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MISSIONSTATEMENT

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

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OUT OF CONTROL

It's a cliche – and not necessarily an accurate one – to believe that things fall into place more easily as we get older. That we will have things more 'together' in later life than we managed in our youth.

As I get older, I am coming to realise that nothing could be further from the truth. Yes, over time I have managed to deepen my understanding of a few very specific things – but with each year that passes I also come to appreciate how much more is out there that I really know very little about.

It's the same with the idea of control. I once thought that getting older would see me more assured, influencing the world around me with confidence and predictability. Instead, I realise just how little I can really influence.

I think this is true for all of us. From unexpected setbacks to the actions of others, we all encounter situations that lie beyond our sphere of control – often leaving us feeling powerless and overwhelmed.

The trick, or so I have come to understand (if not always practise), is recognising that the only thing we're really in control of is ourselves.

I'm sure this comes as no surprise to you – in dentistry, after all, we are not short on external setbacks. Often, there is little to be done about them. We can't change the economic climate through sheer force of will, wish the NHS contract into spontaneous reform, or encourage the most recalcitrant patients into better oral maintenance habits.

But you can work on you. You can learn to be a better leader, educate yourself on running a business, or refine your clinical skill set. This magazine is designed to help you with one of those in particular, of course. You may have been diving into Dentistry CPD, our online CPD portal, to accrue your hours from this magazine for a long time, but did you know that we've recently launched a new service to help you in another aspect of your practising life – namely, compliance? You can't control when the CQC comes to inspect your practice, but with Dentistry Compliance you can prepare for it (and make the process as painless as possible).

I may not have learned much in the grand scheme of things, but one thing I do know is that life isn't about controlling the uncontrollable, but mastering our own responses to it. Ironically, by doing just that we reclaim our own agency in an unpredictable world.

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Clinical Dentistry proudly presents its editorial advisory board – our panel of leading clinicians helping guide the title to clinical excellence

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Meet the experts

Introducing some of the people who have shared their expertise in this issue of *Clinical Dentistry*

DR ALAN CLARKE
BDS MFDS (RCS Eng) LLM Edin

From patient selection to bonding considerations, Alan Clarke shares his 10 top tips for contact lens veneers on page 32.

A highly qualified and experienced dentist with a passion for delivering dental excellence, Alan is clinical director of Paste Dental in Belfast. He received his Bachelor of Dental Surgery (BDS) from Queen's University Belfast and has since expanded his knowledge and expertise through studies in Los Angeles and Abu Dhabi.

With years of experience in cosmetic and restorative dentistry, Alan has mastered the art of creating perfect smiles. He founded Paste Dental in 2020, a dental practice that strives to provide patients with exceptional care and services, including AI technology and digital scanning.

Alan is a member of the Faculty of Dental Surgery at the Royal College of Surgeons, London, and holds a master's in medical law and ethics (LLM) from the University of Edinburgh.

AESTHETICDENTISTRY
32

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April 2024 ■ Vol 4 No 4

27 Maximising aesthetics with tooth whitening and resin infiltration

FEATURES

GENERAL DENTISTRY 13

AESTHETIC DENTISTRY 23

DIGITAL DENTISTRY 35

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CLINICAL DENTISTRY AWARDS CATEGORIES

CLINICAL DENTISTRY AWARDS

The Clinical Dentistry Awards aim to acknowledge clinical excellence in practice. The ceremony takes place at Royal Garden Hotel in London on Friday 11 October. The closing date for entries is Wednesday 10 July. For the full list of categories and more information, visit **dentistry.co.uk/clinical-awards**, or scan the QR code to enter.

To acknowledge clinical excellence in practice, the Clinical Dentistry Awards bring together aesthetic dentistry, orthodontics, periodontics, endodontics, implant dentistry and oral health, showcasing the outstanding work being undertaken in dentistry.

The Clinical Dentistry Awards ceremony will take place at the Royal Garden Hotel in London on Friday 11 October 2024 and promises to be a prestigious and well-respected event for the UK and Ireland.

HOW TO ENTER

Throughout this issue of *Clinical Dentistry*, you will find the criteria for the various categories, including:

- Aesthetic Treatment Practice
- Young Aesthetic Dentist
- Aesthetic Laboratory
- Facial Aesthetics Practice
- Orthodontic Practice
- Young Orthodontic Dentist
- Orthodontic Therapist
- Periodontic Practice
- Endodontic Practice
- Implant Dentistry Practice
- Young Implant Dentist
- Implant: Single Tooth
- Implant: Multiple Teeth
- Implant: Interdisciplinary Team
- Local Oral Health Initiative
- Hygienist of the Year
- Therapist of the Year
- Recently-Qualified Hygienist
- Recently-Qualified Therapist
- Philips Shine-On
- Multidisciplinary Practice.

Once you have decided which categories to enter, simply visit dentistry.co.uk/clinical-dentistry-awards to register your entry.

Next, it's time to start compiling your entries! Follow the guidelines in the category's criteria and include all of what is asked of you – if you don't include all the points and someone else does, then your entry is already at a disadvantage.

Think about getting the judges' attention, and making them want to read your submission. Your entry needs to be clear, creative and concise.

Entry is free and there is no limit to the number of categories you can enter. The closing date for entries is Wednesday 10 July. If you need any guidance, email awards@fmc.co.uk or call 01923 851777 – we're here to help!

MULTIDISCIPLINARY PRACTICE

This category recognises the efforts of an entire team offering more than one discipline, from procedure to aftercare, focusing on the practice environment as well as clinical outcomes achieved and patient satisfaction. To enter Multidisciplinary Practice, you must have entered at least one other category. Entries will be accepted from practices only (not individuals) and judges will be looking at the submission in its entirety. Entries should consist of a portfolio of information, including submission of at least one case and supporting notes. Send up to 1,200 words explaining why your practice is a contender for Multidisciplinary Practice. Focus on the following:

The practice: the history, location, the appearance, feel and branding. How is a practice culture of excellence attained, both clinically and organisationally? What technology do you use?

The staff: who is there, what is their area of interest, what is their training and experience? How has practice investment in training and equipment benefited patients and outcomes?

The marketing: how do you attract patients? (Examples of marketing materials should be included if available)

The patient experience: what does your practice do to make the patient experience unique, from start to finish? How are people put at ease? How are treatment options explained?

The team: how does everyone work together to make sure that the patient receives the best results as efficiently as possible?

Clinical before and after photos: provide high-resolution before and after photographs to show excellent results

Additional photography: the practice, the team etc.

Please also provide one exemplary case report (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and specifically include a discussion of how the case was treated as effectively as possible.

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AYESHA GHAFFAR
BDS MSC PGDIP (CLEAR ALIGNERS)
Ayesha is the clinical director of SA Smile Clinic in Glasgow.

ENHANCED CPD
GDC anticipated outcome: C
CPD hours: one
Topic: General dentistry
Educational aims and objectives: To present a clinical case that provided transformative treatment for the patient. This article qualifies for one hour of enhanced CPD; answer the questions on page 102.

A 61-year-old patient presented for a comprehensive examination to discuss options to replace her denture and improve her smile.

The patient has been a regular attender of the practice since its opening in 2014. She presented with a heavily restored dentition and had been wearing an upper denture since she was 30 years old. She recently had a Co/Cr denture made but dislikes it.

The patient's dental history is linked with her medical history. At the age of seven years, she was hit by a car and her face, teeth and body were badly affected. This is where her ongoing dental treatments started.

Over the years, the patient's dentition resulted in anterior crown and bridgework, loss of UL1 and upper right posterior teeth and numerous dentures. Furthermore, she had been in a few car accidents, contributing to her neck and jaw pains. She had a drooping face on the lower left side and asymmetrical lips drooping on the left side too.

The patient is a long-term grinder/clencher, resulting from stress and anxiety.

She eats healthily, is a non-smoker and doesn't drink alcohol.

The patient attended upset and was unsure what could be done to improve her smile. She felt that her teeth have been deteriorating and is ashamed to smile.

She looks after her teeth – brushing twice daily and using floss and never had any periodontic problems. She has discomfort when chewing food and has had this for many months with ongoing TMJ joint pain – right and left – and neck pain.

Her medical history revealed:

- Haemachromatosis – blood taken every six-months
- Taking antidepressants for depression since 30
- Thyroid medication underactive – no thyroid gland as removed completely at 28 years old due to goitre – risk of being malignant
- Calcium for hypoparathyroidism, taking T4, T3 and thyroxine.

The patient's main concerns she wished to address were:

- Can see black margins around teeth when smiling
- Teeth are yellow
- Feels the front teeth are too big
- Teeth look different shapes and sizes
- Lower teeth are chipped and small
- Hates Co/Cr denture and wants to stop wearing it
- Help with TMJ pain if possible
- Wants whiter, straighter teeth.

AESTHETICS

Special investigations (facebow, digital scans, photographs, radiographs and clinical assessment) were completed to aid in diagnosis and treatment planning.

We found her lower face height to be normal, her upper midline to facial to left, and lower midline to facial, coincident.

The smile analysis revealed a low smile line, a flat smile arc, and deficient buccal corridors. In addition, the shape of her teeth were rectangular and the crown bridgework was a little too big.

Dentistry CLINICAL CASE AWARDS 2023 WINNER Transformative Treatment

Ayesha Ghaffar won the Transformative Treatment category at the Dentistry Clinical Case Awards 2023.

Ayesha Ghaffar details a multidisciplinary case that improved the patient's wellbeing

Transformative treatment

FIGURE 1: *Face frontal view – asymmetrical*

FIGURE 2: *Face*

FIGURE 3: *Smile view*

FIGURE 4: *Frontal scan*

FIGURE 5A: *Right-hand side scan*

FIGURE 5B: *Left-hand side scan*

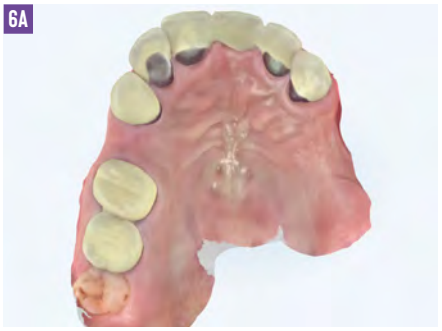

FIGURE 6A: *Upper scan*

FIGURE 6B: *Lower scan*

Base chart pre-treatment

- Missing teeth: UR5, UR4, UL4 to UL8, LL4, LL8, LR4
- RCT: UR6, UR3, UR2, LR7
- Amalgam fillings: LR6, LR5, LL6, LL7
- Posts: UR6, UR3, UR2
- Composite fillings: LR1, LL1
- Metal crown: LR7, mcc: UR6, UR7, UR3, UR2, UL3
- Mcc bridge: UR1 to UL2, abutment pontic UL1

The preoperative OPG highlighted the curve of Spee, which was a concern (Figure 8). What's more, the wave present in both arches shows the disproportion present in the dental work provided, which shows no consideration to the occlusion.

Diagnosis

- Missing teeth – poor posterior support
- Skeletal class II mild
- Class II div 1 mild
- Deep overbite 90%
- Lower severe incisal wear – clenching/grinding – cannot see the lower teeth at all
- Dento-alveolar compensation – occlusal imbalance
- Narrow upper arch bone loss caused further narrowness with missing teeth
- Amalgam restorations posteriorly providing less tooth support especially from
- clenching/grinding
- Smile arc is flat and anterior teeth shape size different and large
- Yellow restorations
- UL2 chronic apical periodontitis
- Gingival margin recession and black margins from metal ceramic crownwork/bridgework
- Curve of Spee and Monson severely curved due to dento-alveolar compensation over the years
- Lower midline to right 3mm
- TMJ – clicking and pain in jaw joints with tight masseters right and left.

Based on the diagnosis, we decided on the following treatment plan:

- Correct smile arc so it is in line with the lower lip and buccal corridors
- Improve the smile by replacing the current crown and bridgework and consider orthodontic treatment to first correct the malocclusions and deep bite
- Reset the teeth and posterior teeth – expand the arches with orthodontic treatment
- Lower anterior and posterior teeth to be restored to increase OVD and restore the wear and create a whiter, straighter smile
- Reduce the TMJ clicking and pain

Regarding the occlusion, we wanted to correct or improve the curve of Spee and Monson.

The treatment was to be done in centric relation, as dento-alveolar compensation has caused a severe occlusal imbalance as the patient displaces the jaw to the right before she closes her teeth.

TREATMENT OPTIONS

The following treatment options were presented to the patient:

1. Orthodontic treatment to expand arches, put teeth in favourable positions, reduce deep bite and increase OVD, improve curve of Spee and Monson – implants for missing upper teeth as the patient does not wish dentures,

FIGURES 7A *and* **7B:** *Additional photographs*

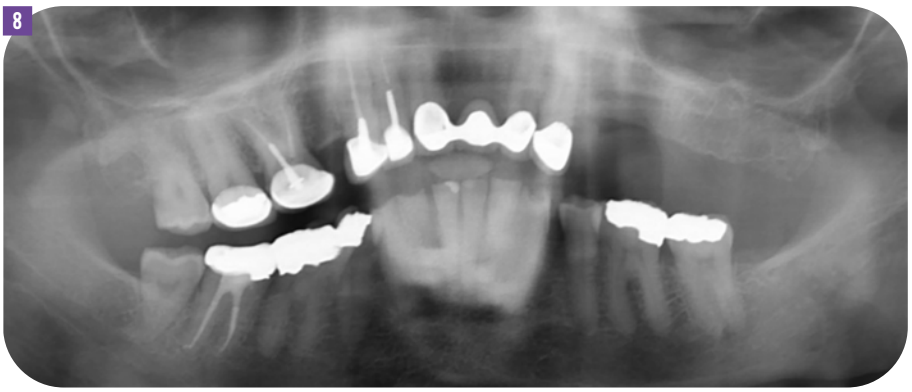

FIGURE 8: *Preoperative OPG*

FIGURE 9: *OPG taken after implant placement*

upper crownwork and bridgework replaced with laser gingivectomy and lower composite bonding lower right three to lower left five and posterior amalgam replacement with onlays/inlays and crownwork, RCT needed UL2 and laser gingivectomy after orthodontic treatment. Option all staged

2. No orthodontic treatment – camouflage result with upper implants – immediate loading for bite – lower anterior composite bonding to increase OVD by 3mm and review patient regarding TMJ and pain – replace the anterior crown and bridgework with temporaries and laser gingivectomy to see how the bite is in new ovd and then restore posterior teeth replace amalgams to onlays/inlays/crownwork and establishing the new bite – review and achieve equilibration – stay in new bite with upper temporaries for a few weeks and restore the full uppers and posterior implant work together
3. Options one or two with lower anterior composite can change later to ceramic crownwork and also for new bite as an intermediate stage that can last years
4. Options one or two with three. Can replace the UR7 and UR6 crownwork to ceramic crowns or leave as it is as it is sound but not aesthetically pleasing. These teeth are in a position that the curve of Spee can still be improved
5. An implant in the UL1 missing with bone graft and connective tissue graft to improve the bone deficit in this area and have separate crownwork for the UL2 and UL3 along with option one or two – a little longer timeframe.

TREATMENT PLAN

A presentation was emailed to the patient and an appointment made for two weeks later to discuss treatment options. The patient was happy with the following plan.

She refused orthodontic treatment and was happy to leave the UR7 and UR6 crowns in place and maybe change later due to the intensity of work needed and cost. As intermediate option for the bite and OVD increase, lower composite bonding was decided – a camouflaged result.

For the posterior teeth, the patient chose a mixture of Emax onlays/inlays/crown and a composite filling based on the risks and benefits of all and cost, understanding if any fail other options, such as crownwork, may be needed (dependent on the bite and the occlusal load).

Wax-ups of the new upper and lower design were provided by the technician and shown to the patient, who was happy with design.

A treatment plan was devised of the patient's choice. Again, she took this away to read over with a plan to come back in two weeks' time with written consent of the treatment plan and costs.

STAGED TREATMENT

- Necessary treatment – RCT UL2 to start ASAP
- One-day implant placement performed by Dr Haroon Sher. UR4 space, two implants in the upper posterior quadrant for a three-unit screw retained bridge – immediate loading with temporary out of bite as no loading necessary – to have the three to four month time period to re-establish the bite and restore the implants and upper crownwork/bridgework at the end
- Four weeks after implant placement: lower anterior bonding from LR3 to LL5 – increase the OVD by 3mm with wax-ups and stent made by Laurie (designed from records sent and discussion) – review in two weeks, as the patient will not have a bite on posterior teeth to check for TMJ problems and clenching/grinding
- Laser gingivectomy done at same time as composite bonding for gums to settle on upper teeth

FIGURE 10: *Laser gingivectomy*

FIGURE 11: *Lower anterior build-up and trial smile for upper teeth*

FIGURES 12A *to* **12C:** *Final result*

FIGURE 13: *Final OPG*

FIGURES 14A *and* **14B:** *Two month review*

- Two weeks' time: removal of upper crownwork and bridgework and temporise to mock ups sent by lab in Luxatemp
- Two-week review: check bite, check the new occlusion, check TMJ, pain in muscles, check smile features, phonetics
- Two weeks' time: posterior replacement of amalgams. Patient chose Emax crown for LR7, LR6 Emax onlay, LR5 Emax inlay, LL6 composite restoration
- Two weeks' time: review the new bite and finalise the bite and smile design with Laurie
- One week later: removal of temporaries posterior implant sites and anterior crowns and bridgework, prepare the teeth take impressions and place temporaries back on – finalise shade with patient
- Fit of the implant restorations and anterior crown bridgework – any adjustments needed or replace crowns place temporary on individual teeth as needed
- Review one-week time – check occlusion, phonetics, smile, TMJ and overall dental health
- Review in two weeks
- Review in one month, two months, three months and maintenance henceforth three monthly.

Treatment commenced in March 2022 with the stages described above. The patient's journey was tailored to her needs and length of all appointments detailed with the preferences all noted above.

Figure 9 shows the OPG taken after implants placed, highlighting the curvature of both the upper and lower arches – dentoalveolar compensation.

For the trial smile, the patient loved the white teeth. We observed the middle line needed corrected; there is a black triangle between the UL1 and UL2 with a wide smile.

This was discussed with the patient and technician at review visit and adjustments were made. The patient announced she was feeling a big difference with her bite, occlusion, TMJ and neck pain settled too. Her TMJ clicking had reduced. The patient had a splint made for a temporary mock-up.

After two trials of the final restorations, we completed treatment in February 2023 (Figures 12 and 13).

RESULT

We were able to give this patient the wider, whiter and straighter smile she requested. The patient was delighted with the result.

FIGURE 15: *Final result*

She said: 'I can confidently smile, feel better with my overall wellbeing and did not realise the difference in my face till now. I have more balance in my bite when eating and talking and less pain in my joints and muscles – if any some days. Clicking sometimes comes but has reduced and I wear my splints religiously as prescribed and sometimes during the day when I feel clenching or grinding. I did not imagine this was possible.'

REFLECTION

Both myself and the patient are delighted with the overall result. The patient feels it has changed her wellbeing for the better.

One of the challenges we faced initially was the OPG presentation of the 2D image of the upper and lower arches. I spent a lot of time discussing with the technician and Dr Haroon the possibility to level out the arches and improve the curve of Spee. It was decided to use the lower posterior teeth to raise the bite and lower the upper implant restorations after the lower anterior teeth build ups and increase of OVD. I feel we achieved a very nice result as seen on the final OPG.

The second challenge was the anterior bridge and the interproximal space between the UL1 and UL2. Two attempts were made to design the shapes and camouflage this area similar to the UL2 and UL1 but due to space, bone resorption and no interdental papilla, this was difficult. I feel I could have improved this by another few attempts with the technician but the patient was happy with this result and did not wish any further trials.

The staged treatment plan worked well and I did need some extra appointments between the stages to correct the bite and review from the composite bonding to posterior restorations.

Regarding maintenance, the patient is on a three-monthly review and hygiene visit, with splint therapy upper and lower, for as long as needed. CD

Acknowledgement
The implant dentist in this case was Haroon Sher. All the laboratory work was carried out by dental technician Laurie Littlejohn at DTS laboratory.

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CLINICAL DENTISTRY AWARDS

The Clinical Dentistry Awards aim to acknowledge clinical excellence in practice. The ceremony takes place at Royal Garden Hotel in London on Friday 11 October. The closing date for entries is Wednesday 10 July. For the full list of categories and more information, visit **dentistry.co.uk/clinical-awards**, or scan the QR code to enter.

AESTHETIC TREATMENT PRACTICE

This category recognises the efforts of an entire team, from procedure to aftercare, focusing on the practice environment as well as clinical outcomes achieved and patient satisfaction. Entries in this category will be accepted from practices only. Send up to 1,200 words on:

The practice: the history, location, tech, the appearance, feel and branding

The staff: who is there, what is their area of interest, what is their training and experience? How has investment in training and equipment benefited patients and aesthetic outcomes?

The marketing: how do you attract patients?

The patient experience: what does your practice do to make the patient experience unique, from start to finish? How are people put at ease?

The team: how does everyone work together to ensure the best results?

Clinical before and after photos: provide high-resolution before and after clinical photographs

Additional photography: the practice, the team etc.

Please also provide one case report (up to 1,000 words), detailing the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and a discussion of how the case was treated.

YOUNG AESTHETIC DENTIST

This category is open to those born on or after 31 August 1988. Send up to 1,000 words covering the following:

- Demonstrate hard work and drive
- Explain how you set yourself apart from other young aesthetic dentists
- Present postgraduate training/development information if relevant
- Provide evidence of how you go beyond regular duty of care
- Provide relevant supporting evidence
- Provide before and after photos.

Please also provide one case report (up to 1,000 words) detailing the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and a discussion of how the case was treated.

FACIAL AESTHETICS PRACTICE

To enter Facial Aesthetics Practice, the practice must have a strong interest in facial aesthetics and have adapted an element of the practice towards this discipline. This category recognises the efforts of an entire team. Send up to 1,200 words focusing on:

The practice: the history, location, tech, the appearance, feel and branding

The staff: who is there, what is their area of interest, what is their training and experience? How has investment in training and equipment benefited patients and aesthetic outcomes?

The marketing: how do you attract patients?

The patient experience: what does your practice do to make the patient experience special, from start to finish?

The team: how does everyone work together to ensure the best results?

Clinical before and after photos: provide high-resolution before and after clinical photographs

Additional photography: the practice, the team etc.

Please also provide one case report (up to 1,000 words), detailing the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and include a discussion of how the case was treated as effectively as possible.

AESTHETIC LABORATORY

This category recognises the efforts of an entire team. Entries in this category will be accepted from laboratories only (not individuals). Send up to 1,000 words on:

The lab: the history, location, the appearance, feel and branding. How is a culture of excellence attained, both clinically and organisationally? What technology do you use?

The staff: who is there, what specialist skills do you have at the laboratory, what is their training and experience? How has lab investment in training and equipment benefited outcomes?

The marketing: how do you attract patients and dentists?

Customer satisfaction: what makes your lab so successful in its communication?

Additional photography: the lab, the team etc.

Please also provide one case report (up to 1,000 words) detailing the treatment carried out, and a discussion of how calibre materials and technology were used to maximise work quality. Submit photographs of stages of lab work if appropriate. Provide any relevant supporting documentation, marketing information and pictures. CD

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A smile ahead together DMG

DR SHIRAZ KHAN
BDS MSC BMEDSC (HONS) MFDS RCS (ENG) MJDF PG DIP PG CERT
Shiraz graduated from the University of Birmingham Dental School in 2013. Having successfully completed foundation training and winning several prizes, he is currently practising in Clapham, London. He lectures nationally and internationally and enjoys progressing his career in additional postgraduate qualifications. He invests time in his career development and experience, regularly sharing with like-minded professionals.

ENHANCED CPD
GDC anticipated outcome: C
CPD hours: one
Topic: Aesthetic dentistry
Educational aims and objectives: To present a case highlighting how tooth whitening and resin infiltration can be performed to overcome generalised discolouration. This article qualifies for one hour of enhanced CPD; answer the questions on page 102.

As has been reported on many occasions, the ability to improve a patient's smile can have profound effects on their confidence, which subsequently can also lead to improvements in oral health (Baldwin, 1980; Davis, Ashworth and Spriggs, 1998).

Regarding noticeable tooth/teeth discolouration, some have considered this to be a physical handicap that can impact a 'person's self-image, attractiveness and even employability' (Kelleher and Roe, 1999).

The principles as outlined by Banerjee (2013) regarding minimally invasive dentistry suggest that by minimising the amount of tooth preparation required to achieve a functional and aesthetic result, we can increase tooth survivability and longevity.

Home whitening has been considered a simple, staple and safe aesthetic treatment that can be carried out in the absence of the any dental disease (Kelleher and Roe, 1999). This implies that prior to any whitening, and even aesthetic treatment, the patient should be in stable oral health, free from any dental, periodontal or soft tissue disease.

CASE PRESENTATION

A 16-year-old male patient attended. He had generalised discolouration since the eruption of the permeant dentition. Having been victimised as a child for 'not brushing his teeth properly', his mother and himself were seeking a minimally invasive treatment strategy to improve his confidence and appearance.

Medically, the patient was fit and well, with no obvious caries, aberrant/pathological tooth surface loss. There was the presence of mild marginal gingival inflammation. The patient had previously always been a regular dental attender, with no history of caries.

The patient had routine screening bitewing radiographs for caries screening, which were also clear of any visible pathology.

DIAGNOSES

The patient was diagnosed with mild generalised gingivitis, and generalised hypomineralisation lesions attributed to fluorosis.

TREATMENT OPTIONS

It was clear that the aesthetic compromise was attributed to the multiple discolourations present on the teeth.

The presence of brown/yellow discolourations, amongst white spot discolourations, were creating this non-homogenous appearance of the enamel.

The primary phase of treatment was to undertake

Dentistry CLINICAL CASE AWARDS 2023 WINNER Tooth Whitening

Shiraz Khan the Tooth Whitening category at the Dentistry Clinical Case Awards 2023.

Shiraz Khan presents an award-winning tooth whitening case

Maximising aesthetics: tooth whitening and resin infiltration





FIGURES 1 *to* **5:** *Initial presentation*

tooth whitening, and supplement this with microabrasion/resin infiltration once the discolourations had homogenised to a white colour.

TREATMENT SEQUENCE/PROTOCOL

A full mouth supra and subgingival scale and polish was completed with the hygienist.

The patient attended for an appointment for intraoral scans to be taken and customised, ultra-seal whitening tray fabrication.

The whitening protocol was slightly elongated to ensure as much whitening of the fluorosis lesions as possible. We completed four weeks of whitening with 16% carbamide peroxide (Lumiwhite by Night) as night-time whitening only.

As we are aware, bond strength can reduce by up to 20% if completed on the same day as the cessation of the whitening (Garcia-Godoy et al, 1993). This occurs due to thin, sparse and fragile resin-tag formation. A period of two weeks allows for any hydroxyl radicals to leach out of the teeth, and for the whitening result to stabilise. Therefore, the appointment for definitive palatal composite of the UL1 was to be completed two-weeks after completion of external whitening.

The upper first molar to first molar were isolated using Unodent Heavy rubber dam.

The process of resin infiltration was as follows. Icon Etch contains 15% hydrochloric acid, which is applied for two-minute intervals. This translates to approximately up to 50um enamel removal.

The etch is washed for 30 seconds, and then Icon Dry – an 99% ethanol-based liquid – is placed over the teeth. This is the most significant aspect of any Icon treatment as it gives the

FIGURE 6: *Result after four weeks of night-time whitening with 16% carbamide peroxide*

FIGURE 7: *Tooth were isolated with rubber dam*












FIGURES 8 to **19:** *Icon resin infiltration*



FIGURES 20 to **22:** *Polishing*

FIGURES 23 *and* **24:** *Final result*

FIGURE 25: *Final result, full face*

opportunity to review whether the lesion will be adequately masked or not, a test-drive if you will of what the tooth will appear like after resin infiltration.

In this case, as can be seen by the severe hypoplasia, there will likely be a requirement for subtle enamel preparation to access the white spot. This was repeated for two cycles only. The Icon Dry showed satisfactory masking of the white spot lesion. Therefore, it was time to infiltrate with resin.

Icon resin infiltration requires a two-minute application and agitation on the teeth, followed by one minute for the resin to remain undisrupted on the teeth. This is followed by excess removal and teeth separation (using floss) and curing for 40 seconds on each tooth.

A second application is repeated for two minutes and cured to account for contraction shrinkage and is again cured for 40 seconds per tooth. Finally, for removal of the oxygen inhibition layer, we complete a final cure under glycerine gel.

The polishing protocol is critical in finalisation of such cases. This starts with Sof-Lex discs at very slow speed/revolutions, running through the sequence from coarse to ultra-fine.

This is supplemented with 3M enhanced polishing spirals, and finally with Flexibuff and diamond polishing paste.

The tooth is well hydrated during the polishing protocol to minimise the risk of overheating the freshly infiltrated resin.

Due to minimal nature of erosive etching cycles required, there was no visible concavity that was created because of the treatment.

Therefore, this case demonstrates the power of microabrasive and resin infiltration treatment to improve the appearance of such white spots.

No supplemental composite was required.

CONCLUSION AND REFLECTION

The discussion process and valid consent are essential when undertaking all forms of treatment, but particularly with reference to elective or aesthetic treatment.

In the case presented in this article, the discussion process ensured that the patient and his mother clearly understood that whitening, although an elective procedure, is the most minimally invasive procedure that will significantly improve the patient's confidence and appearance (Davis et al, 1998).

As demonstrated in this case, a simple yet refined intervention created a suitable outcome without the need for restorative intervention.

The patient was ecstatic in this case as he was previously informed that the only method to create a reasonable outcome would require preparation of the tooth for a veneer.

With consent being a dynamic process, there is no need to assume that the patient would not still consider additional treatment after the whitening had taken place, but discussion of the options at each stage of treatment and appropriate documentation is an imperative element to informed consent.

The patient and his mother were delighted by the enhancement to his smile.

As this case demonstrates, minimally invasive therapy in well selected cases, can not only create monumental changes in appearance, but also preserve the patient's natural dentition, perhaps for their lifetime. CD

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PRODUCTS USED

Icon DMG
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Lumiwhite by Night Lumiwhite
Heavy rubber dam Unodent

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TOP TIPS...

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TOP 10 TIPS FOR CONTACT LENS VENEERS

1 Comprehensive patient assessment. Existing tooth alignment, colour, spacing, undercuts and previous dentistry are all key factors in determining if your patient is a good candidate for contact lens veneers. Bond is key; ask yourself what surface are you bonding to and what is the colour tone of that surface? We want underlaying tooth colour shine through if we are at 0.4mm thickness. There is lots to consider, write a plan and follow it.

2 Manage patient expectations. Educate patients about the benefits and limitations of minimal thickness or no-prep veneers. Discuss realistic outcomes, potential risks, and the need for long-term maintenance to ensure they have realistic expectations. Cost is key here. These are a beautiful but expensive investment for the patient. Consent has to include a large piece on finance as well as long-term maintenance!

3 Smile design. Patients need to be aware of porcelain translucency and how that will look on the final tooth outcome. Do they want colour blocking and a thicker, fuller, full contour matt finish, or do we want to dial up translucency with delicate micro-layered Emax or feldspathic? Showing previous cases with different finishes is a great way to communicate this, so photograph everything! Road map your design with a scan or mould to your ceramicist and design the outcome ahead of time.

4 Selecting the right patients. Identify suitable patients for minimal thickness or no-prep veneers based on factors such as tooth position, alignment, and existing enamel thickness. Patients with minor cosmetic imperfections and healthy tooth structure are ideal for this technique. Do not get blinded by a high-ticket item and a patient willing to pay. It doesn't mean it is the correct treatment for that patient.

5 Relationship with your ceramicist. The technical ability to produce veneers at 0.4mm thickness is an art form in itself. Ensure that you have a completely open and trusting relationship with your ceramic technician. From design to cementation, all these aspects are a joint discussion, one-to-one. Get to know your lab tech, and build trust.

6 Material selection. Choose high-quality porcelain or lithium disilicate materials that offer excellent aesthetics and durability. I use Initial Lisi Press (GC) for my most aesthetic and translucent cases. Discuss the advantages of different veneer materials with the patient and your ceramicist and select the most appropriate option based on their preferences and budget.

7 Minimal tooth preparation. Minimise tooth preparation to preserve as much natural tooth structure as possible. The great feeling of an insertion with no local anaesthetic on a no-prep case allows for natural visualisation by your patient and ultimate enamel bonding.

8 Trial smile. Offer a trial smile using temporary veneers or digital mock-ups to allow the patient to preview the proposed changes before finalising the treatment plan. This helps in fine-tuning the design and ensuring patient satisfaction. I encourage videos and photographs so that patients can chat through their cosmetic options with their family, giving time for consideration.

9 Adhesive bonding technique. This is vital – your bond must be next to perfect. Have a repeatable bonding protocol with your team trained at each vital step. I developed my multi-step process from my wise council at Beam Smile Design in Nashville. With Lisi Press I use Ivoclar Variolink, under strict isolation. Using try-in paste is also essential, as with translucent veneers the value of cement colour is a major consideration.

10 Post-placement care. Create a bespoke process to give your patient's veneers maximum longevity, such as a night biteguard and three-monthly hygiene appointments. Ensure the patient has entered into a maintenance agreement for their new veneers! CD

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DIGITALDENTISTRY

ELISSA NASR
Digital crown lengthening and home bleaching

37

The treatment of excessive gingival display with a crown lengthening surgery is technique sensitive. Using a digital workflow helps the clinician to achieve predictable results. Minimal invasive bleaching therapy could be used to ameliorate the aesthetics of the smile – Elissa Nasr, p37


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DR ELISSA NASR
Elissa is a prosthodontist at Asnanak Dental Center in Kuwait. She is a Styleitaliano community member.

ENHANCED CPD
GDC anticipated outcome: C
CPD hours: one
Topic: Digital dentistry
Educational aims and objectives:
To discuss the treatment of excessive gingival display with crown lengthening surgery using a digital workflow.
This article qualifies for one hour of enhanced CPD; answer the questions on page 102.

The harmony of a smile mainly depends on the balance of three anatomic components: the teeth, the gingiva, and the lips.

Excessive gingival display is defined as a gingival exposure larger than 2mm when a person smiles. Treatment for excessive gingival display depends on the associated factors and aetiology.

Altered passive eruption is a common aetiology of excessive gingival display. Crown lengthening surgery is indicated for altered passive eruption treatment, which consists of exposing sound tooth structure with or without removal of alveolar bone.

To increase the accuracy, predictability and success of crown lengthening surgery, fully digital protocols have been developed.

CASE STUDY

In the case presented in this article, the patient's chief complaints were her gummy smile, and the colour of her teeth (Figure 1).

She presented excessive gingival display associated with altered passive eruption from the upper left canine to the upper right canine and a hypermobile upper lip. The treatment plan for altered passive eruption was one-stage crown lengthening surgery.

Home bleaching was also suggested in order to improve the aesthetics. Later, botulinum toxin injection was planned to be performed to reduce the mobility of the upper lip, however the patient was satisfied with the results and decided to abstain from the Botox therapy.

Intraoral scans, extraoral digital smile design (DSD) photographs, and cone beam computed tomography (CBCT) were taken. All the data was superimposed (Figure 2).

A digital diagnostic wax-up design was performed. It should overlap the gingival margin to achieve less gingival display. The wax-up is designed according to the DSD and the anatomic crown measures extracted from the CBCT.

The shape and size of the teeth were discussed with the patient before finalising the wax-up.

In the lateral cut view, it was verified that the new margin of the wax-up is coronal to the CEJ observed on the CBCT (Figure 3).

The wax-up design cast was 3D printed (Xfab 2000) with cast resin (3D printable resin Invicta 915). A polyvinyl siloxane index (Aquasil Ultra+) was made on the printed cast. A mock-up was performed to check the occlusion and aesthetics (Protemp 4) (Figure 4).

The crown lengthening surgical guide was designed according to the approved wax-up and mock-up. The surgical guide was printed with a 3D printer (Xfab 2000) and biocompatible resin (3D printable resin DS5000) (Figures 5a and 5b).

FIGURE 1: *Preoperative gummy smile situation*

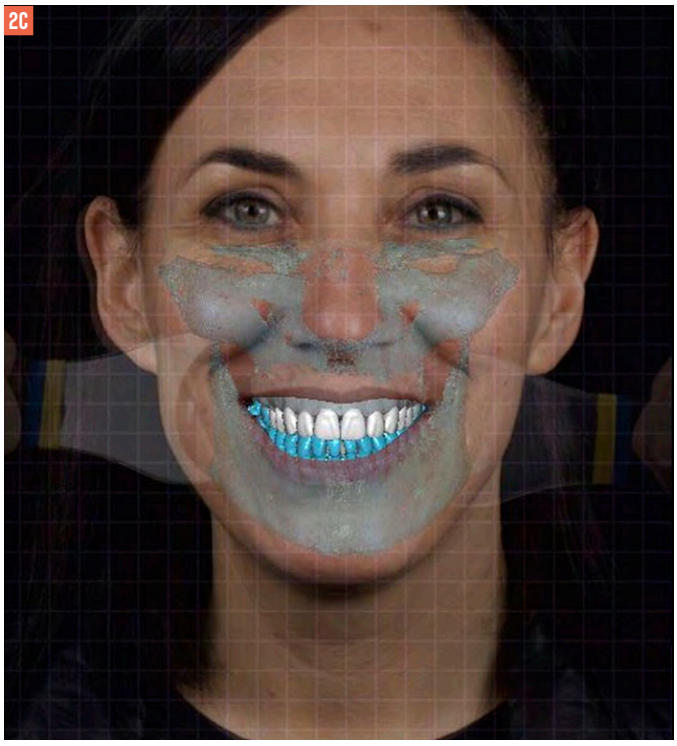
Elissa Nasr discusses treating excessive gingival display with crown lengthening surgery using a digital workflow

Digital crown lengthening and home bleaching

CROWN LENGTHENING PROCEDURE

The crown lengthening procedure was performed by Dr Abdullah Ajili and Dr Lory Abrahamian.

First, the gingivectomy was carried out with an electric tip following the inner shape of the windows of the guide. Then, a full thickness flap was made with papilla preservation to make the osteotomy at the level of the



FIGURES 2A to **2C:** *Digital smile design according to CBCT data*

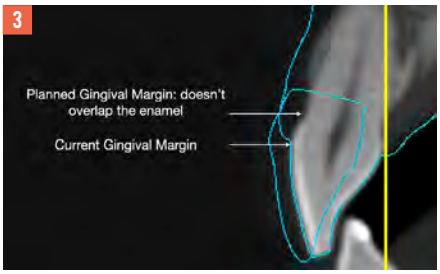


FIGURE 3: *Planning for crown lengthening*

FIGURE 4: *Smile with wax-up*

FIGURES 5A *to* **5C:** *Digitally designed surgical guide for crown lengthening*

FIGURE 6: *Close up of surgical guide with open flap*

FIGURE 7: *Check-up three months after crown lengthening*

FIGURE 8: *Before and after whitening with White Dental Beauty*

FIGURES 9A *and* **9B:** *Before and after crown lengthening and whitening*

bone that corresponds to the upper part of the surgical guide (Figure 5c). Finally, the needed osteoplasty was performed.

Figure 6 shows a close-up of the guide with the open flap.

A three-month postoperative control photograph can be seen in Figure 7, exposing the stability of the results using the crown lengthening guide.

Three months after the surgery, home bleaching was performed for 14 days using 16% carbamide peroxide (White Dental Beauty Professional Tooth Whitening System) (Figure 8).

Figure 9a shows the initial situation while the six-month post-crown lengthening surgery and two months post-bleaching result can be seen in Figure 9b.

CONCLUSIONS

The treatment of excessive gingival display with a crown lengthening surgery is technique sensitive. Using a digital workflow helps the clinician to achieve predictable results.

Minimal invasive bleaching therapy could be used to ameliorate the aesthetics of the smile. CD

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ENDODONTIC CATEGORY: CRITERIA

CLINICAL DENTISTRY AWARDS

The Clinical Dentistry Awards aim to acknowledge clinical excellence in practice. The ceremony takes place at Royal Garden Hotel in London on Friday 11 October. The closing date for entries is Wednesday 10 July. For the full list of categories and more information, visit **dentistry.co.uk/clinical-awards**, or scan the QR code to enter.

ENDODONTIC PRACTICE

To enter this award the practice must have a strong interest in this discipline and have adapted an element of the practice towards endodontics.

This category recognises the efforts of an entire team, from procedure to aftercare, focusing on the practice environment as well as clinical outcomes achieved and patient satisfaction.

Entries in this category will be accepted from practices only (not individuals). Judges will be looking at the submission in its entirety and assessing the overall picture it paints of your practice rather than concentrating on individual elements. However, failure to address any of the criteria set out below may negatively impact your submission.

Entries should consist of a portfolio of information, including submission of at least one case and supporting notes. Send up to 1,200 words explaining why your practice is a contender for Endodontic Practice. Focus on the following:

The practice: the history, location, the appearance, feel and branding. How is a practice culture of excellence attained, both clinically and organisationally? What technology do you use?

The staff: who is there, what is their area of interest, what is their training and experience? How has practice investment in training and equipment benefited patients and outcomes?

The marketing: how do you attract patients? (Examples of marketing materials should be included if available)

The patient experience: what does your practice do to make the patient experience unique, from start to finish? How are people put at ease? How are treatment options explained?

The team: how does everyone work together to make sure that the patient receives the best results as efficiently as possible?

Clinical before and after photos: provide high-resolution before and after clinical photographs and X-rays to show clinically excellent results

Additional photography: the practice, the team etc.

Please also provide one exemplary case report (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and include a discussion of how the case was treated as effectively as possible. CD

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Managing internal inflammatory resorption

Robert Pestell presents a case report discussing the management of internal inflammatory resorption on an upper lateral incisor

Resorption is a pathological or physiological process involving the loss of dentine, cementum or bone. Depending on its position, it can be classified as internal or external.

Internal resorption can then be subdivided into inflammatory and replacement.

External resorption can be subdivided into inflammatory, replacement, cervical, surface and transient apical breakdown.

INTERNAL INFLAMMATORY RESORPTION

Internal inflammatory resorption (IIR) can result from damage to the predentine, either due to physical or chemical trauma or bacterial infection.

In active progressive internal inflammatory resorption lesions, the root canal coronal to the resorptive area is typically necrotic, while the pulp at the apex remains vital, supporting the odontoclasts and allowing lesion progression.

However, if tooth vitality is lost completely, as in the case presented in this article, resorption stops advancing.

Clinical signs usually don't usually appear until the lesion is advanced, with internal inflammatory resorption teeth often asymptomatic.

Vitality testing during resorption may indicate reversible or irreversible pulpitis and advanced cases with infected necrotic root canals may exhibit symptoms of periapical periodontitis.

Diagnosis is usually based on the radiographic appearance along with signs and symptoms, although a cone beam computed tomography (CBCT) scan can be useful.

Radiographically, the lesion has been described as a radiolucent, symmetrical round or oval ballooning out of the root canal wall (Patel, 2018; Mittal, 2014).

The following case presented is that of internal inflammatory resorption on an upper left lateral incisor.

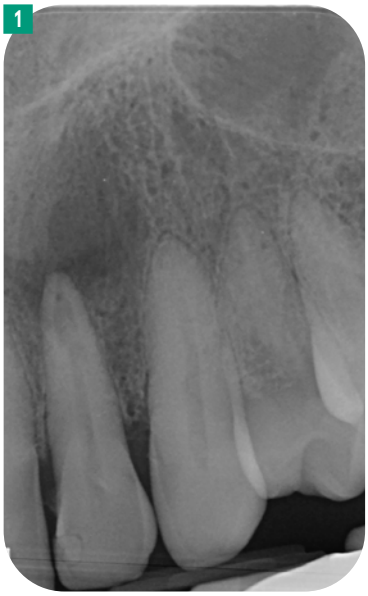

FIGURE 1: *Preoperative radiograph showing large periapical area and radiolucency within the apical third of the canal space*

CASE STUDY

A 57-year-old male attended the practice with generalised pain across the upper left side. The patient had been given amoxicillin by their own dentist and symptoms had reduced although not completely resolved.

Sensibility testing to the upper left teeth reviled the UL2 to be non-responsive in contrast to all other teeth, which responded normally. The UL1, UL2 and UL3 were all mildly tender to percussion. There was generalised tenderness from UL1 to UL4 in the buccal sulcus.

A periapical radiograph was exposed (Figure 1), which showed a large radiolucency around the apex of the UL2. The radiograph also showed a radiolucency relating to the root of the tooth consistent with internal inflammatory root resorption.

The patient reported no history of trauma to the area and there was only a small class III composite restoration in the tooth.

The radiolucency located in the apical third of the root appear centred and continuous with the outline of the canal, despite subsequent changes in the angle of the periapical.

For this reason, it is reasonable to assume a diagnosis of internal resorption – although the true diagnosis was difficult without access to a CBCT scan. A CBCT would have helped us understand the position of the defect as well as its extent.

ROBERT PESTELL
BDS (HONS) BSC (HONS) PGCERT MFDS RCS(ED)
Robert Is a general dentist working in London and Berkshire. He gained his undergraduate degree at Liverpool and continued restorative training at the Eastman where he developed an interest in endodontics.

FIGURE 2: *Master apical file periapical showing apical stop at working length*

FIGURE 3: *Master cone periapical confirming fit at correct working length*

FIGURE 4: *Mid-fill periapical showing apical plug of gutta percha*

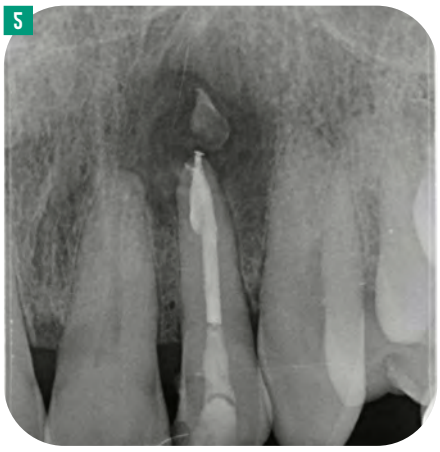

FIGURE 5: *Postoperative showing gutta percha filling the whole canal space and final composite restoration*

It is possible for internal resorption to continue ballooning out until perforating the external wall of dentine. If this had occurred, it would have affected the treatment plan, particularly obturation where the use of a bioactive material, such as MTA or Biodentine, would have been more suitable (Bhuva, 2011).

Unfortunately, a CBCT was not available at the practice and the patient was not keen on outward referral, so we decided to continue without this extra information.

ENDODONTIC TREATMENT

The patient presented to me still in moderate discomfort and I initiated root canal treatment after anaesthetic, isolating with rubber dam and Wedjets.

Immediately after access, significant suppuration was noted. I irrigated with heated 3% sodium hypochlorite and coronally flared with Waveone Gold primary. An electronic apex locator was used, which confirmed a working length of 21.5mm with a size 20 K-file.

A Waveone primary reciprocating file was taken to length easily before apical gauging was carried out and a size 55 master apical file selected. I stepped back using increasing hand files up to size 80 to create an apical taper and exposed the 55 MAF radiograph, which was just shy of the radiographic apex (Figure 2). I was happy there was a suitable apical stop for me to use a warm vertical compaction technique.

A final irrigation with sodium hypochlorite was agitated with the Endoactivator, however, I was unable to fully dry the canal with paper points. The tooth was dressed with calcium hydroxide, Cavit placed in the access cavity and the patient was booked for two weeks' time. Interappointment medication, such as calcium hydroxide, has been recommended due to the complex three-dimensional nature of internal resorption defects (Bhuva, 2011).

FOLLOW-UP

The patient reattended reporting complete resolution of symptoms.

Rubber dam was placed with Wedjets and the tooth re-accessed. Hypochlorite was used to rinse away the of the calcium hydroxide with the help of the Endoactivator.

Because of the complex apical anatomy, I wanted to try a master cone customisation technique. The tip of the 55 04 gutta percha point was dipped into chloroform for one to two seconds and inserted to length with a couple of gentle pumps, before being removed, rinsed and dried while being careful to remember the orientation (Saatchi, 2011).

The cone was then reinserted in the same position and a master cone radiograph was taken (Figure 3). This confirmed the correct length before obturating.

A thorough final rinse sequence of 17% EDTA solution followed by heated 3% sodium hypochlorite both agitated with the Endoactivator to ensure contact with the resorption defect walls. The canal was dried with paper points and pulp canal sealer applied to the customised GP point prior to placing it at length. A System B narrow heated plugger was taken to 19mm before a down packing with a narrow cold plugger.

A mid-fill radiograph was taken (Figure 4) to confirm an apical plug of GP preventing any thermoplasticised GP extrusion when obturating the remaining canal. Finally, Obtura obturation system was used to fill the remaining canal space with regular down-packing to ensure as thorough 3D obturation as possible.

The access was restored with composite and a radiograph taken, showing a good apical seal and generally well condensed obturation.

Unfortunately, there was some extrusion of the calcium hydroxide medicament after the first appointment (first visible on Figure 3), which appeared on subsequent radiographs. This could affect healing (Orucoglu, 2008) and in future I would make efforts to contain with medicament within the canal space.

The patient has failed to return for a six-month review appointment to check on the periapical tissue healing. However, I am pleased with how this case turned out. CD

REFERENCES

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PRODUCTS USED

Wedjets Coltene
Cavit 3M
Obtura Obtura
Waveone, Endoactivator Dentsply Sirona

R-Motion

RECIPROCATION

FKG
swiss endo

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ONE SEQUENCE TO FIT MOST CASES

GLIDE PATH	SHAPING
R-Motion Glider C	R-Motion 25

NEW

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SCAN FOR YOUR FREE SAMPLE PACK ...

MARTIN DAMYANOV
DMD PGDIP
Martin graduated from the Medical University of Sofia in Bulgaria in 2003. He gained a certificate in endodontics at University College London (UCL), Eastman Dental Institute before obtaining the diploma in endodontic practice in 2012 from the same institute. He has worked at Wellington Dental Practice since 2012.

ENHANCED CPD

GDC anticipated outcome: C

CPD hours: one

Topic: Endodontics

Educational aims and objectives: To discuss R-Motion reciprocation and explore the file system's effectiveness in two case studies. This article qualifies for one hour of enhanced CPD; answer the questions on page 102.

It was more than 10 years ago, at a British Endodontic Society (BES) regional meeting, that Dr Ghassan Yared spoke about dentists in a then war-torn Lebanon trying to perform endodontics as quickly as they could, using pieces of rubber glove as improvised rubber dam before being rushed into the bombing shelters.

Being one of those dentists, he was dreaming of a fast, efficient and safe root canal system. Balanced force technique with handheld stainless steel instruments was well known at the time to produce predictable results in curved canals.

The balanced force technique recognises the fact that instruments are guided by the canal walls when rotated (Roane et al, 1985). Since the files will cut in both a clockwise and counterclockwise rotation, the balanced force concept of instrumentation consists of placing the file to length and then a clockwise rotation (less than 180 degrees) engages dentine. This is followed by a counterclockwise rotation (at least 120 degrees) with apical pressure to cut and enlarge the canal (Torabinejad and Walton, 2009).

Years later, Professor Yared was testing mechanical reciprocation with nickel titanium instruments. In 2007, he published a clinical article on canal preparation using only one engine-driven nickel titanium instrument, and started developing a system specifically to be used in reciprocation.

At that same BES meeting, he was telling another story about a single file system that could achieve predictable results in most clinical cases, including retreatments. The faint-hearted left the auditorium in disbelief.

Up until that moment, five nickel titanium instruments were necessary to achieve predictable results. It takes the skill of a visionary to bring such a paradigm shift.

ROTATION VERSUS RECIPROCATION

As yet, no system is able to completely prepare all the dentine, eliminate all microorganisms or remove all obturation material from the root canal system.

Rotation is an 'inside out' technique, where the shapers work as a brush and remove the dentine laterally. Think of the shapers as a brush and not a drill! The shapers first fit easily within the canal to be shaped and then cut the radicular coronal restrictive preparation by laterally brushing and then removing it.

Each instrument's preparation allows the next shaper and finisher to easily fit (West, 2018).

On the other hand, reciprocation is a technique where the files shape the canal in descending order where repetitive back and forth motion has been clinically utilised. Following a reproducible glide path, the clinical technique of reciprocation has always been a crown-down concept.

1

FIGURE 1: *The two R-Motion files: one sequence to fit most cases*

Martin Damyanov explores R-Motion reciprocation and presents two clinical cases that demonstrates the file system's effectiveness

Minimally invasive endodontics

Because a single file is being asked to produce a similar predictable conefit as with multiple rotary files, a different skill set is required. The file is used in a multipass sequence. Restraint and confirming patency are key watchwords during every pass in the multipass sequence, since a single file is replacing the workload of a multiple file sequence, such as rotary shaping.

Irrigation and confirming patency are also recommended with each separate pass in order to prevent blocks, ledges, perforations, and transportations (West, 2018).

2

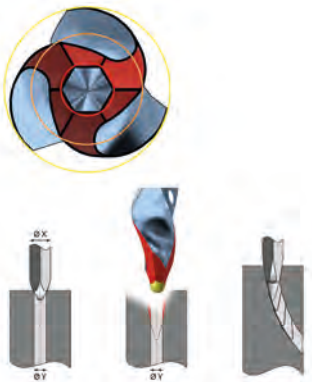

FIGURE 2: *R-Motion files have a rounded triangular cross-section with sharp cutting edges and an optimised file tip*

RECIPROCATION TODAY

Fast forward to present day, and all major players in the endodontic field have a reciprocating system on the shelf, which should come as no surprise.

Here are the key features that make the R-Motion (RM) reciprocation very desirable method of root canal preparation in modern days (Grande et al, 2015):

1. Reciprocation extends the lifespan of all types of files tested
2. The amplitude of reciprocation has a significant influence on the cyclic fatigue life of the flies tested
3. Reciprocation does not reduce the cutting efficiency of the flies tested
4. Reciprocating and rotary motion have similar cutting efficiency
5. Reciprocating files shape canals well and preserve the original canal anatomy
6. Reciprocating single file usage reduces the shaping time compared to a full sequence rotary system
7. Dentine microcracks occur independently of the type of file and its kinematics.

FKG R-MOTION RECIPROCATION

Not surprisingly, FKG came with a reciprocating system of its own, but can the company bring something new to the table? Seemingly so – a reciprocation system called R-Motion.

R stands for reciprocation, but one could argue also 'rapid' as the system is fast, as well as resilient and remarkable.

FKG's newly expanded R-Motion range aims to provide minimally invasive endodontics combined with simplicity at affordable cost. FKG claims that R-Motion has been shown to have greater efficiency, flexibility and resistance to cyclic fatigue with a design that respects the anatomy of the root canal.

R-Motion is up to 3.3 times more flexible and up to 3.6 times more resistant to cyclic fatigue compared with equivalent competing instruments, according to internal laboratory results. Resulting in 60% less transportation than standard reciprocating nickel titanium systems, better centring and up to a 40% less dentinal stress.

In a busy clinical environment, what files a clinician prefers would depend on their personal skills, experience and the individual requirements of the patient being treated. Should that choice be R-Motion?

The system delivers results with just two files – a glider and a one shaping file – but to cover all possible cases, R-Motion offers one of the largest lines of instruments, presenting incredible

3

FIGURE 3: *R-Motion 06.25 on WL*

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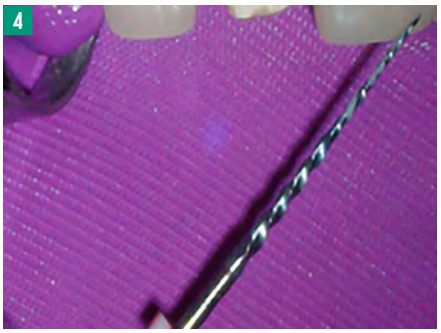

FIGURE 4: *Inspect the debris in the flutes at the apical third*

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FIGURE 5: *Master cone on WL*

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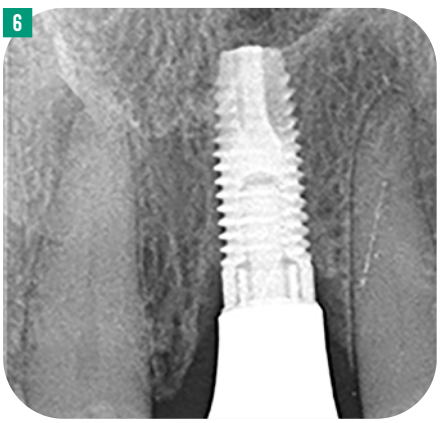

FIGURE 6: *Radiograph*

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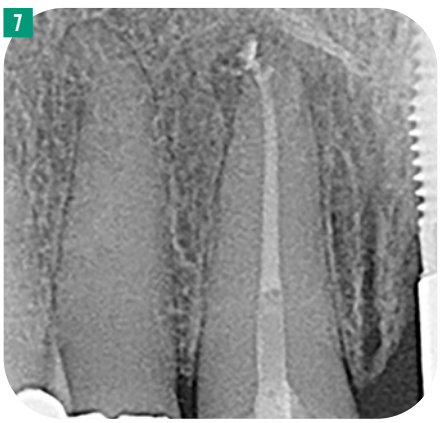

FIGURE 7: *Single file R-Motion sequence*

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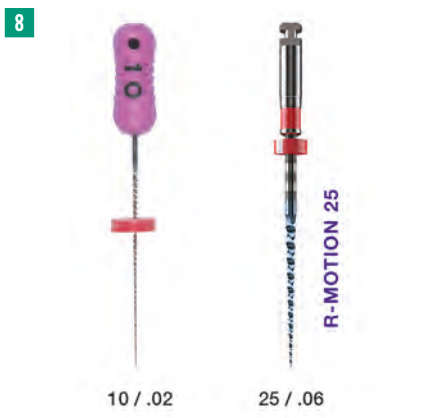

FIGURE 8: *R-Motion sequence*

FIGURE 9: *Case one – radiographic examination revealed apical radiolucency associated with the apical portion of the LL7*

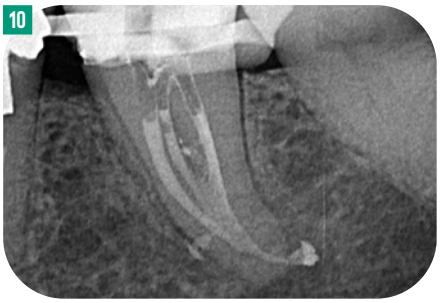

FIGURE 10: *Case one – mid-fill radiograph*

FIGURE 11: *Case one – after caries excavation, the access cavity was cleaned*

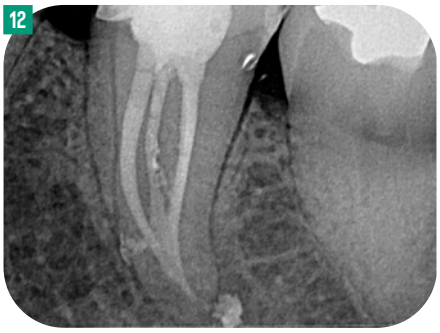

FIGURE 12: *Case one – final radiograph*

choice, consisting of seven files in total:

- Two glide path files: R-Motion Glider and R-Motion Glider C
- Five shaping files R-Motion 20, 25, 30, 40 and 50 (Figure 1).

R-Motion was designed with the intention to decrease the screwing effect. The smaller core sizes of the instruments also make them minimally invasive. They have rounded triangular cross-section with sharp cutting edges and an optimised file tip that centres the instrument, respects the anatomy, and quickly achieves a size considerably larger than the starting diameter.

Combined, these features deliver cutting efficiency while preserving the dentine. It also decreases stress on the dentine and minimises the risk of microcracks development.

My clinical experience revealed that for the most clinical cases, sizes 20 or 30 were sufficient to complete the root canal preparation. Both files are exceptionally flexible and agile. Size 20.04 preparation was sufficient for effective irrigation with a 30G safe-ended tip needle. It also enabled sonic or/and ultrasonic agitation. When larger taper and apical foramen were required, 25.06 was an invaluable option. The R-Motion 25 (25.06) is a flexible, yet robust file with excellent feedback. Sizes over 25 remained flexible and a very useful option in larger canals.

All R-Motion files apart from Glider C are heat treated. They have an easily recognisable bluish hue, while Glider C is silver coloured. Heat treatment is one of the fundamental approaches to adjust the crystalline transition phase of a metal alloy and improve its fatigue resistance (Ramos, 2022).

The file is soft when the alloy is in its martensitic phase, and it can easily be permanently bent (also defined as controlled memory). In contrast, the austenitic phase is firm and returns to the original straight condition when the load is removed (spring-back effect). Martensitic instruments are superior in curved canals and provide better maintenance of the original canal path (Sousa-Neto et al, 2018).

ELECTROCHEMICAL POLISHING

All R-Motion files underwent a proprietary electrochemical polishing. The treatment removes surface imperfections, reducing drastically the risk of weak points (micro-cracks). The resulting shiny surface also allows for better cleaning.

Furthermore, this process makes it possible to obtain increased resistance to fatigue and corrosion.

A SINGLE FILE TECHNIQUE

The following case did not require a glider file. After the working length (WL) was established with a 10 file, the root canal preparation was completed with 06.25.

The preparation method I normally use is with in-and-out pecking movements of the instrument with 3mm of amplitude until the WL is reached. A gentle inward pressure is applied.

I regularly inspect the file for deformation and for remains of debris in the flutes. The canal is then irrigated, recapitulated with a 10 hand file and re-irrigated.

The R-Motion file is cleaned before reinserted into the canal into a medium of irrigant (Figures 3 to 8).

WHEN GLIDE PATH IS REQUIRED

After the initial scouting of the canals with small files (sizes 06 to 10) and WL is established, a glider is used to provide glide path. Glider C is a preferred file in sclerotic canals, followed by 04.20 as a finishing file. The flutes of the canal are inspected to determine the size of the finishing file. The larger tapered 06.25 is preferred file in wider canals. Larger apical sizes are available if required: 04.30, 04.40 and 04.50.

Copious irrigation is advised between each file sequence followed by recapitulation with 10 file and re-irrigation. Different methods of agitating the irrigants are also recommended: sonic or ultrasonic. Inspect the files for deformation and discard if such has been noticed.

CLINICAL CASES

Case one

A 66-year-old female was referred regarding pain on biting LL6. The patient reported that she had a recent crown fitted in 2023. The patient had an unremarkable medical history and her oral hygiene was fair. The clinical examination revealed that the aforementioned tooth had drifted mesially LL7, presently occupying the space LL6, although the patient could not remember any previous extraction.

LL7 was restored with a porcelain overlay, which showed signs of discrepancies mesially. The alveolar mucosa, floor of the mouth and buccal mucosa appeared healthy in terms of texture and colour. The periodontal examination did not reveal pocketing deeper than 3mm associated with the LL7. The LL7 was moderately tender to percussion.

The radiographic examination revealed apical radiolucency associated with the apical portion of the LL7 (Figure 9). The roots of the LL7 were also converging. Mandibular second molars usually have two roots with three root canals, two in the mesial root and one in the distal root; however, these teeth can present severe anatomical variations, such as the presence of three canals in the mesial root, two canals in the distal root, or supernumerary roots. Often two or more of these canals could be confluent or a C-shape canal system could be observed.

I arrived at the following diagnosis: chronic apical periodontitis LL7. The following treatment options were discussed with the patient:

FIGURE 13: *Case two – periapical radiograph revealed widening of the PDL associated with the LR and a symptomatic chronic apical periodontitis*

FIGURE 14: *Case two – the access cavity was thoroughly rinsed*

FIGURES 15 *and* **16:** *Case two – two periapical radiographs revealed very conservative preparation shape yet well condensed root filling*

1. Root canal treatment LL7 following replacing of the overlay
2. Extraction.

The patient opted for root canal treatment but preferred to retain the overlay restoration for the time being.

After local anaesthesia and rubber dam isolation, the LL7 was accessed through the existing zirconia overlay to reveal necrotic content and strong necrotic odour. There was also caries that extended to the mesial margin of the restoration. Three orifices were located. There was no pus or other exudate in the canals.

Three canals were negotiated and working lengths were established with EAL: MB 23.0mm, ML 23.0mm, D 22.0mm. Alternating irrigation protocol was established to reveal a confluent root canal anatomy. Solutions of sodium hypochlorite 3% and EDTA 17% were used in conjunction with passive ultrasonic irrigation with Irrisafe ultrasonic file under low power.

R-Motion filing system was used to complete the chemo-mechanical debridement: MB canal was completed with 04.20, ML and D were completed with 06.25. The canals were obturated by the means of hydraulic bioceramic condensation.

A mid-fill radiograph revealed the complex confluent anatomy, deep isthmus and lateral canal over the apical section of the mesiobuccal root (Figure 10).

After complete caries excavation, the access cavity was cleaned and sealed with composite filling material (Figure 11) and recall appointment was scheduled after six months. The final radiograph revealed well condensed root filling material and satisfactory coronal seal (Figure 12).

In this case, R-Motion reciprocating system and modern irrigation and obturation techniques allowed us to address an extremely complex root canal anatomy.

Case two

A 71-year-old female patient was accepted for emergency appointment regarding continuous pain and pressure sensitivity LR6. At the time of the appointment, the patient was taking ibuprofen to keep the pain under control.

The clinical examination revealed that the LR6 was increasingly tender to percussion. No changes of the surrounding mucosa were noted and the periodontal probing was normal. A periapical radiograph (Figure 13) revealed widening of the PDL associated with the LR and a symptomatic chronic apical periodontitis. LR6 was established as diagnosis. The dentist then offered to open the tooth and medicate it with CaOH dressing. He then referred the patient to me to complete the root canal treatment.

After local anaesthesia and rubber dam isolation, the LR6 was accessed through the existing porcelain-bonded crown to reveal a necrotic content. Initial scouting was performed with 06 file in three canals: MB, ML and D and working lengths were established. MB and ML canals were found to be confluent. R-Motion sequence was used in the mesial canals:

- R-Motion Glider
- R-Motion 04.20 following the intricate confluent anatomy.

The distal canal was instrumented with the following: R-Motion Glider, R-Motion 04.20, and R-Motion 06.25 to address much larger oval shaped root canal anatomy.

Sodium hypochlorite 3% and EDTA 17% alternating solutions were used by the means of passive ultrasonic irrigation (PUI). The canals were obturated by the means of hydraulic bioceramic condensation. The access cavity was thoroughly rinsed (Figure 14) and sealed with composite filling material.

Two periapical radiographs were obtained (Figures 15 and 16), revealing very conservative preparation shape yet well condensed root filling. Several lateral canals were noted alongside the main canals coinciding with the periradicular alveolar bone loss.

The R-Motion file system allowed me to provide the treatment through a very small and conservative access cavity and to produce conservative shapes, respecting the root canal anatomy and the pericervical dentine, yet facilitated the irrigation techniques in order to achieve cleanliness.

CONCLUSION

Every dentist would rather perform an endodontic treatment that is easier, efficient, simpler and profitable. But we are also clinicians that centre our clinical efforts around the patient and science. We would like our treatments to be predictable and long lasting. We want happy patients and we want results. As every case is unique, the clinical skills and the rationale beside them precede the desired outcome.

With R-Motion, FKG has delivered a file system that has quickly become my preferred system, covering the majority of my everyday clinical cases. It is fast, safe and cost-effective. While we as clinicians are striving towards perfection, FKG's R-Motion is very close to it. CD

REFERENCES

siobhan.hiscott@fmc.co.uk

PRODUCTS USED

Irrisafe Acteon
R-Motion FKG Dentaire (available in the UK from Schottlander)

septodont ivoclar KULZER MITSUI CHEMICALS GROUP Dentsply Sirona 3M Perfection Plus COLTENE GC

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BIOMIN® F: BENEFITS

TRYCARE PRESENTS BIOMIN® F TOOTHPASTE, WHICH INCREASES ACID RESISTANCE OF TEETH BY 1000%

BioMin® F is the only toothpaste that delivers low level Fluoride with Calcium and Phosphate ions continuously for 12 hours after brushing. By contrast, soluble Fluoride used in all other toothpastes is washed away by saliva and has little clinical benefit just over an hour after brushing.

BIOGLASSES IN TOOTHPASTES

Developed over 20 years ago, first generation NovaMin® bioglass was not originally developed for use as a toothpaste. It was initially formulated for orthopaedic bone grafting. Only later was it used in toothpastes because of its adherent and slow dissolving capabilities to release Calcium and Phosphate. It does not contain Fluoride or even optimum proportions of Calcium and Phosphate.

NovaMin®, the active ingredient in Sensodyne Repair and Protect, is a bioglass without Fluoride. Repair and Protect incorporates additional soluble Fluoride which rapidly washes away like all other saliva soluble Fluoride toothpastes.

Resulting from 15 years research and development at Queen Mary's University, London, BioMin® F is an advanced second generation bioglass, specifically developed for dental applications and uniquely formulated to slowly release Fluoride, Calcium and Phosphate ions over a 12 hour period. It facilitates rapid and continual production of stable, acid-resistant Fluorapatite within dentinal tubules and on tooth surfaces. This constant Fluorapatite development increases the acid-resistance of teeth by 1000%. All other toothpastes contain soluble Fluoride that is washed away providing far less protection.

THE FLUORIDE MISCONCEPTION

Some wrongly believe that the optimal toothpaste should contain 1500ppm of Fluoride. This figure is not based on clinical benefit, but is simply the legal maximum a toothpaste can contain without having to comply with onerous product registration requirements. No manufacturer can add more Fluoride to a toothpaste without a Pharmaceutical Product Licence. BioMin® F avoids this problem because of its controlled continuous release of Fluoride with Calcium and Phosphate.

The higher the Fluoride content, the greater the risk of Fluorosis by accidental imbibition, especially amongst children and people prone to swallowing toothpaste.With its lower 530ppm Fluoride content this risk is minimised, whilst still delivering 12 hour Fluoride protection!

REDUCED SENSITIVITY

BioMin® F contains Fluoride, Calcium and Phosphate ions in the optimum proportion for rapid remineralisation. As the oral pH decreases after consuming sugary and acidic food and drink, the bioactive glass dissolves quicker, resulting in even faster release of these minerals, which in turn neutralises acid helping to stabilise the pH further and helping to protect the teeth from decay.

BioMin® F bioglass particles are 60% smaller than those found in NovaMin® products, resulting in less abrasivity and deeper penetration of the dentinal tubules with acid resistant Fluorapatite. So, formation of Fluorapatite is not just on the tooth's surface, but also deep within dentinal tubules. The tubular occlusion achieved with BioMin® F is much more resistant to dissolution, providing more effective and longer-lasting relief from dentine hypersensitivity. No other toothpaste delivers such effective remineralisation of teeth and long-term protection against dentine hypersensitivity. Published research shows that BioMin® F outperforms other sensitivity toothpastes in its ability to block dentinal tubules, resulting in superior and long-lasting sensitivity relief (studies available upon request). CD

TRYCARE

For more details, visit the Trycare website, **www.trycare.co.uk/biomin**, contact your local Trycare representative or call **01274 885544**.

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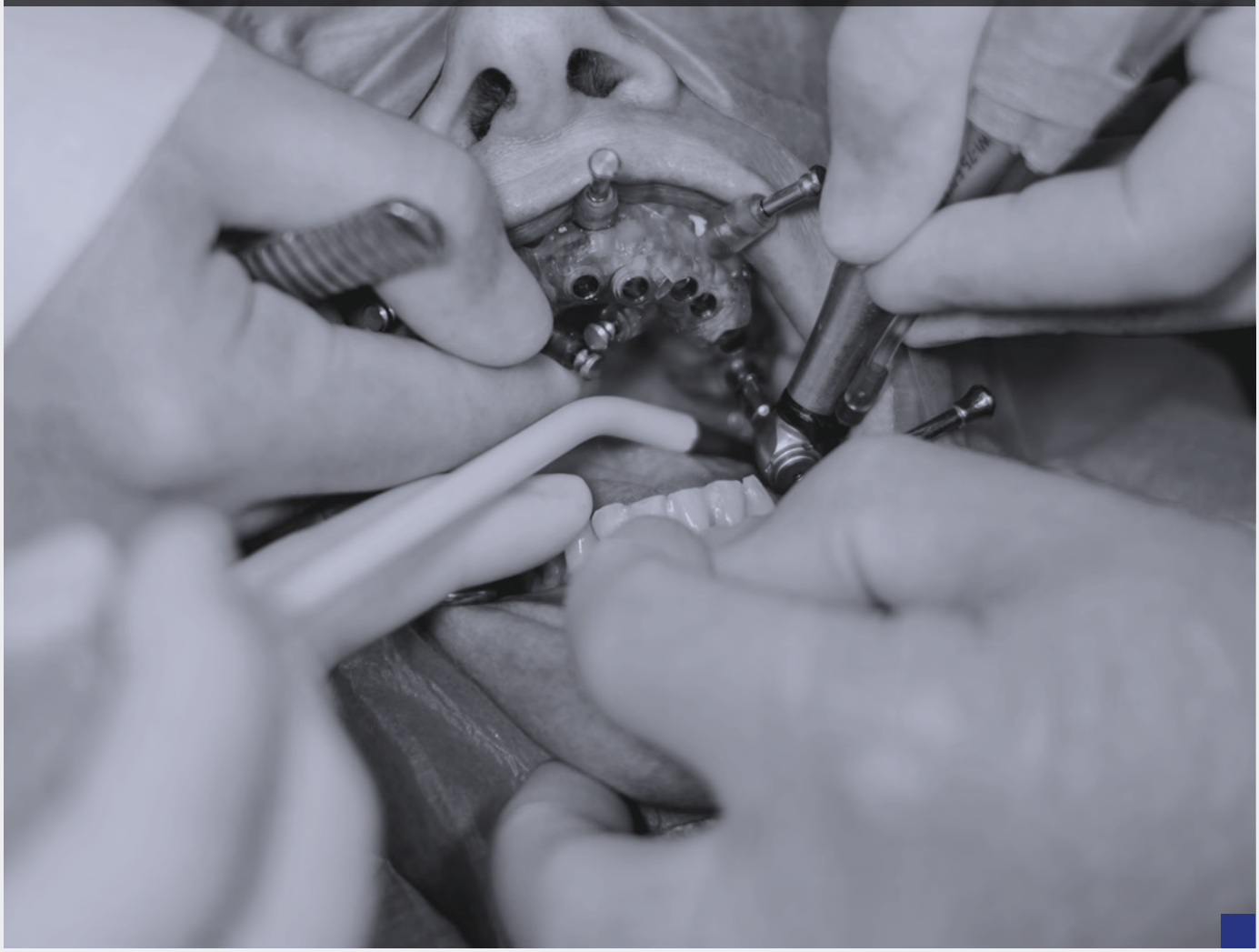
IMPLANTDENTISTRY



CLINICAL DENTISTRY AWARDS 2024

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IMPLANT DENTISTRY CATEGORIES: CRITERIA

CLINICAL DENTISTRY AWARDS

The Clinical Dentistry Awards aim to acknowledge clinical excellence in practice. The ceremony takes place at Royal Garden Hotel in London on Friday 11 October. The closing date for entries is Wednesday 10 July. For the full list of categories and more information, visit **dentistry.co.uk/clinical-awards**, or scan the QR code to enter.

IMPLANT DENTISTRY PRACTICE

To enter this award the practice must have a strong interest in this discipline and have adapted an element of the practice towards dental implants.

This category recognises the efforts of an entire team, from procedure to aftercare, focusing on the practice environment as well as clinical outcomes achieved and patient satisfaction.

Entries in this category will be accepted from practices only (not individuals). Judges will be looking at the submission in its entirety and assessing the overall picture it paints of your practice rather than concentrating on individual elements. However, failure to address any of the criteria set out below may negatively impact your submission.

Entries should consist of a portfolio of information, including submission of at least one case and supporting notes. Send up to 1,200 words explaining why your practice is a contender for Implant Dentistry Practice. Focus on the following:

The practice: the history, location, the appearance, feel and branding. How is a practice culture of excellence attained, both clinically and organisationally? What technology do you use?

The staff: who is there, what is their area of interest, what is their training and experience? How has practice investment in training and equipment benefited patients and outcomes?

The marketing: how do you attract the patients? (Provide examples of marketing materials if available)

The patient experience: what does your practice do to make the patient experience unique, from start to finish? How are people put at ease? How are treatment options explained?

The team: how does everyone work together to make sure that the patient receives the best results as efficiently as possible?

Clinical before and after photos: provide high-resolution before and after clinical photographs to show clinically excellent results

Additional photography: the practice, the team etc.

Please also provide one report of a case that you feel is exemplary (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and specifically include a discussion of how the case was treated as effectively as possible.

YOUNG IMPLANT DENTIST

This category is open to those born on or after 31 August 1988. Applicants should send up to 1,000 words explaining why they are a contender for an award through any, or a combination, of the following:

- Demonstrate hard work and drive; show achievement in your career to date
- Explain how you set yourself apart from other young implant dentists
- Present postgraduate training/development information if relevant
- Provide evidence of how you go beyond the regular duty of care
- Provide any other supporting evidence and pictures you feel are relevant
- Provide a portfolio of high-resolution outstanding before and after clinical photographs.

Please also provide one report of a case that you feel is exemplary (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and specifically include a discussion of how the case was treated as effectively as possible.

IMPLANT: SINGLE TOOTH

SPONSORED BY ADI ASSOCIATION OF DENTAL IMPLANTOLOGY

This category is for dentists and/or technicians. Please anonymise your entry for this category. Include a covering letter listing the names of all clinicians involved in treatment, such as the surgical and restorative stages.

If a dentist is entering alone, the technician should be named on the covering letter – both the dentist and technician will be awarded. Send up to 1,200 words detailing:

- The treatment, which involved replacement of one anterior tooth using implants to support the restoration
- This can include immediate/delayed placement and/or immediate/delayed loading
- Other treatment may have been carried out, but the major change will result from the implant therapy.

Clinical Dentistry Awards 2023 ceremony

IMPLANT: MULTIPLE TEETH

SPONSORED BY ADI ASSOCIATION OF DENTAL IMPLANTOLOGY

This category is for dentists and/or technicians. Please anonymise your entry for this category. Include a covering letter listing the names of all clinicians involved in treatment, such as the surgical and restorative stages.

If a dentist is entering alone, the technician should be named on the covering letter – both the dentist and technician will be awarded. Send up to 1,200 words detailing:

- The treatment, which involved replacement of multiple teeth using implants to support the restoration (this may be a small anterior bridge or two adjacent implants). Excludes full arches
- This can include immediate/delayed placement and/or immediate/delayed loading
- Other treatment may have been carried out, but the major change will result from the implant therapy.

IMPLANT: INTERDISCIPLINARY TEAM

SPONSORED BY ADI ASSOCIATION OF DENTAL IMPLANTOLOGY

This category is for all members of the team – dentists, surgeons, technicians and other clinicians as appropriate to the treatment undertaken. All team members included in the entry will be awarded.

Please anonymise your entry for this category. Include a covering letter listing the names of all clinicians involved in treatment.

Send up to 1,200 words detailing:

- The treatment should be carried out by more than one clinician, working as a team. The implant surgeon and other clinicians must be different individuals
- The treatment must involve the placement of dental implant/s. Other treatment should also have been carried out, depending on the case. This can include (but is not limited to) orthodontics/orthognathic surgery or endodontic treatment – but the major change in the smile should be underpinned by the implant surgery and restoration.

HOW TO ENTER

Highly inclusive and practice-based, the Clinical Dentistry Awards offer a wide range of categories, bringing together aesthetic dentistry, orthodontics, periodontics, endodontics, implant dentistry and oral health, to showcase the outstanding work being undertaken in dentistry.

The ceremony at the Royal Garden Hotel in London on Friday 11 October promises to be a prestigious and well-respected dental awards occasion for the United Kingdom.

Entering the Clinical Dentistry Awards 2024 is easy. Visit dentistry.co.uk/clinical-awards, click 'register now' and add your details, selecting the categories you wish to enter.

For this year's Clinical Dentistry Awards, please anonymise entries for the following implant categories:

- Implant: Single Tooth
- Implant: Multiple Teeth
- Implant: Interdisciplinary Team.

Remember to include a covering letter that lists the names of all the clinicians and technicians involved in treatment.

Once your entry has been written, polished and perfected, it's time to send it in! All you need to do is complete the online form at dentistry.co.uk/clinical-awards and upload your entry.

The deadline for entries is Wednesday 10 July.

To be eligible for an award, you should not be subject to any ongoing fitness to practise investigation by the General Dental Council (GDC), or be practising under any conditions imposed as a result of such an investigation.

If you need any guidance, don't hesitate to contact the awards team by calling 01923 851 777 or emailing awards@fmc.co.uk.

Good luck! CD

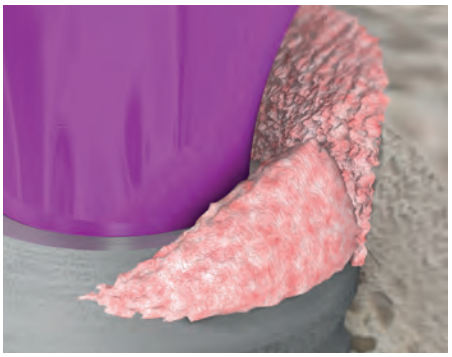
ADVERT

BEYOND PLATFORM-SWITCH

Bone Growth Concept

The right combination of shape, surface characteristics and positioning of an implant leads to the growth of bone on the backtaper, as scientific research and daily clinical practice have shown.

Bone Growth Concept



Backtaper - The evolution of Platform-Switch

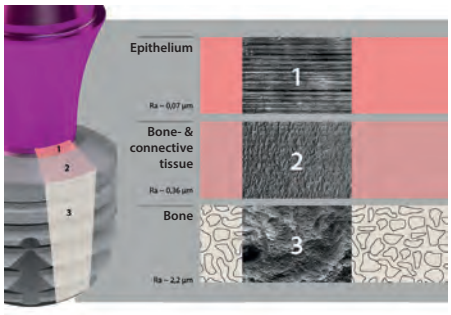
The platform-switch has proven itself in modern implant systems. The Backtaper is now an additional element which gives the hard and soft tissue more space for attachment than the cylindrical and conical implant shapes as the following illustration clearly demonstrates.

Subcrestal positioning

Clinical experience has shown that the additional space created by the backtaper, could be increased by subcrestal positioning of the copaSKY implant. The slim concave-shaped abutments provide more space for soft tissue attachment and bone growth on the backtaper. This has been confirmed in a recent multicenter clinical study.

Microstructured surface

The microstructured surface of the backtaper supports the attachment of bone and connective tissue. When the edge of the backtaper is positioned subcrestally, there is the possibility of depositing bone chips on it, thereby preventing the ingrowth of soft tissue and offering additional support for osseointegration. Thanks to the minimalist design of the cover screw, the peri-implant tissue around the backtaper is not irritated during re-opening. Any new bone formed on the anodized cover screw can be easily removed with a sharp excavator.

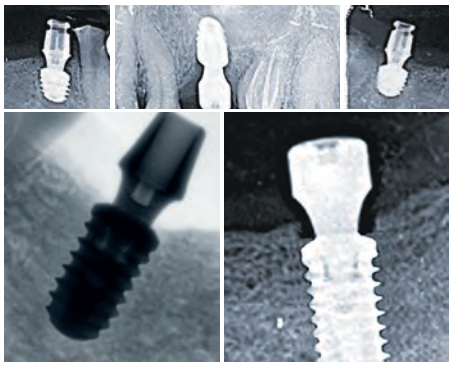


Impressive clinical results

The results observed by the clinicians are persuasive. Regardless of the clinical indication, new bone formation can be observed, from single-tooth restoration to the rehabilitation of edentulous jaws according to the SKY fast & fixed therapy. The vertical dimension of the alveolar ridge is preserved through the newly formed bone on the backtaper because there is reduced indication for bone levelling.

The Bone Growth Concept is precisely the further development of the Platform-Switch: the implant and abutment design, the microstructured backtaper and the subcrestal positioning of the copaSKY implants, synergistically not only prevent bone resorption but also reliably support the formation of new bone which completely encloses the implant.

Contact us today to find out more about the Bone Growth Concept.



Bone Growth Concept

- **Backtaper –** gives more space to the bone and soft tissue
- **Microstructured surface –** supports osseointegration and the attachment of connective tissue
- **Subcrestal positioning –** promotes bone growth

Scan QR Code for more information!

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

ENHANCED CPD

GDC anticipated outcome: C

CPD hours: one

Topic: Implant dentistry

Educational aims and objectives: To present a retrospective study that discusses the behaviour of implants with a smaller diameter (2.5 and 3mm) and length between 5.5 and 6.5mm. This article qualifies for one hour of enhanced CPD; answer the questions on page 102.

Eduardo Anitua presents a retrospective study that analyses the use of narrow and extra-short implants in the maxilla and mandible

Narrow and extra-short implants

Improvements in the design of dental implants, their morphology, connections, load resistance and stress distribution have led to the development of new concepts, including short, extra-short and narrow platform implants (Al-Johany et al, 2017; Maló et al, 2017).

The use of short and extra-short implants is a widespread practice in vertical atrophy of both the maxilla and mandible.

In those cases where this atrophy is combined with a decrease in the available bone width, we are faced with mixed atrophy, where extra-short and reduced diameter implants are an alternative to be considered, as are classic regeneration techniques to increase the available bone volume (Berczy et al, 2016; Kovacic et al, 2018).

We can consider extra-short implants to be those with a length of less than 7mm, although there are different classifications in this respect where variations may occur (Berczy et al, 2016).

Regarding the definition of 'narrow' implants, there is greater controversy, with those with diameters of less than 3.5mm being categorised in some studies and 3.3mm in others, as long as they are two-piece implants that allow conventional rehabilitation and components can be screwed inside the implant connection (Monje et al, 2013; Sohrabi et al, 2012; Ortega-Oller et al, 2014; Bidra and Almas, 2013; Pommer et al, 2018).

These implants of reduced diameter and length have been studied in recent years in order to find out whether they can be comparable in terms of survival and crestal bone loss with those considered to be of 'conventional' length and diameter.

As a result of this research, Pommer published a meta-analytical review in 2018 in which the behaviour of implants with a length of less than 7mm and a diameter of less than 3.5mm was studied.

In this study, the shorter implants (between 4 and 5.4mm) showed comparable results to those of greater length (5.5 and 6.5mm), with survival rates of 95.1% and 96.4% respectively.

Despite obtaining similar survival results, it is established in this same study that implants of length 5.5 and 6.5mm obtain better survival figures when inserted in the mandible than in the maxilla.

Similarly, it is observed that implants with a smaller diameter (between 3 and 3.25mm) have a significantly lower survival rate than implants with a diameter above 3.25mm (94.3% compared to 97.7%), with statistically significant differences $P < 0.001$.

These data make us reconsider the behaviour of implants with a smaller diameter (2.5 and 3mm) and length between 5.5 and 6.5mm.

We have prepared this retrospective study in which implants with these characteristics have been studied in the maxilla and mandible, to determine their cumulative survival and separately according to anatomical location, as well as the bone loss associated with each of the groups, assessing whether there are significant differences.

MATERIAL AND METHOD

Patients with extra-short implants (5.5 and 6.5mm) and diameters between 2.5 and 3mm were retrospectively recruited in both the maxilla and mandible between December 2019 and December 2020.

All patients were studied before implant insertion by means of diagnostic models, intraoral exploration and dental CBCT subsequently analysed using specific software (BTI-Scan III).

In addition, in order to correctly plan the subsequent rehabilitation, a diagnostic wax-up was carried out, from which a surgical guide was drawn up.

Prior to implant insertion, antibiotic pre-medication consisted of amoxicillin 2g orally one hour before surgery and paracetamol 1g orally (as an analgesic). Subsequently, patients were treated with amoxicillin 500-750mg orally every eight hours

1

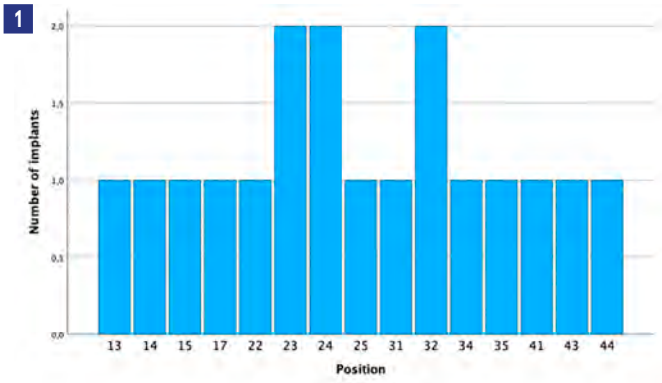

FIGURE 1: *Positions of the implants included in the study*

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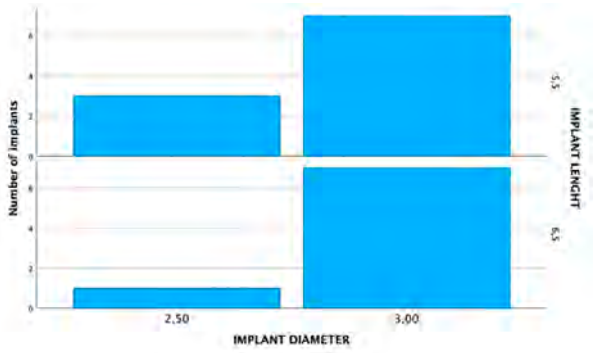

FIGURE 2: *Diameters and lengths of the implants included in the study with their respective percentages*

3

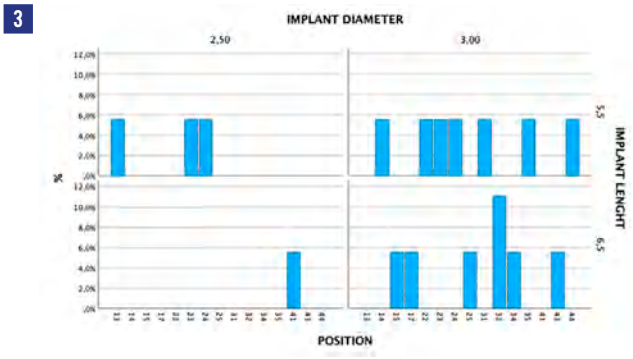

FIGURE 3: *Implants included in the study according to length and diameter categorised by position*

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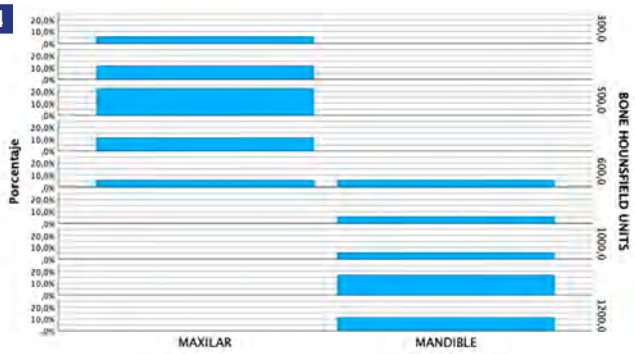


FIGURE 4: *Distribution of densitometry according to anatomical location*

(according to weight) for five days. Implant insertion was performed by the same surgeon, using the biological drilling technique, at low revolutions, without irrigation (Anitua et al, 2015; Anitua et al, 2016; Anitua, Carda and Andia, 2007).

Marginal bone loss was measured on the last periapical radiograph taken with a follow-up positioner. Once the X-ray was obtained in digital format, it was calibrated using specific software (Digora) through a known length in the X-ray, such as the dental implant.

Once we introduce the calibration measure, the computer program performs a calculation based on this measure to remove the magnification, being able to perform linear measurements exempted from this error.

The crestal bone loss was measured at two points: mesial and distal to each implant.

STATISTICAL ANALYSIS

A Shapiro-Wilk test was performed on the data obtained to confirm the normal distribution of the sample.

The main variable assessed was the survival of the implant followed by the loss of bone and subsequently assessed secondary from the loss of bone loss and survival in function of the location of the implant (maxillary upper or lower jaw) with a comparison of independent media (t-Student).

Qualitative variables were described by frequency analysis. Quantitative variables were described by means of mean and standard deviation.

Implant survival was calculated using the Kaplan-Meier method. Data were analysed with SPSS v15.0 for Windows.

RESULTS

Five patients were recruited and 18 implants were inserted that met the previously established inclusion criteria.

We found no significant statistical differences between bone loss and anatomical location

Eighty-three per cent were women with a mean age of 65.29 years (+/- 1.54). Of the patients, 55.6% were located in the maxilla and the remaining 44.4% in the mandible. The most frequent position in the upper jaw was for UL3 and UL4 with 11.1% respectively and in the lower jaw for LL2 with 11.1%.

The implants included in the study with the positions in which they were inserted are shown in Figure 1.

Implant diameters ranged from 2.5 to 3mm and lengths from 5.5 to 6.5mm, with the most frequent being 3 x 5.5mm and 2.5 x 6.5mm implants (39% of cases respectively) (Figure 2).

If we group the implants according to the position in which they are inserted, the most frequent implant is the 3 x 6.5mm in position LL2. The remaining positions and metrics are shown in Figure 3.

The mean bone densitometry of the bone where the implants were placed was 725 Hu (+/- 305), with a range between 300 and 1200 Hu.

If we categorise the implants according to their insertion in the maxilla or mandible, we find that for the maxilla the bone densities ranged between 300 and 600 Hu and for the mandible between 600 and 1200 Hu (figure 4).

The mean insertion torque was 33.06Ncm (+/- 18.32).

FIGURES 5 and **6:** *Initial images of the patient. She has a removable partial upper and complete lower prosthesis, both of which are in poor condition and do not meet the patient's aesthetic and functional expectations*

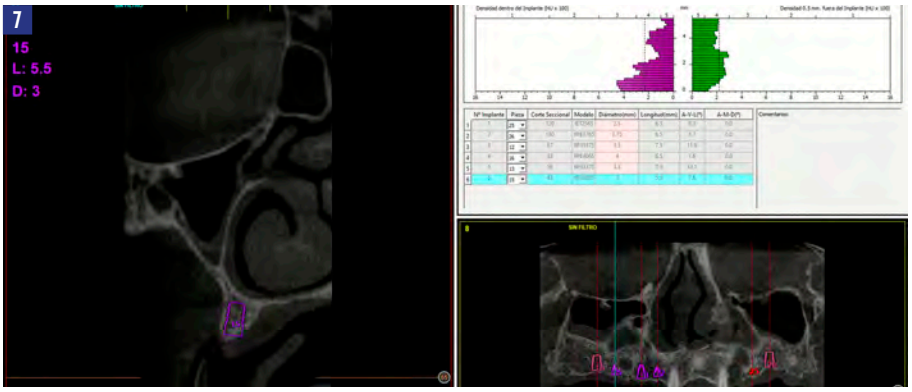


FIGURE 7: *Planning cut of the implant of 3mm in diameter and 5.5mm in length included in the study, joined to other implants as we can see in the planning to form part of a prosthesis with splinting of the elements*

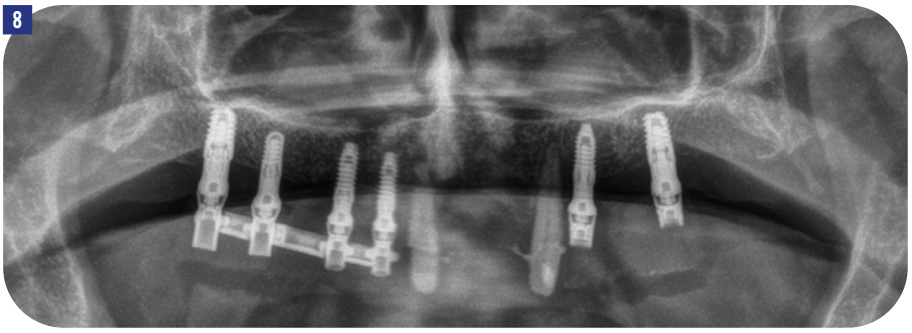


FIGURE 8: *Progressive loading of the implants at five months using a prosthesis made with articulated bars, which allows us to generate a structure to be screwed in easily, which can be modified according to our needs during the initial loading phase. In the anterior sector, a temporary bridge is placed over the remaining teeth*

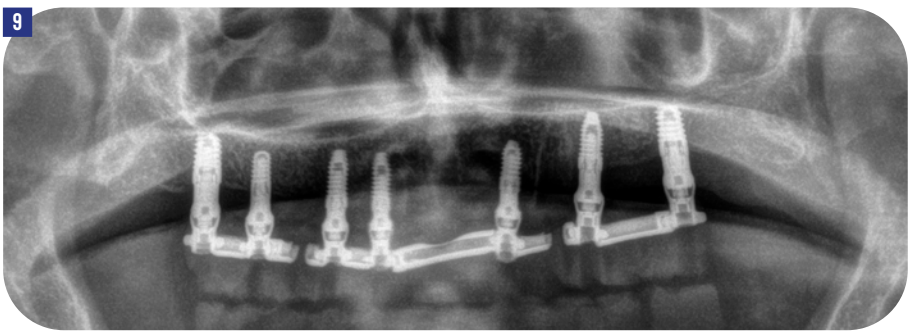


FIGURE 9: *Six months later we can proceed with the extraction of the remaining teeth, the insertion of new implants in the anterior sector and the creation of a new prosthesis with progressive loading, this time including all the implants, including the two anterior implants that have been placed post-extraction with immediate loading*

Survival of the implants studied was 100% with a mean follow-up time of 20.56 months (+/- 5.65).

The mean overall mesial bone loss for all implants was 0.18mm (+/- 0.62) and the mean overall distal bone loss was 0.21 (+/- 0.36).

When we studied the mean mesial bone loss according to the anatomical location of the implant, we found that for the maxilla it was 0.16mm (+/- 0.14) and for the mandible it was 0.21mm (+/- 0.82).

The distal bone loss according to anatomical location was, on average, 0.17mm (+/- 033) for the maxilla and 0.25mm (+/- 0.41) for the mandible.

When we compared the mean mesial and distal bone loss according to anatomical location (maxilla and mandible) we found no statistically significant differences (p=0.261 for mesial and p=0.769 for distal).

The survival rate reported for the prostheses was 100%, with only one adverse event detected during the follow-up period, which was loosening of one of the prostheses during the second month of loading. After tightening upon detection of the incidence, this or any other incidence was not reported for the prostheses studied.

All implants were rehabilitated with Multi-Im transepithelial screw-retained prostheses as part of bridges or complete rehabilitations.

One of the cases included in the study is shown in Figures 5 to 14.

DISCUSSION

More and more frequently, patients are requesting dental implants to rehabilitate their edentulousness, even in cases with extreme bone resorption of the maxilla or mandible, horizontally, vertically or mixed (combined) atrophies.

Implant dentistry has evolved to respond to most cases, even the most complex ones, creating different solutions for different clinical situations such as short, extra-short and ultra-short implants and implants with reduced diameter and platform (Al-Johany et al, 2017; Maló et al, 2017).

All these advances in the morphology and dimensions of implants aim to reduce the morbidity of treatments and to reach a greater number of patients by increasing the number of cases in which they can be used. These minimally invasive surgeries in oral implantology offer a series of advantages for the patient (less morbidity, fewer surgical procedures, better postoperative recovery) and for surgeons (lower costs, less time and in some cases simplification of the surgical technique) (Pommer et al, 2018; Pommer et al, 2014; Romandini et al, 2023).

FIGURES 10 *and* **11:** *The second set of provisionals after extraction of the remaining teeth and loading of the implants*

Initially, the need for greater length and width when placing dental implants was made in order to seek correct primary stability, since without this initial stability, osseointegration was compromised and therefore regenerative techniques were of vital importance (Bedrossian, 2020; Blume et al, 2021).

Nowadays, surgical and drilling protocols for the insertion of short, narrow implants make it possible to achieve this stability without increasing the useful surface area of the implant, using careful diagnostic, insertion and drilling protocols to adapt to each situation in a specific way (Kovacic et al, 2018; Anitua et al, 2015; Anitua et al, 2016; Anitua, Carda and Andia, 2007).

The diagnostic, insertion and rehabilitation protocol is crucial in order to obtain the best results

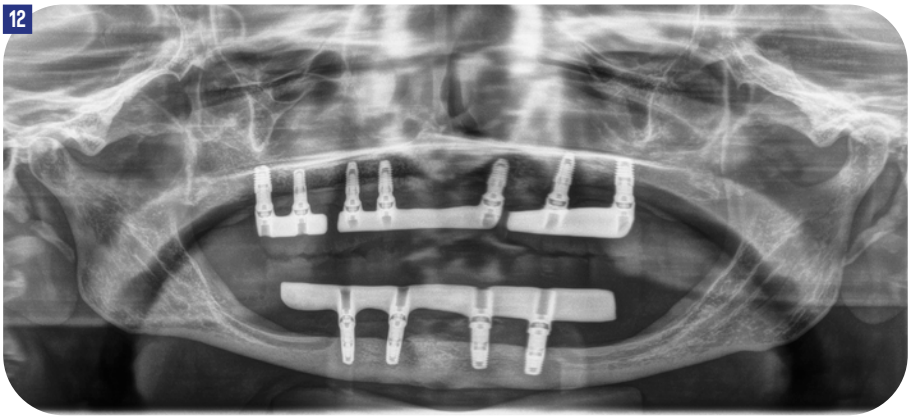


FIGURE 12: *Final prosthesis divided into three sections where we can observe the stability of the implant included in the study, after two years of follow-up as well as the rest of the implants placed*

FIGURES 13 *and* **14:** *Clinical images of the patient comparing the initial situation and the final situation once the treatment was completed*

In this series of cases in which extra-short, small-diameter implants were used, we obtained a 100% survival rate, which is consistent with the results published in the international literature on the subject, with rates of between 94 and 100% (Pommer et al, 2018; Pommer et al, 2016; Ortega-Oller et al, 2014).

The mean mesial and distal bone loss has also been similar to that reported in other studies in the international literature (Pommer et al, 2018; Pommer et al, 2016; Ortega-Oller et al, 2014).

In our case, we have found no significant statistical differences between bone loss and anatomical location (maxilla and mandible).

Pommer (2018), in his review of extra-short and narrow implants, does draw the conclusion that there is a higher failure rate of these implants in the maxilla when the length is reduced, especially below 6mm or the diameter of the implant is reduced below 3.3mm.

It is true that in the review work itself it is pointed out that there is a great variety of implants, bone types, loading protocols and implant-prosthesis connections, as well as surgical procedures for implant insertion that can have repercussions on the figures obtained.

In our case, the unification of the drilling protocol and the rehabilitation protocol (screw-retained prostheses splinted on transepithelial) makes the results of the sample more homogeneous and, therefore, it may be that the differences between the anatomical location are not evident.

CONCLUSIONS

Extra-short implants (5.5 and 6.5mm) of reduced diameter (2.5 and 3mm) can be used for our implant-supported rehabilitations, avoiding previous regenerative accessory techniques.

We must be clear in this type of situation that the diagnostic, insertion and rehabilitation protocol is crucial in order to obtain the best results in terms of survival and crestal bone loss.

However, studies with larger samples and longer follow-up time are necessary to assess more accurately the behaviour of this group of implants. CD

REFERENCES

siobhan.hiscott@fmc.co.uk

PRODUCTS USED

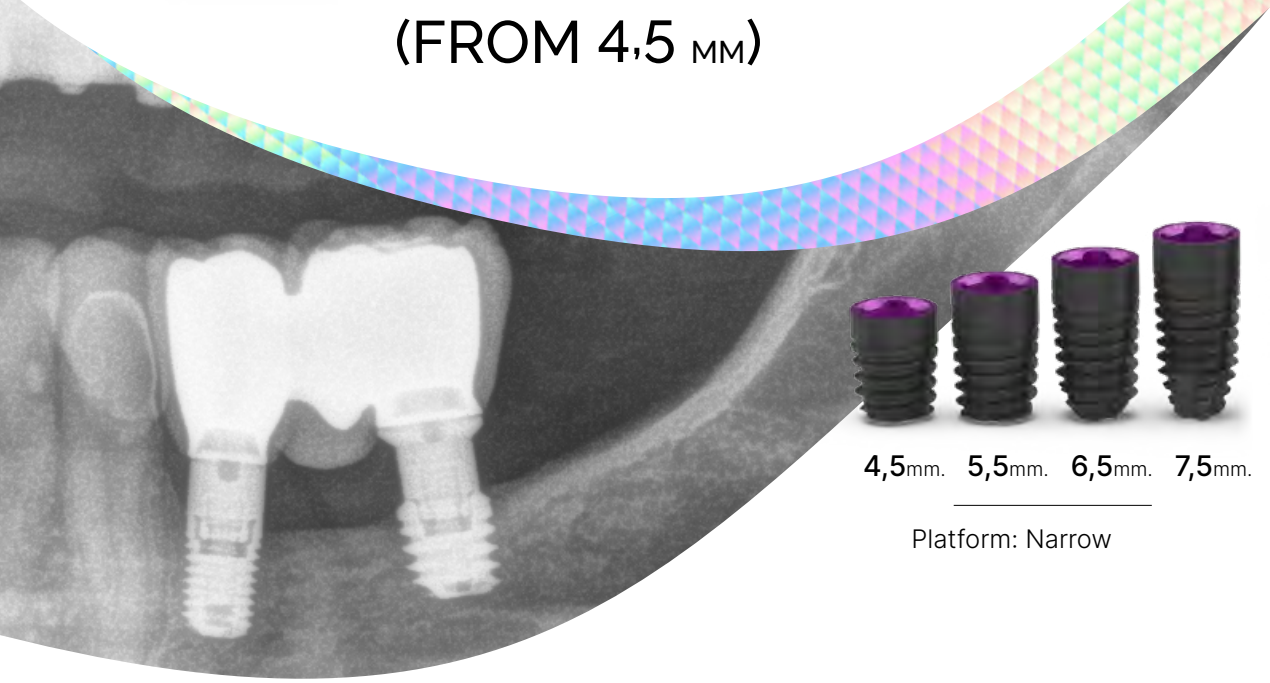
Multi-Im Biotechnology Institute

bti
Biotechnology Institute

MINIMALLY INVASIVE SOLUTIONS

SHORT IMPLANTS

(FROM 4,5 MM)



4,5mm. 5,5mm. 6,5mm. 7,5mm.

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- *Loading anchors considering the distance between the first molar of the lower jaw and the canine of the upper jaw. Slight insertion of the anchor into the bite to leave enough space for the connectors*
- *Creation of a breathing gap between upper and lower incisors. This portion is calculated digitally and subtracted from the upper and lower bite by creating a split which improves patient's breathing*

Restoring an upper left central incisor

Rob Oretti presents a case study detailing implant replacement of the upper left central incisor utilising Mineross and Novomatrix

The patient was referred for implant replacement of her failed UL1. The tooth was tender to percussion and exhibited grade II mobility.

Clinical and CT scan assessment confirmed that the UL1 suffered from root resorption and was associated with a large periapical lesion that extended palatally and laterally towards the UL2 root tip. The UL2 tested positive to vitality testing.

TREATMENT OPTIONS

It was considered high risk to attempt an immediate implant placement in such a compromised site.

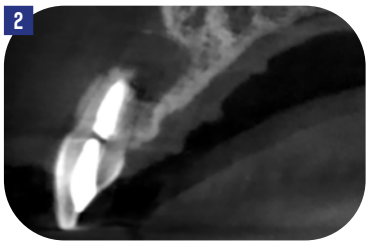
The treatment plan was to firstly remove the tooth and the granulation tissue and perform a ridge preservation procedure simultaneously to combat the likelihood of severe shrinkage of the socket during the healing period.

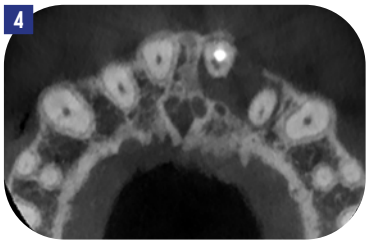
The rationale being to fill the bone defect with a bone graft material immediately after tooth removal, to reduce the shrinkage of the socket and maintain most of the socket dimensions during the healing phase.

TREATMENT: BONE AUGMENTATION

The first treatment phase included the elevation of a large full thickness flap to fully expose the area and enable the harvesting of autogenous bone.

The UL1 was then removed, including excavation of all granulation tissue, taking care to avoid any direct curettage of the exposed UL2 root tip. The apical defect as well as the UL1 socket was filled with a 50/50 mix of autogenous



FIGURES 1 *to* **4:** *Presenting situation*

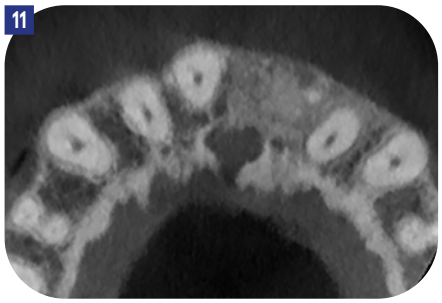



FIGURES 5 *to* **8:** *Guided bone regeneration utilising the open wound healing concept*

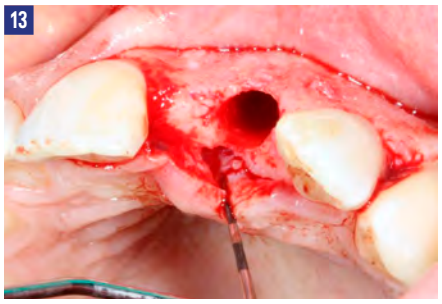
ROB ORETTI

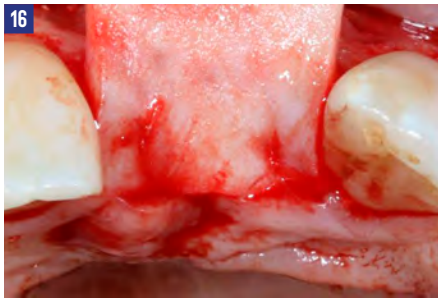
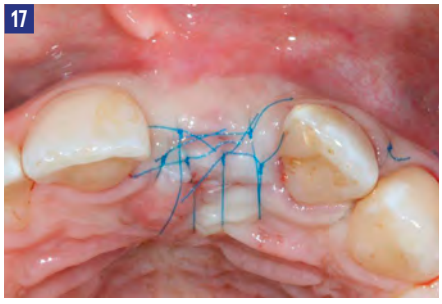
Rob qualified from King's College, London in 1987 and has gained years of experience in performing complex implant, orthodontic and cosmetic treatments. He is clinical co-director at Pentangle Dental Transformations (part of Bupa).



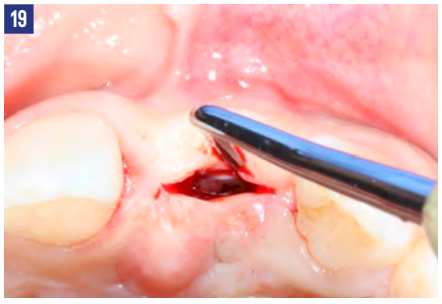


FIGURES 9 *to* **11:** *Seven months of healing*

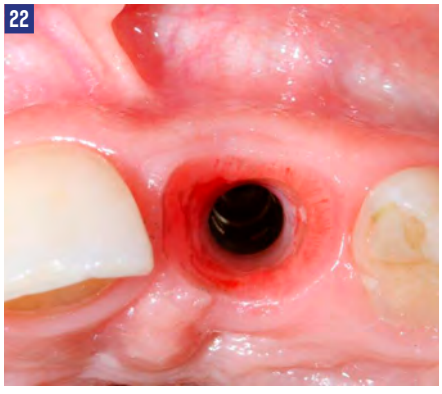



FIGURES 12 *to* **17:** *Implant placement and Novomatrix application*





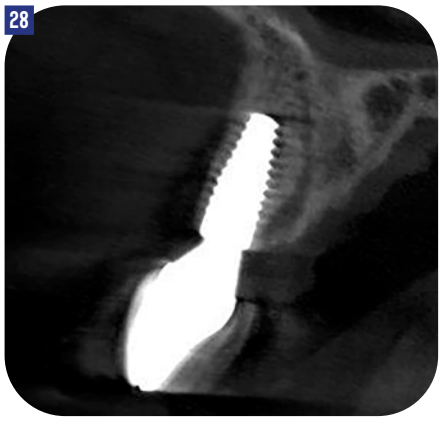
FIGURES 18 *to* **22:** *Implant exposure and provisionalisation*

FIGURES 23 to **25:** *Delivery of the final restoration*

bone chips and an allograft (Mineross – cortico-cancellous mix) and the apical defect was covered with a native porcine collagen membrane with a high percentage of collagen type III for a prolonged barrier function of six months (Jason membrane).

The mucoperiosteal flap was sutured back with 6.0 prolene and no attempt was made to coronally advance the flap for complete closure.

UL2 maintained vitality throughout the treatment



FIGURES 26 to **28:** *Final review*

The rationale was to maintain the open socket wound and thereby preserve the original mucogingival relationship with no alteration.

The socket entrance was sealed with a resorbable haemostatic sponge (Hemocollagene) and the original tooth was utilised as a temporary pontic and bonded to the adjacent teeth with flowable composite.

TREATMENT: IMPLANT SURGERY

Healing was uneventful and following a seven-month healing period, a full thickness flap was elevated revealing good turnover of bone graft into host bone. A bone level implant was placed in a slightly buccal position due to the close proximity of the naso-palatine foramen followed by the placement of a 4mm healing cap.

No additional bone grafting was performed, but the soft tissue volume was enhanced utilising a strip of acellular porcine dermal matrix (Novomatrix), which was sutured to the palatal flap and stabilised buccally with periosteal suture fixation. Full closure was performed with 6.0 prolene.

Three months later, a small crestal incision was performed to expose and remove the healing cap and impressions taken to construct an under-contoured screw-retained provisional crown.

Over a period of two visits, composite was incrementally added to the subgingival portion of the temporary crown to expand and modify the soft tissue emergence profile until an acceptable shape was achieved.

A new impression was taken, capturing the transmucosal shape and a customised abutment and zirconia crown was fabricated as a one-piece screw-retained restoration.

Due to multiple connections/disconnections during the restorative stages, epithelial downgrowth had occurred within the transmucosal compartment. Therefore, prior to fitting of the final restoration, the internal aspect of the soft tissues was de-epithelialised (refreshed) with a low grit rugby shaped diamond bur and the final crown fitted immediately afterwards.

CONCLUSION

A two-month review of the final outcome displayed adequate hard and soft tissue volume at this very early stage of maturation, which is likely to improve over the following 12 months.

The UL2 maintained vitality throughout the treatment. CD

PRODUCTS USED

Mineross, Novomatrix Biohorizons
Jason Botiss Biomaterials
Hemocollagene Septodont

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Friday 11 October 2024

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- Implant: Interdisciplinary Team
- Implant: Multiple Teeth
- Implant: Single Tooth
- Local Oral Health Initiative
- Multidisciplinary Practice
- Orthodontic Practice
- Orthodontic Therapist
- Periodontic Practice
- Philips Shine-On Award
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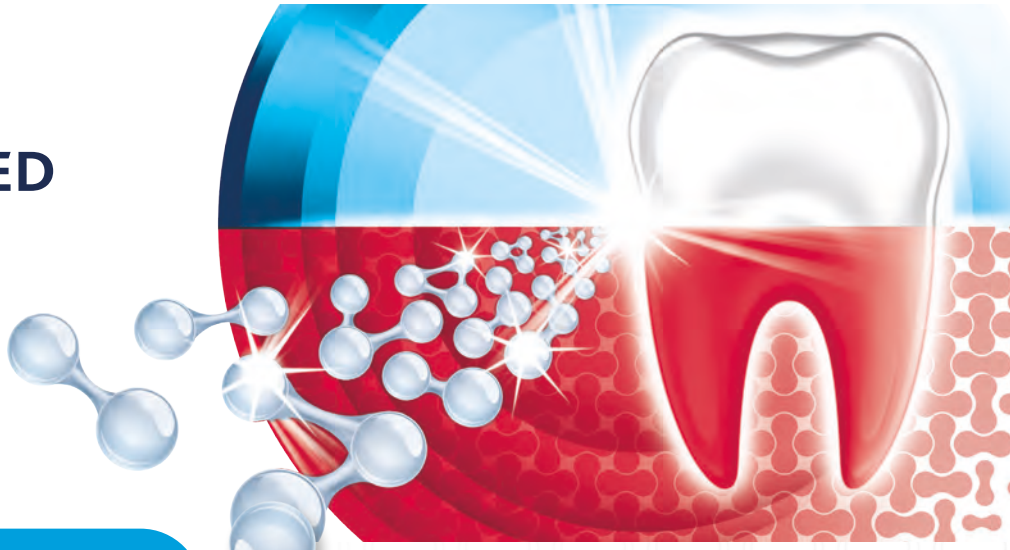

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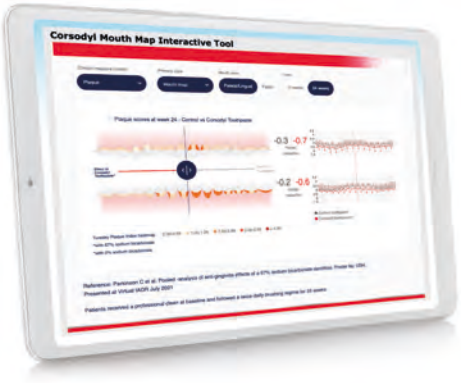

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1. Jose *et al.* J Clin Dent 2018;29:33-39. **2.** Pratten J *et al.* Int J Dent Hygiene. 2016;14:209-214.
3. Akwagyriam I *et al.* Oral Health Prev Dent. 2018;16(5):401-407.

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ORAL HEALTH CATEGORIES: CRITERIA

CLINICAL DENTISTRY AWARDS

The Clinical Dentistry Awards aim to acknowledge clinical excellence in practice. The ceremony takes place at Royal Garden Hotel in London on Friday 11 October. The closing date for entries is Wednesday 10 July. For the full list of categories and more information, visit **dentistry.co.uk/clinical-awards**, or scan the QR code to enter.

PERIODONTIC PRACTICE

To enter this award the practice must have a strong interest in this discipline and have adapted an element of the practice towards periodontics.

This category recognises the efforts of an entire team, from procedure to aftercare, focusing on the practice environment as well as clinical outcomes achieved and patient satisfaction.

Entries in this category will be accepted from practices only (not individuals). Judges will be looking at the submission in its entirety and assessing the overall picture it paints of your practice rather than concentrating on individual elements. However, failure to address any of the criteria set out below may negatively impact your submission.

Entries should consist of a portfolio of information, including submission of at least one case and supporting notes. Send up to 1,200 words explaining why your practice is a contender for Periodontic Practice. Focus on the following:

The practice: the history, location, tech, the appearance, feel and branding
The staff: who is there, what is their area of interest?
The marketing: how do you attract patients?
The patient experience: what does your practice do to make the patient experience unique, from start to finish?
The team: how does everyone work together to ensure the best results as efficiently as possible?
Photography: provide high-res before and after clinical photographs to show clinically excellent results, and photos of the practice, the team etc.

Please also provide one case report and supporting notes (up to 1,000 words).

HYGIENIST OF THE YEAR

This award is for an individual dental hygienist working for a practice (or several practices). It is designed to recognise an empathetic, innovative and effective approach to clinical care and the promotion of oral health. Entrants to this category cannot enter both Hygienist of the Year and Therapist of the Year.

Applicants should send up to 1,000 words explaining why they are a contender for an award through any, or a combination, of the following:

- Demonstrate hard work and passion for prevention; show achievement in your career to date
- Explain how you set yourself apart from other dental hygienists
- Show innovation in educating patients
- Present postgraduate training/development information if relevant
- Provide evidence of how you go beyond the regular duty of care
- Demonstrate how you have carried the oral health message beyond the practice
- Provide any other supporting evidence and pictures you feel are relevant
- Provide a portfolio of high-resolution outstanding before and after clinical photographs.

Please also provide one report of a case that you feel is exemplary (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and specifically include a discussion of how the case was treated as effectively as possible.

THERAPIST OF THE YEAR

This award is for an individual dental therapist working for a practice (or several practices). It is designed to recognise an empathetic, innovative and effective approach to clinical care and the promotion of oral health. Entrants to this category cannot enter both Hygienist of the Year and Therapist of the Year.

Applicants should send up to 1,000 words explaining why they are a contender for an award through any, or a combination, of the following:

- Demonstrate hard work and passion for prevention; show achievement in your career to date
- Explain how you set yourself apart from other dental therapists
- Show innovation in educating patients
- Present postgraduate training/development information if relevant
- Provide evidence of how you go beyond the regular duty of care
- Demonstrate how you have carried the oral health message beyond the practice
- Provide any other supporting evidence and pictures you feel are relevant
- Provide a portfolio of high-resolution outstanding before and after clinical photographs.

Please also provide one report of a case that you feel is exemplary (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and specifically include a discussion of how the case was treated as effectively as possible.

RECENTLY-QUALIFIED HYGIENIST

This award is for an individual who is starting out in their hygiene career. Individual hygienists who have qualified within the last five years are eligible to enter. It is designed to recognise an empathetic, innovative and effective approach to clinical care and oral health promotion.

Entrants to this category cannot enter both Recently-Qualified Hygienist and Recently-Qualified Therapist.

Applicants should send up to 1,000 words explaining why they are a contender for an award through any, or a combination, of the following:

- Demonstrate hard work and passion for prevention; show achievement in your career to date
- Explain how you set yourself apart from other dental hygienists
- Show innovation in educating patients
- Present postgraduate training/development information if relevant
- Provide evidence of how you go beyond the regular duty of care
- Demonstrate how you have carried the oral health message beyond the practice
- Provide any other supporting evidence and pictures you feel are relevant
- Provide a portfolio of high-resolution outstanding before and after clinical photographs.

Please also provide one report of a case that you feel is exemplary (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and specifically include a discussion of how the case was treated as effectively as possible.

RECENTLY-QUALIFIED THERAPIST

This award is for an individual who is starting out in their therapy career. Individual therapists who have qualified within the last five years are eligible to enter. It is designed to recognise an empathetic, innovative and effective approach to clinical care and the promotion of oral health.

Entrants to this category cannot enter both Recently-Qualified Hygienist and Recently-Qualified Therapist.

Applicants should send up to 1,000 words explaining why they are a contender for an award through any, or a combination, of the following:

- Demonstrate hard work and passion for prevention; show achievement in your career to date
- Explain how you set yourself apart from other dental therapists
- Show innovation in educating patients
- Present postgraduate training/development information if relevant
- Provide evidence of how you go beyond the regular duty of care
- Demonstrate how you have carried the oral health message beyond the practice
- Provide any other supporting evidence and pictures you feel are relevant
- Provide a portfolio of high-resolution outstanding before and after clinical photographs.

Please also provide one report of a case that you feel is exemplary (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and specifically include a discussion of how the case was treated as effectively as possible.

LOCAL ORAL HEALTH INITIATIVE

This award is designed to recognise the work being done to take oral health education outside the practice. Submissions are welcomed from all: individuals, practices, charities, local health teams etc.

Potential suitable projects include, but are not limited to, outreach work in care homes, education to local schools or spreading awareness of good oral health to the community.

Applicants should send up to 1,000 words explaining why they are a contender for Local Oral Health Initiative through any, or a combination, of the following:

- Describe the project and the intent behind it
- Explain how the initiative was put into action
- Highlight the impact that the work has had on the community.
- Include photographs, testimonials and other supporting evidence to help your entry stand out.

PHILIPS SHINE-ON AWARD

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The Philips Shine-On Award is designed to recognise and celebrate dental hygienists/therapists who are pushing the boundaries of the profession, creating their own career pathway and who demonstrate clear dedication to career development and success.

Applicants should send up to 1,000 words explaining why they are a contender for the Philips Shine-On Award through any, or a combination, of the following:

- Demonstrate passion for the profession
- Show how you have gone beyond the usual career boundaries
- Show your dedication to career development and progression
- Provide credible and relevant testimonials where relevant/possible.

While not essential, entries for the Philips Shine-On Award can include patient care cases. CD

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DR ANDRE VAN ZYL
MCHD
Andre is in private practice in Hermanus, South Africa.

ENHANCED CPD

GDC anticipated outcome: C

CPD hours: one

Topic: Oral health

Educational aims and objectives: To discuss non-surgical therapy of periodontitis and the role it plays in successful dental implant therapy. This article qualifies for one hour of enhanced CPD; answer the questions on page 102.

Andre W van Zyl discusses non-surgical therapy of periodontitis and the role it plays in successful dental implant therapy

Periodontitis and dental implants

Dental implants have become standard of care to replace lost teeth. Clinicians should, however, always diagnose the reason for tooth loss before planning the replacement of teeth with implants.

Periodontitis remains one of the main reasons for tooth loss and has important implications should implants be planned. This is especially true for the more advanced/severe periodontitis cases (Takedachi et al, 2022; Papapanou et al, 2018).

Periodontitis is associated with plaque bacteria and requires excellent plaque control for successful management (Takedachi et al, 2022; Papapanou et al, 2018; Schwarz et al, 2021).

The design of implant restorations and the accessibility for excellent plaque removal is also of importance in preventing peri-implantitis (Mattheos et al, 2021).

Dental implants are surrounded by gingiva and bone, much like a natural tooth, and plaque bacteria accumulate on implants and subgingival around the implant (Figure 1). The notion that 'implants are for life' is a misconception and implants can develop infection in the surrounding gingiva and alveolar bone just like teeth.

Peri-implant infection is called peri-implant mucositis when no bone loss has occurred and peri-implantitis if there is progressive bone loss.

Implants need to be examined for peri-implant tissue health using a periodontal probe, visual inspection, and palpation of tissues (Berglundh et al, 2018).

Periodontitis and poor plaque control are important risk factors for peri-implant infection and should therefore be diagnosed and treated before placing dental implants.

Figure 2 shows a patient with undiagnosed and untreated periodontitis, poor plaque control with caries and root rests with two implants placed in fourth quadrant. The implants showed advanced bone loss before any restorations could be placed and will have to be removed.

TYPES OF PERI-IMPLANT DISEASE

Peri-implant mucositis

This is much like gingivitis with bleeding on probing, redness of marginal gingiva and suppuration. Clinical signs of inflammation must be present before making the diagnosis of peri-implant mucositis.

Implants must be probed as this is the only way to determine presence and progression of disease. Gentle probing will not harm the implant or peri-implant tissues (Berglundh et al, 2018).

Peri-implantitis

This is also a plaque associated disease with signs of inflammation as seen in peri-implant mucositis as well as progressive loss of alveolar bone support around implant.

Recession may be seen on the implant, and probing depths increase in peri-implantitis (Berglundh et al, 2018).

DIAGNOSIS OF PERIODONTITIS

To diagnose periodontal disease, one should be able to define periodontal health. Periodontal health may be seen in an intact periodontium (where no recession or bone loss is found) or in a reduced periodontium (successfully treated periodontal disease, after crown lengthening or where aggressive brushing has caused loss of attachment).

Periodontal health in an intact periodontium has no:

- Bleeding on probing
- Redness or swelling
- Patient symptoms
- Attachment loss
- Bone loss.

Bone margins are found 1 to 3mm from the CEJ (Chapple et al, 2018). Periodontal health in a reduced periodontium has the same characteristics except in the presence of attachment and bone loss.

Patients with periodontal health after successful treatment of periodontitis remain at risk of future

development of periodontitis. The same cannot be said for patients with reduced periodontium from other reasons (Chapple et al, 2018). This is why the supportive treatment phase of periodontitis is so important.

The diagnosis of periodontitis, according to consensus, includes (Papapanou et al, 2018):

- Interproximal clinical attachment loss of more than 2 to 3mm at more than two non-adjacent teeth
- Probing depth of more than 3mm with CAL (probe goes beyond the CEJ) at more than two non-adjacent teeth will indicate periodontitis if it cannot be ascribed to non-periodontitis causes such as traumatic brushing, caries, third molar removal etc
- Interproximal bone loss can usually be seen on radiographs.

TREATMENT OF PERIODONTITIS

According to the American Academy of Periodontology, non-surgical therapy may be successful in most periodontitis cases.

Non-surgical treatment or root planing is achieved through debridement of the root surfaces in periodontal pockets to remove plaque bacteria and calculus and to smoothen the roots to remove bacterial toxins.

FIGURE 1: *Extensive accumulation of plaque with bone loss and inflammation around implants in an edentulous patient that has received no maintenance after implant placement*

Ultrasonic debridement of roots in periodontitis is as effective as hand instrumentation, but much easier to perform (Chapple et al, 2018). There is also less chance of trauma to the soft tissue that may occur during the use of periodontal curettes, especially for the inexperienced clinician.

Self-injury with periodontal curettes is a concern, which is not found with ultrasonic instruments.

Root planing requires an intimate knowledge of root morphology and anatomy below the gingival crest. This will enable accurate probing

FIGURE 2: *Advanced loss of peri-implant bone in untreated periodontitis case*

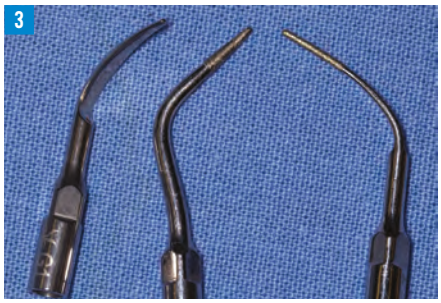

FIGURE 3: *Scaling tip (left) is used for gross debridement and the two diamond tips (right) for root planing and getting a smooth subgingival root surface*

FIGURE 4: *One 100mg capsule per 1ml water for a 10% doxycycline solution*

FIGURE 5: *Doxycycline capsules dissolved in water should be left for a few minutes for the suspended particles to settle*

FIGURE 6: *The clear liquid is drawn up in the syringe, leaving solid particles behind, which will block the irrigating needle if care is not taken in this process*

as well as effective debridement (illustrated in the video via the QR code).

Treatment of periodontitis in a conservative non-surgical manner cannot harm the patient. It can only improve the situation.

Unwanted side-effects of the treatment will be temperature sensitivity and recession of gingiva. This is, however, an indication that the treatment has been successful and during the healing, gingiva will recede and expose root surfaces that may be sensitive. Sensitivity is temporary and can be treated while recession of gingiva is permanent. Patients must be informed of the unwanted effects of the treatment beforehand and, once they understand why this happens, most patients will accept it.

Treatment of periodontitis in a conservative non-surgical manner cannot harm the patient. It can only improve the situation

I prefer to perform the gross debridement with a scaling tip as the first step, followed by proper root planing with a diamond tip (Figure 3) (see video).

This is then followed with sub-gingival irrigation of the pockets with a 10% doxycycline solution for five minutes (Figures 4 to 6).

Doxycycline 100mg dissolved in 1ml water gives a 10% solution and I use 20-30ml on a full periodontal treatment. This is a very toxic, low pH solution, so one should take great care to have very effective suction to prevent any of the solution going down the throat and to irrigate small areas at a time.

My advice is to do one quadrant at a time until you become more confident before doing two quadrants simultaneous, left and right sides separately to facilitate effective suction.

A continuous five-minute irrigation is done for the entire area before moving on to the next.

RISK OF PERIODONTITIS FOR DENTAL IMPLANTS

As peri-implantitis is a plaque-induced infection, plaque control is important in preventing this.

It follows that periodontitis will place a high bacterial burden on the peri-implant tissues and should be treated before placing any dental implants.

Peri-implant mucositis may precede peri-implantitis like gingivitis precedes periodontitis. Peri-implantitis may lead to severe implant complications and implant loss, so patients should be monitored as it has been shown that patients with poor plaque control, not on a maintenance programme, are more likely to develop peri-implantitis.

Peri-implantitis develops at a faster rate than periodontitis and should therefore be treated as early as possible (Berglundh et al, 2018).

There is consensus that strong evidence exists for the following risk factors for peri-implantitis (Berglundh et al, 2018):

- A history of severe periodontitis
- Poor plaque control
- Those not on a maintenance supportive programme after dental implants are placed.

FIGURE 7: *Preoperative view of early onset periodontitis*

FIGURE 8: *Palatal view of same case – bleeding and suppuration after probing*

FIGURE 9: *Early onset case three years after root planing with ultrasonic scaler and irrigation with doxycycline 10%. Patient was seen every four months for scaling and motivation*

FIGURE 10: *Preoperative view of fourth quadrant in periodontitis patient*

FIGURE 11: *Bleeding may be profuse during root planing*

FIGURE 12: *Five days after root planing with excellent healing and patient still using chlorhexidine 0.2% rinse*

FIGURE 13: *One year later and tissue has stabilised due to excellent plaque control by the patient*

CONCLUSION

Effective plaque control is essential in preventing peri-implant disease. This implies that periodontal disease should be treated before dental implants are placed and implant restorations/prostheses need to be designed to facilitate effective plaque control.

This will include designing the suprastructure to allow maintenance procedures. Screw retention makes it possible to remove the crown/bridge/prosthesis for maintenance if needed and should be used wherever possible.

Periodontitis should be treated before placing dental implants and patients need to be informed of the risk of poor plaque control and not staying on the maintenance programme for the periodontitis.

Patients who are edentulous may have had severe periodontitis and should be treated in the same manner by placing them on a maintenance programme to monitor plaque control and performing subgingival debridement where necessary.

The treatment of periodontitis falls within the scope of practice of all dental healthcare workers and the video demonstrates how to perform non-surgical periodontal treatment.

The results will speak for themselves if the treatment is carried out with proper care (Figures 7 to 9).

Treating a severe case of periodontitis will lead to much bleeding but will settle down by the time subgingival irrigation is complete. After root planning, the patient is placed on chlorhexidine 0.2% mouthwash and asked to rinse vigorously for 10 days.

The patient is followed up five to 10 days after root planing to give detailed plaque control instructions. The reason for this is that patients do not respond well when instructions are given at the time of treatment due to the stressful situation. Once they see how fast the periodontium heals and treatment is behind them, they respond much better on what is required of them to maintain the health of periodontium (Figures 10 to 13).

Should a patient not respond to this treatment, referral to a periodontist may be indicated, alternatively retreatment may improve the situation.

Severe periodontitis – with pockets deeper than 8mm – will be more difficult to debride effectively and may indicate a genetic susceptibility.

Smoking, although not conclusive, may be detrimental to implant health and certainly to periodontal health. Such factors should also be addressed in striving for periodontal and peri-implant health.

It is also accepted that keratinised attached gingiva is necessary for periodontal and peri-implant health and makes plaque control measures easier to perform. CD

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PERIODONTITIS AND DENTAL IMPLANTS

Scan the QR code to watch a video highlighting how to perform non-surgical periodontal treatment.

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DENTAL HYGIENIST ROADSHOW 2024

The first of the 2024 LISTERINE® Dental Hygienist Roadshows, on Saturday 9th March, brought together some of the brightest minds in dentistry, showcased a robust evidence base, and fostered meaningful discussions on advancing dental practice.

Capitalising on the momentum of last year's achievements, the Roadshow has already demonstrated it will deliver an even more compelling experience for its participants. Indeed, the start of the 2024 Roadshow was nothing short of a triumph. With rooms filled to capacity for each of the three engaging sessions, attendees were immersed in a world of knowledge and innovation.

This year, the spotlight is once again on the introduction of an adjunctive mouthwash – an area that garnered significant interest last year – while delving deeper into the latest findings and their implications for patient care. The aim is to share knowledge using the latest, high-quality evidence, supporting dental professionals' approach to guiding patients in their at-home oral hygiene practices.

A DISTINGUISHED PANEL

Once more, the Roadshow is being fronted an impressive lineup of speakers. Professor Iain Chapple, a standout from last year, returns to lead with his pioneering research and captivating delivery. Accompanying him in the north were Benjamin Tighe and Laura Bailey, each contributing unique perspectives.

Laura captured the essence of the event, saying, 'It's been an absolutely amazing day. We've had the opportunity to do three forums, which ordinarily we'd only be able to do one. We talked to loads of clinicians and have been able to really understand the new evidence, the paradigms of gingivitis, and how we could better help our patients.

'I had an absolutely great time delivering my presentation on growth mindset, and it's something that we can translate into every aspect of our life, whether it's dentistry, our careers, hobbies, our family life. And I think, hopefully, people took something away today and they can start changing their careers and having work freedom.'

FOSTERING ACTIVE INVOLVEMENT

All the speakers then shared invaluable insights during the Q&A Forum, which aims to foster active involvement, offering participants the chance to explore topics in depth and interact directly with the experts.

This method was proven to be an effective avenue for learning and networking, as the positive feedback from the 2023 participants showed. The 2024 version is set to meet and uphold the high expectations established by its predecessor, continuing the tradition of limited and exclusive entry to the Q&A Forums.

To create an atmosphere that supports thorough understanding and connections, attendance at each session will be capped at 10 individuals, available on a first-come, first-served basis.

YOUR OPPORTUNITY AWAITS

For those who missed this remarkable event, there is good news - the Roadshow will be visiting other locations throughout the year, including:

- Dentistry Show Birmingham – 17 & 18 May
- Dentistry Scotland Show – 21 September
- Dentistry Show London – 4 & 5 October.

At each venue, attendees can enjoy a unique experience, with three Q&A Forums held throughout the day on the LISTERINE® stand.

This presents an opportunity for dental professionals to engage with experts, explore the latest in dental research, and experience the transformative power of shared knowledge.

Given the overwhelming interest and limited seats available for the Q&A Forums, it is advisable to register early. Ensure you don't miss out on this exclusive chance to enrich your professional journey and impact your practice positively. CD

Oral mucositis treatment: future protocols

Nina Garlo, Matti Mauramo and Tuomas Waltimo explore treating oral mucositis with antibacterial light therapy

Oral mucositis, an inflammation of the oral mucosa, often occurs in association with cancer treatments, particularly radiation and chemotherapy. It manifests as severe pain, redness, and swelling in the patient's mouth, potentially impacting the success of cancer therapy.

To date, no existing medication has effectively prevented the development of mucositis. However, recent research suggests that antibacterial dual-light therapy may be an effective method to manage the symptoms of this condition.

TREATMENT METHODS

Traditional approaches to treating oral mucositis include preventive measures such as maintaining good oral hygiene and using ice therapy during chemotherapy.

If bacterial infection is present, the use of antibiotics may be considered by the physician.

Corticosteroids are also a treatment option to alleviate pain and the inflammatory response associated with mucositis. However, corticosteroid use poses risks, as it can suppress the immune system, making cancer patients more susceptible to infections (Brown and Gupta, 2020; Al-Rudayni et al, 2021).

Ongoing research explores novel methods for preventing and treating oral mucositis. Mitochondria-stimulating red-light therapy has proven to be effective in treating oral mucositis, particularly as a preventive measure. Although light therapy is estimated to be the most effective treatment modality, its widespread implementation faces challenges such as availability and practical issues.

The latest studies investigate antibacterial treatments to preventively address oral mucosal ulcers originating from mucositis, aiming to mitigate the adverse effects of aggressive cancer treatments.

In a bachelor's thesis from the Faculty of Medicine at the University of Helsinki titled 'Oral mucositis – antibacterial dual light in the treatment of oral mucositis', medical student Jessica Hentilä (2023) explores the effects of antibacterial photodynamic therapy (aPDT) and antibacterial blue light (aBL) on mucositis ulcers as local treatments.

Hentilä's research evaluates the efficacy of dual-light therapy against Streptococcus oralis – a common bacterium in the oral microbiome. The study indicates that antibacterial dual-light, a combination of aPDT and aBL, not only effectively targets streptococcal infections found in mucositis-induced ulcers but also provides red light therapy simultaneously.

According to paediatric heart and organ transplantation surgery specialist Dr Tommi Pätilä, the thesis adviser of Hentilä's project, the reduction of oral bacterial load in the mouth promotes mucosal wound healing, concurrently reducing the risk of local and systemic

NINA GARLO
Nina is a journalist for Koite Healthcare.

MATTI MAURAMO
PHD DDS MD
Matti is a dentist, specialised physician, and clinical instructor in medicine.

TUOMAS WALTIMO
Tuomas is an experienced healthcare professional and clinical university professor.

Oral mucositis is a prevalent side effect in cancer patients undergoing chemotherapy, radiation therapy, or combined chemoradiation therapy

infection complications common in cancer patients. This is an important addition to the conventionally applied red light therapy (Hentilä, 2023).

IMPROVING PATIENT QUALITY OF LIFE

Oral mucositis is a prevalent side effect in cancer patients undergoing chemotherapy, radiation therapy, or combined chemoradiation therapy.

Its pathophysiology stems from the ability of cancer treatments to inhibit rapidly dividing cells, present not only in cancer tissues but also in the oral mucosa (Rapone et al, 2017; NIDCR, 2023).

Clinically, oral mucositis induces an inflammatory reaction in the oral mucosa, leading to swelling, redness, and painful ulcers. These mucosal variations create an entry point for oral bacteria, exacerbating mucositis-related inflammation or potentially spreading to other parts of the body, explains Dr Matti Mauramo, a dentist and specialist in pathology.

Dr Mauramo emphasises that maintaining good oral hygiene is crucial for overall wellbeing. For cancer patients, oral health preservation is especially vital, as a clean mouth reduces the inflammatory burden caused by bacteria, worsening mucositis.

Cancer patients must maintain good chewing ability and a diverse, high-calorie diet during intensive cancer treatments to avoid malnutrition and the development of a general weakness known as cachexia (Rapone et al, 2017; NIDCR, 2023).

Professor Tuomas Waltimo from the University of Basel notes that while mucositis can occur in any part of the digestive tract, its manifestation on the oral mucosa poses specific challenges for cancer patients. Severe cases may hinder oral nutrition intake, leading to premature discontinuation of cancer treatments and compromising overall prognosis.

Professor Waltimo, currently practising at a Finnish dental clinic providing specialised dental care for patients undergoing cancer treatments, acknowledges the improvement in managing the side effects of cancer treatments compared to the early 2000s.

Throughout his two-decade-long career as a researcher, Professor Waltimo closely observed the development of cancer treatment pathways, particularly the increasing understanding of the role of oral infections in treatment outcomes.

In the early 2000s, according to Professor Waltimo, the importance of oral health in the context of general healthcare was not systematically recognised as it is today in many European countries. However, the situation has improved, with dental care becoming a standard practice before initiating stem cell transplantation treatments in countries like Switzerland.

Simultaneously, patients' prognoses have improved, and, most importantly, the quality of life for many patients has improved as the management and prevention of side effects of cancer treatments have become more efficient.

A GUARD AGAINST SERIOUS INFECTIONS

Professor Waltimo highlights that alongside mucosal inflammation, cancer treatments often induce dry mouth, exposing cancer patients to various other oral diseases as well, such as tooth decay, gingivitis, and challenging periodontal and peri-implant diseases (Rapone et al, 2017; NIDCR, 2023).

Oral infections are detrimental to overall health, causing a low-grade inflammatory state and potentially affecting the entire body. Oral infections are particularly harmful to cancer patients due to an increased risk of bacteremia – a bacterial infection that occurs when bacteria entering the bloodstream trigger the body's defence reaction. In severe cases, bacteremia can lead to life-threatening sepsis (Zimmer et al, 2022).

Professor Waltimo emphasises that good oral care can prevent infection complications, which cancer patients are more susceptible to, given their increased risk of diseases. Maintaining oral health is crucial for cancer patients, as the mouth is the primary source of routine bacterial seeding in the body. Mucous membranes, teeth and gums must be kept in impeccable condition through daily effective oral hygiene.

According to Dr Mauramo, Lumoral's antibacterial treatment can influence the inflammatory process and induce an anti-inflammatory effect. Additionally, antibacterial dual-light therapy can complement traditional bactericidal treatments (Gholami et al, 2023).

Professor Waltimo suggests that antibacterial dual-light therapy could potentially serve as a preventive measure to support the oral health of cancer patients before the initiation of cancer treatments.

Preliminary observations suggest that Lumoral's antibacterial dual-light therapy might be an important tool in the armoury for oral mucositis treatment. Confirmation studies shall be set up to further investigate the effectiveness of the novel approach.

A new doctoral dissertation study will commence at the University of Helsinki to delve into this topic, adds Professor Waltimo. CD

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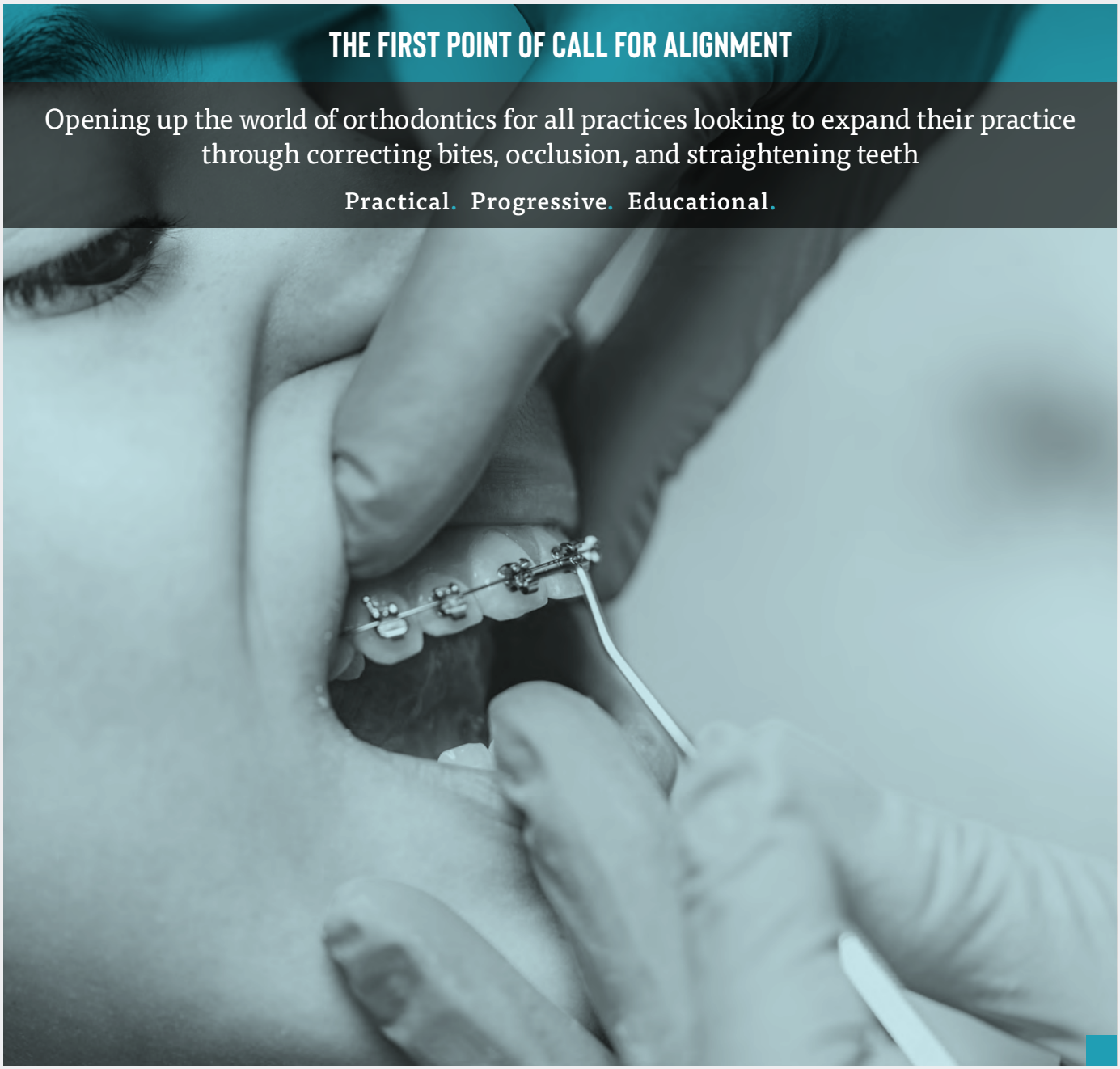

CLINICAL DENTISTRY AWARDS 2024

ORTHODONTIC CATEGORIES: CRITERIA

CLINICAL DENTISTRY AWARDS

The Clinical Dentistry Awards aim to acknowledge clinical excellence in practice. The ceremony takes place at Royal Garden Hotel in London on Friday 11 October. The closing date for entries is Wednesday 10 July. For the full list of categories and more information, visit **dentistry.co.uk/clinical-awards**, or scan the QR code to enter.

ORTHODONTIC PRACTICE

To enter this award the practice must have a strong interest in orthodontics and have adapted an element of the practice towards this discipline.

This category recognises the efforts of an entire team, from procedure to aftercare, focusing on the practice environment as well as clinical outcomes achieved and patient satisfaction.

Entries in this category will be accepted from practices only (not individuals). Judges will be looking at the submission in its entirety and assessing the overall picture it paints of your practice rather than concentrating on individual elements. However, failure to address any of the criteria set out below may negatively impact your submission.

Entries should consist of a portfolio of information, including submission of at least one case and supporting notes. Send up to 1,200 words explaining why your practice is a contender for Orthodontic Practice. Focus on:

The practice: the history, location, the appearance, feel and branding. How is a practice culture of excellence attained, both clinically and organisationally? What technology do you use?

The staff: who is there, what is their area of interest, what is their training and experience? How has practice investment in training and equipment benefited patients and outcomes?

The marketing: how do you attract the patients who are interested in orthodontics? (Marketing materials should be included if available)

The patient experience: what does your practice do to make the patient experience unique, from start to finish? How are people put at ease? How are treatment options explained?

The team: how does everyone work together to ensure the best results as efficiently as possible?

Photography: provide high-resolution before and after clinical photographs to show clinically excellent results, and the practice, the team etc.

Please also provide one case report (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and specifically include a discussion of how the case was treated as effectively as possible.

ORTHODONTIC THERAPIST

This award is for an individual dental orthodontic therapist working for a practice (or several practices). Entries should consist of a portfolio of information, including submission of a case and supporting notes. Send up to 1,000 words focusing on the following:

- Demonstrate hard work and drive; show achievement in your career to date
- Explain how you set yourself apart from other orthodontic therapists
- Present postgraduate training/development information if relevant
- Provide evidence of how you go beyond the regular duty of care
- Provide any other supporting evidence and pictures you feel are relevant
- Provide a portfolio of high-resolution before and after clinical photographs.

Please also provide one report of a case that you feel is exemplary (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and include a discussion of how the case was treated as effectively as possible.

YOUNG ORTHODONTIST

This category is open to those born on or after 31 August 1988. Applicants should send up to 1,000 words explaining why they are a contender for an award through any, or a combination, of the following:

- Demonstrate hard work and drive; show achievement in your career to date
- Explain how you set yourself apart from other young orthodontists
- Present postgraduate training/development information if relevant
- Provide evidence of how you go beyond the regular duty of care
- Provide any other supporting evidence and pictures you feel are relevant
- Provide a portfolio of high-resolution outstanding before and after clinical photographs.

Please also provide one report of a case that you feel is exemplary (up to 1,000 words). This should detail the treatment carried out – the patient's presentation, diagnosis, treatment planning and treatment execution, and specifically include a discussion of how the case was treated as effectively as possible. CD

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Class III malocclusion: early intervention

Evisi Nastasi explores the benefits of early intervention in class III malocclusion

Early intervention in orthodontics aims at promoting a physiological development of a good occlusion and avoid the progress of a malocclusion. This is very important because the majority of malocclusion can be prevented and corrected at an early stage (Proffit, 2007).

Class III malocclusion is challenging because sometimes we cannot go against the genetic component of the lower jaw growth.

Early orthodontic treatments are carried out at the stage of primary and/or early mixed dentition with the aim of reducing the length and the severity of orthodontic treatments with conventional fixed appliances (Proffit, 2007).

Class III malocclusion is associated with a deviation in the sagittal relationship of the maxilla and the mandible, characterised by a deficiency and/or a backward position of the maxilla, or by prognathism and/or forward position of the mandible.

EARLY INTERVENTION

Early treatments of class III malocclusion due to maxillary hypoplasia have shown better clinical results in primary or early mixed dentition (Ferro et al, 2003; Westwood et al, 2003).

Also, a systematic review by Toffol and colleagues (2008) underlines that treatment in deciduous dentition produces greater skeletal changes than those produced in the mixed dentition. Moreover, when therapy begins in the early mixed dentition, it seems to induce more favourable changes in the craniofacial skeleton, compared with the same treatment started in the late mixed dentition (Toffol et al, 2008; Baccetti et al, 1998).

Baccetti, Franchi and McNamara Jr (2005) published the cervical vertebral maturation (CVM) method for the assessment of optimal treatment timing in class III malocclusion. In this study, in 45 treated patients compared with 24 non-treated, they saw that the interval pubertal growth spurt (CS3-CS4) occurs later in development and is five months longer than in class I subjects. Since the growth of the maxilla (pterygoid-maxillary sutures) is active until CS3 and ossifies after this stage it would be better to start as early as possible so that we can achieve more skeletal correction.

For those patients who receive a first phase of treatment at a pre-pubertal stage of development and do not achieve a completely satisfactory correction of the malocclusion, a second phase of rapid maxillary expander/face mask

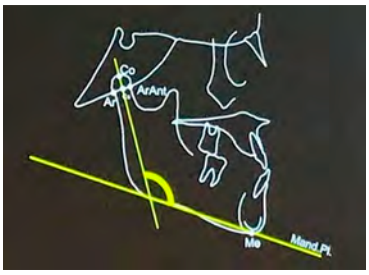


FIGURE 1: *The condylar axis with the mandibular plane is a reliable predictor for long-term stability of early class III treatment*

FIGURE 2: *Before any early orthodontic treatment*

FIGURE 3: *After 13 months of treatment with rapid expander and face mask protocol*

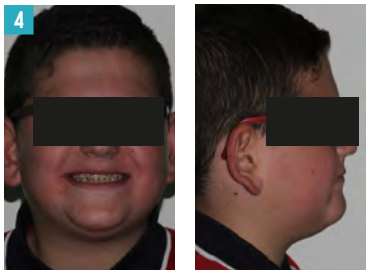


FIGURE 4: *Four-year follow-up extraoral photographs*

EVISI NASTASI

Evisi is a specialist orthodontist based in Oxford, working at Lars Christensen Orthodontics since 2022. She holds a joint degree in dentistry and dental prosthetic from the Catholic University of Our Lady of Good Counsel and the University of Tor Vergata, Rome. Evisi earned her master, specialist in orthodontics and PhD qualification from the University of Tor Vergata, Rome in Italy.

FIGURES 5A *to* **5C:** *Intraoral photographs before orthodontic treatment*

FIGURES 6A *to* **6C:** *Intraoral photographs during orthodontic treatment*

FIGURES 7A *and* **7B:** *Rapid expander*

therapy can be accomplished at the peak of skeletal growth with the more limited aim of restricting mandibular growth (Baccetti, Franchi and McNamara Jr, 2000; Franchi, Baccetti and McNamara, 2004).

An interesting article by Souki and colleagues (2019) found the long-term success of early therapy and the predictive variable, which is the angle of the condylar axis with the mandibular plane (Figure 1).

This study is a collaboration of an Italian group (IG-28 class III patients) and Brazilian group (BG-73 class III patients). The long-term success rate for the treatment with rapid maxillary expander and face mask was 70 to 75%.

The predictive variable of condylar axis mandibular plane was greater than 147.8 degrees for unsuccessful cases and less than or equal to 147.8 degrees for the successful cases.

This can help the orthodontist to assess the stability of the orthodontic treatment if we start earlier.

With this predictive variable, we can inform the patient more about the risk of the relapse and the probability of having jaw surgery when they have finished their growth in the future (Baccetti, Franchi and McNamara Jr, 2000; Souki et al, 2019).

OBSERVATIONS

In a group of 21 patients (11 male and 10 female) from six to 12 years treated by me and colleagues at the Catholic University Clinic of Our Lady of Good Counsel in Tirana, we observed more orthopaedic differences in patients younger than eight years old (CS3-CS4).

The SNA angle increased by 3.5 degrees in younger patients and by 1.75 degrees in children older than eight years old. ANB and Wits increased respectively by 3.31 degrees and 4.48 degrees in children eight years old and younger. In patients older than eight years old, this increase was 1.79 degrees and 4.0 degrees. There wasn't any significant statistic change for the angle SNB between the two groups.

FIGURES 8A *to* **8C:** *Intraoral photographs after the active stage of the orthodontic treatment*

FIGURES 9A *to* **9C:** *Intraoral photographs showing follow-up of four years after the orthodontic treatment*

FIGURE 10A: *Lateral cephalometric X-ray before*

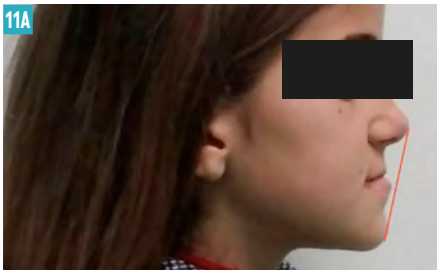
FIGURE 10B: *Lateral cephalometric X-ray after four years of the orthodontic treatment*

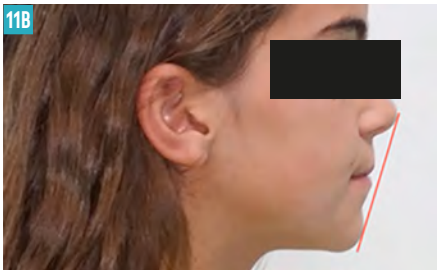
SNA	78°
SNB	81°
ANB	-3°
FMA	21°
SN^GoGN	31°
CoGoMe	145°
IMPA	86°

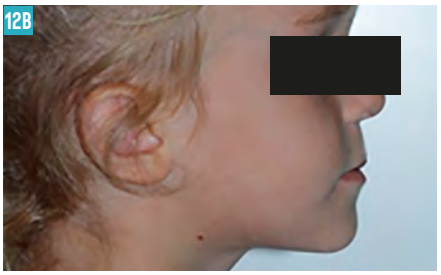
TABLE 1: *Cephalometric analysis before treatment*

SNA	86°
SNB	84°
ANB	2°
FMA	21°
SN^GoGN	31°
CoGoMe	141°
IMPAel	85°

TABLE 2: *Cephalometric analysis after treatment*







FIGURES 11A *to* **12B:** *Examples of profile changes after the class III early intervention*

The importance of class III early intervention is not only about giving good function and reequilibration of the upper and lower jaw growth but also the improvement in self-esteem that this patient group gets after the treatment.

Class III malocclusion is quite visible and makes our younger patients more concerned about their appearance, which affects their self-esteem (Westwood et al, 2003).

CASE STUDY

A six-year-old patient attended the practice as he felt that his lower jaw was very prominent, and he couldn't show his upper teeth while smiling.

In Figure 2 (before any early orthodontic treatment), the patient exposes only the lower teeth while smiling and finds it difficult to smile naturally. In Figure 3, after 13 months of treatment with rapid expander and face mask protocol, he shows more of the upper teeth and is more confident and happier with his new smile. Figure 4 was taken after four years follow-up and the result is stable.

The activation of the expander was with two turns per day for seven days. The patient kept the bite block for a minimum of 20 hours to favour the maxillary protraction with Delaire face mask and to control the post-rotation of the lower jaw.

The face mask was delivered on the last day of the turns with the rapid expander and the patient was advised to wear it for a minimum of 14 to 16 hours a day until the overjet was greater than 3mm, plus an additional four to six months of night-time wear (Figure 7).

Extraoral elastics were placed at a 30-degree inclination with the occlusal plane at a traction force 400-500g per side.

Figure 9 shows the follow-up of four years after the orthodontic treatment and where we are still monitoring the lower jaw growth. The patient is in late mixed dentition. Lateral cephalometric X-rays were taken before and four years after orthodontic treatment (Figures 10a and 10b).

CONCLUSIONS

Rapid expander and the face mask protocol is more effective if performed before puberty. The long-term success rate for rapid maxillary expander and face mask is 70-75% (Baccetti, Franchi and McNamara Jr, 2000).

The inclination of the condylar axis to the mandibular plane can be regarded as a powerful and reliable predictor for long-term stability of early class III treatment with rapid maxillary expander and face mask in patients aged 4.5 to 11 years.

Values of condaxis-MP less than the value of 147.8 degrees have a high percentage of successful and stable orthodontic treatment through time. Nowadays, there are other tools like TADs (palatal screws) that can help to have skeletal improvement if the patient is seen in late mixed dentition, but sometimes this is more difficult to be accepted by younger patients and the cost is higher.

Also, we use a bone borne expander and face mask protocol if there is a risk of upper canine impaction since research has shown that the face mask protraction gives higher dentoalveolar effects when we don't have a bone anchorage.

Lastly, and most importantly, the psychological benefits of the early intervention in class III malocclusion cannot be underestimated. As can be seen in Figures 11 and 12, the profile aesthetic change for young females after the class III early intervention is remarkable. CD

REFERENCES

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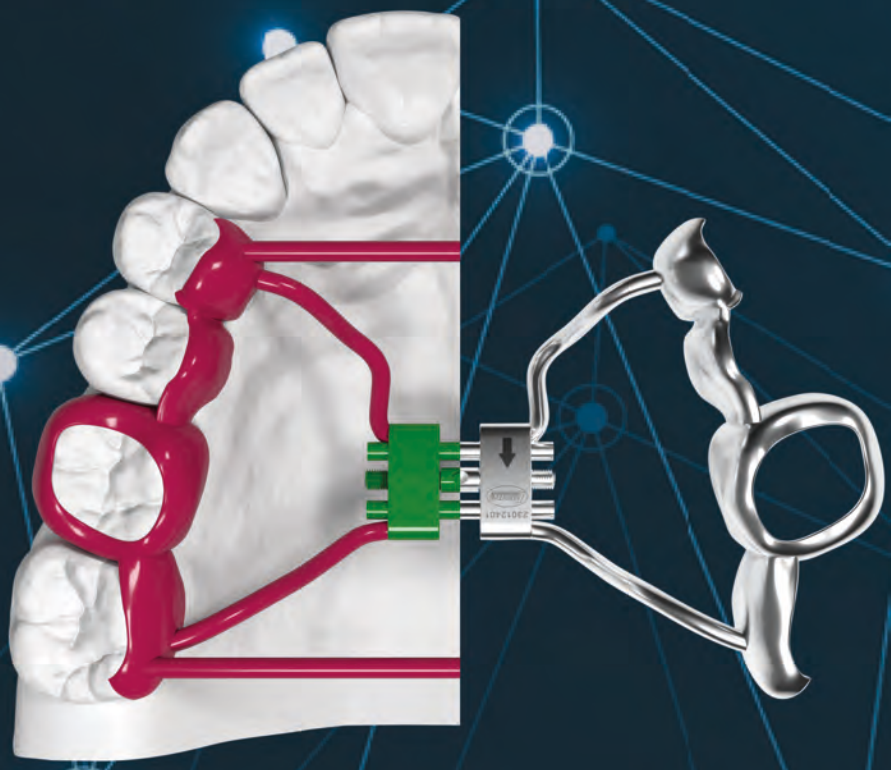

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Hypodontia is defined as the developmental absence of one or more teeth, excluding third molars (Goodman, 1994).

The prevalence of hypodontia is reported to be between 3.5 and 6.5% in the permanent dentition (Polder, 2004; Khalaf, 2014), and females are more likely to be affected than males. Mandibular second premolars (3%) are most commonly missing teeth, followed by maxillary lateral incisors (1.6%) and then maxillary second premolars (1.4%). Bilateral hypodontia of maxillary lateral incisors are more common than unilateral. Hypodontia is rare in the deciduous dentition with prevalence of less than 1%.

The aetiology of hypodontia is both complex and multifactorial, and is often associated with both genetic and environmental factors.

Common causes of hypodontia include:

- Genetics: MSX1, PAX9 and AXIN2 genes are associated with hypodontia
- Environmental: infections, chemotherapy and irradiation
- Localised disruption: often found in patient with cleft lip/palate
- Systemic disruption: syndromes such as ectodermal dysplasia, Ehlers-Danlos and Down's syndrome are often associated with hypodontia.

THE ROLE OF THE ORTHODONTIST

The orthodontist takes the lead role and should ensure all other specialities are involved in a timely and appropriate manner at different stages in the patient's treatment pathway.

The orthodontist should take a thorough history, examination and form a treatment plan (especially regarding space closure and space opening) as follows.

History

- Patient complaint: research shows that patients are very concerned about the appearance of missing teeth and particularly spaces associated with this. Patients report a dissatisfaction with facial and dental aesthetics of hypodontia associated features such as spacing, peg laterals, rotation and centreline shifts. Johal (2006) showed there is a negative psychological impact on children and their family's quality of life. Research also shows that as patients approach their teenage years, they can become more aware of their appearance. Severe hypodontia can affect speech and eating (Locker, 2004)
- Assess patient motivation: the comprehensive treatment of hypodontia is long and complex. The patient's long-term expectations and commitment should be assessed

ENHANCED CPD
GDC anticipated outcome: C
CPD hours: one
Topic: Orthodontics
Educational aims and objectives: To discuss orthodontic treatment considerations in the management of hypodontia: missing lateral incisors. This article qualifies for one hour of enhanced CPD; answer the questions on page 102.

Dental	Skeletal	Systemic
(Hobkrik and Brook, 1980) • Microdontia – localised or generalised • Delayed eruption and development • Ectopic eruption of canines • Over retention of primary teeth • Over eruption • Ridge atrophy • Uneven spacing • Reduced overbite.	• Bimaxillary retrusion • Skeletal I pattern • Skeletal III pattern • Reduced vertical proportions.	• Rickets • Down's syndrome • Chondro – ectodermal dysplasia • Hypohydrotic ectodermal dysplasia – fine, sparse hair, dry fragile skin, spoon shaped nails, hypodontia, conical teeth.

TABLE 1: *Common dental/skeletal features and conditions associated with hypodontia*

Avan Mohammed and Sri Jeganathan discuss orthodontic considerations in the management of patients with congenitally missing maxillary lateral incisors

Management of hypodontia

- Medical history: hypodontia can be associated with a syndrome, so this should be checked for. Smoking history can also affect the feasibility of future dental implants
- Dental history: ensure the level of dental health is adequate and the patient has a GDP to maintain and monitor general oral health. Oral hygiene routine and diet habits should be checked and improved if necessary
- Habits: habits such as parafunctional grinding can affect the choice of prosthetics.

ORTHODONTIC EXAMINATION

Extraoral

- Skeletal profile: a skeletal I or III profile would favour space opening, whereas a skeletal II profile may be better treated with space closure
- Vertical skeletal pattern: reduced vertical skeletal pattern, often associated with deep overbites, will favour space opening. Hypodontia is associated with maxillary retrusion and reduced lower anterior face height, these features will favour space opening (Nodal, 1994)
- The soft tissue profile:
  - Special attention should be given when examining the nasiolabial angle and relationships of the lips to Rickett's E-line to look for signs of retrusion
  - The lip line should be examined. A high lip line with increased gingival show can make management challenging in space closure cases given the canines have a higher gingival margin. The gingival margin of the canine and incisor is, on average, approximately 0.5-1mm higher than the lateral incisors
  - Average lip length is 22mm in males and 20mm in females. Girls achieve maximum lip length at 10-12 years and boys two years later (Behrents, 1984). Normal incisor show at rest is 1-5mm and ideally is 3-5mm. On smiling, upper incisor show of 8mm of crown and 2mm of gingival tissue is normal. The lips should be positioned 2mm above or below the gingival line.

Intraoral

In addition to a general dental health check (caries, periodontal, wear), special attention should be given to checking for anomalies associated with hypodontia, including:

- Microdontia: generalised microdontia and localised microdontia such as peg-shaped laterals should be examined for. Especially in cases of unilateral lateral incisor hypodontia, the contralateral lateral is more likely to be peg-shaped. A Bolton analysis can be done. If the prognosis of the contralateral lateral incisor is poor, consideration should be given to extracting it to aid symmetry. Another option is to restore it to normal coronal morphology using direct or indirect methods
- Spacing: hypodontia can lead to spacing, which will lean towards space opening/redistribution for treatment
- Rotations and centreline shifts: hypodontia of the upper left lateral will often lead to rotation of the upper left central and canine
- Ectopic canine eruption: palatal impaction of canines is associated with ectopic development, with 42% arising adjacent to diminutive or congenitally absent maxillary lateral incisors (Becker, 1984)
- Retained primary teeth: Any retained primary laterals should be scrutinised in relation to their coronal shape, root form and length, shade and integrity:
  - Maxillary Bs are very rarely deemed appropriate for long-term retention, but they should be preserved for as long as possible to preserve alveolar bone for future implants
  - In some rarer instances, the UL3 may have erupted into the UL2 space and the ULC may be retained. Kokich (2005) suggested that this can be used to maintain thickness of alveolus, in some cases early extraction of the B can facilitate this
- Lack of alveolar development: a lack of alveolar bone development at the site of tooth agenesis may influence the decision for implants. This especially occurs if there is no maxillary B or the maxillary B has little root remaining. This can be lead to problems during space closure or when trying to place implants
- Assessment of the malocclusion: this is important when considering space opening or redistribution:
  - Incisor relationship: if the patient has a class I incisor relationship, that should be maintained. If the incisor relationship was class II, then maxillary space is required to correct the overjet, so space closure may be appropriate whereas space opening may be preferred in class III incisor cases

Bond primary teeth	Bonding difficulties with fixed appliances due to altered tooth morphology, microdontia leading to poor adaption of the bracket base to tooth structure **Bond primary teeth** Advantages: preserve root morphology Disadvantages: root resorption more progressive in diminutive roots, occlusal interferences (infraocclusion/supra eruption)
Space management	Build up small and primary teeth – helps to retain alveolar ridge for implant option. May need diagnostic wax set up. Ideally restore with composite resin
Pontic management during orthodontic treatment	Advantages – addresses aesthetic concern of patient, optimal space management
Bracket variations	Bond accessible teeth Canine substitution (3s = 2s) invert canine bracket to increase palatal root torque Class II or I – enhance labial torque to help support protraction of posterior teeth Class III – reduce labial torque to aid in lover incisor retraction
Finishing and retention	Aim for: optimal root positioning, inter-radicular space, good gingival margins, coronal space Modified Hawley with pontics

TABLE 2: *Orthodontic treatment considerations*

FIGURE 1: *Hypodontia of UR2 and UL2 with spacing in the upper arch*

FIGURE 2: *Hypodontia of UL2 with complete loss of space, UL3 erupted in position of the missing UL2*

FIGURES 3A to **3C:** *Space opening for missing UR2 and UL2 with prosthetic replacement (bridge)*

- Molar relationship: in class I molar relationship, this should be maintained. This requires an equal number of upper and lower teeth, assuming there is no tooth size discrepancy, so space opening will be preferred
- Crowding/spacing: this patient has a class I malocclusion, which should be maintained. If there is no tooth size discrepancy there will space, so space opening will be the preferred option. Prosthetic replacement is likely and any retained deciduous teeth should be retained for as long possible.

THE CANINE

The size, shape, colour and gingival margin of the upper left canine are very important when considering treatment options.

This can be assessed by a restorative dentist to check for feasibility of disguising the canine as a lateral. In space closure cases, reshaping of the canine can take place before, during or after orthodontic treatment.

In young patients, such as in this case, it should not be forgotten the pulp is still very large.

In addition to reshaping using reduction, composite build-up or veneer placement may be appropriate. This will require maintenance.

THINGS TO CONSIDER

- The incisal edge – the canine has a pointy incisal edge that is different from the flat edge on the lateral incisor. This can be carefully reduced
- The gingival margin – the gingival margin of the canine and central incisor is 0.5mm to 1mm higher than the lateral incisor. The gingival levels of the canines are normally equal to that of the central incisors, resulting in visual disharmony if they are in the lateral position. A study by Rosa and colleagues (2016) (sample size 50) advised, in addition to reshaping, canine extrusion (with incisor tip reduction) and premolar intrusion aided aesthetics and did not affect the periodontal health of these teeth. This can be done by placing the bracket more gingival on the canine or using finishing bends

FIGURE 4A: *Prosthetic tooth attached to arch wire to mask the missing UR1*

FIGURE 4B: *Aligner pontic paint provide an aesthetic solution to mask missing anterior teeth*

- Palatal surface – the canine has a more prominent palatal cingulum than the lateral, which can lead to occlusal interferences. This can be reduced gradually
- Buccal surface – the buccal bulge on the canine is a challenge as, given the enamel is very thin (approximately 0.5mm thick), reduction in this area will lead to dentine exposure
- The mesial distal width of the canine is, on average, 8mm and the lateral is 7mm. Selective reduction can correct this
- Colour – the canine is more yellow than the lateral. This can be corrected using selective vital bleaching with 10% or 16% carbide peroxide.

TREATMENT OPTIONS

The various treatment options can be explored using diagnostic chairside and/or laboratory wax build-up. A Kesling set-up produced by the lab can be informative in showing patients the difference between space closure and space opening. Often, patients will be assessed on a joint clinic with a restorative dentist and an orthodontist to finalise the treatment plan:

1. No treatment: if the patient is happy and the aesthetics and function are good, then treatment may not be necessary. Also, if the dental health is poor, treatment maybe riskier than of benefit to the patient
2. Restorative treatment only: if the pre-treatment positions of the teeth are that natural space closure has occurred, the canine could be reshaped, accepting a compromised result. Very rarely, the natural space created is ideal for a form of prosthetic replacement without orthodontics, but again a compromise of using a small pontic could be used in a cases where orthodontics may not be appropriate
3. Space closure and canine reshaping
4. Space opening for implant retained prosthetic or bridgework
5. Extraction of upper right lateral incisor with space closure on both sides and canine reshaping – the symmetry achieved has been shown to be acceptable to patients and removes the burden of prosthetic replacement. This may be appropriate if the contralateral lateral is peg-shaped or has poor prognosis.

Retention prior to prosthesis

The patient will be provided with a Hawley retainer with a pontic and stops either side of the lateral space to prevent space closure, even if the pontic is lost.

The restorative team can often use the pontic with gradual composite additions to sculpt the gingival contour where the lateral prosthesis will go to aid emergence.

CONCLUSION

The treatment is complex and will involve multiple joint appointments for planning and prior to debond.

All risks and length of treatment must be fully explained to the patient.

To provide the most aesthetic and functional outcome, a multidisciplinary approach is required from the start. CD

REFERENCES

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ZIRKONZAHN DETAILS ITS LECTURE TOUR IN DUBLIN AND BELFAST ON 14-15 MAY 2024

ZIRKONZAHN'S LECTURE TOUR: DUBLIN AND BELFAST

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- What do I have to pay attention to in order to avoid common errors in the dental workflow? The lecturer, DT Alexander Lichtmanegger (CAD/CAM expert, course instructor and member of Zirkonzahn R&D department), will draw attention to technical aspects and factors that influence the final result of a zirconia restoration. By showing a real, complex case restoration, he will illustrate the challenges faced during each workflow step, from patient diagnostic to characterisation, providing keys to overcome them successfully. Special attention will be given to impression-taking, occlusion registration, passivity check and correct material selection.

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FIGURE 1: *The lecture will focus on a complex restoration 100% digitally created, starting from diagnostic analysis and complete 3D virtual reproduction of the patient's oral and extraoral anatomy without loss in information: initial situation (left) and first digital tooth setup (right)*

FIGURES 2 *and* **3:** *Digital planning of the gingivectomy in the Zirkonzahn.Modifier software, definition of the new occlusion and design of the temporary mock-up which is the key tool for checking and reproducing all workflow steps up to the final restoration*

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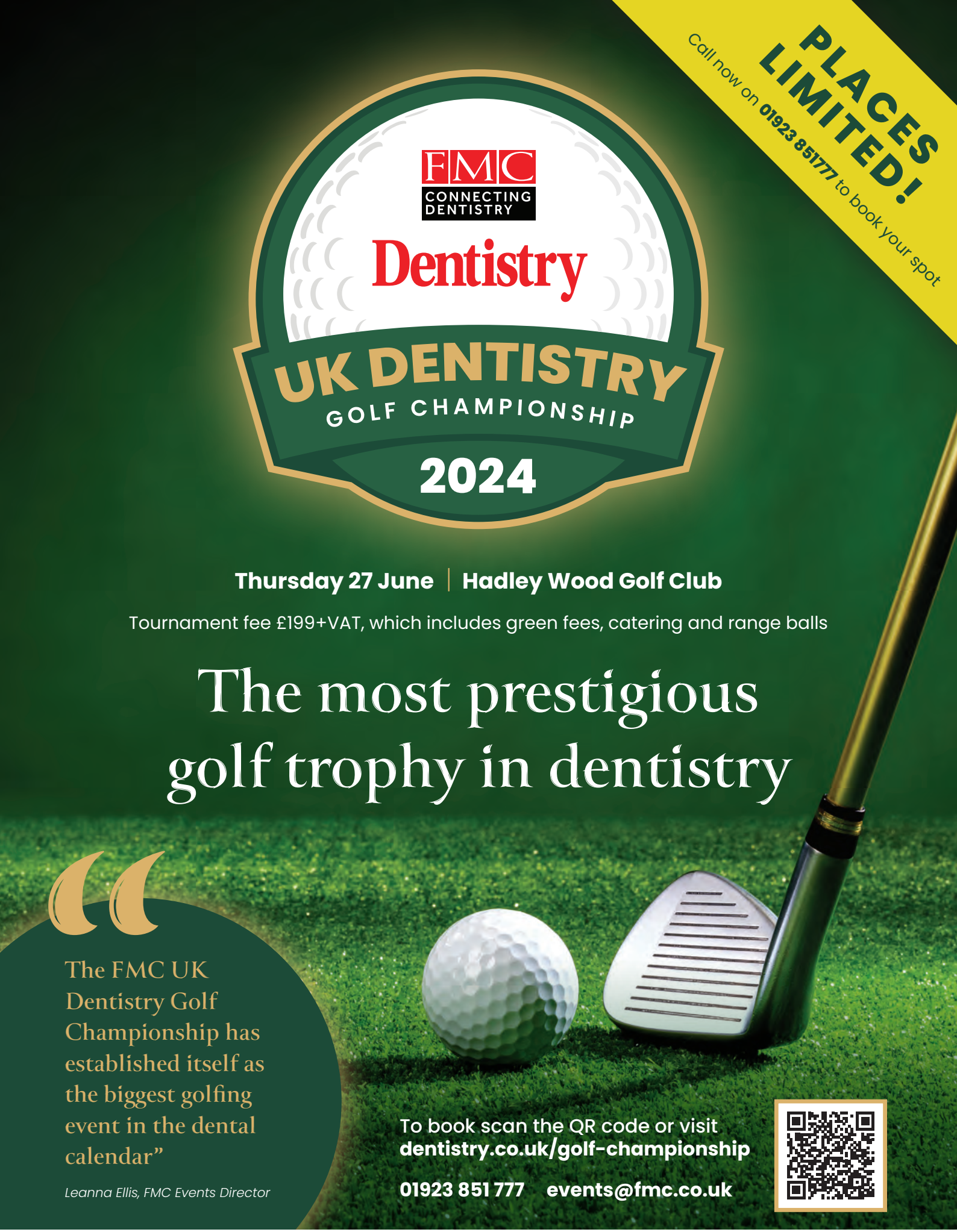

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NEW SCREWDRIVER SET

Zirkonzahn

Zirkonzahn®
Human Zirconium Technology

The new Screwdriver Lab by Zirkonzahn is conceived to fix and loosen different screws on the model. To work flexibly and efficiently, the screwdrivers are available in different lengths and for different implant systems. The system library is constantly expanded.

The screwdrivers can be stored safely in the Screwdriver Holder Magprism, which can contain up to three Screwdriver Labs. The Screwdriver Holder Magprism has a magnetic surface that allows to combine several holders to store additional screwdrivers.

The Screwdriver Lab is marked with a colour code indicating the implant system. The same colour code can be found on the screw supplied with the screwdriver: this coloured screw is inserted into the Screwdriver Holder Magprism, allowing for an easy identification of the screwdriver and its corresponding slot in the holder.

To fix and loosen abutments and abutment screws in the patient's mouth or on the model, the Universal Screwdriver Set is also available, including several screwdrivers and tools. This set consists of the Torque Ratchet Wrench, the Screwdriver Zirkonzahn MUA for fixing and loosening Zirkonzahn Multi Unit Abutments Non Hex, the Adapter Ratchet Wrench and the Screwdriver Handpiece.

All instruments can be safely stored in the Instrument Case Universal Screwdriver Set, which can be personalised with up to 25 Zirkonzahn screwdrivers or right-angle shank extractors, individually chosen by the user depending on the implant system.

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FULL-DAY RESTORATIVE HANDS-ON WORKSHOPS
Trycare

Trycare Ltd is the UK distributor of Tokuyama Dental's range of spherical composites, including Estelite Sigma Quick.

Featuring Tokuyama's patented RAP monomer and aesthetic spherical filler technology, Estelite Sigma Quick delivers an extended working time in ambient light yet cures in only 10 seconds! There is also less residual monomer and minimal after cure colour change for long-term aesthetic satisfaction.

In association with GC UK and NSK, Trycare is running a series of full-day workshops by Joan Mach, one of Europe's leading exponents in minimally invasive aesthetic and restorative dentistry. Joan will cover all the key points for achieving excellence in direct anterior composites using a biomimetic and non-invasive approach. This will include how to accomplish outstanding aesthetic results and long-lasting treatments in the anterior region using the latest products, including Tokuyama's Estelite Sigma Quick.

Featuring the use of silicon matrices, layering processes for complex class IV restorations, finishing and polishing, and much more, live demonstrations and hands-on practice will help delegates to recreate nature and achieve natural lifelike results.

Offering six and half hours of CPD with learning objective C, the workshops will be held in Birmingham (Friday 14 June) and London (Saturday 15 June). Course fee, including all course materials and refreshments, is £395 plus VAT (before 30 April 2024) and £495 plus VAT (after 30 April 2024).

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STATE-OF-THE-ART BONE REGENERATION
Trycare

Tecnoss's Osteobiol GTO is the state-of-the-art second generation guided bone regeneration material distributed by Trycare.

All Tecnoss Osteobiol products are second generation because they contain a dual-phase resorbable bone matrix incorporating both mineral component and collagen. Unlike ceramised first generation materials that undergo very little resorption and are therefore never completely replaced by newly formed bone, dual-phase biomaterials do resorb progressively and are replaced by adequate new vital bone.

Handling like a sticky putty, Osteobiol GTO is Tecnoss's state-of-the-art ready-to-use pre-hydrated biomaterial that can be easily dispensed into defect sites direct from the syringe. It enables clinicians to skip the hydration phase with saline or blood, saving time and decreasing the risk of accidental exposure to pathogens. Osteobiol GTO contains Tecnoss's innovative Osteobiol TSV Gel, which ensures optimal stickiness of the material, allowing easy adaptability to the recipient site and extreme stability.

Conceived as a universal biomaterial, easily adaptable to any bone defect, it has proven clinically valid for horizontal augmentation of two-wall defects and socket preservation with compromised buccal plates. It can also be used to treat peri-implant lesions and severe bony defects, also in combination with Osteobiol Soft Cortical Lamina.

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TOOTH WHITENING IN JUST 10 MINUTES!
Trycare

The result of more than 15 years research and available from Trycare, Blancone typically produces an improvement of up to four to five shades of white at a very low price and in a comfortable session lasting only a few minutes. In as little as 10 minutes, you can transform your patient's smile.

Due it its very fast action, Blancone treatments are not aggressive, do not dehydrate the enamel and do not induce pain or sensitivity, so no desensitising or remineralisation agents are required.

They don't require gingival barriers, which saves time and money, and can be combined within the dental hygiene appointment. They are the ideal add-on to EMS GBT and other forms of prophylaxis treatment!

Offering a new approach to tooth whitening, based upon new photochemical technologies, Blancone treatments can be repeated regularly and are the gateway to more intensive treatments if required.

Blancone's photochemical gels include two special components that break down the peroxide in such an effective way and at a speed that cannot be achieved by the chemical reactions of traditional whitening systems.

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GENERAL DENTISTRY
CD/APR/GHAFFAR/PAGE 17

1. Why did the patient attend the practice?
- ☐ a. To discuss options to replace her denture
- ☐ b. To discuss tooth whitening
- ☐ c. To discuss a suspicious lesion
- ☐ d. To discuss sensitivity at the UL1 site

2. What did the patient's medical history reveal?
- ☐ a. Haemachromatosis
- ☐ b. Taking antidepressants
- ☐ c. Calcium for hypoparathyroidism
- ☐ d. All of the above

3. Which treatment did the patient refuse during the planning phase?
- ☐ a. Orthodontics
- ☐ b. Implants
- ☐ c. Root canal treatment
- ☐ d. Composite bonding

4. Following two trials of the final restorations, when was treatment completed?
- ☐ a. January 2023
- ☐ b. February 2023
- ☐ c. March 2023
- ☐ d. April 2023

AESTHETIC DENTISTRY
CD/APR/KHAN/PAGE 27

1. Prior to any tooth whitening, and even aesthetic treatment, what should the patient be free from?
- ☐ a. Any dental disease
- ☐ b. Any periodontal disease
- ☐ c. Any soft tissue disease
- ☐ d. All of the above

2. In this case, how old was the patient when he first attended the practice?
- ☐ a. 16 years old
- ☐ b. 17 years old
- ☐ c. 18 years old
- ☐ d. 19 years old

3. How many weeks of night-time whitening with 16% carbamide peroxide (Lumiwhite by Night) were completed?
- ☐ a. One week
- ☐ b. Two weeks
- ☐ c. Three weeks
- ☐ d. Four weeks

4. What does the author suggest is critical in finalisation of cases such as the one presented?
- ☐ a. 'After' photographs
- ☐ b. The polishing protocol
- ☐ c. Resin infiltration
- ☐ d. Removal of the oxygen inhibition layer

DIGITAL DENTISTRY
CD/APR/NASTASI/PAGE 37

1. According to the author, what does the harmony of a smile mainly depend on the balance of what?
- ☐ a. The teeth
- ☐ b. The gingiva
- ☐ c. The lips
- ☐ d. All of the above

2. Excessive gingival display is defined as a gingival exposure larger than what when a person smiles?
- ☐ a. 2mm
- ☐ b. 3mm
- ☐ c. 4mm
- ☐ d. 5mm

3. What did the initial treatment plan consist of?
- ☐ a. One-stage crown lengthening surgery
- ☐ b. Home bleaching
- ☐ c. Botox therapy
- ☐ d. All of the above

4. How long after the surgery was home bleaching performed?
- ☐ a. Three days
- ☐ b. Three weeks
- ☐ c. Three months
- ☐ d. Six months

ENDODONTICS
CD/APR/DAMYANOV/PAGE 47

1. How many nickel titanium instruments were historically necessary to achieve predictable results?
- ☐ a. Three
- ☐ b. Five
- ☐ c. Seven
- ☐ d. Nine

2. What does the R stand for in R-Motion?
- ☐ a. Reciprocation
- ☐ b. Rapid
- ☐ c. Resilient
- ☐ d. Remarkable

3. What colour is the Glider C, according to the author?
- ☐ a. Blue
- ☐ b. Red
- ☐ c. Silver
- ☐ d. Gold

4. How old was the patient in case two presented in the article?
- ☐ a. 63 years old
- ☐ b. 66 years old
- ☐ c. 68 years old
- ☐ d. 71 years old

IMPLANT DENTISTRY
CD/APR/ANITUA/PAGE 63

1. **According to the author, extra-short implants can be considered as those with a length of less than what?**
- ☐ a. 12mm
- ☐ b. 9mm
- ☐ c. 6.5mm
- ☐ d. 7mm

2. **For the author's study, five patients were recruited but how many implants were inserted?**
- ☐ a. 12
- ☐ b. 15
- ☐ c. 18
- ☐ d. 21

3. **If grouping the implants according to the position in which they are inserted, what was the most frequent implant in position LL2?**
- ☐ a. 3 x 5.5mm
- ☐ b. 3 x 6.5mm
- ☐ c. 2 x 5.5mm
- ☐ d. 2.5 x 6mm

4. **What benefit does the author list as an advantage to the patient of minimally invasive surgeries in oral implantology?**
- ☐ a. Less morbidity
- ☐ b. Fewer surgical procedures
- ☐ c. Better postoperative recovery
- ☐ d. All of the above

ORAL HEALTH
CD/APR/VAN ZYL/PAGE 79

1. **According to the author, how can dental implants be examined for peri-implant tissue health?**
- ☐ a. Using a periodontal probe
- ☐ b. Visual inspection
- ☐ c. Palpation of tissues
- ☐ d. All of the above

2. **Which of the following is considered a risk factor for peri-implantitis:**
- ☐ a. A history of severe periodontitis
- ☐ b. Poor plaque control
- ☐ c. Those not on a maintenance supportive programme after dental implants are placed
- ☐ d. All of the above

3. **For sub-gingival irrigation of the pockets, what solution does the author use?**
- ☐ a. 5% doxycycline solution
- ☐ b. 10% doxycycline solution
- ☐ c. 0.2% chlorhexidine
- ☐ d. 17% EDTA

4. **Whose scope of practice does the treatment of periodontitis fall within?**
- ☐ a. Periodontists
- ☐ b. Dental hygienists
- ☐ c. Dentists
- ☐ d. All dental healthcare workers

ORTHODONTICS
CD/APR/MOHAMMED/PAGE 94

1. **What is the prevalence of hypodontia reported to be in the permanent dentition?**
- ☐ a. 1-2%
- ☐ b. 2-3.5%
- ☐ c. 3.5-6.5%
- ☐ d. More than 7%

2. **Which are the most commonly missing teeth?**
- ☐ a. Mandibular second premolars
- ☐ b. Maxillary lateral incisors
- ☐ c. Maxillary second premolars
- ☐ d. All of the above

3. **What is the average lip length in males?**
- ☐ a. 19mm
- ☐ b. 20mm
- ☐ c. 21mm
- ☐ d. 22mm

4. **In space closure cases, what treatment option could be considered?**
- ☐ a. Reshaping the canine
- ☐ b. Composite build-up
- ☐ c. Veneer placement
- ☐ d. All of the above

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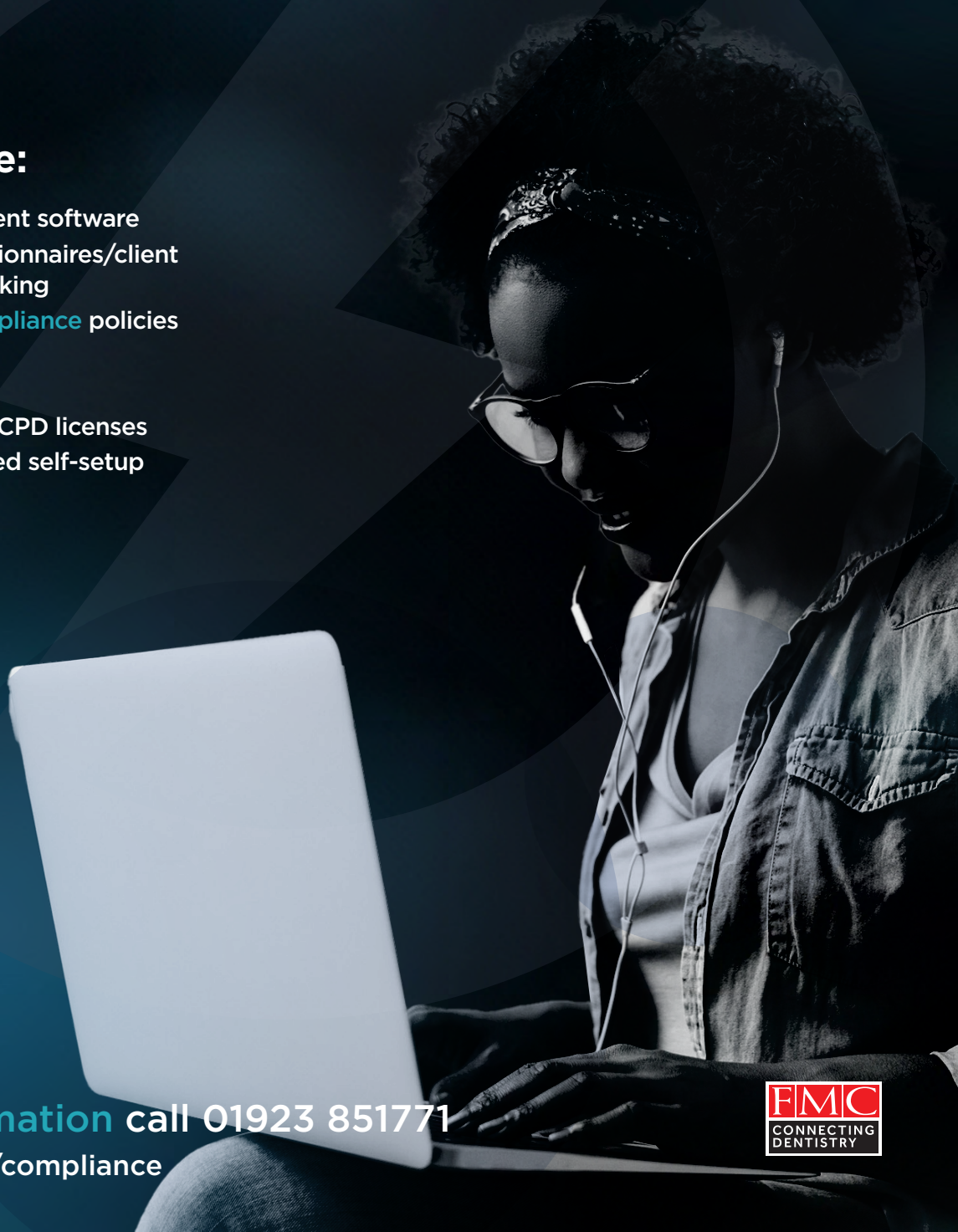

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