine guidance, a class I incisal relationship and a class I molar relationship. The patient's overbite and overjet were normal. His lip seal was intact. The clinical examination showed no temporomandibular joint (TMJ) disorder complaints or symptoms. His masseter muscles were hypertrophic.

The patient had a healthy mouth, teeth and gums with one small filling on his UL6 and a chip on the LR1 (Figure 3).

The patient suffered from bruxism and appeared to be grinding his teeth rather than clenching. Some anterior wear was apparent.

FIGURE 1: *The patient's main complaint was the aesthetics of his smile*

FIGURE 2: *He wanted a smile makeover that would give him larger, brighter, whiter teeth*

FIGURE 3: *The patient had one small filling on his UL6 and a chip on the LR1*

Manrina Rhode presents a case in which she helps a patient achieve his desire for a larger, whiter, more aesthetic smile using 20 IPS Emax lithium disilicate glass-ceramic veneers

Smile transformation with veneers

TREATMENT OPTIONS

There was no requirement for orthodontic treatment as the patient's teeth were already very well aligned. Tooth whitening would not provide the optimal outcome as he wanted a very light shade that could not be achieved by bleaching alone.

His expectations were for minimal ongoing maintenance and a restoration that offered aesthetics and longevity.

The advantages and disadvantages of composite and porcelain veneers were fully explained to the patient. Composite bonding was a potential treatment option. However, due to the need to change the shade of the dentition, every tooth visible when smiling would require bonding, which was a total of 20 teeth.

I am not keen on covering the whole tooth with composite, as the material is more likely to chip and stain. Composite resin will typically last for around five years, whereas I would expect my porcelain restorations to have a lifespan of 20 years, if properly looked after.

Porcelain veneers can deliver a highly aesthetic and durable outcome using minimally invasive preparation techniques. In addition to a lighter shade, the patient wanted longer and wider teeth. This case, therefore, would require minimal preparation as porcelain would be added to the tooth surface.

CASE PLANNING

The patient was assured that his aesthetic concerns could be addressed by placing Ivoclar IPS Emax Press veneers on the teeth, UR1 to UR5, UL1 to UL5, LR1 to LR5 and LL1 to LL5.

I have been using IPS Emax veneers for 22 years and have provided more than 14,000 ceramics. Emax materials have never let me down. I am always confident of a predictable, beautiful, natural-looking result.

It was explained to the patient that he would have to maintain immaculate oral hygiene and wear a nightguard to protect his new restorations.

A hygiene appointment was made for a routine scale and polish prior to commencement of treatment. After visiting the hygienist, botulinum toxin type A was injected into the patient's masseter muscles to relieve the symptoms of bruxism and to prevent strong forces from damaging the new veneers.

Smile set-up

A stick bite and conventional impressions were taken (Figure 4), although nowadays an intraoral scanner would be used as part of my workflow. A full series of photographs were obtained and periapical X-rays taken of every tooth to be prepared. A wax-up was fabricated.

FIGURE 4: *A stick bite and conventional impressions were taken*

FIGURE 5: *Any remaining pencil marks left on the original tooth surface were removed with a diamond preparation bur*

FIGURE 6: *Photographs were taken of the prepared teeth and base shades*

FIGURE 7: *The teeth were spot etched and bonded, rinsed and dried*

FIGURE 8: *Luxatemp bis-acrylic composite shade B1 was selected for the temporary veneers*

FIGURE 9: *At the review appointment, the UR3 to UR5 were lengthened to correct an incisal cant*

FIGURE 10: *IPS Emax Press veneers shade BL2 were selected for the permanent restorations*

FIGURE 11: *Variolink Esthetic neutral shade was used for the adhesive cementation*

FIGURE 12: *The veneers were positioned and spot-cured*

Tooth preparation

To assist with minimal preparations, the Galip Gürel technique was used. Local anaesthetic was administered. A temporary stent was made to replicate the shape and length of the wax-up and to outline the incisal edges. The stent was filled with Luxatemp, a bis-acrylic composite temporary material, and placed into the patient's mouth. Once set, the stent and excess temporary material were removed.

A depth-reduction bur was used at 0.3mm depth to pencil grooves on the teeth to be prepared for the veneers. The temporary material was peeled off and any remaining pencil marks left on the original tooth surface were removed with a diamond preparation bur (Figure 5). This ensured we were only preparing the teeth where necessary.

The incisal guide was used to check clearance on every tooth for placement of a 0.3mm IPS Emax veneer. The prepared teeth were tidied up and supragingival and chamfer margins created. The incisal stent was placed back in the mouth and contacts checked to see if any contact point needed to be opened. The process was repeated on the lower arch.

Tooth shade determination and impression

Photographs were taken of the prepared teeth and base shades (Figure 6). The Ivoclar Ivobase Shade Guide was used to communicate the shade of the prepared teeth to Precision Dental Studio. The laboratory was also informed of the brand of shade guide to ensure accuracy.

An analogue impression was taken using Ivoclar Virtual putty. The vinyl polysiloxane impression material always provides exceptional readability and precision. Two impressions were taken of each set of upper and lower teeth to reduce the risk of air bubbles, drags and voids. A bite registration of the upper and lower prepared teeth was recorded.

Temporary veneer placement

Ivoclar Optragate latex-free lip and cheek retractor was placed for an accessible and manageable treatment field. The teeth were spot-etched and bonded, rinsed and dried (Figure 7).

Luxatemp shade B1 was selected for the temporary veneers (Figure 8). The material was syringed into the stent and gently placed over the patient's teeth until set.

A small amount was placed on a glove so that the setting time could be checked. The excess was carefully cleaned off and the matrix removed.

The procedure was repeated on the lower jaw. Polishing was completed, the bite checked, and margins cleaned.

The patient went home to try out his temporary veneers. The next day, the UR3 to UR5 were lengthened to correct an incisal cant (Figure 9). An alginate impression was taken and sent to the laboratory.

FIGURES 13 *and* **14:** *Superior aesthetics and long-term function were achieved*

FIGURES 15 *and* **16:** *The patient was delighted with his smile transformation*

PERMANENT RESTORATIONS

Two weeks later, the patient returned to have his IPS Emax veneers placed. Shade BL2 had been selected for his permanent restorations using the Ivoclar A-D shade guide with bleach shades (Figure 10).

Five per cent lignocaine was administered as buccal infiltration. The temporary material was removed and a yellow diamond bur run over the surface of the teeth to ensure that no bond remained.

The patient's teeth were cleaned and flossed and his oral health and gums checked. The IPS Emax ceramic veneers were dipped in water, tried-in the mouth and shown to the patient.

Once the patient was happy, each veneer was etched with hydrofluoric acid and washed off. Ivoclar Monobond Plus was applied to the inner surface of the veneers using a microbrush.

The enamel and dentine were etched using 37% phosphoric acid and a primer and bond applied. Ivoclar Variolink Esthetic neutral shade was used for the adhesive cementation of the dental restorations (Figure 11).

The material's consistency makes it easy to use and provides excellent results with a reliable, predictable bond.

Optragate was used to retract the lips evenly and gently, and gauze placed on the tongue. The veneers were positioned and spot-cured (Figure 12). Residual cement was removed and the veneers cleaned and flossed. Each veneer was light-cured.

The restorations were finished with a long yellow diamond bur underneath the gingival margin and a rugby-shaped yellow diamond bur was used at the margins. A serrated strip and yellow metal polishing strip were used to clean between the teeth. The teeth were flossed and the bite checked.

An alginate impression was taken for fabrication of the night guard.

SUPERIOR AESTHETICS

I was pleased with the outcome and, although our bonding process has changed since this case, my workflow, techniques and materials of choice are much the same today.

Along with minimally invasive preparation, we provided the patient with custom-made, superior aesthetics and long-term function (Figures 13 and 14). The patient was delighted with his smile transformation (Figures 15 and 16).

Five years on, he is still enjoying his larger, whiter, 'perfect' smile and will continue to do so over many years.

CASE REFLECTION

Clive Brazier and Manrina Rhode present a case review on page 25 of this issue, in which they explore the minimally invasive debate regarding porcelain versus composite veneers and treatment outcome. CD

SMILE MAKEOVER COURSE

To learn more about Dr Manrina Rhode's smile makeover course, visit www.designingsmiles.co.uk or email academy@drmr.co.uk.

PRODUCTS USED

IPS Emax Press veneers, Ivobase, Virtual putty, Optragate, Monobond Plus, Variolink Esthetic Ivoclar
Luxatemp DMG

REFERENCE

Gürel G (2007) Porcelain laminate veneers: minimal tooth preparation by design. *Dent Clin North Am* 51(2): 419-31

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11:10
minutes to crystallization [5]

References:
[1] Based on global sales figures.
[2] Average biaxial flexural strength, Outcome after more than 10 years of ongoing quality testing, R&D Ivoclar, Schaan.
[3] Hill T, Tysowsky G, AADR/CADR Annual Meeting: 1672, 2016.
[4] The survival rate of monolithic IPS e.max CAD posterior crowns was evaluated with the Kaplan-Meier method. The failure rate refers to technical failures such as fracture and chipping, R&D Ivoclar, Schaan.
[5] Programat CS6, Superspeed crystallization, 11:10 minutes, IPS e.max CAD HT, MT, LT, IPS e.max CAD Crystall./ Glaze Spray or Self Glaze, max. 2 restorations, R&D Ivoclar, Schaan.

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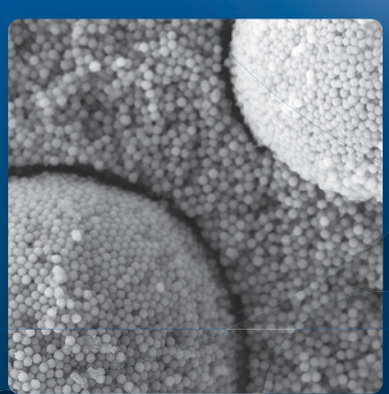

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Smile transformation with veneers: case reflection

Clive Brazier quizzes Manrina Rhode on a case in which she treated a patient with 20 porcelain veneers, and explores the minimally invasive debate of porcelain versus composite

On page 19 of this issue of *Clinical Dentistry*, Manrina Rhode presents a case report in which she helped a patient achieve a larger, whiter, more aesthetic smile using 20 IPS Emax lithium disilicate glass-ceramic veneers.

The following interview between Clive Brazier and Manrina presents a reflection of the case. The pair discuss whether the treatment provided was the best option or if an alternative plan could have given a better outcome.

Clive: For this case, you placed 20 porcelain veneers. Why was this the best option for the patient?
Manrina: It's what the patient wanted. We have to acknowledge that sometimes the patient's choice is the best course of treatment, when provided ethically in the least invasive way possible.

Clive: Looking at the preoperative photographs in the case report (Figure 1), he's got a little bit of spacing and the colour of his canines and premolars are mismatched. Did you consider bleaching and bonding to achieve a satisfactory result?
Manrina: This patient was looking for the perfect smile. He was aware of tiny imperfections, different teeth lengths and embrasure sizes and was seeking to correct these. Whitening wouldn't have given him the even BL2 shade he was looking for. Could this result have been achieved with composite bonding? Yes, but by changing the teeth shade I would have needed to bond every tooth that would be visible when he smiled, so that would be a total of 20 teeth.

FIGURE 1: *Before – the patient wanted a 'perfect' smile*

FIGURE 2: *After – 20 porcelain veneers were placed*

DR CLIVE BRAZIER
BDS
Clive is a GDP at a private practice in Kent. He has worked as a house surgeon in paediatrics and oral surgery for Guy's and St Thomas' NHS Foundation Trust. He graduated from Guy's Hospital, London in 2002.

DR MANRINA RHODE
BDS
After graduating from Guy's Hospital, London in 2002 Manrina has become a top cosmetic dentist in the UK.

Clive: Would you have wanted to do 20 composite veneers?
Manrina: I could, but would they be long lasting? Would they look just as beautiful in 15 years? Would they look as beautiful in five years, or would they start to chip and stain, as we all know can happen with composite. The patient wanted to avoid repeat dental treatment to maintain his smile. He was aware that his oral hygiene would need to be meticulous, and he would need to wear a nightguard but he wanted the work to look great for as long as possible.

Porcelain veneers can be provided minimally invasively, when done correctly. We were really careful to prepare the teeth using the Galip Gürel technique. In this case, we prepared the teeth through his temporaries. The aim was also to make the teeth longer and wider as well as whiter, so they wouldn't require much preparation.

With this additive process, porcelain was applied to the surface. This will, in my view, offer greater longevity than composite.

LIFESPANS AND MAINTENANCE

Clive: You discussed his expectations and that the shade he wanted could not be achieved by bleaching alone, and you explained the treatment could have been completed with composite bonding, but longevity was the issue. Let's now talk about ongoing maintenance and replacement of veneers as opposed to replacement of composite. What are the lifespans of each and what damage are we likely to do to the teeth when we replace each type of restoration?
Manrina: I used to tell my patients that they had to replace their ceramics after 10 years. Materials and techniques have evolved and now I see my patients 10 years on and their ceramics still look great. So nowadays I tell them porcelain veneers will last for around 20 years and composite bonding five years.

When it comes to repair, I would use composite for fractured porcelain or composite bonding. It means you can replace little pieces as and when required.

If it were a case of replacing all the composite veneers or porcelain veneers then the process of removing each would be the same. I would argue it is less invasive to remove porcelain veneers as I make a groove in them and break them off. With composite, I would need to use a drill and it can also be tricky to distinguish composite from enamel.

Clive: So, in other words, there isn't a 'no-prep' option for a long-lasting result?
Manrina: You wouldn't change the whole composite veneer but rather replace portions of bonding as necessary. But for someone with a high aesthetic need that wouldn't work. I have provided a lot of composite veneers on premolars when patients have porcelain veneers at the front and can't afford a full set on the sides. Premolars have a lower aesthetic demand but now the fashion is to have porcelain all over.

In our 22 years of experience, we have seen chipped and stained composite. As much as you polish the restorations and check occlusion, it is still something that happens in the long term. Porcelain is made in a laboratory, fired in an oven to a high polish and is far less likely to stain.

Clive: How many composite veneer fractures are you seeing compared to porcelain fractures?
Manrina: The porcelain veneers have been created to be occlusally stable. The patient in this case can only break them if he does something intentionally, such as using his teeth as a tool, or suffers a trauma. At that stage, I would repair the veneer with composite bonding or recement the fractured portion of porcelain.

Clive: If you are going to replace fractured porcelain with composite then why aren't you using composite in the first place?
Manrina: It is so rare that someone breaks their porcelain veneers. Actions that break teeth, break veneers.

Clive: Was this plan the only ethical option?
Manrina: I do everything I can to minimise the amount of preparation. I don't even recommend opening contacts unless necessary. It certainly wouldn't be ethical if we were drilling teeth for crowns. If a minimally invasive preparation is not possible, the pros and cons of all the options should still be given to the patient. Dentists can also learn to carry out the treatment in a minimally invasive way or refer to a colleague who can.

Clive: Thanks for sharing your reflections on this case, Manrina. I began this interview wondering if the patient could have been treated with a different plan. But actually, this was the most appropriate option for someone who wanted a very white shade of longer, wider teeth, while avoiding continual maintenance. The teeth did not require much preparation, any repairs are likely to be no less invasive than repairs to composite veneers, and the result will stand the test of time for this young man. CD

CASE REPORT
Read Manrina's full smile transformation with veneers case report on page 19 of this issue.

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CAT EDNEY
Informing digital workflows

31

Scanning every patient led to significant changes. Using the Itero intraoral scanner has improved patient communication. Being able to visualise their oral health at the chairside means that patients are more likely to embrace our recommended treatment plans, including orthodontic care – Cat Edney, p31

A WINDOW ON THE WORLD OF DIGITAL DENTAL WORKFLOWS

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1. Data at Align Technology, as of September 30, 2021

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CAT EDNEY
Cat is a multi-award-winning dental therapist with more than 15 years' experience working in specialist and private practice. She has developed a passion for multidisciplinary team working in the dental setting, with a focus on maximising the use of the full dental team to ensure profitability alongside patient care and engagement. She lectures nationally and has developed hands-on dental courses under her training brand The Modern Therapist.

ENHANCED CPD
CPD hours: one
GDC development outcome: C
Topic: Digital dentistry
Educational aims and objectives: To discuss how intraoral scanners can be used to inform digital workflows, create optimal care journeys and enhance practice growth opportunities. This article qualifies for one hour of enhanced CPD; answer the questions on page 66 or scan the QR code.

Recruitment and retention of dentists and other practice team members is a major issue impacting capacity, access and delivery of care. The macroeconomic environment continues to create financial pressure on dental practices. We need to continuously look for ways to adapt operational models, streamline staff training, and improve patient communication for long term practice stability.

During the first 10 years of my career as a dental therapist, I experienced a significant increase in frustration levels due to these challenges. A typical day involved seeing up to 20 patients in 30-minute appointment slots, with no supporting dental nurse. This meant minimal time to communicate effectively, including educating patients on how to improve their oral health.

It was a truly disheartening situation; I knew these patients would likely return in six months with the same issues. And I knew that improved collaboration with other clinical team members could help, particularly while the patient was still at the practice. But it felt like we were in a vicious circle.

DRIVING CHANGE

Dental therapists play a special role at the heart of dental teams, a role that is often misunderstood and underutilised. In fact, guidance from NHS England (2023) on potential business models for NHS general dental practices referred to research and practice-based evidence about the clinical effectiveness, safety, and acceptability of using dental therapists and dental hygienists to provide preventive and diagnostic care to patients, alongside performing a

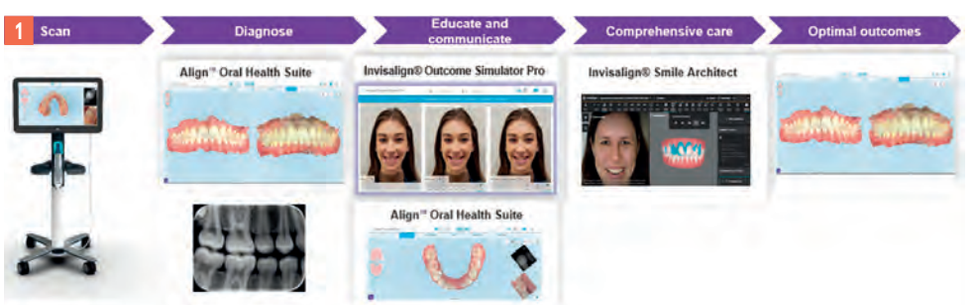

FIGURE 1: *The scan as an essential tool for aiding diagnosis, communication and education*

FIGURE 2: *The Align Oral Health Suite showing the patient's scan in the centre and the oral health conditions around it*

FIGURE 3: *The Align Oral Health interface for Tooth Health condition shows the 3D model, the Itero NIRI technology view and the integrated intraoral camera view*

Cat Edney explains how intraoral scanners can be used to inform digital workflows, optimise care and enhance practice growth opportunities

Informing digital workflows

range of treatments to both adults and children. They were told by practice owners that working with dental therapists is economical, increases patient access, and promotes efficient division of labour across the dental team.

With that understanding, I had the opportunity to attend an Align Technology practice training event that changed my perspective even further.

During the session, I was impressed by the Itero scanner and its patient education capabilities. Using these digital features meant that I could show my patients the issues I could personally see inside their mouth.

At that point, the Itero scanner was not being used by dental therapists. I identified an opportunity to try using the Itero scanner to understand the impact on a few patients.

The first time I used the scanner was with a gentleman who had a broken amalgam on the upper right second molar, something recorded on his treatment plan for several years but that he had chosen not to address. It was asymptomatic; however, when I showed it to him on the scan, his reaction was: 'Get that out of my mouth'. This was a pivotal moment for me. I understood the benefit of scanning everyone who would come into our practice, including patients who had never been scanned before, but who I had treated for many years.

BRINGING DIGITAL TO A NEW PRACTICE

Since then, I have moved to a dental therapist role in London's financial district where I have introduced a therapist-led model that has significantly improved patient care. I introduced a protocol that involves scanning every patient at every appointment. I now see up to eight patients daily, a mix of both new and existing.

The Itero scanner is in constant use, helping to empower our patients to visualise and understand potential issues and to make informed decisions about their oral health. In turn, this has driven treatment acceptance and enhanced the quality of care we provide.

This therapist-led model is highly collaborative and involves multiple team members. My responsibility is to stabilise patients and refer them to the hygienist to address their periodontal needs. Dentists are responsible for treatments such as occlusion, tooth movement and indirect restorative procedures. I ensure treatments are completed as planned (Figure 1).

The result? We increased the number of scans by 167% within six months. Scanning every patient led to significant changes. Using the Itero intraoral scanner has improved patient communication. Being able to visualise their oral health at the chairside means that patients are more likely to embrace our recommended treatment plans, including orthodontic care.

FIGURES 4A *to* **4D:** *Sequence of the new patient exam with a young child using the Itero scanner and the Align Oral Health Suite to help diagnose, communicate, and educate the patient and his mother, and build a treatment plan*

Our analysis reveals that patients who have not been scanned have an average treatment value of £978, while scanned patients have a treatment value of £2,387 – a 145% increase in revenue. This increase is a testament to the improved quality of care and outcomes achieved when utilising the right tools to communicate treatment plans. In turn, this has led to the prevention of discomfort, fewer emergency visits and enhanced quality of life for our patients.

OPTIMISING SCANNER TOOLS

During a patient consultation, I discuss their dental needs and concerns. This is followed with an Itero scan, to help better understand their oral health, including diagnosing any issues or identifying changes they would like to make. I encourage my patients to watch the screen during the scan. They are often amazed by the quality of the images, and this helps to prompt wider discussion.

After also capturing extraoral photographs, we review the scan together using the Align Oral Health Suite (Figure 2).

The Align Oral Health Suite has a selection of tools available to highlight findings, while the Itero Near Infra-Red Imaging (NIRI) technology (Figure 3) helps us identify potential interproximal carious lesions, which we then confirm with bitewing radiographs.

We also closely examine stone model views of the scan (rather than full colour) to assess tooth wear, erosion and recession areas – and the implications of not going ahead with treatment.

I analyse the results to create a treatment plan while the dental nurse uses the Invisalign Outcome Simulator Pro for in-face visualisation.

Throughout the consultation, we avoid using technical dental language and take advantage of the scanner's visualisations to explain each finding.

FAVOURITE FEATURES

Itero Near-Infra Red Imaging (NIRI) is my favourite feature of the Itero scanner. It supports me when assessing interproximal lesions and is especially helpful when treating young children or those that cannot tolerate bite wing radiographs.

NIRI's non-ionising radiation also allows us to scan patients more often, based on their risk of dental caries. Being able to view scans from multiple angles helps us to determine if lesions are present when you have bitewings with overlapping surfaces. This is not possible with radiographs.

In addition, for patients presenting interproximal carious lesions, I can effectively treat them with resin infiltrations. We scan the patient post-treatment to determine the success of the restoration, which is impossible to determine with radiographs. Generally, I treat these lesions per quadrant, and then rescan and show the before and after images with the Align Oral Health Suite. I can justify this less invasive treatment because it is cost-effective for the clinic and less invasive for the patients.

TRANSFORMING WORKFLOWS

In my opinion, Itero scanners can completely transform workflows, streamline processes and improve practice performance. By empowering staff, it creates stronger loyalty and offers career development opportunities to dental therapists and hygienists.

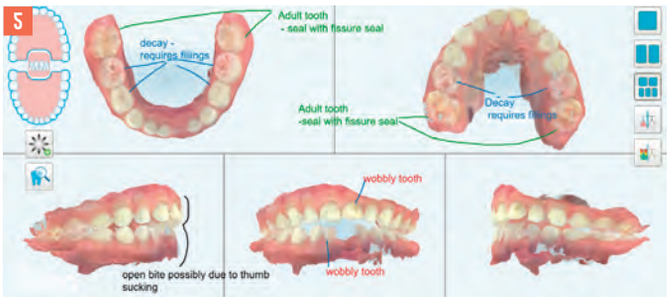

FIGURE 5: *The Itero scan report with annotations and markings of the clinical findings discussed during the consult*

FIGURES 6A *and* **6B:** *Bitewing radiograph and preparations and final restorations on deciduous molars during the restorative phase*

By creating personalised visualisations to aid discussions in the dental chair, helping to prevent, diagnose, and treat oral health conditions, scanners provide patients with valuable information to make informed decisions about accepting comprehensive dental care.

CLINICAL CASE STUDY

A six-year-old male patient presented to my clinic. His mother requested a second opinion after noticing dark areas on his teeth, something for which his previous dentist had only applied fluoride.

Before scanning, I explained what a scan was and handed him a wand tip so that he could feel its soft texture and flexibility.

I showed him a scan and invited him to touch the screen and spin the 3D model around. I promised he could do the same with his own scan (Figures 4a to 4d).

Clinical findings

I detected carious lesions in all lower deciduous molars and the upper second deciduous molars. I recommended sealants in the upper and lower primary permanent molars to prevent future decay. The upper left central incisor and lower right central incisor were loose, and the lower left deciduous central incisor had recently exfoliated. This patient also presented an anterior open bite due to thumb sucking, which will be closely monitored to prevent further issues (Figures 5 and 6).

The mother accepted all recommended treatments, stating: 'Bringing my son to have this examination was a world away from the dentistry we have experienced in the past. He was included in every discussion, and it was clear that he learned a lot on the day. Every child (and every adult!) should have an experience like that.' CD

REFERENCE

NHS England (2023) *Building dental teams: Supporting the use of skill mix in NHS general dental practice – long guidance.* Available at: https://www.england.nhs.uk/long-read/building-dental-teams-supporting-the-use-of-skill-mix-in-nhs-general-dental-practice-long-guidance/#summary-and-next-steps

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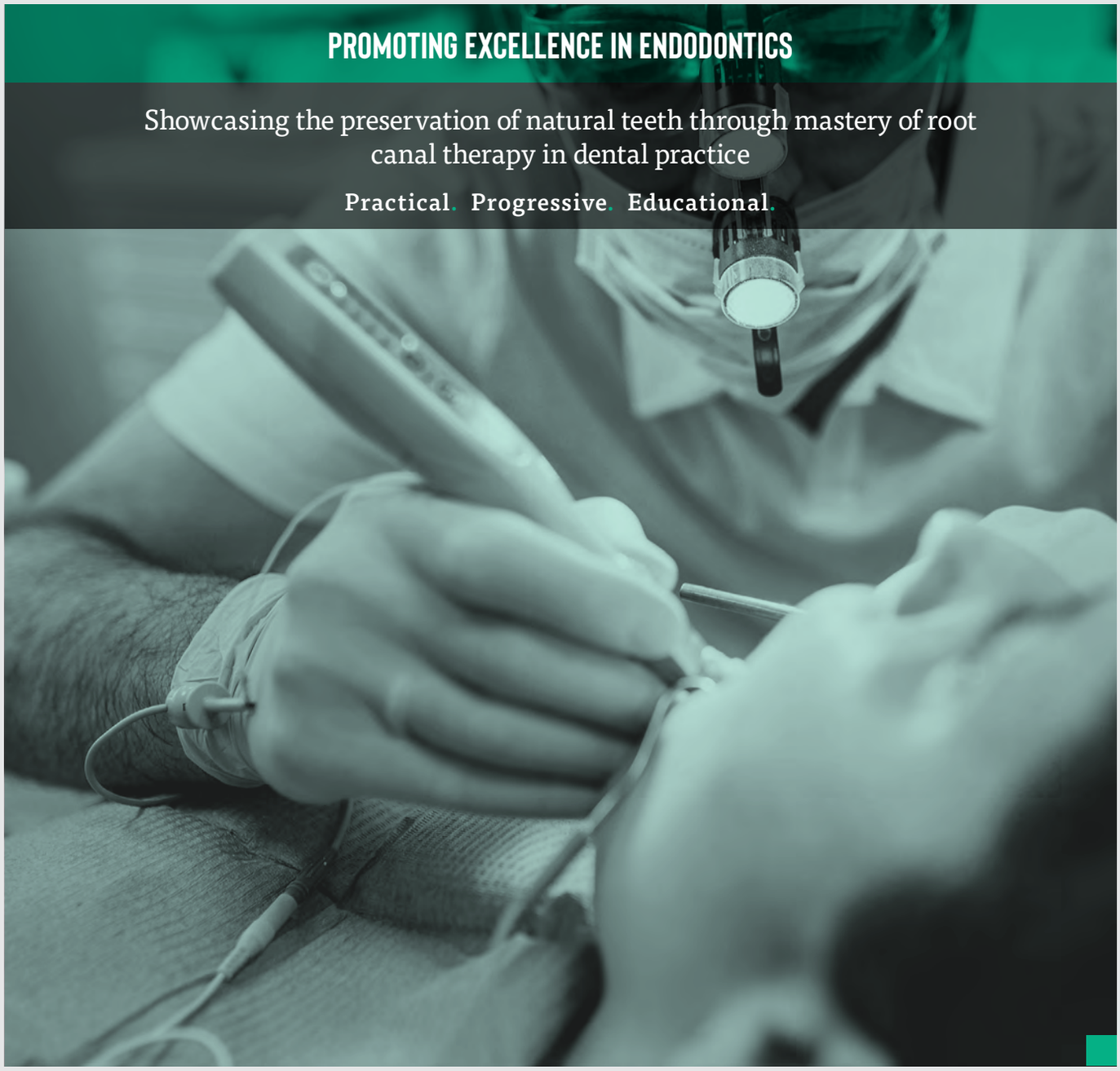
ENDODONTICS

AYMAN AL SIBASSI
Managing broken files in endodontics

38

Research indicates that clinical outcomes are equivalent whether a file is bypassed or removed, provided effective chemo-mechanical debridement can be achieved within 2mm of the apex. This objective is central to decision-making – Ayman Al Sibassi, p38



DR AYMAN AL SIBASSI
Ayman graduated with a BDS (Hon) from King's College London. He has successfully completed clinical specialist training and achieved a distinguished Membership in Endodontics (M Endo) with the Royal College of Surgeons of Edinburgh and is currently pursuing a doctorate in endodontics at the University of Liverpool. He practises at Olive Tree Dental in Reading.

ENHANCED CPD
CPD hours: one
GDC development outcome: C
Topic: Endodontics
Educational aims and objectives: To discuss management options for handling a separated instrument in endodontics. This article qualifies for one hour of enhanced CPD; answer the questions on page 66 or scan the QR code.

Encountering a separated file is a challenge that clinicians will potentially face when performing endodontic treatment. There are several potential strategies for navigating such a situation, including removal, bypass, leaving the fragment in situ, or surgical interventions such as extraction, apicectomy, root resection, hemi section, or intentional replantation.

Research indicates that clinical outcomes are equivalent whether a file is bypassed or removed, provided effective chemo-mechanical debridement can be achieved within 2mm of the apex. This objective is central to decision-making.

The appropriate management approach should be determined based on a thorough assessment of the factors presented in this article.

FACTORS INFLUENCING MANAGEMENT DECISIONS

Tooth-specific considerations

Effectiveness of chemo-mechanical debridement:

- If the fragment separates toward the end of chemo-mechanical debridement, when the canal is already at its cleanest, the inability to remove the fragment is unlikely to significantly impact treatment outcomes.

Presence of a periapical (PA) lesion or vitality of the tooth:

- Teeth that were previously vital and lacked a PA lesion are likely to have minimal bacterial load apical to the fragment. In such cases, leaving the fragment in situ may be a viable option with minimal effect on prognosis.

Tooth anatomy:

- Canal morphology should be carefully assessed, potentially with the aid of cone beam computed tomography (CBCT). For instance, if two canals merge and one contains the separated instrument, chemo-mechanical debridement might still be achievable through the second canal, mitigating the need for file removal.

Risk of structural damage:

- Attempts to remove the fragment must account for the potential weakening of the tooth structure, which could increase the risk of root fractures or iatrogenic perforations.

Location of the separated file fragment:

- Fragments located beyond a canal curvature or in the apical region are typically challenging, if not impossible, to retrieve. These situations often favour bypassing the fragment to minimise the risk of iatrogenic complications.

FIGURE 1: *Broken endodontic file; a common complication that can occur during root canal treatment*

Ayman Al Sibassi presents management options for handling a separated instrument in endodontic treatment

Managing broken files in endodontics

Characteristics of the fragment

Length:

- Longer fragments are generally more difficult to bypass, increasing the likelihood that removal may be necessary.

Material composition:

- Stainless steel instruments (eg hand files) are less prone to shattering when subjected to ultrasonic energy compared to nickel titanium instruments. Nickel titanium fragments are more fragile and may further fragment during retrieval attempts.

Axial cross-section:

- Smaller file diameters and fewer contact points with the canal walls facilitate easier bypassing or removal due to the increased space around the file fragment.

TECHNICAL STEPS FOR FILE MANAGEMENT

Steps to bypass a separated file

- Coronal flaring of the canal is necessary to create adequate access
- Irrigation with EDTA (17%) can help demineralise dentine and create space around the fragment
- Small, stiff hand files with non-cutting tips (eg C-pilot files in sizes 6, 8, or 10) should be pre-bent apically and manipulated with a '90-degree and pull' motion to feel for engagement in space around the file
- Periapical radiographs are recommended once the fragment is bypassed – even before patency is achieved – to track the progress of the bypass attempt and to confirm no canal transportations have occurred
- Once patency and working length are established, standard canal preparation can resume, progressing sequentially with larger files.

Steps to remove a separated file

- Visualisation with a direct operating microscope (DOM) is essential for successful retrieval
- Long, fine ultrasonic tips operated at low-energy settings are required
- Loop systems may be beneficial for longer fragments embedded in the canal walls
- The canal should be flooded with irrigant
- Coronal flaring should be performed before using ultrasonic tips to create space coronal to the file
- Dentine removal should be carried out with ultrasonic tips on the inside wall of the canal, adjacent to the file fragment to prevent the file (especially nickel titanium files) flicking into the space created due to their property of shape memory
- Ultrasonic energy applied in an anticlockwise direction may dislodge the fragment ('jumping' it out)
- Precautions should be taken to prevent the fragment from migrating into other canals by covering these with PTFE or cotton pellets.

ALTERNATIVE INTERVENTIONS

In cases where neither bypass nor removal is feasible and a periapical lesion is present, alternative surgical options may be considered. These include extraction, apicectomy, root resection, hemi section, or intentional replantation.

Each option should be evaluated in the context of the tooth's prognosis and the patient's overall treatment plan. CD

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September: MSc Course Induction. Remote.

Sat. 11th Oct.: Treatment planning and case selection. Face to face contact day with hands-on workshops.

Sat. 1st Nov.: Basic sciences for Implant dentistry. End of Module Assessment. Pre-recorded lectures; live webinar discussions.

Sat. 15th Nov.: Implant Design. Pre-recorded lectures; live webinar discussions. End of Module Assessment.

Sat. 6th Dec.: Surgical skills for Implant dentistry. Face to face contact day with hands-on workshops.

Sat. 10th Jan.: Occlusion. Pre-recorded lectures; live webinar discussions. End of Module Assessment.

Sat. 24th Feb.: Restoring Implants. Pre-recorded lectures; face to face contact day with hands-on workshops.

Sat. 14th Mar.: Digital Workflow in Implant Dentistry. Pre-recorded lectures; face to face contact day with hands-on workshops.

Sat. 11th Apr.: Bone Defects. Pre-recorded lectures; live webinar discussions. End of module assessment.

Sat. 25th Apr.: Complications and their management & revision. Pre-recorded lectures; live webinar discussions. End of Module Assessment.

27th Apr. - 4th May: Formative Written Exam. Online using Maxinity.

Sat. 16th May: Cadaver course. Face to face contact day with hands-on surgical skills workshops. West Midlands Surgical Training Centre Coventry.

24th May: Case Report Presentations covering case selection & treatment planning – each delegate to present one case.

2nd - 3rd June: End of Year Exam. Written Exam and Unseen Case oral presentation.

CBCT Masterclass: 2 days, consecutive to be completed before Feb. 28th 2025. Choose from a selection of dates.

Module DX4017 Utilising the evidence base – completed online

Module DX4016 End of year Assessment

Complete 5 Clinical days - supervised clinical practice
You will assess and plan appropriate treatment for patients. Includes: case assessment and treatment planning, including use of radiographic stents and CBCT.

Module DX4026 Clinical Implantology Year 2

Complete 10 Clinical days - supervised clinical practice. Includes: case consultation, implant placement, GBR procedures, restoration, follow up.

Module DX4027 Research Strategy. Prepare and submit a 8,000-word clinically orientated research project, which may take the form of a mini systematic review.

Final examinations.

PLEASE NOTE that all webinars are preceded by recorded lectures and long questions for discussion.

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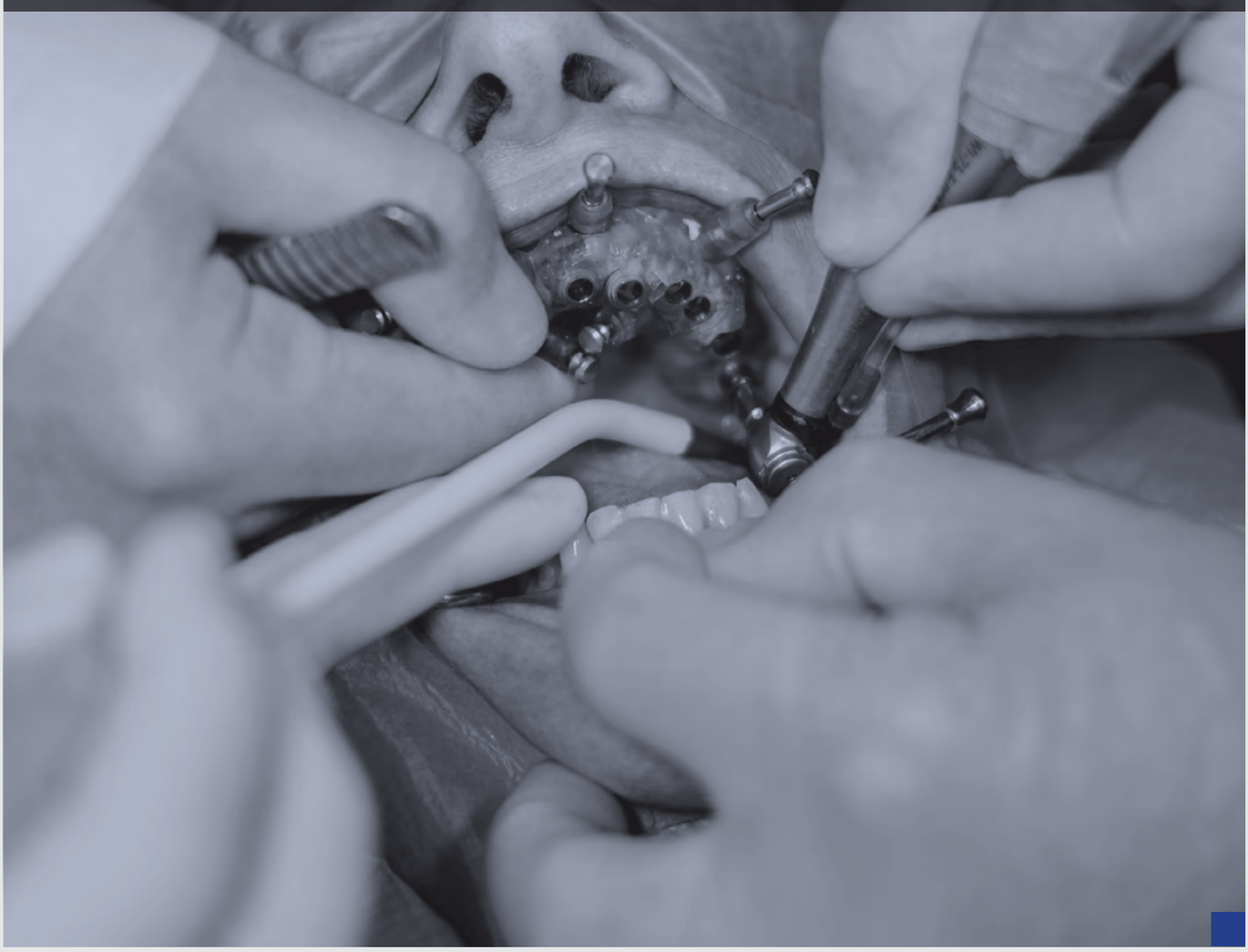
IMPLANTDENTISTRY

SELVARAJ BALAJI
Treating vertical and horizontal bone loss

43

A CT scan demonstrated significant horizontal and vertical bone loss in the area, putting the alveolar crest very close to the dental foramen and alveolar nerve. This did not mean that dental implants were not possible, but additional considerations would be required – Selvaraj Balaji, p43



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DR SELVARAJ BALAJI
BDS MFDS RCPS(GLA) MFD SRCS(ED) LDS RCS(ENG)
After obtaining his BDS, Selvaraj worked in maxillofacial units in the UK for several years and gained substantial experience in surgical dentistry. He is the principal dentist of The Gallery Dental Group, which is made up of Meadow Walk Dental Practice and The Gallery Dental & Implant Centre. Selvaraj is the founder of the Academy of Soft and Hard Tissue Augmentation (ASHA) and runs courses, lectures and study clubs for aspiring implant dentists.

A female patient in her 70s attended the practice in 2019 in substantial dental pain. She also had a loose LL6 tooth and was missing her LL7 and LL8. An initial assessment was conducted, revealing a hopeless prognosis for the LL6, which was extracted as part of the emergency appointment.

The patient was keen to continue her dental journey by restoring the gaps in her dentition, so we scheduled for her to return three months later for a comprehensive evaluation of the restorative options available.

TREATMENT EVALUATION AND PLAN

A CT scan demonstrated significant horizontal and vertical bone loss in the area, putting the alveolar crest very close to the dental foramen and alveolar nerve. This did not mean that dental implants were not possible, but additional considerations would be required. For example, with only 3mm of bone, short implants were not an option. This left us a choice between implant placement with nerve lateralisation in order to create sufficient space for restoration, or implant placement alongside vertical bone augmentation with a block graft or particulate bone and a PTFE membrane.

All these treatment options were discussed in full with the patient, as were no treatment and dentures as other possibilities. She expressed a preference for an implant with bone augmentation so that she may enjoy the benefits of a long-term fixed restorative solution.

A full suite of clinical photographs, radiographs and a CT were taken to inform the treatment plan. These were used to digitally plan where bone grafting would be most important, as well as the final position, angle and depth of implant needed to facilitate stable, functional and aesthetic restorations.

The plan also incorporated a soft tissue graft, which would be performed after bone augmentation and implant placement following a staged approach for the best result in this case.

The advantages, limitations and risks of each procedure involved were outlined and the importance of oral hygiene emphasised before the patient gave fully informed consent to proceed.

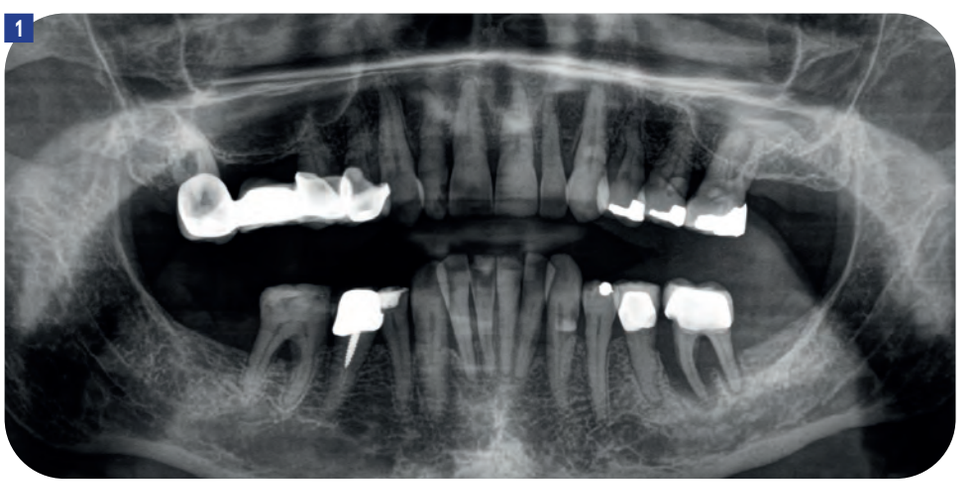

FIGURE 1: *Presenting situation radiograph showing loss of vertical and horizontal bone height*

ENHANCED CPD
CPD hours: one
GDC development outcome: C
Topic: Implant dentistry
Educational aims and objectives: To present a complex implant placement case that involved treating vertical and horizontal bone loss. This article qualifies for one hour of enhanced CPD; answer the questions on page 66 or scan the QR code.

Selvaraj Balaji presents a complex case of implant placement achieved with predictable hard and soft tissue augmentation techniques

Treating vertical and horizontal bone loss

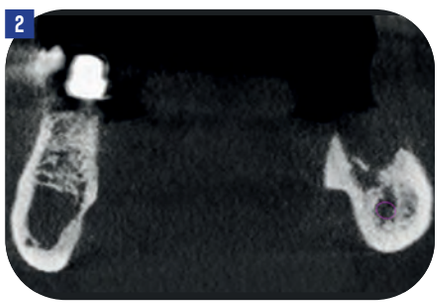

FIGURE 2: *Close proximity of alveolar nerve*

FIGURE 3: *Preoperative treatment site*

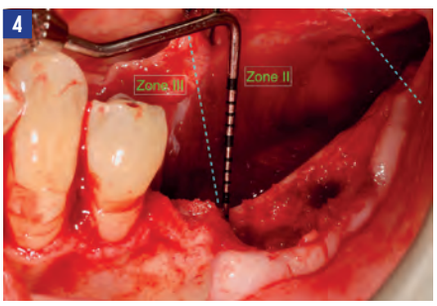

FIGURE 4: *Three sections identified along lingual flap*

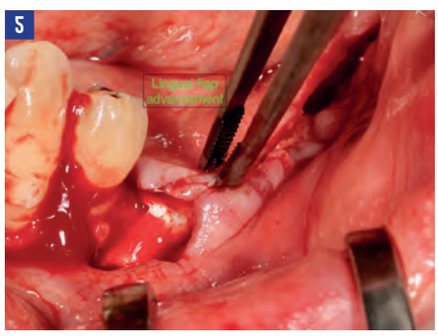

FIGURE 5: *Lingual flap advancement*

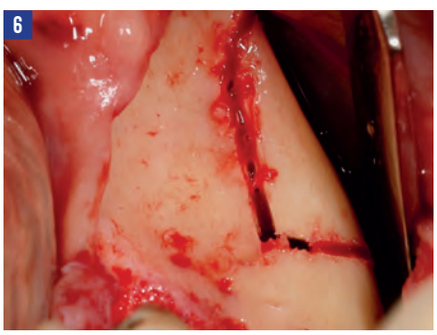

FIGURE 6: *Autogenous bone harvested*

FIGURE 7: *Harvested bone particulated*

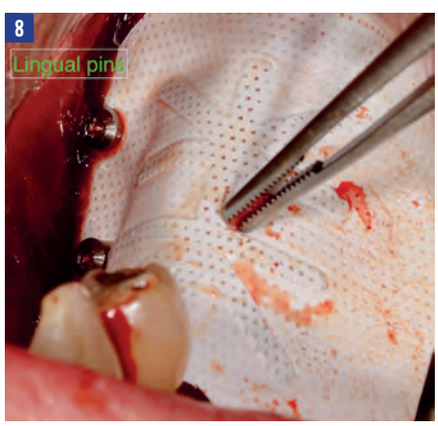

FIGURE 8: *PTFE membrane placed and secured with lingual master pins*

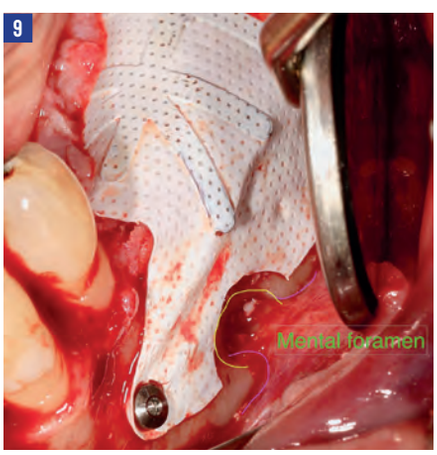

FIGURE 9: *PTFE membrane secured*

FIGURE 10: *Buccal flap advancement*

A STAGED TREATMENT APPROACH

On the day of surgery, a safety flap was raised and extended two teeth away from the defect mesially. One crestal incision was made in the keratinised mucosa and one oblique incision made towards the coronoid process.

I used a modified lingual flap technique that is divided into three different zones and steps; the first is the retro molar region, the second the high mylohyoid muscle attachment area, and the third is low mylohyoid muscle attachment area. By working in three separate regions, this allowed the use of three different techniques to advance the lingual flap without damaging the vital structures behind, including the lingual nerve and submandibular glands.

Once the buccal and lingual flaps were raised, autogenous bone was harvested from the ramus of the mandible using a Piezomed instrument and a Safescraper. The harvested bone was particulated using a bone mill. The bone graft was prepared with 60% autogenous bone and 40% xenograft.

A PTFE membrane was selected, shaped and secured into place with master pins inserted lingually first. The graft was loaded into the defect, with the membrane folded buccally and secured with further master pins. The buccal and lingual flaps were checked for passive closure, and it was decided to further release the buccal flap by using a mucoperio elastic technique. The soft tissue was then closed with PTFE sutures, ensuring the connective tissue met connective tissue. The patient was given standard postoperative oral hygiene and dietary instructions at the end of the appointment.

FOLLOW-UP APPOINTMENTS

Approximately eight months later, the PTFE membrane was removed and two implants (4.2mm x 9mm) were placed in the pre-planned positions, angles and depths.

A further two months after this, the patient returned for a soft tissue graft designed to increase the amount of keratinised tissue around the implants. The strip graft technique was performed, using a free gingival graft tissue that was harvested from the palate.

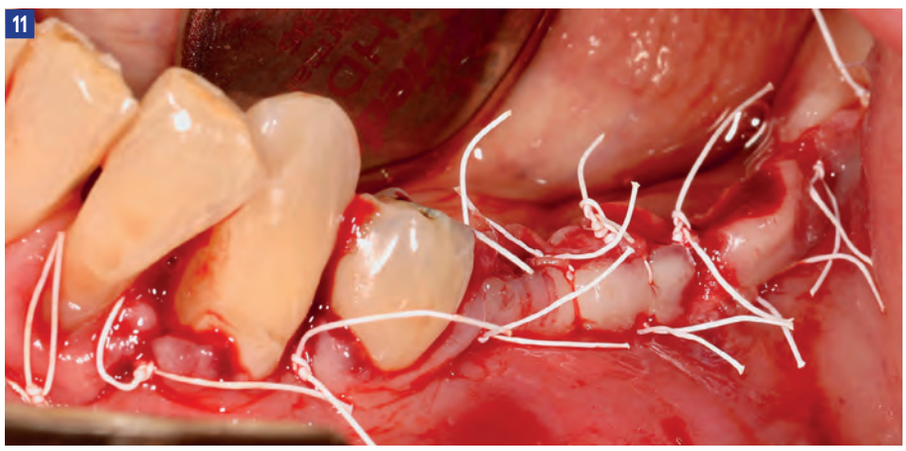

FIGURE 11: *Flap closed with PTFE sutures tension-free*

FIGURE 12: *Post bone augmentation*

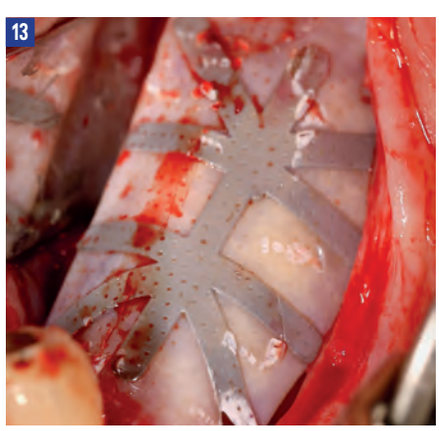

FIGURE 13: *PTFE membrane exposed and removed*

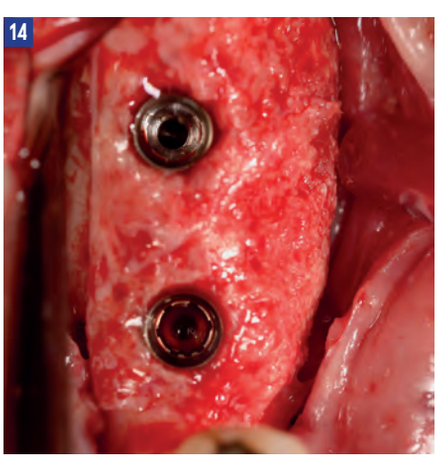

FIGURE 14: *Two implants placed*

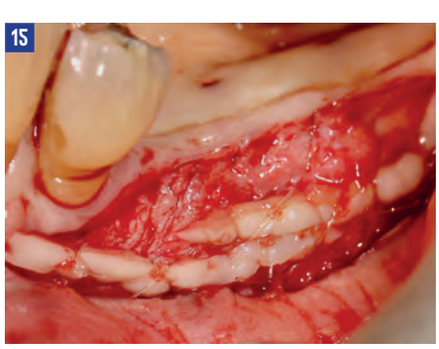

FIGURE 15: *Free gingival graft tissue placed using a strip graft technique*

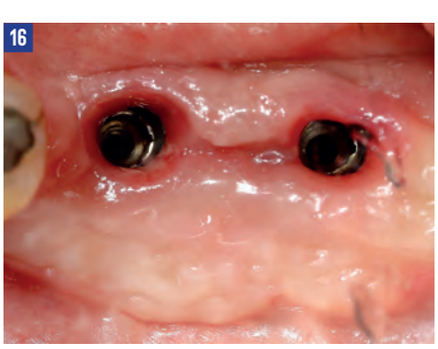

FIGURE 16: *Implants exposed after healing for three months*

FIGURE 17: *Implants restored*

FIGURE 18: *Post-treatment radiograph*

At the recipient site, a split thickness flap was raised and apically repositioned. The graft material was placed on top of the periosteum and left to mature for three months.

At this point, treatment was concluded with the restoration phase. The implants were exposed, impression copings placed and a new impression taken for the fabrication of the implant-retained crowns. These were fabricated and loaded.

DISCUSSION

Treatment options were restricted in this case due to the lack of bone available. The size of the defect ruled out short implants immediately. Doing nerve lateralisation is also a high-risk procedure, so is often not the first choice for patients. In addition, the crown would be too long compared to the neighbouring crown, so cleaning and maintaining the implant in the long-term can be difficult for the patient following this approach.

The methods used instead were selected because they provided more predictable results. The modified lingual flap techniques also allowed us to advance the lingual flap enough to cover the graft for tension-free closure. This is essential for the soft tissue health, as well as the function and aesthetics of the implant in the long-term. The five-year follow-up of this particular case demonstrates the stability of the results achieved. CD

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COURSE PROGRAMME

Day one – from 9.00 am to 6.00 pm:

- Explanation of the importance of a minimally invasive preparation
- Step-by-step demonstration of the five tooth preparation phases to produce zirconia crowns which each participant will re-apply on their own models.

Day two – from 9.00 am to 6.00 pm:

- Finalisation of the preparations
- Digital scanning of the final models with the new Detection Eye intraoral scanner
- Verifying the accuracy of the preparations in the software
- Introduction to the cementation technique and demonstration
- Crown cementation on the prepared models.

The next edition of the course will be held on 10-11 July 2025 by a qualified dentist and allows a maximum of six participants. It takes place at Zirkonzahn Klinik DeMedici, one of Zirkonzahn's nine training centres located in South Tyrol (Italy), which was designed to host events focusing on interdisciplinary collaboration between clinics and laboratories. CD

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The Hall Technique is quicker to carry out and cheaper than alternative solutions when return appointments for failure are considered with more predictable and better long-term outcomes than fillings; outcomes have been found to be equivalent to conventional crowns in randomised control trials – Nicola Innes and Shannu Bhatia, p51

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PROF. NICOLA INNES
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Shannu is the lead for paediatric dentistry, a clinical reader and honorary consultant in paediatric dentistry at Cardiff University. She has a master's in both medical education and in clinical dentistry. She chairs the community of practice of wellbeing and resilience at the Association of Dental Education in Europe. She is president of British Society of Paediatric Dentistry.

ENHANCED CPD

CPD hours: one

GDC development outcome: C

Topic: Oral Health

Educational aims and objectives:
To discuss the Hall Technique – a method for restoring carious primary molar teeth with preformed metal (also known as stainless steel) crowns. This article qualifies for one hour of enhanced CPD; answer the questions on page 66 or scan the QR code.

The Hall Technique is a method for restoring carious primary molar teeth with preformed metal (also known as stainless steel) crowns. No local anaesthesia is placed, no carious tooth tissue is removed, and no tooth removal is carried out before placing the crown. The carious lesion is simply sealed into the tooth and it stops progressing, as the bacteria in the biofilm have no access to sugar, oxygen and the conditions become unfavourable for the bacteria to survive.

The technique is preferred by children, parents, and clinicians to traditional 'drill and fill' methods. The Hall Technique is quicker to carry out and cheaper than alternative solutions when return appointments for failure are considered with more predictable and better long-term outcomes than fillings; outcomes have been found to be equivalent to conventional crowns in randomised control trials.

BACKGROUND

Managing caries in children's primary molars is complicated by the small size of children and their mouths, their early stage of cognitive development and the accompanying parent/carers. In addition, the restorative options we used to have were difficult to apply and had notoriously poor outcomes. As a result, many dentists gave up trying to restore primary teeth.

More recently, there has been a revolution in our understanding of dental caries – in that it does not need to be cut out like gangrene. This has led to successful use of techniques to seal caries into teeth and arrest the disease, avoiding pulpal complications (pain and infection) before the teeth exfoliate.

There are numerous laboratory studies that have shown significant changes in the bacterial composition of carious lesions after they have been sealed. There are fewer bacteria, the species are less cariogenic, less diverse, and they show reduced viability.

The findings from clinical studies back this up, showing that the success rates for sealing in carious lesions are comparable to traditional restorative approaches where the previous standard of complete caries removal was used (Schwendicke et al, 2021).

Specifically in primary molar teeth though, the most successful technique is the Hall Technique where preformed crowns are used to achieve a highly predictable seal over a tooth.

There are more than 15 randomised control trials and numerous clinical studies consistently finding the Hall Technique to outperform restorations and have outcomes as good as conventional crowns (Tedesco et al, 2024).

The advantage of the Hall Technique is that there is no need to place local anaesthesia, prepare the tooth or remove caries.

There are two disadvantages of the Hall Technique. The first is the appearance of the crown, as some parents do not like the steel colour and the perceived non-aesthetic appearance. It is therefore important to explain the benefits of placing the crowns before obtaining consent. Unfortunately, none of the currently available aesthetic primary tooth crowns have materials with similar properties to the metallic ones and therefore cannot be fitted without tooth preparation.

In our experience, children seem to find the colour very acceptable and are often proud to show their 'tooth helmet' or 'princess crown' to their peers.

The second disadvantage is that fitting the crowns without tooth preparation creates a premature contact and means that the occlusion is propped open following the crown fit. Studies have shown no detriment to the child's TMJ (Nair et al, 2020), in the short or longer term and evidence from several clinical trials has consistently found that the occlusion returns to its pre-crown balance over a period of around four weeks with the re-establishment coming from a combination of intrusion of the crowned tooth, less so for the opposing teeth, and to a lesser extent through compensation by other teeth (Nair et al, 2020). The technique is now used across the world, included in all international guidelines and taught in all dental schools in the UK.

Nicola Innes and Shannu Bhatia discuss the Hall Technique, a method for restoring carious primary molar teeth with preformed stainless steel crowns

The Hall Technique

TECHNIQUE

To place a Hall Technique crown, some preparation is needed ahead of the fitting appointment.

Figure 1 illustrates the equipment to have ready on bracket table, which includes:

- Mirror
- Probe or spoon excavator – to remove separators if these have been placed
- Large spoon excavator – to remove the crown if it doesn't seat evenly over the tooth or if the wrong size of crown is placed
- Flat plastic – to fill crown with cement
- Cotton wool rolls – to wipe away cement and for the child to bite down on to push crown on tooth
- Gauze or sticky stick/Elastoplast tape to protect the airway
- Dental floss – to remove cement from contacts
- Callipers or graded periodontal probe to measure tooth (not needed as experience in sizing the crowns is gained).

Figure 2 shows the equipment to have on the working side for the dental nurse:

- Box of crowns with varying sizes
- Clean tweezers – to lift crowns from box
- Glass ionomer cement (can be hand mixed or encapsulated).

Ahead of the crown fitting appointment, prepare the child by showing them the crown and let them handle one. Children often call them their princess crown/spaceman helmet or Iron Man/Supergirl tooth.

If the contacts between the adjacent teeth are very tight, consider using separators (Figure 3). These can be placed using dental floss or orthodontic tools. They usually need to be left in place only for a few days (three to five) to create enough space mesially and/or distally to allow the crown to be placed.

At the crown fitting appointment, the following six-step technique for placing a Hall Technique crown is recommended:

1. Protect the airway using a gauze swab or a sticky stick or tape on the crown and choose the size of crown by measuring the tooth using callipers or a periodontal probe
2. Mix glass ionomer cement (either hand-mix to the consistency of a luting cement) or encapsulated and fill the crown with it (Figure 4)
3. Locate the crown over the tooth, seat it evenly until it engages the contact points (Figure 5) and get the child to bite it into place or push it into place using a cotton roll (Figure 6)
4. Check the crown has been pushed down evenly over the tooth and if not, remove it while the cement is still not set using a

FIGURE 1: *Equipment on bracket table ready for placement of a Hall crown*

FIGURE 2: *Equipment on dental nurse working side*

FIGURE 3: *Separator placed between mandibular primary molars*

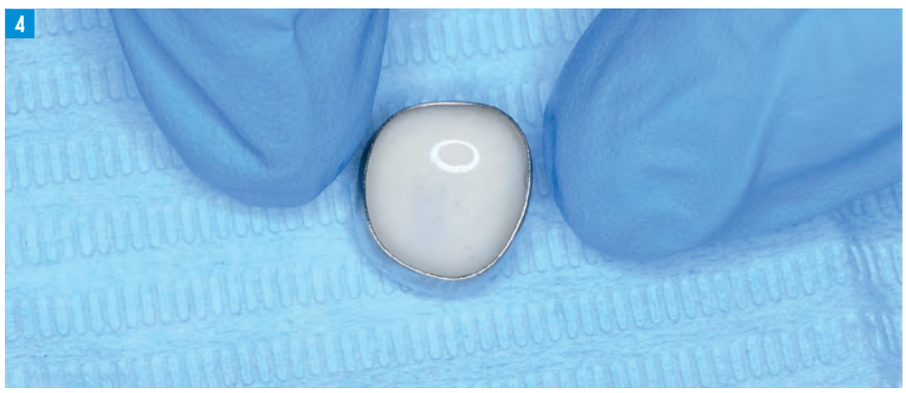

FIGURE 4: *Mixed glass ionomer cement placed in the crown*

FIGURE 5: *Crown placed over tooth evenly, engaging with mesial and distal contact points*

FIGURE 6: *Child biting crown into place with cotton roll to evenly distribute force*

FIGURE 7: *Excess cement being removed with floss*

spoon excavator. Clean the excess cement away (if using gauze to protect this airway, this can just be removed from the mouth, wiping the cement away at the same time

5. To get the crown fitting as well as possible (for the best seal) and to reduce the effect on the occlusion, repeat steps three and four again – seat the crown further on the tooth by getting the child to bite it in place again or by pressing it onto the tooth further with more pressure
6. More cement will probably be extruded so clean it away with floss (Figure 7) and check the occlusion is only opened by a few millimetres and not excessively (Figure 8).

EVIDENCE

There are more than 15 randomised control trials all of which show the Hall Technique to outperform plastic restorations.

Also, to perform as well as conventional stainless steel crowns where local anaesthesia is placed, the teeth are prepped and caries removed – often practitioners will carry out a pulp treatment whether the tooth is symptomatic or not, based on misinterpreted data that a broken marginal ridge will indicate irreversible pulpal damage (note: this is no longer accepted).

INDICATIONS

- Primary molars where there is a clear band of dentine visible between the lesion and the pulp (Figure 9)
- Proximal lesions cavitated or non-cavitated – this is the main indication for the Hall Technique. Occluso-proximal lesions or other multi-surface lesions are very difficult to achieve high quality, long-term restorations consistently using plastic restorative materials. This is partly due to the difficulty with achieving a good cavity design in a bulbous tooth where the floor of a proximal box can be lost and partly because of the difficulty with using such materials in small mouths where moisture control can be difficult to achieve
- Occluso-proximal cavitated lesions
- Occlusal lesions – but only usually where:
  - The child cannot tolerate other treatments and either is unlikely to develop the ability to manage treatment before the tooth becomes more damaged, or is unlikely to be a regular attender for dental care (ie a definitive restoration is required); or
  - A young child (five or younger) has an extensive lesion, so the tooth has a long time till exfoliation and a very predictable restoration is required.

8

FIGURE 8: *Crown on lower second primary molar showing occlusion increased by only opened by a few millimetres and blanching of gingiva where crown is seated subgingivally*

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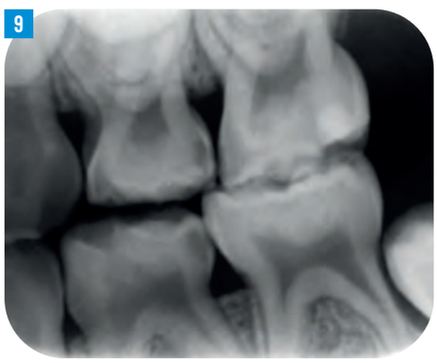

FIGURE 9: *Bitewing radiograph showing distal caries lesions on upper and lower first primary molars. Note that a clear band of dentine is visible between the lesions and the dental pulp*

CONTRAINDICATIONS

- Irreversible pulpitis or abscess/infection
- Clinical or radiographic evidence that the caries lesion has reached the pulp, pulp exposure or apical pathology
- Badly broken-down teeth without enough crown left to fit a crown
- Teeth with arrested caries.

TIPS AND HINTS

To help choose the right size of crown:

- It can be helpful to use a graded periodontal probe to measure the mesio-distal length of the tooth and compare it with the crowns. Otherwise, as a rule of thumb, try size five first of all, as this seems to be the most common size used
- Beware not to place a larger size crown than is needed in a lower E when there is no first permanent molar erupted to prevent an overhanging distal margin.

To prevent the child from tasting the bitter GIC:

- The child can be distracted from the taste of the cement by placing toothpaste or fluoride varnish the size of a grain of rice on the tongue just before the crown is cemented.

If the child is not keen to bite the crown into place:

- Sometimes the child can be reluctant to push the crown on because it feels hard. You can push it on using finger pressure (see Figure 5), but the child's bite force is generally higher and it can give them a feeling of success if they manage it themselves. You can try placing a cotton roll on the teeth but in the line of the arch (so that you can still see the position of the crown being pushed over) and the child might be able to be encouraged to bite on to the softness and squash the cotton roll, therefore pushing the crown over the tooth. This can also be useful to help apply even pressure to the crown and stop it being pushed over buccally or lingually/palatally.

There isn't an obvious crown to fit:

- If it is difficult to find the right size of crown, consider using a crown for a different tooth. For example, upper first primary molars can sometimes be wider bucco-palatally than mesio-distally and choosing a crown for a lower second primary molar crown can sometimes fit well if rotated by 90 degrees. Sometimes it is necessary to crimp or otherwise adjust the edges of the crown to help with the fit and orthodontic pliers can be useful.

Uncertainty over the appearance of the crown:

- It can sometimes be beneficial to allow the child to see the crowns before the parent and to explain how special it is etc. CD

10

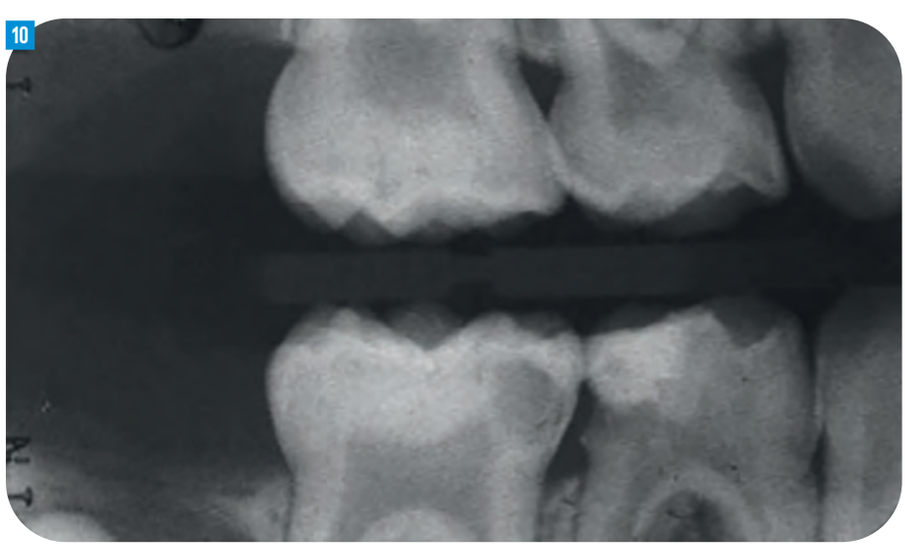

FIGURE 10: *Bitewing radiograph showing caries lesions on lower first and second primary molars (and some evidence of a failed restoration). There is no clear band of dentine visible between the lesions and the dental pulps*

FURTHER INFORMATION

The Scottish Dental Clinical Effectiveness Guideline on *Prevention and Management of Dental Caries in Children* gives more details.

For more information, visit www.sdcep.org.uk/published-guidance/caries-in-children.

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GARY CHAPMAN UNVEILS HOW PORTMANDENTEX IS DOING THINGS DIFFERENTLY FOR ITS PATIENTS, PRACTICES AND CLINICIANS

GARY CHAPMAN
Gary is Director of Mergers and Acquisitions, UK and Europe at PortmanDentex.

A NEW ERA FOR DENTISTRY

Having worked in dentistry for over 40 years, I've seen first-hand how the profession has evolved – bringing both challenges and opportunities. The merger of Portman Dentex Care and Dentex Health marked a pivotal moment; creating a stronger, united organisation built on shared values, excellence and the ability to leverage our scale for the benefit of patients, practices, and colleagues alike. Together, we are creating a business that supports our practices and provides exceptional growth opportunities for dental professionals across the UK and Ireland.

COLLABORATION: STRENGTH IN UNITY

PortmanDentex is more than just a dental group – it is a dynamic network of practices, clinicians, and support teams working together to achieve the best outcomes for our patients and colleagues. Our scale allows us to share knowledge, resources, and expertise across our network, ensuring every practice benefits from the wider group's experience.

By working closely with our practices, we support them in navigating the challenges and opportunities of modern dentistry. Whether through investment in technology, clinical training, or operational efficiencies, we ensure our practices are well-equipped to thrive in an evolving industry.

CONSULTATION: A PEOPLE-FIRST APPROACH

Success at PortmanDentex is built on understanding the needs of our clinicians and support teams. Transitions – especially for practice teams – can be emotional and uncertain. That's why our integration process is designed with people at its core.

From pre-acquisition discussions to ongoing support, we ensure our teams feel heard and valued. Our experienced integration specialists, many from practice backgrounds, guide new practices through this journey, helping them adapt while preserving their unique qualities.

COOPERATION: DRIVING EXCELLENCE TOGETHER

A key advantage of our merger is the ability to harness the collective expertise of two industry-leading organisations. Our practices join a group committed to continuous improvement and excellence in patient care. The ability to collaborate and learn from one another sets PortmanDentex apart. Our practices are not just partners in name – they are integral to our success. We respect and nurture each practice's identity and strengths. By working collaboratively, we help practices elevate their standards, streamline operations, and unlock new growth opportunities. We also provide career and clinical growth opportunities for dental professionals. Through roles such as Clinician Engagement Lead and Practice Clinical Lead, we offer pathways for leadership development, enabling clinicians to mentor and manage while delivering outstanding patient care.

COMMUNICATION: THE FOUNDATION OF SUCCESS

With a growing network, maintaining transparency and clarity across all levels of the business is more important than ever. We prioritise engagement with our practice teams, ensuring key messages, updates and strategic developments are communicated effectively. From leadership calls and business-wide team meetings to local discussions, we actively seek feedback and listen to our colleagues and practice partners. Their insights drive our decision-making, ensuring we remain agile, responsive and true to our values.

A FUTURE OF GROWTH AND OPPORTUNITY

The merger of Portman and Dentex is the start of a new era in dentistry. As PortmanDentex, we are uniquely positioned to shape the future of patient care, provide greater opportunities for dental professionals, and continue our journey of excellence. Together, we are reimagining the future of dentistry – one practice, one patient and one colleague at a time. CD

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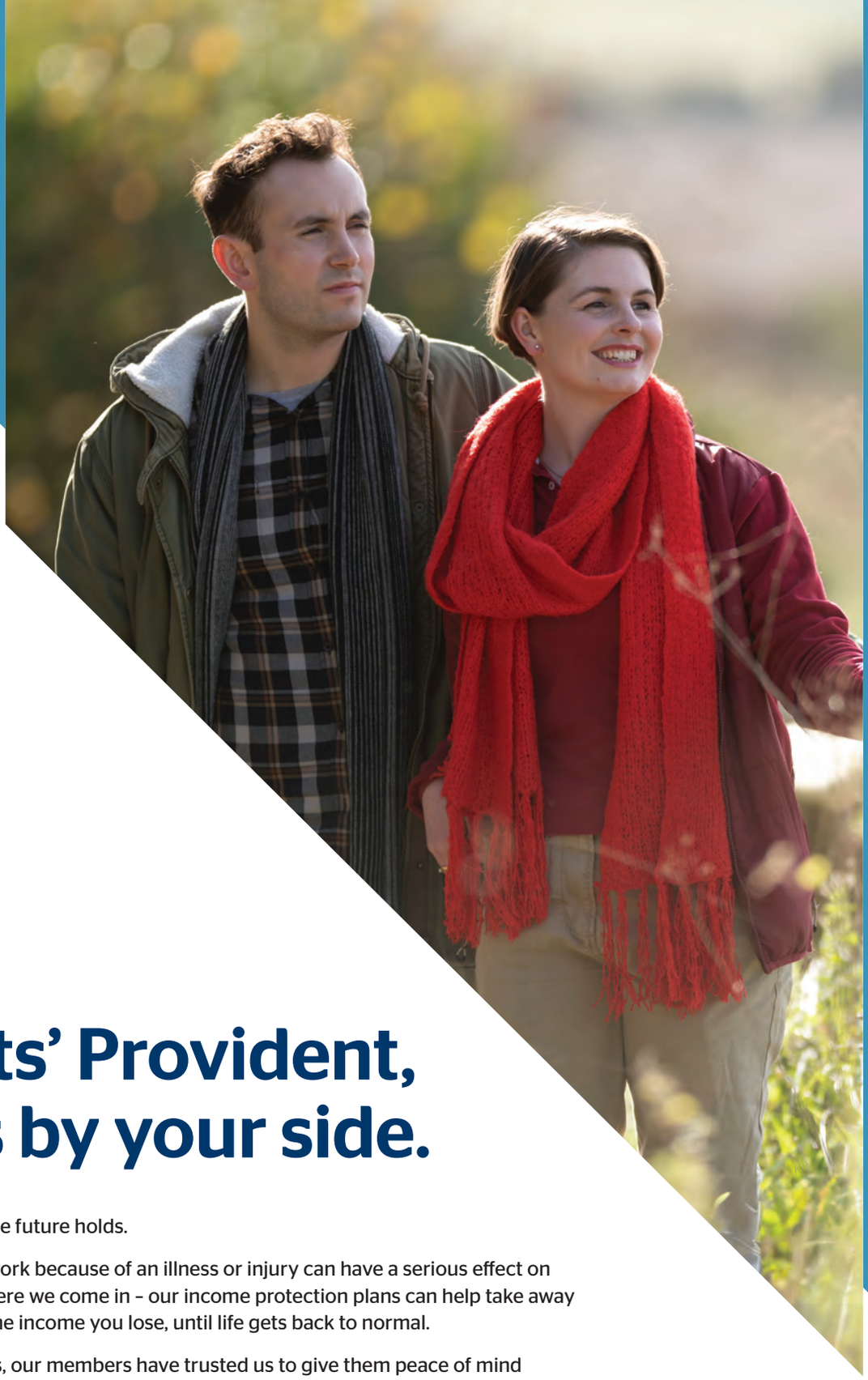

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ORTHODONTICS

ROSE AMEEN
Dual arch orthodontic treatment

59

The patient opted for orthodontic treatment involving both arches to avoid relapse in the malocclusion. Removable aligners were selected due to their aesthetic advantages. Two types were recommended, tailored to the requirements of each arch – Rose Ameen, p59

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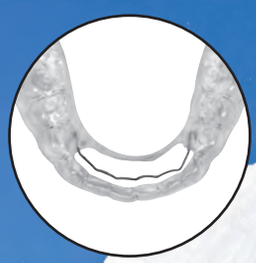

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DR ROSE AMEEN
Rose is a qualified dentist committed to excellence in restorative and aesthetic dental care. She graduated from the University of Münster in Germany in 2010 and is currently practising at Llanedeyrn Dental Practice in Cardiff. She recently gained an MSc in restorative dentistry from the University of Birmingham. She is certified in several aligner systems, including Inman Aligner, Clearsmile Aligner, and Invisalign.

ENHANCED CPD
CPD hours: one
GDC development outcome: C
Topic: Orthodontics
Educational aims and objectives: To present a case detailing mild to moderate crowding in the maxillary and mandibular arches, treated with both Clearsmile Aligner and Inman Aligner solutions. This article qualifies for one hour of enhanced CPD; answer the questions on page 66 or scan the QR code.

A 48-year-old female patient attended the practice initially seeking care due to dissatisfaction with her smile aesthetics. She was particularly concerned about the misalignment of her upper left lateral incisor and crowding in the maxillary anterior region. She wanted to improve the alignment of her upper dentition and achieve a more natural, pleasing smile.

Following a referral from her general dentist, her treatment involved the alignment of both the maxillary and mandibular anterior teeth. Aligning both arches was deemed essential, establishing an ideal overbite and overjet that would mitigate the risk of mandibular displacement and prevent excessive occlusal forces on the maxillary teeth. This also optimises conditions for oral hygiene.

The treatment plan incorporated the Clearsmile Aligner and Inman Aligner systems, which were selected to address the patient's aesthetic concerns while achieving functional outcomes.

INITIAL ASSESSMENT

An initial treatment assessment was conducted in the summer of 2022. The patient presented with skeletal class I with average Frankfort-mandibular plane angle (FMPA) and lower face height.

Moreover, the patient presented with a bilateral class I molar relationship in the posterior segments, accompanied by mild anterior crowding in the maxillary arch and moderate crowding in the mandibular arch. A class I incisor relationship with an overjet of 3mm and an overbite of 60% was also noted, and the lower midline had shifted to the left by 3mm. The patient had excellent oral hygiene and no underlying health conditions.

Along with the diagnostic records that included periapical radiographs, intraoral scans and clinical photographs obtained with a DSLR camera, a Spacewize+ space analysis was performed to quantify crowding and confirm case suitability for the proposed orthodontic interventions.

FIGURE 1: *Pre-treatment anterior in occlusion*

FIGURE 2: *Right lateral in occlusion*

FIGURE 3: *Left lateral in occlusion*

FIGURE 4: *Pre-treatment smile picture*

Rose Ameen treats a case with mild to moderate crowding in the maxillary and mandibular arches

Dual arch orthodontic treatment

TREATMENT PLAN

Various treatment options were presented to the patient, including a comprehensive alignment using fixed orthodontic appliances with an orthodontist, alignment limited to the upper arch, simultaneous alignment of both the upper and lower anterior teeth, and a non-treatment option.

Each option was thoroughly discussed, highlighting both the benefits and risks to ensure the patient was adequately informed and could provide informed consent.

The patient opted for orthodontic treatment involving both arches to avoid relapse in the malocclusion. Removable aligners were selected due to their aesthetic advantages. Two types were recommended, tailored to the requirements of each arch. In the upper arch, the Clearsmile Aligner was suggested due to its capacity for enhanced control and effectiveness, while also providing an aesthetic appeal. For the lower arch, characterised by mild to moderate crowding, the Inman Aligner was considered optimal for achieving efficient results within a shorter timeframe.

FIGURE 5: *Pre-treatment right lateral side*

FIGURE 6: *Pre-treatment left lateral side*

FIGURE 7: *Pre-treatment upper occlusal*

FIGURE 8: *Pre-treatment lower occlusal*

Following these discussions, the patient consented to the proposed treatment.

Dental impressions were subsequently taken to initiate the aligner fabrication process.

TREATMENT: TEETH ALIGNMENT

At the end of 2022, the orthodontic treatments commenced simultaneously. Impressions were taken for the Clearsmile Aligner at intervals of

FIGURE 9: *Anterior in occlusion with upper clear smile aligner*

FIGURE 10: *Right lateral side in occlusion with upper clear smile aligner*

FIGURE 11: *Left lateral side in occlusion with upper clear smile aligner*

FIGURE 12: *Mid-treatment upper occlusal view*

FIGURE 13: *Mid-treatment lower occlusal view*

five aligners, ensuring accurate fitting throughout the treatment.

Upon initial placement, the patient reported mild tenderness associated with the Inman Aligner, though this soon subsided.

The Clearsmile Aligner posed no issues, and the treatment progressed without any complications.

The patient was advised to use 'chewies' multiple times daily to promote optimal aligner fit and enhance treatment outcomes.

The patient wore the aligners for the recommended 20 to 22 hours daily, which contributed to a more efficient and successful treatment.

Upon treatment completion, the patient reported significant aesthetic improvements, reflecting the effectiveness of this carefully managed orthodontic approach.

TREATMENT: WHITENING, BONDING, RETENTION

Upon completing the teeth alignment, impressions were taken for the fabrication of upper and lower fixed bonded retainers. After bonding the retainers with Venus Pearl, impressions were sent to the IAS Laboratory to produce custom bleaching trays.

The patient then underwent a two-week tooth whitening regimen, utilising Philips Zoom Day White gel containing 6% hydrogen peroxide. The patient was instructed to apply the gel twice daily for 30 minutes. The whitening process achieved a final shade corresponding to A1 on the Vita shade guide.

Two weeks after completing the whitening procedure, composite edge bonding was performed on the upper anterior teeth (UR2 to UL2) using Venus Pearl composite in shade A1 to enhance aesthetics and symmetry.

The treatment protocol for teeth UR2 to UL2 began with a 30-second etching using 37% phosphoric acid, followed by a 15-second rinse with an air-water spray. Subsequently, a universal adhesive (Prime & Bond Active, Dentsply Sirona) was applied with a micro brush,

The patient was advised to use 'chewies' multiple times daily to promote optimal aligner fit

FIGURE 14: *Post-treatment anterior in occlusion*

FIGURE 15: *Post-treatment right lateral in occlusion*

FIGURE 16: *Post-treatment left lateral in occlusion*

FIGURE 17: *Post-treatment anterior open view*

FIGURE 18: *Post-treatment right lateral open view*

FIGURE 19: *Post-treatment left lateral open view*

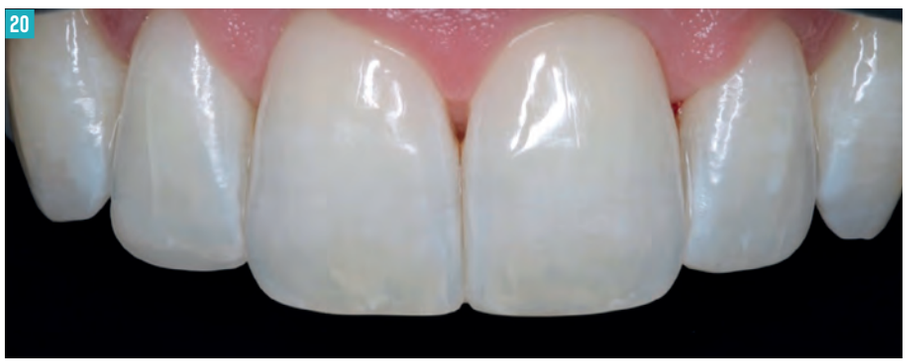

FIGURE 20: *Post-treatment anterior close-up view*

FIGURE 21: *Post-treatment right lateral smile*

FIGURE 22: *Post-treatment left lateral smile*

FIGURE 23: *Post-treatment upper occlusal*

FIGURE 24: *Post-treatment lower occlusal*

FIGURE 25: *Post-treatment anterior smile*

air-dried for five seconds, and light-cured for 20 seconds.

Venus Pearl composite was selected for the restorative material for its superior aesthetic properties.

After shaping the direct composite restorations with an ultra-fine diamond flame bur, the surfaces were polished in stages using Super-Snap disks.

The next step involved the application of Venus Supra Twist Disks, which acted as both pre-polishers and gloss polishers. Sof-Lex polishing strips were delicately employed to refine the finish in the interproximal areas.

For retention and stability post-treatment, fixed bonded retainers were supplemented with both upper and lower Essix retainers in October 2023, ensuring continued retention and reducing relapse risk.

SUPERVISION AND MENTORSHIP

This case was supervised by Dr Claudia Waddell, an IAS Academy mentor. Dr Waddell's recommendations, particularly concerning interproximal reduction (IPR), aimed at accelerating tooth movement while maintaining minimal reduction to preserve natural tooth structure. The patient returned every two weeks for limited IPR.

The IAS Academy's mentorship, particularly from Dr Waddell, was invaluable, offering reassurance and clinical support throughout the process. The IAS Academy's online platform allowed for seamless photo sharing, enabling Dr Waddell to review progress, provide guidance, and confirm adherence to best practices.

Her feedback often required only minor adjustments, which was encouraging for both the clinician and the patient. This minimally invasive approach contributed to excellent outcomes.

OUTCOME

The completed treatment delighted the patient, and I am equally happy with the outcome. The minimally invasive orthodontic treatment enhanced oral hygiene outcomes and improved aesthetics.

In appropriate cases, this is recommended instead of veneers or composite bonding without orthodontic treatment, as if the teeth have been aligned properly, only minimally invasive cosmetic restorations are necessary.

Having someone to support your aligner treatment over the sometimes prolonged amount of time is a great comfort. This means that treatment can be delivered safely and securely, with excellent results, as in this case.

At the patient's most recent visit a year later, she renewed the Essix retainers and was still using them. This is a rewarding feeling, and it has encouraged me to take a comprehensive but minimally invasive ortho-restorative approach to similar cases. CD

PRODUCTS USED

Clearsmile Aligner, Inman Aligner IAS Laboratory
Venus Pearl, Venus Supra Twist Kulzer
Zoom Day White Philips
Prime & Bond Active Dentsply Sirona
Sof-Lex 3M
Super-Snap Shofu

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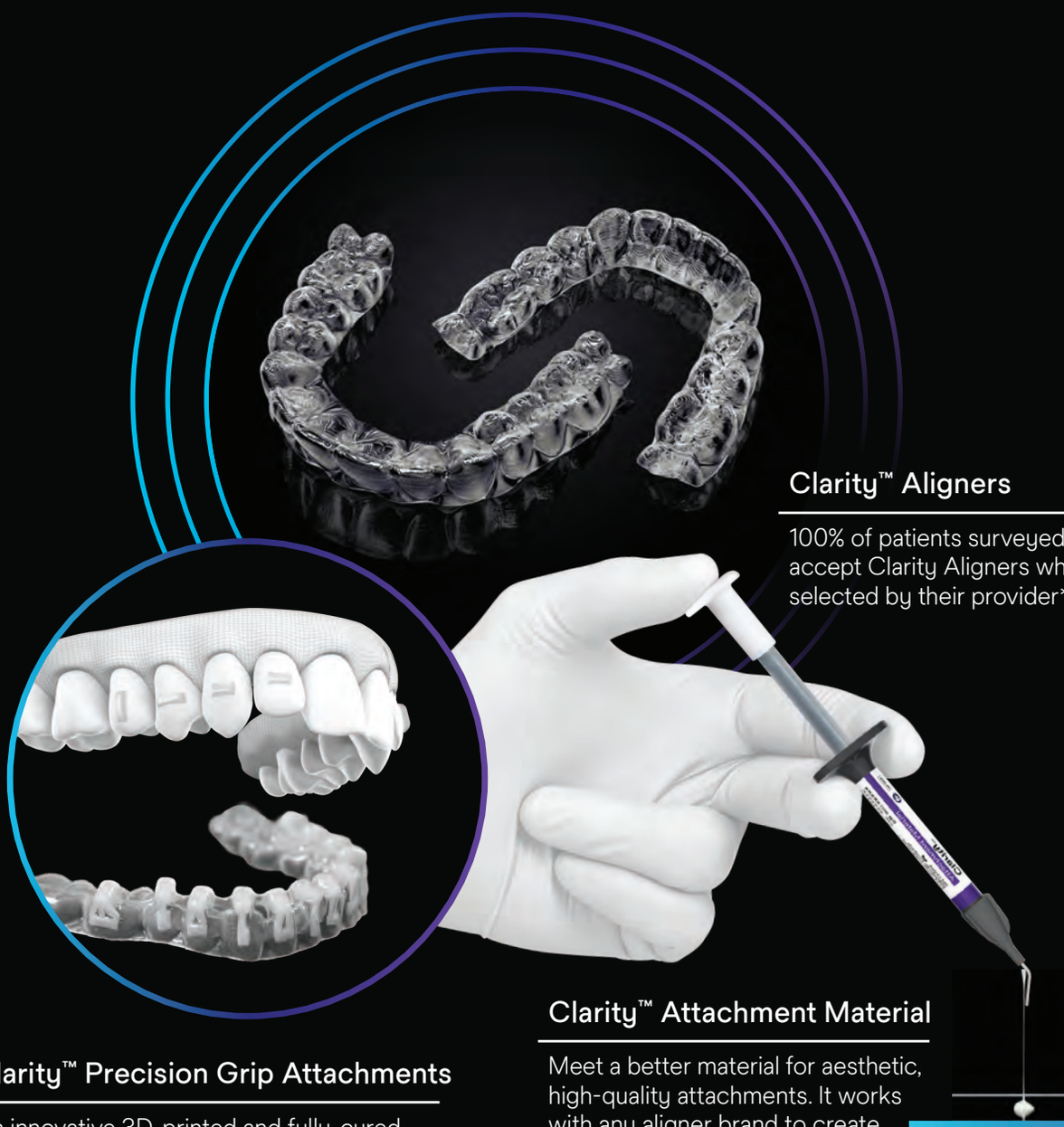

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With Zirkonzahn's new Detection Eye intraoral scanner, the patient's jaw can be digitised within one minute. The choice of two different tips (standard and small) makes the impression taking more comfortable.

Lightweight and ergonomic, Detection Eye provides real-time scanning with realistic colours and clear preparation margins. Moreover, the scanning areas do not need to be pre-treated with powder, simplifying the acquisition process and allowing the user to complete the digitisation via one-button control.

The scanner can also be operated via motion sensing technology. In addition, its Cart Basic with a useful drawer for perfect accessory storage can be rotated by the user as desired to reach the most ergonomic posture.

Once the data has been captured, it can be easily and quickly loaded into the Model Maker software module. The model is then transferred to the new Zirkonzahn.slicer software. This is pre-configured for the dental workflow for a seamless and well-calibrated printing process.

At this point, the generated 3D printing data is transferred to Zirkonzahn's P4000 Printer. The large printing volume permits the simultaneous production of, for example, up to 21 Geller models or 15 full-arch models.

The open-system 3D printer is conceived to process resins with a wavelength of 405nm and works in combination with the Printer Resins and Printer Resins Waterbased by Zirkonzahn, available in many colours.

The model can be then cleaned in an ultrasonic bath, cured in the L300 Post-Curing Lamp and mounted into the PS1 Articulator or ZS1 Mini-Arti without using plaster thanks to the new Jawaligner PS1 or ZS1 (magnetic spacer plates).

www.zirkonzahn.com

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GENERAL DENTISTRY
CD/MAR/NASSER/PAGE 12

1. **In the case, why did the female patient present to the practice for an emergency appointment?**
- ☐ a. She had pain in the upper left molar
- ☐ b. She had gingival swelling
- ☐ c. She had a bad taste in her mouth
- ☐ d. All of the above

2. **As part of the patient's postoperative advice, she was told not to brush the UL4 to UL7 site for how long?**
- ☐ a. One week
- ☐ b. Two weeks
- ☐ c. Three weeks
- ☐ d. One month

3. **In moderate cases, according to the author's protocols, the PTFE membrane is recommended to remain in place for how long?**
- ☐ a. Three weeks
- ☐ b. Four weeks
- ☐ c. Five weeks
- ☐ d. Six weeks

4. **At the four-month review, what did a repeat CBCT demonstrate?**
- ☐ a. Good healing
- ☐ b. Good bone turnover and relative density
- ☐ c. Adequate ridge dimensions
- ☐ d. All of the above

AESTHETIC DENTISTRY
CD/MAR/RHODE/PAGE 19

1. **In this case, which tooth was chipped?**
- ☐ a. UL6
- ☐ b. LR1
- ☐ c. UR1
- ☐ d. LL6

2. **How many veneers did the author place in total in this case?**
- ☐ a. Four
- ☐ b. Eight
- ☐ c. 12
- ☐ d. 20

3. **A depth-reduction bur was used at what depth to pencil grooves on the teeth to be prepared for the veneers?**
- ☐ a. 0.1mm
- ☐ b. 0.2mm
- ☐ c. 0.3mm
- ☐ d. 0.4mm

4. **For the temporary veneers, which Luxatemp shade was selected?**
- ☐ a. A1
- ☐ b. A2
- ☐ c. B1
- ☐ d. Bleach Light

DIGITAL DENTISTRY
CD/MAR/EDNEY/PAGE 31

1. **For long-term practice stability, what do dental professionals need to continuously look for, according to the author?**
- ☐ a. Ways to adapt operational models
- ☐ b. Ways to streamline staff training
- ☐ c. Ways to improve patient communication
- ☐ d. All of the above

2. **In the article, what does the author say about working with dental therapists?**
- ☐ a. It is economical
- ☐ b. It increases patient access
- ☐ c. It promotes efficient division of labour across the dental team
- ☐ d. All of the above

3. **According to the author's analysis, what was the average treatment value of scanned patients?**
- ☐ a. £978
- ☐ b. £1,784
- ☐ c. £2,387
- ☐ d. £3,162

4. **In the clinical case study presented, how old was the male patient?**
- ☐ a. Five years old
- ☐ b. Six years old
- ☐ c. Seven years old
- ☐ d. Eight years old

ENDODONTICS
CD/MAR/AL SIBASSI/PAGE 38

1. **According to the literature, clinical outcomes are equivalent whether a file is bypassed or removed, provided effective chemo-mechanical debridement can be achieved within what of the apex?**
- ☐ a. Less than 1mm
- ☐ b. 1mm
- ☐ c. 2mm
- ☐ d. 3mm

2. **To minimise the risk of iatrogenic complications, how should fragments located beyond a canal curvature or in the apical region be dealt with?**
- ☐ a. Bypass the fragment
- ☐ b. Remove the fragment
- ☐ c. Extraction of the tooth
- ☐ d. None of the above

3. **In terms of the characteristics of the fragment, which of the following factors will influence management decisions?**
- ☐ a. Length
- ☐ b. Material composition
- ☐ c. Axial cross-section
- ☐ d. All of the above

4. **In what cases may alternative surgical options be considered?**
- ☐ a. Where bypass is not feasible
- ☐ b. Where a periapical lesion is present
- ☐ c. Where removal is not feasible
- ☐ d. All of the above

IMPLANT DENTISTRY
CD/MAR/BALAJI/PAGE 43

1. **The initial assessment revealed which tooth had a hopeless prognosis in this case?**
- ☐ a. LL5
- ☐ b. LL6
- ☐ c. LL7
- ☐ d. LL8

2. **The bone graft was prepared with what percentage of autogenous bone and xenograft?**
- ☐ a. 40% autogenous bone and 60% xenograft
- ☐ b. 50% autogenous bone and 50% xenograft
- ☐ c. 60% autogenous bone and 40% xenograft
- ☐ d. 70% autogenous bone and 30% xenograft

3. **How many implants were placed in this case?**
- ☐ a. One
- ☐ b. Two
- ☐ c. Three
- ☐ d. Four

4. **The graft material was placed on top of the periosteum and left to mature for how many months?**
- ☐ a. One
- ☐ b. Two
- ☐ c. Three
- ☐ d. Four

ORAL HEALTH
CD/MAR/INNES/PAGE 51

1. **Regarding the Hall Technique, which of the following statement is correct?**
- ☐ a. No local anaesthesia is placed
- ☐ b. No carious tooth tissue is removed
- ☐ c. No tooth removal is carried out before placing the crown
- ☐ d. All of the above

2. **What equipment do the authors recommend having on the working side for the dental nurse?**
- ☐ a. Box of crowns with varying sizes
- ☐ b. Clean tweezers
- ☐ c. Glass ionomer cement
- ☐ d. All of the above

3. **At the crown fitting appointment, how many steps are involved in placing a Hall Technique crown?**
- ☐ a. Four
- ☐ b. Six
- ☐ c. Eight
- ☐ d. Nine

4. **When choosing the right crown size, as a rule of thumb, what size do the authors recommend trying first?**
- ☐ a. Size two
- ☐ b. Size four
- ☐ c. Size five
- ☐ d. Size six

ORTHODONTICS
CD/MAR/AMEEN/PAGE 59

1. **During the initial treatment assessment, the lower midline had shifted to the left by how much?**
- ☐ a. 1mm
- ☐ b. 2mm
- ☐ c. 3mm
- ☐ d. 4mm

2. **Which removable aligner was suggested for the upper arch?**
- ☐ a. Clearsmile Aligner
- ☐ b. Inman Aligner
- ☐ c. Invisalign
- ☐ d. None of the above

3. **The patient was recommended to wear the aligners for how many hours each day?**
- ☐ a. 10 to 12 hours
- ☐ b. 15 to 18 hours
- ☐ c. 20 to 22 hours
- ☐ d. 24 hours

4. **To enhance aesthetics and symmetry, composite edge bonding was performed on the upper anterior teeth using composite in what Vita shade?**
- ☐ a. A1
- ☐ b. A2
- ☐ c. A3
- ☐ d. A4

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