IDentistry

INTERNATIONAL DENTISTRY - AFRICAN EDITION

VOL. 10 NO. 1

IN THIS ISSUE

Nitzan Bichacho and Mirela Feraru
Replacing hopeless maxillary incisors with adjacent implants via an integrative biologically oriented approach

Alan Atlas, Simone Grandini and Marco Martignoni
Evidence-based treatment planning for the restoration of endodontically treated single teeth: importance of coronal seal, post vs no post, and indirect vs direct restoration

Julia Plattner, Vasilios Alevizakos and Constantin von See
Placement of a ceramic implant after uprighting the canine with aligner therapy due to tooth agenesis

Peet J van der Vyver, Martin Vorster, Farzana Paleker and Natasha Predin Djuric
Forward reciprocation of conventional rotary instruments – Literature review and clinical case reports

Tif Qureshi
A simple and cost-effective makeover using the Dahl technique and composite edge bonding

Olivier Étienne and Bérangère Cournault
Bonding of ceramic veneers

Gregory Camaleonte
Direct and indirect composite

The World's First Ledge Correction File

CL-File System

V-Taper™ GOLD Rotary

- Unique designed 6-file system
- Shaping files made by AF™-R wire
- Finish Files made by AF™-H wire

AF™ Blue R3 Reciprocating One-File System

AF MAX -Cleaning Finisher Rotary

NEW

- Excellent Finisher
- Remove Smear Layer

Integrated Apex Locator

Continuous Rotation and Reciprocation

Apical Slowdown and Reverse

Want to see how TOUGH our files are?

Scan Here

Scan Here to Watch Video

- **Pretoria:** Patrick: 082 375 3699 - Brandon: 082 555 4406 - **Johannesburg:** Gerhard: 082 373 1548
Johan: 082 829 6804 - **Port Elizabeth:** Leon: 079 501 5880 - **Cape Town:** Danielle: 082 551 6146

012 342 8551

IAD
inter-africa dental pty(ltd)

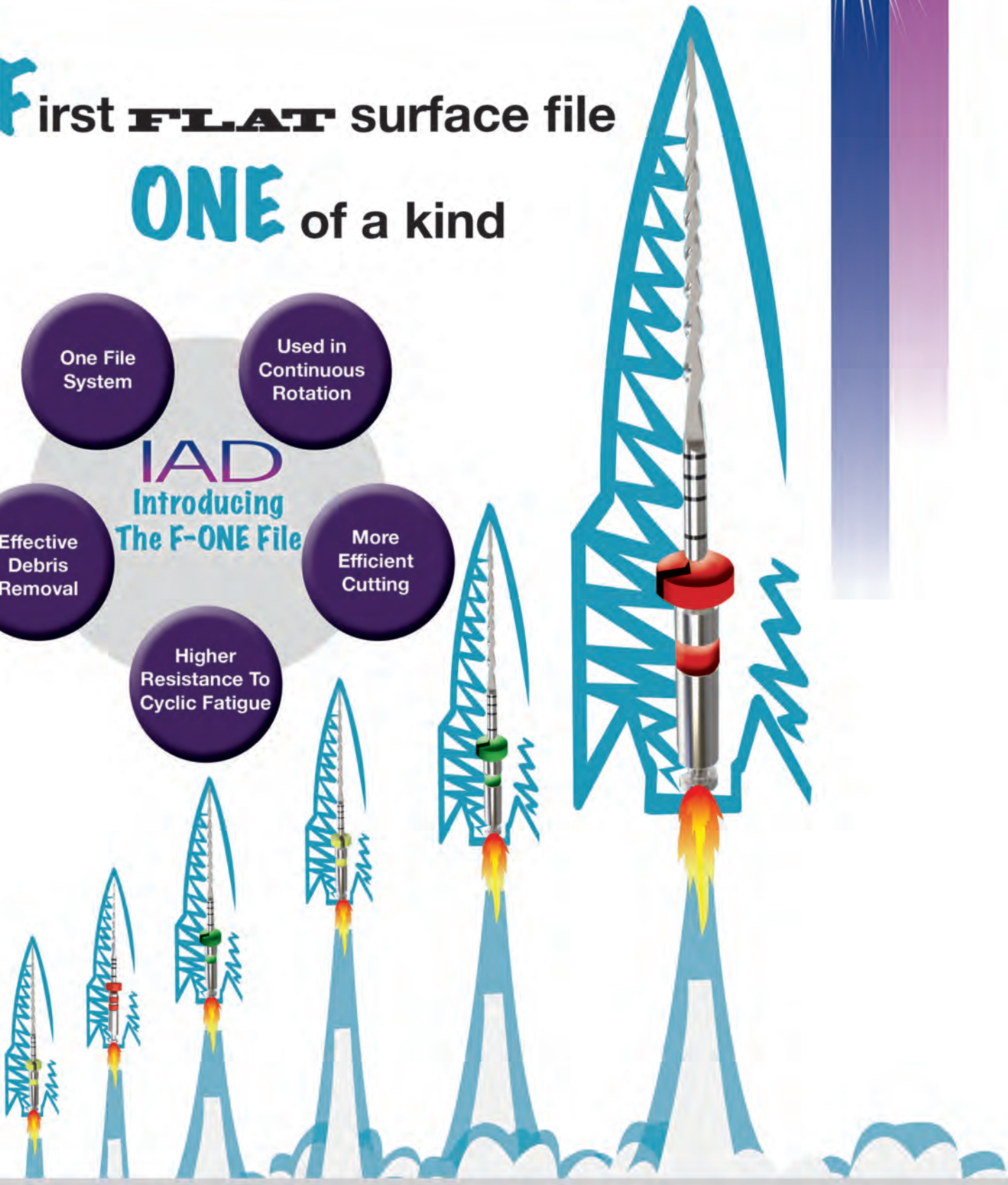
"Passionate about Dentistry!"

First FLAT surface file

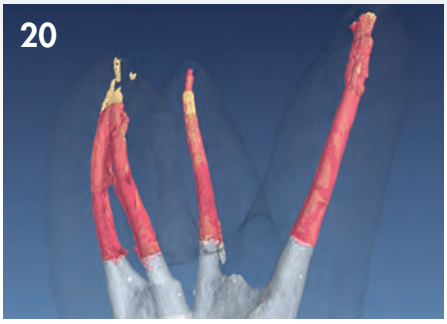
ONE of a kind

- One File System
- Used in Continuous Rotation
- Effective Debris Removal
- More Efficient Cutting
- Higher Resistance To Cyclic Fatigue

IAD
Introducing
The F-ONE File



www.interafricadental.com - orders.iad@gmail.com - 0861-DENTAL(336825) - (T) 012 342 8551 - (F) 087 809 5940
Address: 1315 Stanza Bopape Street, Hatfield, Pretoria, 0028 I PO BOX 11050, Hatfield, 0028, South Africa



Contents

February/March 2020
Volume 10 No.1

6 Clinical
Replacing hopeless maxillary incisors with adjacent implants via an integrative biologically oriented approach
Nitzan Bichacho and Mirela Feraru

20 Clinical
Evidence-based treatment planning for the restoration of endodontically treated single teeth: importance of coronal seal, post vs no post, and indirect vs direct restoration
Alan Atlas, Simone Grandini, Marco Martignoni

38 Clinical
Placement of a ceramic implant after uprighting the canine with aligner therapy due to tooth agenesis
Julia Plattner, Vasilios Alevizakos and Constantin von See

46 Clinical
Forward reciprocation of conventional rotary instruments – Literature review and clinical case reports
Peet J van der Vyver, Martin Vorster, Farzana Paleker and Natasha Predin Djuric

54 Clinical
A simple and cost-effective makeover using the Dahl technique and composite edge bonding
Tif Qureshi

64 Clinical
Bonding of ceramic veneers
Olivier Étienne and Bérangère Cournault

72 Clinical
Direct and indirect composite
Gregory Camaleonte

76 CPD Questionnaire 1

78 CPD Questionnaire 2

82 Products and News / Classifieds

HENRY SCHEIN®
DENTAL WAREHOUSE

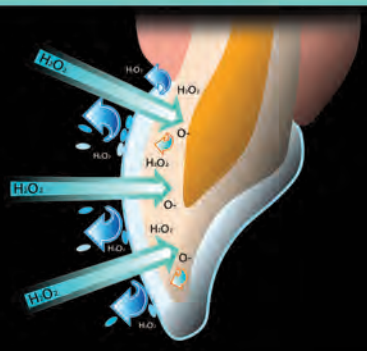
Rely on Us™

Focus on Cosmetic Dentistry

WHITE DENTAL BEAUTY

THE DOUBLE WHITENING ACTION OF WHITE DENTAL BEAUTY

REMOVES SURFACE STAINING AND LIGHTENS THE TEETH FROM WITHIN.



CASE BY
DR. GRÉGORY
CAMALEONTE

BEFORE

IN PROGRESS

AFTER

STYLEITALIANO

A SMILE CAN LIGHT UP YOUR FACE

Only dental professionals are legally allowed to carry out tooth whitening procedures. Treatments and products offered by non-professionals (such as beauty salons/tanning salons) could potentially cause damage to your teeth.

- We use the highest percentage of professional peroxide with Novon® available for an effective whitening action.*
- White Dental Beauty Mild is a patented formula designed to whiten with less overall sensitivity.
- White Dental Beauty gels are proven to be safe, effective and produce visible results in less than a week.
- Male or female, old or young, White Dental Beauty has helped enhance thousands of natural smiles.

*Your dentist will advise the percentage of gel that is right for your smile.

Taking care of everything dental TOLLFREE 0800 111 796 admin@henryschein.co.za

LIKE US ON HenryScheinSA FIND US ON @HenryScheinSA Henry Schein South Africa

International Dentistry
INTERNATIONAL DENTISTRY - AFRICAN EDITION

Vol. 10 No. 1, February/March 2020
ISSN 2226-1567

International Dentistry African Edition is published by Modern Dentistry Media CC,
PO Box 76021 Wendywood 2144 South Africa
Tel: +27 11 702-3195
e-mail: dentsa@iafrica.com
www.moderndentistrymedia.com

Published in association with
FMC DENTISTRY'S INFORMATION CENTRE
abc

Planmeca ProMax® 3D Plus

Extended excellence

Planmeca Ultra Low Dose™ 3D imaging

The **Planmeca Ultra Low Dose™** imaging protocol enables 3D imaging with a comparable patient dose to 2D panoramic imaging.

Easy motion artefact correction

The **Planmeca CALM™** movement correction algorithm cancels the effects of patient movement in 3D images with a push of a button.

Efficient metal artefact reduction

The **Planmeca ARA™** artefact removal algorithm efficiently removes shadows and streaks caused by metal artefacts from 3D images.

Premium image quality

All Planmeca 3D units offer the very best in image quality – offering crystal-clear images at optimal patient doses.

Find more info!

www.planmeca.com

PLANMECA

Planmeca Southern Africa Adriaan van der Spuy • tel. 076 821 6239 • email: adriaan.vds@planmeca.com

Replacing hopeless maxillary incisors with adjacent implants via an integrative biologically oriented approach

Nitzan Bichacho[1] and Mirela Feraru[2]

Abstract

Achieving successful immediate implant placement in periodontally compromised sites requires that current biologic insights be translated to the modern clinical workflow. The clinical challenge increases in the case of adjacent implants in the smile zone and when the immediately placed implants are to be immediately restored. This article describes and analyzes state-of-the-art concepts and clinical strategies used to maximize key influencing variables to attain success with this treatment modality. These factors that are described in detail include: precise virtual planning for accurate guided implant placement, a flapless surgical approach, bone augmentation and soft-tissue enhancement of the deficient thin biotype, a "one abutment, one time" prosthetic approach for screw-retained restorations utilizing a novel implant system, and model-based cervical design for optimal restorative integration with newly created peri-implant mucosa. The combined digital and analog workflow demonstrates the use of current tools that enable clinicians to predictably perform such treatment in a controlled manner for the right indications.

When replacing a natural tooth with an implant restoration in the smile zone, strict biologic, functional, and esthetic criteria must be fulfilled in order to attain an artificial restoration that looks like a natural tooth and functions within healthy supporting tissues.[1-3] This endeavor poses a challenge given the fact that the mucosal structure around implant restorations is different biologically and physiologically from the supporting periodontium of teeth.[4-7]

The mucosa of a single implant between natural teeth is also supported by the periodontal apparatus of the adjacent roots, which contributes to the natural look of the papillae. However, in cases of adjacent implants the inter-implant papilla stands alone (with no Sharpey fibers originating from an adjacent cementum), thus its volume and shape is naturally reduced and altered.[8-12] Different clinical strategies have been proposed to partially overcome the esthetic limitations of immediately placed adjacent implants in the smile zone with varying degrees of success.[13-15] In addition to these inherent deficiencies, if the teeth to be replaced have bone loss and initial reduced periodontal support, the challenge to recreate the missing bone and soft tissues around the implant increases dramatically.[16]

Use of current cutting-edge technologies is essential in today's workflow to achieve predictable, successful biologic and esthetic results. These tools include 3-dimensional (3D) computerized planning, guided implant placement, minimally invasive surgical techniques, biologically oriented implant systems (comprising both the implant and the restorative components), augmentation concepts, and state-of-the-art materials and techniques. This article will describe an integrative strategy employing these tools to immediately replace and restore periodontally deficient, hopeless central incisors.

[1] Nitzan Bichacho, DMD
Expert Professor of Prosthodontics, Oral Rehabilitation Department, Faculty of Dental Medicine, Hebrew University Hadassah Medical School, Jerusalem, Israel; Member, Prosthodontics Department, Tel Aviv University School of Dental Medicine, Tel Aviv, Israel; Past President and Life Member, European Academy of Esthetic Dentistry; Team Member, Bichacho Clinic, Tel Aviv, Israel

[2] Mirela Feraru, DMD
Team Member, Bichacho Clinic, Tel Aviv, Israel; Affiliate, European Academy of Esthetic Dentistry

Figure 1: The maxillary central incisors exhibited gingival recession, "black holes," flat interdental papilla, dark roots, thin periodontal biotype, and an uneven gingival line with grade 3 mobility (clinically).

Figure 2: Periapical radiograph. More than 60% bone loss was noticeable. The four incisors were splinted due to excessive mobility of the centrals.

Case Presentation

A 60-year-old healthy male patient presented to the authors' clinic complaining about his maxillary central incisors. His chief complaint was an inability to chew on these teeth, and he sought a stable, functional, and esthetic solution. According to the patient, he underwent periodontal surgeries in the posterior areas due to periodontal disease some years ago. His upper front region, however, was never treated surgically, and crowns on the central incisors were more than 20 years old. He reported that a few years earlier he received a hard knock on his front teeth and noticed that gingival recession, as well as mobility, had developed gradually in more recent years. The mobility had become unbearable in the previous 2 weeks.

Clinical examination revealed two single crowns on teeth Nos. 8 and 9, exposed dark roots, mobility grade 3 on No. 8 and grade 2 on No. 9 (with obvious occlusal trauma), a thin periodontal biotype, gingival recessions, a flat interdental papilla, gingival "black holes," and an uneven gingival line (Figure 1). Probing depths ranged from 5 mm to 9 mm. The smile line was relatively low and exhibited the distal papillae of the involved teeth, but not the central papilla. Also, the cervical aspect of the crowns was not revealed during function.

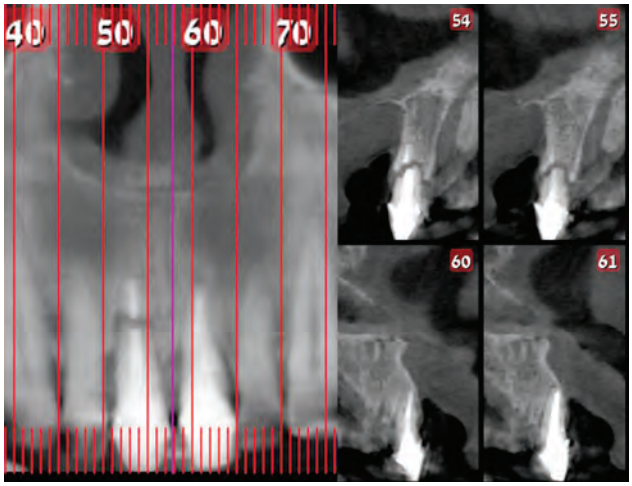


Figure 3: The CBCT depicted a horizontal root fracture at No. 8, considerable bone loss, and very thin or no labial cortical plates at both teeth.

Radiographic and cone-beam computed tomography (CBCT) images demonstrated more than 60% bone loss, horizontal root fracture of No. 8, and very thin or no labial bone plates (Figure 2 and Figure 3). Oral hygiene was good.

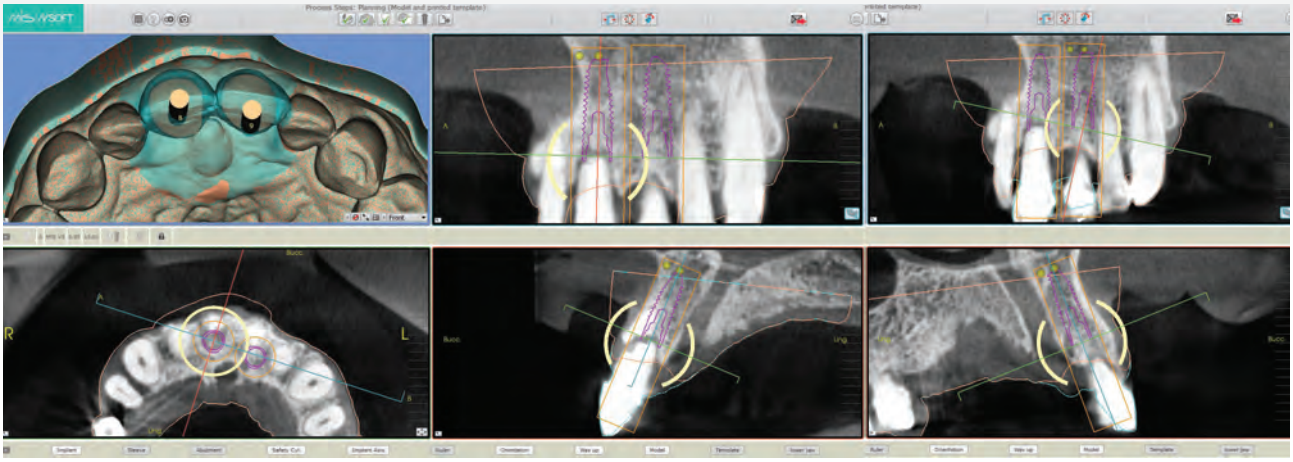


Figure 4: Virtual implant planning software. Implants positions were designed to engage maximum bone and allow for screw-retained restorations.

Figure 5: The surgical template was produced.

Figure 6: Teeth Nos. 8 and 9 were extracted in an atraumatic flapless manner.

Due to root fracture of No. 8, the severe bone loss of both teeth, their deep gingival pockets, and high mobility, the two teeth were diagnosed at the time with localized advanced periodontitis with occlusal traumatism with a hopeless prognosis. Clinical photographs were taken, both dental arches were scanned with an intraoral scanner (Trios® 3, 3Shape A/S, 3shape.com), and the four maxillary front teeth were splinted with composite resin until the surgical session.

Treatment Planning

After consultation with the patient regarding various restorative options for the treatment of missing central incisors, the chosen treatment plan was to replace the maxillary central incisors with fixed implant-supported crowns. The patient expressed a strong desire to minimize the number of treatment visits, and it was, therefore, agreed upon to remove the roots, place two implants, and augment the missing bone and soft tissue at the same operational visit. If the immediate stability of the implants allowed, immediate provisional crowns would be connected to the implants; if this was not plausible, a provisional resin-bonded fixed partial denture (FPD) would serve as an interim restoration. Definitive restorations would be produced 4 to 6 months after surgery.

The implant system used (V3, MIS Implants, mis-implants.com) was selected due to its excellent immediate stability features; triangular neck design, which allows for greater bone volume around the implant neck[17,18]; and its vast prosthetic arsenal. Also, the implant's 12-degree conical connection and component fit is conducive to enabling a strong mechanical connection and flawless seal.

The standard tessellation language (STL) file of the previously scanned arches was merged with the CBCT digital imaging and communications in medicine (DICOM) file in a virtual implant planning software (MSOFT, MIS Implants). Two implants were planned and virtually positioned (Figure 4) so as to maximally engage existing bone. At the time of treatment, this software was not operable with 16 mm implants, which were chosen for the case; therefore, two

Assurance

Invest in reliability. Focus on the patient. Express your style. From the people who build the most dependable dental equipment in the world, A-dec 200™ provides you with a complete system to secure a successful future.

Discover how you can gain assurance with A-dec 200.
Contact Wright Millners today on 0860 100 200.

From
R149,900.00
Dependent on build & configuration

Discover **A-dec 200**. Contact Wright Millners or visit a-dec.com

a-dec
reliablecreativesolutions

Wright MILLNERS

Wright Millners 0860 100 200
www.wright-millners.co.za

Figure 7: Connect extension abutment. This 4mm diameter solid transmucosal abutment, in various heights, allows for rotation-free or anti-rotation suprastructure connection.

13 mm implants were virtually positioned 3 mm apically to the planned coronal plane to simulate precisely the actual 16 mm implants to be placed. The implant angulations were planned in a 3D position, which allows for the connection of screw-retained restorations. Whenever possible, the authors prefer non-cemented screw-retained restorations due to the well-established biologic and retrievability advantages.[19]

Because the gingival line at site No. 9 was initially at a more apical level than No. 8, the position of implant No. 9 was planned slightly more palatal than that of No. 8. This would allow more room for placement of augmentation materials, both hard and soft, buccally.

A surgical guide template (MGUIDE, MIS Implants) was manufactured accordingly (Figure 5). Both the resin-bonded FPD and splinted acrylic crown shells were prepared; one of these options would eventually be used based on the implants' primary stability at the surgery.

Surgical Treatment and Immediate Restorations

(To view a short video showing the main highlights of this clinical session, scan the QR code next to Figure 6.)

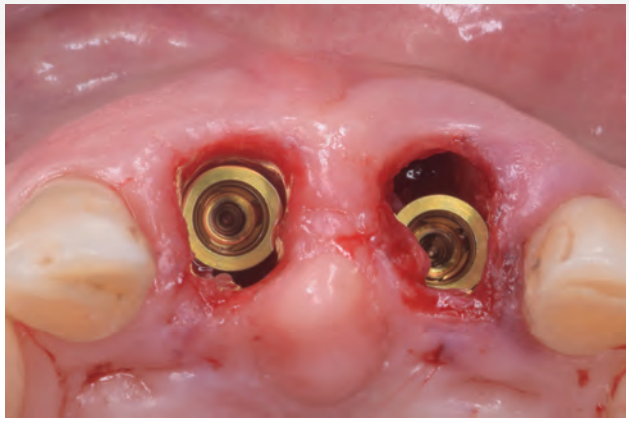


Figure 8: The 3mm height abutments connected to the freshly placed implants. The prosthetic platform was located 3mm to 4mm subgingivally and 3mm away from the implant heads. No. 9 was located more palatally to allow for more augmentation materials buccally.

Figure 9: Provisional restoration. Acrylic shells were connected chairside to titanium sleeves for screw-retained immediate provisionalization.

The patient was administered 1 gram of amoxicillin 1 hour before treatment. After local anesthesia infiltration, gentle intrasulcular incisions were made with a periotome. The roots were carefully extracted in an atraumatic flapless manner,[20-22] and the sockets were debrided (Figure 6). The surgical guide template was seated and fixed on the maxillary dentition, and the osteotomy sequence was performed through the titanium guide sleeves according to the recommended V3 drilling protocol.

For insertion of the implants, either they could be inserted through the sleeves or, as was done in this case (because at the time the guiding system was not suitable for 16 mm implants), the guide removed and the implants (3.9 mm x

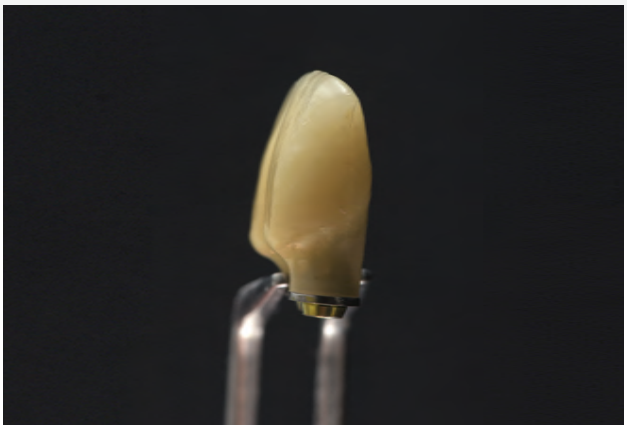


Figure 10: The cervical area of the provisionals was trimmed as narrow as possible.

Figure 11: De-epithelialized free gingival graft, harvested from the palate, was prepared.

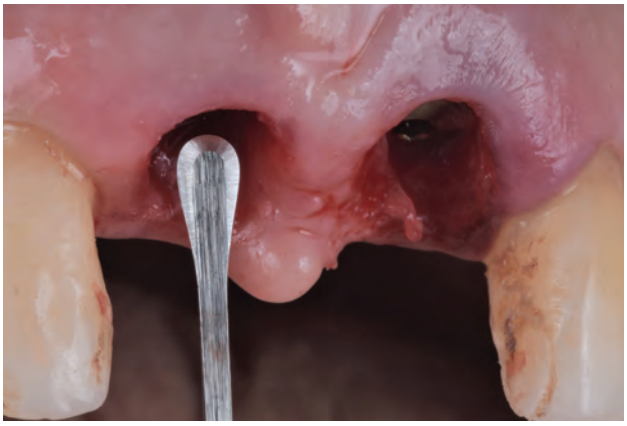


Figure 12: Micro-knives were used to mobilize the soft tissues, creating a pouch for the graft.

Figure 13: Provisional crowns connected. A cross-suture at No. 9 pulled the tissue coronally.

16 mm) inserted freehand into the osteotomies. A primary stability of around 50 Ncm was achieved.

The implant drivers of this system have 3 mm and 6 mm markings to monitor the depth of the implant head in relation to the free gingival margin when placed flaplessly. As planned, the implant heads were positioned 6 mm apical to the existing free gingival margin, and a flat surface of the triangular neck of each implant was oriented buccally to allow for maximum space for the required augmentation.[23,24]

Immediately after implant placement, a solid transmucosal extension abutment 3 mm in height (Connect, MIS Implants) was connected to each implant and torqued down to 33 Ncm (Figure 7). This transmucosal abutment offers several benefits. First, because it is a solid one-piece unit there is no screw chimney that might allow for oral contaminants passing through to the abutment–implant junction.[25,26] When torqued down to 33 Ncm, this conical connection provides a perfectly hermetic seal with practically no micromovement between the abutment and implant and no microgap. The bone-level implant is actually transformed into a tissue-level implant where the prosthetic platform is away from the bone. Different available heights of this abutment allow for selection of the optimal prosthetic level in relation to the soft tissue regardless of the depth of the implant head. Furthermore, the narrow contour of the abutment allows for the connective tissue to heal and mature around it, providing an ultimate mucosal seal, and because the abutment is not removed after placement, repeated disruption of the soft-tissue seal during the prosthetic workflow is avoided. Finally, after the abutment is connected, the prosthetic workflow is kind to the tissue, painless to the patient, and easily controlled by the dentist.

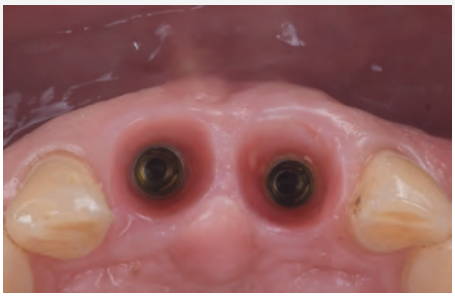


Figure 14: At 4 months the peri-implant mucosa exhibited a healthy appearance and adequate volume.

Figure 15: Digital scanning of the restorative site.

Figure 16: Impression transfer copings connected to the abutments for traditional open-tray impression.

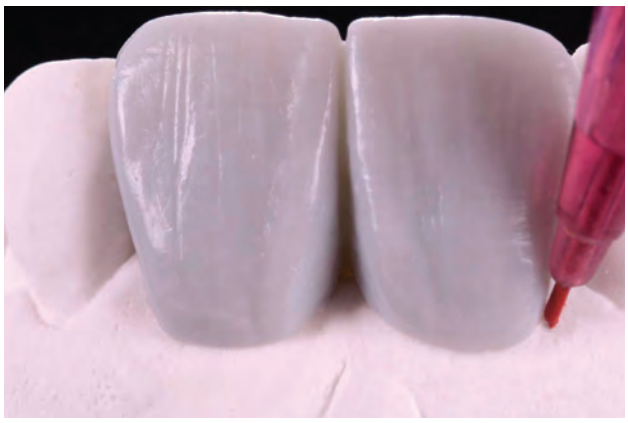


Figure 17: Ideal wax-up on the working model allowed for marking of cervical contours on the plaster.

The Connect prosthetic platform was now located 3 mm to 4 mm apical to the free gingival margin (Figure 8).

Because the initial stability of the implants allowed for immediate prosthetic connection, two titanium sleeves were screwed to the Connect abutments, and the acrylic crown shells were placed over them, loaded with fresh acrylic resin, allowed to set, and then removed. The provisional restorations were then finished, trimmed, and polished chairside in a traditional manner (Figure 9 and Figure 10). The cervical profile of the provisionals was trimmed as narrow as possible to avoid unnecessary pressure on the soon-to-be grafted surgical site.

De-epithelialized free gingival graft, harvested from the palate, was prepared (Figure 11). Mobilization of the soft tissue buccal to the implants, including the papillae, was gently performed with micro knives in a tunnel approach (Figure 12).

A combination of autogenous bone from the osteotomies and particulate bone mixture (70% allograft and 30% xenograft) was then gently packed around the implant necks; meanwhile, the Connect abutments were temporarily sealed with healing caps.[27-29] The connective tissue graft then was slid into the created pouch, between the abutments and the inner part of the gingiva. The graft was positioned so as to also support the bases of the papillae. A thicker graft was placed on top of implant No. 9. The soft-tissue grafts were secured in place with 6.0 polyglycolic sutures (Serafit®, Serag-Wiessner, serag-wiessner.de). Thickening the soft tissue, especially in thin biotype, allows for future stability of the healed and matured peri-implant tissues.[30,31]

The Connect healing caps were removed and the two splinted provisional crowns were screwed with a torque of 22 Ncm, and the screw openings were sealed. Then, an additional cross-suture was used to pull the tissue on top of No. 9 coronally and was anchored to the provisional crown with a composite resin (Figure 13).

The mandibular posterior teeth were temporarily built-up on their buccal cusps with composite resin stops to allow

ivodent
Adding value

GUM Access Floss

Specially designed to **floss under and around crowns, bridges, braces and wide interdental spaces**

+ Built-in threader allows for easy insert into narrow spaces and hard-to-reach areas
+ Floss adapts to different sizes of patients' interdental spaces for more tooth surface contact
+ Easy and effective plaque and debris removal without irritating the gums

PERIO • ORTHO

Specialist oral care solutions for every step

@ivodentSA 0860 456 123 HEALTHY GUMS. HEALTHY LIFE.®

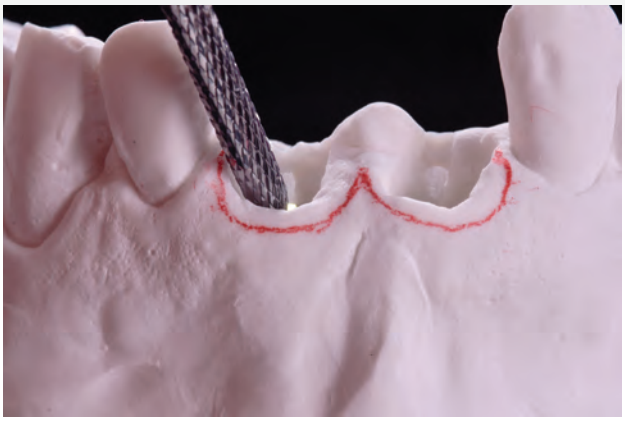


Figure 18: The tissue between the marking and the prosthetic platform was gently removed to allow smooth continuity of the cervical prosthetic site.

Figure 19: The peri-implant envelope was optimally designed.

Figure 20 and Figure 21: Definitive restoration. Splinted zirconia-based layered crowns were created (Fig 20) and connected to Ti-base sleeves (Fig 21) (Technician: Giuseppe Romeo, MDT).

temporary increase of the vertical dimension of occlusion to completely exclude any contact between the immediate implant crowns and their opposing teeth in all jaw positions and movements.

The patient received standard postsurgical instructions and one dose of 12 mg dexamethasone. He was instructed to follow an antibiotic regimen for 2 more days and to rinse his mouth three times daily with a chlorhexidine solution (Corsodyl 0.2% mouthwash, GSK, corsodyl.co.uk) followed by 0.025% hyaluronic acid solution (Gengigel® Hydrogel, Ricerfarma, ricerfarma.com) for 3 weeks. He was also instructed to avoid biting on his front teeth and consume a soft diet for 8 weeks.

Definitive Restorations

Four months after surgery the provisional restorations were removed revealing a healthy mucosa (Figure 14). Because the prosthetic platform is that of the Connect abutments (ie, 3 mm away from the implant head), all of the prosthetic steps can be executed without harming the biologic width that was created and organized during the healing period. As stated earlier, using such transmucosal extensions provides the flexibility of a two-piece implant system (eg, precise positioning according to the bone anatomy, implant submergence if needed, etc) with the advantages of a tissue-level implant, which include no abutment–implant microgap next to the bone (and, therefore, no bacterial colonization of the abutment–implant junction at the bone level), no micromovement close to the bone, no tissue disruption throughout the prosthetic workflow, and the ability to clearly view and access the implant in any region.[32-34]

The height of the extension abutment is chosen according to the clinical situation, and this can be replaced if significant tissue alterations occur. In this case, because the extension

Figure 22: Definitive restoration. Note that No. 8 had a non-engaged (free rotation) connection whereas No. 9 had an engaged (anti-rotational) connection.

Figure 23: Definitive restoration. The cervical profiles of the two crowns differed due to the different spatial positions of the prosthetic platforms.

abutments were never removed, the abutment also adheres to the desirable demand of "one abutment, one time."[35-37]

Impression of the Connect prosthetic platform and adjacent teeth and tissue can be made either by digital scanning (Figure 15) utilizing designated scan bodies or by traditional impression transfer coping (Figure 16) for open or close tray. The technician partner of the team in this case preferred the traditional analog method. (To view a brief video of the digital scanning of the restorative site, scan the QR code next to Figure 15.)

Cervical Contouring Concept:
A Model-Based Cervical Design

To create the ideal cervical contour of the definitive crowns, the cervical contouring concept was applied.[38-40] An ideal wax-up was duplicated on the working model, and the cervical crown contours were marked on the plaster (Figure 17). Then, the wax crowns were removed and the plaster between the marked line and the inner prosthetic platform was gently carved away (Figure 18). Thus, a smooth continuity of the cervical region, from the narrow prosthetic platform (4 mm diameter) to the wider diameter of the crowns as they emerge from the tissue, was achieved. Also, the inter-implant papilla was thinned and sharpened (Figure 19).

In this restorative concept, when referencing the traditional cervical part of an implant crown with its deep and superficial contours (also termed "critical" and "subcritical" contours, respectively[41]) the deep contour is composed of the pre-manufactured narrow Connect abutment, whereas the superficial contour is custom-made as per the cervical contouring concept. The modified cervical region in the model directs the design of the cervical contours of the crowns. When the crowns are connected intraorally the peri-implant mucosa will adapt to these optimal contours.

The definitive restorations in this case were chosen to be splinted zirconia-layered crowns (Figure 20) bonded to titanium sleeves (Figure 21). The sleeves of this prosthetic system can be either engaged or non-engaged. When multiple connected crowns are to be screw-retained, only one connection can be engaged, while the rest should be non-engaged in order to have maximal passive fit (although all of them could be non-engaged).

In this case, a non-engaged Ti-base combined together with an engaged one were chosen (Figure 22). The two cervical crown profiles differed due to the varying spatial positioning of the implants and the corresponding Connect abutments (Figure 23). The crowns were screw-retained at 25 Ncm, and the screw openings were sealed with an expanded polytetrafluoroethylene (ePTFE) plug (KWO, kwoptfe.de) and composite resin (Figure 24). A CBCT at this stage revealed acceptable bone and mucosal volumes around the implants and their abutments (Figure 25).

At 13 months recall, further maturation of the augmented tissue was obvious (Figure 26) and stable bone was noticeable in a periapical radiograph (Figure 27).

Conclusion

Immediate implant placement followed by immediate restoration is a demanding treatment modality[42] that requires

Figure 24: At 2 weeks the definitive crowns integrated well with the surrounding mucosa and teeth.

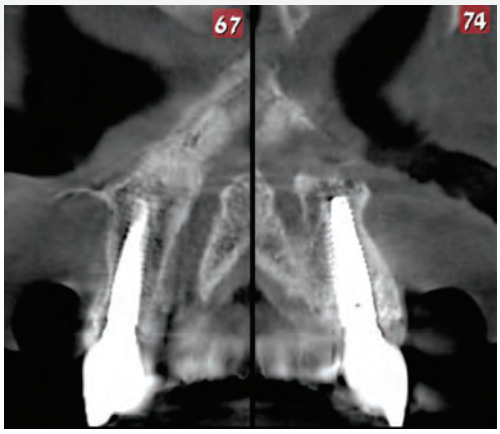
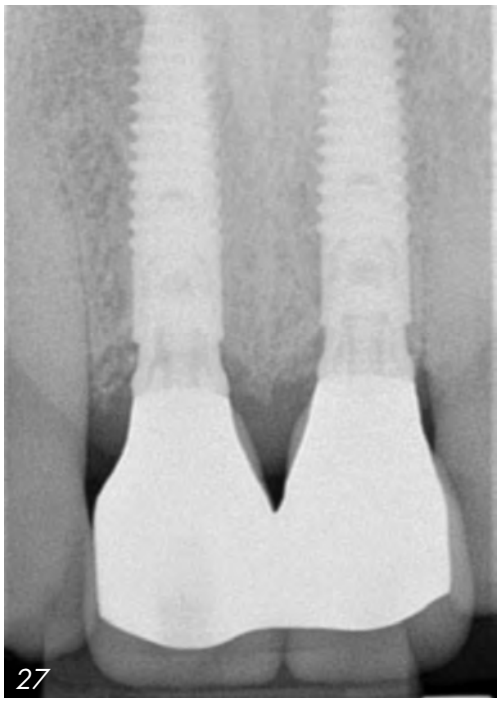


Figure 25: CBCT slices of the treated site. Adequate bone and mucosa surrounded the implants and abutments. No. 9 was positioned more palatally, allowing for more augmentation materials and thicker mucosa where the gingiva initially was deficient.

Figure 26: At 13-month recall, the mucosa was continuing to mature and grow, covering more of the crowns' cervical region.

Figure 27: Periapical radiograph at 13 months depicted stable bone next to the implants. Note the relationship of the implant heads, bone, and Connect abutments as well as the whole implants-restorative contours.



vast knowledge and experience and excellent clinical skills. A thorough analysis of the case, precise planning, and meticulous execution are fundamental for success, especially at the smile zone. Understanding the biologic and physiologic events following tooth extraction and implant placement is crucial to be able to choose the most suitable treatment strategy, techniques, materials (augmentation and restorative), and implant system (surgical, implant, and prosthetic components). Implementing this knowledge in an intelligent and rational clinical workflow increases the predictability for achieving healthy, esthetic, and stable results and a satisfied patient.

Acknowledgment

The authors thank the technician partner of the team in this treatment, Mr. Giuseppe Romeo, MDT, of Torino, Italy.

Q1 2020 PROMOTIONS

INTERNATIONAL

Buy 1 TheraCal LC 4 pack Get 1 Syringe FREE!

TheraCal LC 4 Syringe Package	H-33014P
TheraCal LC Syringe	H-3301P

20% OFF

CEMENTS		
TheraCem Dual Syringe	(Natural, 8g)	D-46311P
TheraCem Ca Dual Syringe	(Natural, 8g)	D-46501P
BONDING		
All-Bond Universal	(6ml Bottle)	B-7202P
All-Bond Universal Kit w/o BAC		B-7202B0K-EU
All-Bond Universal	(4ml Bottle)	B-7204P
All-Bond Universal Kit w/BAC		B-72020K
PRIMERS		
Z-Prime Plus	(4ml Bottle)	B-6001P
Z-Prime Plus	(2ml Bottle)	B-6002P
Porcelain Primer	(10ml Bottle)	B-2221P
Bis-Silane	(Two Component 6ml Bottles)	B-3210P

* Discounts are effective January 1st through March 31st, 2020.

CONFIDENT CLINICAL

BISCO

Rx Only

www.bisco.com

MC-6254QP

Dale: 071 875 5522 Leon: 071 921 4566 CT/Cole: 063 811 3069
Dbn / Bruce: 071 894 9838 Head Office: 011 483 1881

Disclosure

Dr. Bichacho is co-inventor of the V3 Implant System (MIS Implants) and declares a financial interest in this system. He is also a consultant to MIS Implants in Bar-Lev, Israel. Dr. Feraru has no financial interest in any of the products mentioned in this article.

References

1. Fürhauser R, Florescu D, Benesch T, et al. Evaluation of soft tissue around single-tooth implant crowns: the pink esthetic score. Clin Oral Implants Res. 2005;16(6):639-644.

2. Belser UC, Grütter L, Vailati F, et al. Outcome evaluation of early placed maxillary anterior single-tooth implants using objective esthetic criteria: a cross-sectional, retrospective study in 45 patients with a 2- to 4-year follow-up using pink and white esthetic scores. J Periodontol. 2009;80(1):140-151.

3. Kois JC. Predictable single tooth peri-implant esthetics: five diagnostic keys. Compend Contin Educ Dent. 2001;22(3):199-206.

4. Dhir S, Mahesh L, Kurtzman GM, Vandana KL. Peri-implant and periodontal tissues: a review of differences and similarities. Compend Contin Educ Dent. 2013;34(7):e69-e75.

5. Berglundh T, Lindhe J, Ericsson I, et al. The soft tissue barrier at implants and teeth. Clin Oral Implants Res. 1991;2(2):81-90.

6. Berglundh T, Lindhe J, Jonsson K, Ericsson I. The topography of the vascular systems in the periodontal and peri-implant tissues in the dog. J Clin Periodontal. 1994;21(3):189-193.

7. Hermann JS, Buser D, Schenk RK, et al. Biologic width around one- and two-piece titanium implants. Clin Oral Implants Res.2001;12(6):559-571.

8. Lee DW, Park KH, Moon IS. Dimension of keratinized mucosa and the interproximal papilla between adjacent implants. J Periodontol. 2005;76(11):1856-1860.

9. de Oliveira RR, Novaes AB Jr, Papalexiou V, et al. Influence of interimplant distance on papilla formation and bone resorption: a clinical-radiographic study in dogs. J Oral Implantol. 2006;32(5):218-227.

10. Buser D, Martin W, Belser UC. Optimizing esthetics for implant restorations in the anterior maxilla: anatomic and surgical considerations. Int J Oral Maxillofac Implants. 2004:19 suppl:43-61.

11. Tarnow DP, Cho SC, Wallace SS. The effect of inter-implant distance on the height of inter-implant bone crest. J Periodontol. 2007;71(4): 546-549.

12. Novaes AB Jr, Barros RR, Muglia VA, Borges GJ. Influence of interimplant distances and placement depth on papilla formation and crestal resorption: a clinical and radiographic study in dogs. J Oral Implantol. 2009;35(1):18-27.

13. Mankoo T. Maintenance of interdental papillae in the esthetic zone using multiple immediate adjacent implants to restore failing teeth—a report of ten cases at 2 to 7 years follow-up. Eur J Esthet Dent. 2008;3 (4):304-322.

14. Van Dooren E. Adjacent implants in the anterior maxilla: surgical and prosthetic concepts. J Cosmetic Dent. 2012;28(2):42-51.

15. Wöhrle PS. Predictably replacing maxillary incisors with implants using 3-D planning and guided implant surgery. Compend Contin Educ Dent. 2014;35(10):758-768.

16. Kolerman R, Tal H, Guirado JLC, Barnea E. Aesthetics and survival of immediately restored implants in partially edentulous anterior maxillary patients. Applied Sciences. 2018;8(3):377.

17. Grunder U, Gracis S, Capelli M. Influence of the 3-D bone-to-implant relationship on esthetics. Int J Periodontics Restorative Dent. 2005;25 (2):113-119.

18. Amato F, Polara G, Spedicato GA. Tissue dimensional changes in single-tooth immediate extraction implant placement in the esthetic zone: a retrospective clinical study. Int J Oral Maxillofac Implants. 2018; 33(2):439-447.

19. Sailer I, Mühlemann S, Zwahlen M, et al. Cemented and screw-retained implant reconstructions: a systematic review of the survival and complication rates. Clin Oral Implants Res. 2012;23 suppl 6:163-201.

20. Kan JYK, Rungcharassaeng K, Deflorian M, et al. Immediate implant placement and provisionalization of maxillary anterior single implants. Periodontol 2000. 2018;77(1):197-212.

21. Slagter KW, den Hartog L, Bakker NA, et al. Immediate placement of dental implants in the esthetic zone: a systematic review and pooled analysis. J Periodontol. 2014;85(7):e241-e250.

22. Caneva M, Botticelli D, Salata LA, et al. Flap vs. "flapless" surgical approach at immediate implants: a histomorphometric study in dogs. Clin Oral Implants Res. 2010;21(12):1314-1319.

23. Ishikawa T, Salama M, Funato A, et al. Three-dimensional bone and soft tissue requirements for optimizing esthetic results in compromised cases with multiple implants. Int J Periodontics Restorative Dent. 2010; 30(5):503-511.

24. Rungcharassaeng K, Kan JY, Yoshino S, et al.

Immediate implant placement and provisionalization with and without a connective tissue graft: an analysis of facial gingival tissue thickness. Int J Periodontics Restorative Dent. 2012;32(6):657-663.

25. Lakha T, Kheur M, Kheur S, Sandhu R. Bacterial colonization at implant-abutment interface: a systematic review. J Dent Specialties. 2015; 3(2):176-179.

26. Canullo L, Penarrocha-Oltra D, Soldini C, et al. Microbiological assessment of the implant-abutment interface in different connections: cross-sectional study after 5 years of functional loading. Clin Oral Implants Res. 2015;26(4):426-434.

27. Tomasi C, Sanz M, Cecchinato D, et al. Bone dimensional variations at implants placed in fresh extraction sockets: a multilevel multivariate analysis. Clin Oral Implants Res. 2010;21(1):30-36.

28. Berglundh T, Abrahamsson I, Lang NP, Lindhe J. De novo alveolar bone formation adjacent to endosseous implants. Clin Oral Implants Res. 2003;14(3):251-262.

29. Covani U, Cornelini R, Calvo-Guirado JL, et al. Bone remodeling around implants placed in fresh extraction sockets. Int J Periodontics Restorative Dent. 2010;30(6):601-607.

30. Grunder U. Crestal ridge width changes when placing implants at the time of tooth extraction with and without soft tissue augmentation after a healing period of 6 months: report of 24 consecutive cases. Int J Periodontics Restorative Dent. 2011;31(1):9-17.

31. Linkevicius T, Apse P, Grybauskas S, Puisys A. The influence of soft tissue thickness on crestal bone changes around implants: a 1-year prospective controlled clinical trial. Int J Oral Maxillofac Implants. 2009;24(4):712-719.

32. Kumar VV, Sagheb K, Kämmerer PW, et al. Retrospective clinical study of marginal bone level changes with two different screw-implant types: comparison between tissue level (TE) and bone level (BL) implant. J Maxillofac Oral Surg. 2014;13(3):259-266.

33. Kim S, Jung UW, Cho KS, Lee JS. Retrospective radiographic observational study of 1692 Straumann tissue-level dental implants over 10 years: I. Implant survival and loss pattern. Clin Implant Dent Relat Res. 2018;20(5):860-866.

34. Kang MH, Jung UW, Cho KS, Lee JS. Retrospective radiographic observational study of 1692 Straumann tissue-level dental implants over 10 years. II. Marginal bone stability. Clin Implant Dent Relat Res. 2018;20(5):875-881.

35. Canullo L, Bignozzi I, Cocchetto R, et al. Immediate positioning of a definitive abutment versus repeated abutment replacements in post-extractive implants: 3-year follow-up of a randomised multicentre clinical trial. Eur J Oral Implantol. 2010;3(4):285-296.

36. Degidi M, Nardi D, Piattelli A. One abutment at one time: non-removal of an immediate abutment and its effect on bone healing around subcrestal tapered implants. Clin Oral Implants Res.2011;22(11):1303-1307.

37. Grandi T, Guazzi P, Samarani R, Garuti G. Immediate positioning of definitive abutments versus repeated abutment replacements in immediately loaded implants: effects on bone healing at the 1-year follow-up of a multicentre randomised controlled trial. Eur J Oral Implantol. 2012;5(1):9-16.

38. Bichacho N, Landsberg CJ. A modified surgical/prosthetic approach for an optimal single implant-supported crown. Part II. The cervical contouring concept. Pract Periodontics Aesthet Dent. 1994;6(4):35-41.

39. Bichacho N. Prosthetically guided soft tissue topography surrounding single implant restorations: cervical contouring concept. Int J Dent Symposia. 1997;4(1):30-35.

40. Bichacho N. Achieving optimal gingival esthetics around restored natural teeth and implants: rationale, concepts, and techniques. Dent Clin North Am. 1998;42(4):763-780.

41. Su H, Gonzalez-Martin O, Weisgold A, Lee E. Considerations of implant abutment and crown contour: critical contour and subcritical contour. Int J Periodontics Restorative Dent. 2010;30(4):335-343.

42. Buser D, Chappuis V, Belser UC, Chen S. Implant placement post extraction in esthetic single tooth sites: when immediate, when early, when late? Periodontol 2000. 2017;73(1):84-102.

Evidence-based treatment planning for the restoration of endodontically treated single teeth: importance of coronal seal, post vs no post, and indirect vs direct restoration

Alan Atlas,[1] Simone Grandini[2], Marco Martignoni[3]

Abstract

Every orthograde endodontic procedure requires restoration of the coronal (access) cavity. The specific type of treatment used in individual cases greatly depends on the amount and configuration of the residual coronal tooth structure. In practice there are Class I access cavities as well as coronally severely damaged, even decapitated, teeth and all conceivable manifestations in between. The latest attempts to review results from clinical trials to answer the question of whether post placement or crowning can be recommended for the restoration of endodontically treated teeth or not are inconclusive. For dental practitioners, this is not a satisfactory result. This appraisal evaluates available evidence and trends for coronal restoration of single endodontically treated teeth with a focus on clinical investigations, where available. It provides specific recommendations for their coronal restoration to assist clinicians in their decision making and treatment planning. (Quintessence Int 2019;50: 772–781; doi: 10.3290/j.qi.a43235)

Key words: coronal restoration, direct restoration, endodontically treated teeth (ETT), endodontics, fiber post, indirect restoration, seal

[1] Alan Atlas
Clinical Professor, Departments of Endodontics, Preventive and Restorative Sciences, University of Pennsylvania School of Dental Medicine, USA; Private Practice, Philadelphia, Pennsylvania, USA

[2] Simone Grandini
Professor and Chair, Department of Medical Biotechnologies, Division of Restorative Dentistry and Endodontics, University of Siena, Siena, Italy

[3] Marco Martignoni
Clinical Assistant Professor, Department of Medical Biotechnologies, Division of Restorative Dentistry and Endodontics, University of Siena, Siena, Italy; Private Practice, Rome, Italy

Correspondence:
Dr Alan Atlas, Departments of Endodontics and Preventive and Restorative Sciences, University of Pennsylvania School of Dental Medicine, University of Pennsylvania, 240 S 40th St, Philadelphia, PA 19104, USA.
Email: amatlas@upenn.edu

The importance of coronal restoration for endodontic treatment outcome

Leaking coronal restorations dramatically reduce the chance of endodontic treatment success. Numerous studies by renowned authors provide appropriate evidence, concluding that the coronal restoration is at least as important for apical periodontal health as the quality of the endodontic treatment itself.[1-4]

An early study on the influence of the marginal integrity of coronal restorations on endodontic treatment outcome assessed more than 1,000 teeth radiologically that had undergone endodontic treatment.[1] It was apparent that the absence of apical periodontitis was significantly dependent on the marginal integrity of the coronal

restoration; 90% of endodontically sufficiently treated teeth were free of apical foci, assuming these were also restored coronally and a marginal seal achieved. The success rate dropped to 44% for coronal restorations that appeared to have marginal leakage (Fig 1).

The importance of coronal restoration is also verified by a large epidemiologic study of survival data on close to 1.5 million ETT, provided by a US dental health insurer.[2] From approximately 42,000 teeth extracted during the observation period, 85% had no proper coronal coverage and were removed at a rate six times greater than teeth that had coronal coverage. Further retrospective research is in line with this finding.[3]

A comprehensive meta-analysis of data available on the subject concluded that when either the quality of the coronal restoration or the quality of the root canal filling is completed inadequately, it is equally contributive to an unsuccessful outcome.[4] Placement of a sufficient restoration over a poorly obturated root canal, or vice versa, does not render the high degree of success associated with performing both procedures adequately.

Hence, for the best possible, meaning long-term successful, endodontic treatment, both adequate endodontic and restorative treatments are indispensable. The question remains how state-of-the-art coronal restoration can be accomplished in an endodontic context.

To post or not to post, that is the question

ETT are more susceptible to fracture than vital teeth.[5] It appears that particularly the loss of marginal ridges reduces fracture-resistance.[6,7] In the case of a three-surface Class II mesio-occluso-distal (MOD) access cavity configuration, that is involving loss of both marginal ridges, coronal stiffness reduction is on average 63%.[7] To compensate for this loss of stability, it is still customary to crown ETT. A central procedure in this context is frequently placement of a post.

A root post is traditionally used primarily for improving retention of the build-up material to the residual tooth structure. Whether posts improve the time in situ of the coronal restoration or tooth, however, is a controversially discussed subject. Current reviews assess the data available on the issue.[8,9] As the authors of these reviews criticize the lack of methodic quality of the investigations under review, they are unable to provide a general recommendation for or against the use of posts. However, it is noted that there appears to be an emerging trend toward the superiority of fiber-reinforced posts.[9]

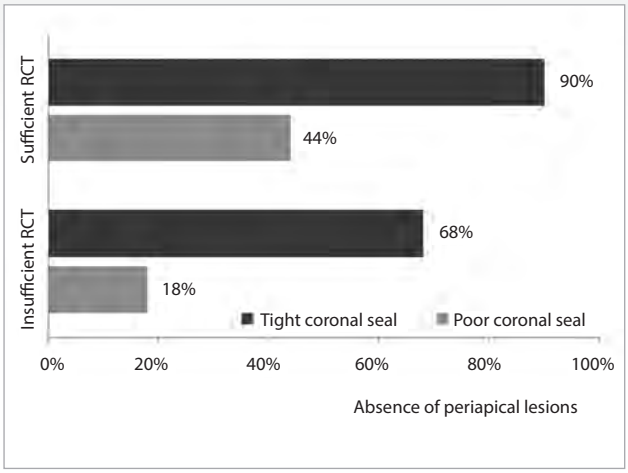


Figure 1: Endodontic success, ie the absence of periapical lesions, depending on coronal restoration seal (tight or poor) and the quality of the root canal treatment (RCT, sufficient or insufficient). Modified from Ray and Trope.[1]

Post type

Within the scope of this appraisal, a selection of the clinical trials available on the subject shall therefore be made according to the following rationale: fiber posts are based on state-of-the-art technology and the accepted standard of care. Studies and reviews confirm that:

- fiber posts exhibit relatively uniform stress distribution to the root[10]
- fiber posts have elastic moduli similar to dentin[10]
- fiber posts are easy to place, cost effective, and esthetic[10]
- glass fiber posts are associated with low catastrophic failure rates compared to other post types[11]
- glass fiber posts exhibit lower and thus superior stress peaks in finite element analysis.[12]

Based on this rationale, the appraisal at hand only takes clinical trials into consideration, which:

- deal with a "composite core with fiber post vs composite core without fiber post" scenario
- are included in the "Level I Evidence" category (that is, randomized controlled trial [RCT]) as set forth by the US Preventive Services Task Force (USPSTF).[13]

Premolars

According to the recent review of trials on the topic,[8] there are three published RCTs that match the above criteria.[14-16] Conclusions from these trials can be summarized as follows:

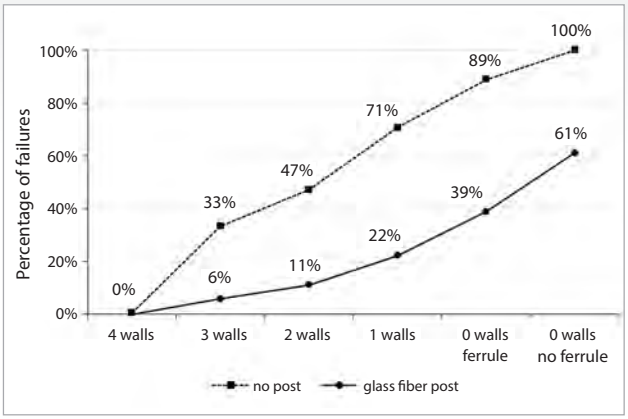


Figure 2: Overall failures of ETT as a function of residual coronal walls, with and without glass fiber post. Modified from Ferrari et al.[15]

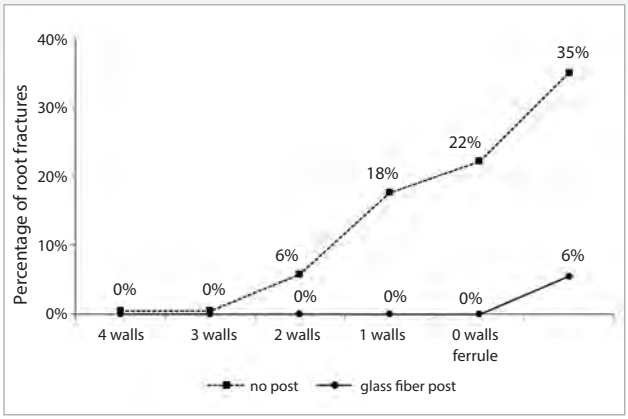


Figure 3: Root fractures of ETT as a function of residual coronal walls, with and without glass fiber post. Modified from Ferrari et al.[15]

- in premolars, the amount of residual coronal tooth structure generally influences survival, ie the more coronal walls, the fewer failures (Fig 2)[14,15]
- in premolars, glass fiber posts reduce failure risk (Fig 2)[14,15]
- in premolars, glass fiber posts protect against root fracture (Fig 3)[14,15]
- in premolars, the previous two effects are more pronounced the more coronal cavity walls remain[14,15]
- in decoronated teeth, quartz fiber posts significantly extend the time to restoration failure.[16]

Based on these findings it can be concluded that post placement is still a legitimate approach to restoration of ETT, especially for cases with extensive coronal structure loss (Fig 4). The more structure is lost, the more useful fiber post placement becomes. However, it needs to be taken into consideration that the above-mentioned clinical trials mostly focus on crowned premolars.

Figure 4: For severely destroyed teeth, adhesive placement of a glass fiber post with subsequent core buildup and conventional crowning is recommended. Reprinted from Naumann[53] with permission.

Molars and incisors

There is only one RCT that matches the criteria and which also considers molars and incisors.[16] The trial followed a non-inferiority design with an assumed margin of equivalence of 15%. Its objective was to show that placement of quartz fiber posts makes no difference to clinical failure for any reason. Based on the results and in line with its non-inferiority design, the authors conclude that placement of a post provides no added clinical value except for the "no-wall" scenario, that is decoronated teeth. In this group, post retention exhibited a 7% failure rate compared to 31% for teeth without post retention. The authors conclude that quartz fiber post placement is efficacious in reducing failures of post-endodontic restoration of teeth exhibiting no coronal wall. The same study recommends that post insertion for teeth with minor structure loss should be critically reconsidered to avoid overuse. One circumstance limiting the validity of the trial is the lack of totally standardized conditions, as the authors themselves admit. Beyond pooling of various types of teeth, crowns of the teeth observed were, depending on the extent of the defect, restored using either metal, porcelain-fused-to-metal, or all-ceramic full crowns, metal or all-ceramic partial crowns, or composite restorations. Also, it should be taken into consideration that the cores were built up using a combination of conventional self-curing adhesive and

INNOVATIVE TREATMENT MODALITIES IN AESTHETIC DENTISTRY

JOIN US FOR A DAY OF IMPLANTS & POLO

MIS SOUTH AFRICA PRESENTS

PROF. NITZAN BICHACHO

Towards a biologically-oriented aesthetic implant restoration at the smile zone. Where do we stand?

VAL DE VIE ESTATE PAARL

SATURDAY, 18 APRIL 2020

Dr. Avish Jagathpal & Dr. Jonathan Du Toit
Soft tissue management around dental implants.

Dr. Thabit Peck
Simplifying bone augmentation using calcium sulphate based biomaterials.

Dr. Jacques Malan & Dr. Niel Grundling
Making It Simple in the Eastern Cape.

COST: R2500.00
7 CLINICAL CPD POINTS

MIS DAY RSA 2020
IMPLANTS & POLO

mis SOUTH AFRICA

For more information,
Tel: 012 665 4631 | 021 851 4875
email: info@implant.co.za
misdaysouthafrica.misimplants.co.za

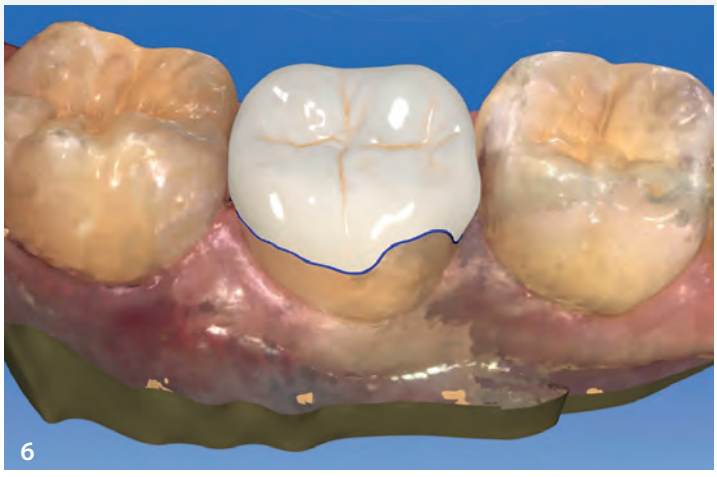


Figure 5: In cases where placement of a conventional crown is planned, preparation of a ferrule is advised. Reprinted from Naumann[53] with permission.
Figure 6: CAD/CAM construction of an all-ceramic overlay. For posterior teeth presenting with few or undermined walls, cuspal coverage with a partial crown or an adhesively placed onlay is advised. (Courtesy of Dr Andreas Bindl, Switzerland.)

core build-up composite – material classes characterized by moderate bond strengths and considerable shrinkage stress development.

In similar form, a comprehensive literature review recommends restoration of root filled molars (and premolars) exhibiting limited tissue loss, that is, with 50% or more of the coronal structure preserved, without post placement, especially when cusp protection is planned.[17] One of the rare in vitro investigations on the effects of post placement in molars also found fiber posts ineffective in increasing the fracture-resistance of teeth with cuspal coverage.[18]

In addition, data for anterior teeth are scant. Biomechanical considerations suggest that, due to different load directions, anterior teeth behave differently from premolars and molars. Which effect these load patterns ultimately have on restorative success and survival of ETT is the subject of scientific discussion. Some consider the maxillary anterior region a particularly high-risk area for mechanical failure after endodontic treatment owing to the oblique loading pattern,[8] while others argue that lateral, horizontal, or oblique forces generated at angles less than 90 degrees, as they occur in posterior teeth, are more destructive than vertical loads and can lead to greater failure of restorations.[19] Deep overbites, a horizontal envelope of function, and extreme parafunctional forces also may increase the possibility of fracture and loss of anterior teeth. It seems that in maxillary central incisors, tooth stability decreases starting with preparation of the endodontic access cavity, with further significant destabilization occurring after post space preparation.[19] In the mandible, the anatomy of incisors is generally daintier compared to other teeth. Some authors recommend coronal reconstruction of root-filled incisors with limited tissue loss using composite only.[17] Notwithstanding, a trend to achieve additional retention through post placement to compensate load patterns or anatomical limitations in anterior teeth, such as small pulp chambers and thin residual walls, is recognized.[20] Because it appears, however, that preservation of natural tooth structure is a decisive factor for successful restoration of ETT, post space preparation should be kept to a minimum in all cases.[21]

Coronal restoration of ETT

Crowning and cuspal coverage

Crowns are proven to function well as a long-term restorative measure for ETT. With an average annual failure rate of 1.9%, their longevity corresponds to those of various indirect restorations in vital teeth, which range between 1.4% and 1.9%.[22,23] The preparation of a ferrule (Fig 5) is deemed a decisive success factor in that context.[24]

With classic crowning, however, a significant amount of residual tooth structure is sacrificed in the preparation. Moreover, crowning often involves creating a subgingival preparation margin and therefore a significantly less hygienic margin region. For those reasons and in the light of recent research results, the almost habitual, reflex-like decision in favor of crowning single teeth regardless of the coronal

Carestream DENTAL

Wright MILLNERS

ACCURACY MATTERS.

Study shows highest accuracy. Again.

Best Single Crown, Partial Prosthesis and Full Arch Trueness.[1] In a recent comparative in vitro performance study on accuracy, the CS 3600 surpassed leading competitors by varying the least between the scanned model and the reference model, delivering a significantly better performance in terms of trueness. It also provided the most consistently repeatable results for the best precision when scanning a single crown or partial prosthesis and had the second-best precision when scanning a full arch. Trueness and precision play a vital role in the fit of final restorations, appliances and implants. A perfect fit for restorative dentists. **Contact Wright Millners on talk2us@wright-millners.co.za for more information.**

Book FREE Demo Today!

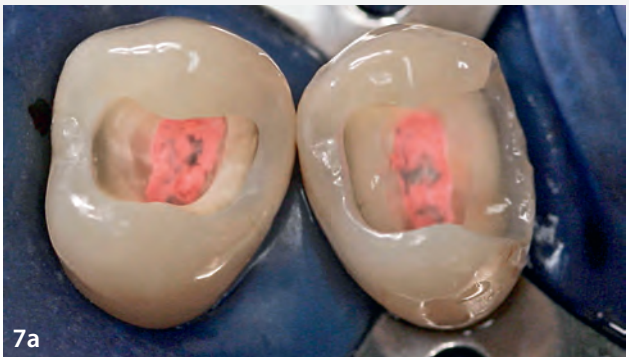
WORKFLOW INTEGRATION | **HUMANIZED** TECHNOLOGY | **DIAGNOSTIC** EXCELLENCE

[1]Mangano F, Logozzo S, Hauschild U, Veronesi G, Imburgia M, Mangano C, Admakin O. June 6, 2019. Trueness and precision of 5 intraoral scanners in the impressions of single and multiple implants: a comparative in vitro study. BMC Oral Health. 19(101): DOI 10.1186/s12903-019-0792-7

Pictures used may be for representation only. E&OE.

0860 100 200 | @wrightmillners | Wright Millners Dental Suppliers

www.mywrightplace.co.za | www.wright-millners.co.za



Figs 7a to 7c: Endodontically treated posterior teeth with four and three coronal walls, respectively. In such Class I and two-surface, Class II type (access) cavities with barely undermined residual tooth structure, the decision to treatment plan direct adhesive composite restorations is possible if risk factors discussed in the article and listed in Table 1 are favorable. (Courtesy of Dr Marcus Holzmeier, Germany, and Prof Simone Grandini, Italy.)

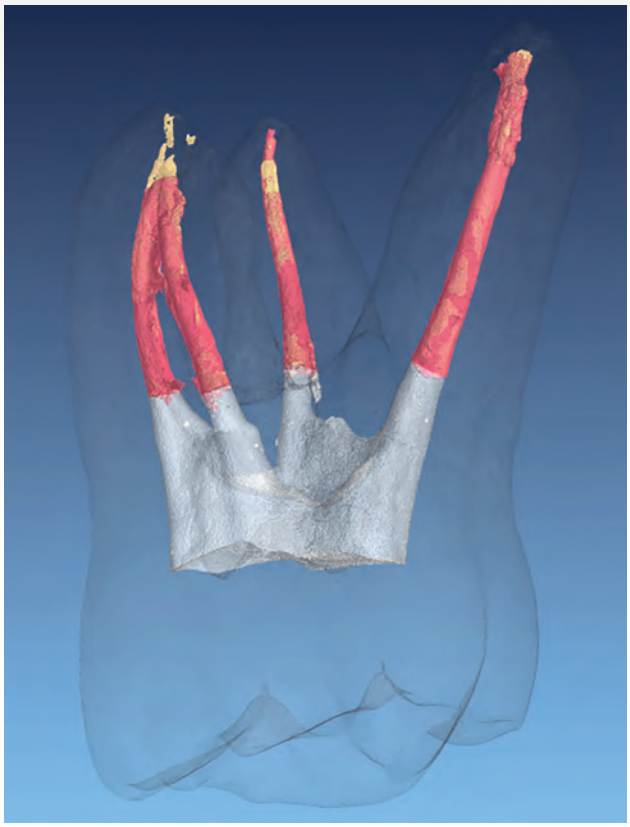


Figure 8: Micro-computed tomography view of a flowable, bulk-fill composite (SDR, Dentsply Sirona, light blue portion) applied to an endodontic access cavity. Note the high degree of adaptation to the pulp cavity despite its complex geometry. (Courtesy of Dr Frank Paqué, Switzerland.)

cavity configuration must be considered questionable.

The epidemiologic investigation referred to earlier in this appraisal advises cuspal coverage for ETT lacking three or more coronal surfaces.[2] However, the call for cuspal coverage does not make crowning compulsory if coronal stabilization can be achieved by other means.

A recent retrospective clinical evaluation comparing 3-year survival of post-retained porcelain-fused-to-metal crowns and cast ceramic onlays without posts in mildly and severely destroyed premolars found no statistically significant differences in outcome across the various scenarios.[25] The authors concluded that onlays are a reliable method of restoring endodontically treated premolars.

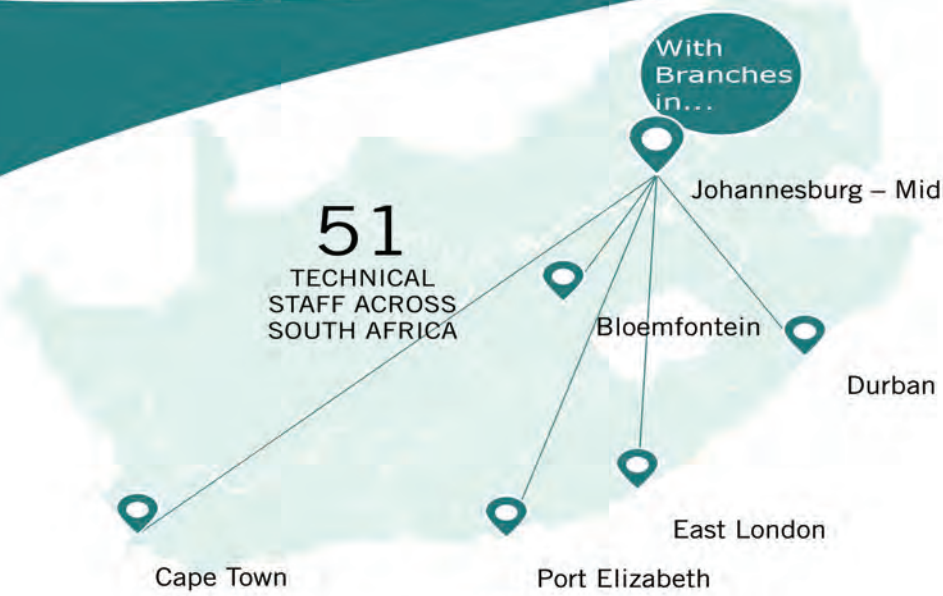
On an ex vivo level, it has been demonstrated that in endodontically treated premolars with Class II MOD configuration, cuspal coverage can enhance fracture-resistance by a factor of 2.3 versus composite Class II MOD restorations without cusp replacement. In fact, for the former, fracture-resistance was increased to a level close to the value determined for the sound teeth in the control group.[26]

Cusp replacement is typically carried out in indirect procedures (Fig 6). However, this approach appears to be noncompulsory as direct resin-based cusp replacement was shown to be equally effective.[27]

Direct restoration

With a two-surface Class II configuration, the increase in fracture-resistance through cusp replacement, though statistically significant, seems to be much less pronounced.[28] Here again the stabilizing effect of the remaining ridge becomes apparent. Access cavities with four intact walls are even more stable.[29]

A Cochrane review on the matter concluded that insufficient data are available for deciding whether preference should



AXIM

Ritter®
[THE DENTAL EXPERTS]

quark
innixim

Your Full Service Dental Equipment Solutions Company

dimeda®
SURGICAL INSTRUMENTS

VARIOUS OTHER HIGH QUALITY CAPITAL EQUIPMENT AVAILABLE FROM A COMPANY FOCUSED ON SERVICE

Ghrizinda van Zyl - 082 569 6381 ghrizindav@axim.co.za www.axim.co.za AXIM Dental South Africa

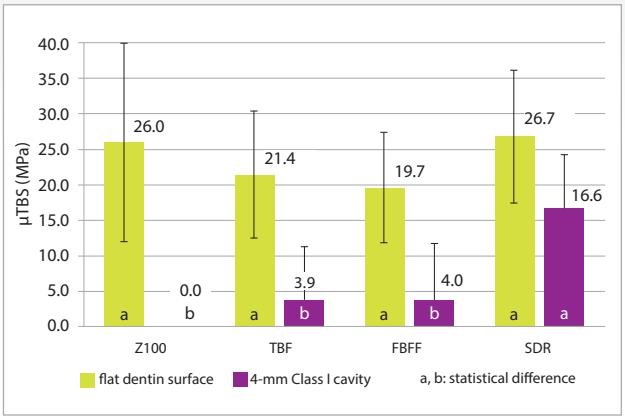


Figure 9: Microtensile bond strength (µTBS [MPa]) of various (bulk-fill) composites achieved on flat dentin surfaces and in Class I, that is, the highest C-factor cavities. All composites were applied in 4-mm increments. It appears that commercially available materials are not equally performant. Z100, 3M; TBF, Tetric EvoCeram Bulk Fill, Ivoclar Vivadent; FBFF Filtek Bulk Fill Flowable, 3M; SDR, Dentsply Sirona. Modified from Van Ende et al.[42,43]

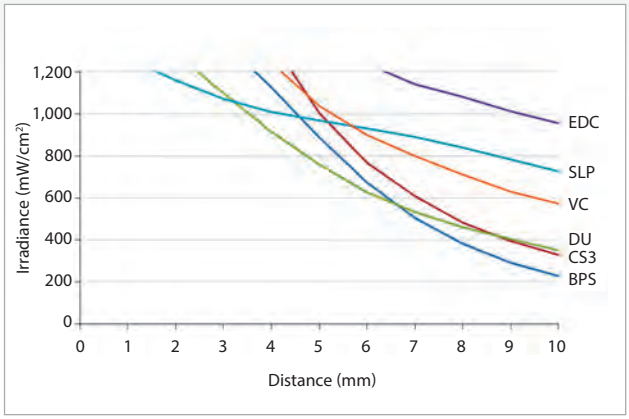


Figure 10: Irradiance of LED curing units decreases over clinically relevant distances. BPS, Bluephase Style 20i, Ivoclar Vivadent; CS3, Coltene SPEC 3, Coltene; DU, Demi Ultra, Kerr; EDC, Elipar DeepCure, 3M; SLP, SmartLite Pro, Dentsply Sirona; VC, Valo Cordless, Ultradent. Data provided by Bluelight Analytics, Halifax, Canada.

be given to direct restorations or crowns for restoring ETT.[30] The review identified one single acceptable study, in which survival of porcelain-fused-to-metal crowns and fiber-post-retained composite restorations in Class II cavities with preserved cusps were compared.[31] The reviewed investigation itself, however, established that clinical success rates of both restorative approaches are equivalent. Another recent RCT in largely destroyed ETT found a statistically significant and yet only slightly more frequent need for intervention for the composite group versus crowns. There was, however, no statistically significant difference between crowns and composites in terms of survival. The authors concluded that both composite restorations and porcelain-fused-to-metal crowns are acceptable approaches for achieving good survival and success rates.[32] In another retrospective clinical investigation, the authors concluded that ETT with coronal defects lacking up to three surfaces can be restored with adhesive composite fillings.[33] A similar view is supported by a systematic review which suggested that in teeth with limited coronal hard structure loss, composite resin restorations and crowns do not present significantly different longevity.[34] A recent retrospective study demonstrated that long-term (6 to 13 years) durability of Class II posterior composites with 2.5- to 3-mm cusp thickness in ETT was clinically comparable to that of vital teeth.[35] Placement of composite fillings in ETT should therefore be considered, depending on the amount and configuration of residual coronal tooth structure following endodontic treatment (Fig 7).

The use of a low-stress, flowable bulk-fill composite is a natural choice when restoring ETT directly. Such materials are deemed effective from both an in vitro[33-39] and clinical[40,41] point of view, and equally, or even more, reliable than conventional composites. Even in high C-factor cavities, such as in ETT with little coronal structure loss, flowable bulk-fill composites are proven to achieve high adhesion.[42,43] Likely reasons are their low shrinkage stresses as well as self-adaptational properties (Fig 8). However, at least in this particular indication, commercially available materials do not appear to be equally performant (Fig 9). Hence, careful consideration should be given to the choice of material. The choice of light-curing unit also influences the quality of clinical treatment. One important factor is the amount of light that arrives at the resin subject to curing.[44-46] This value is referred to as irradiance. Endodontic access cavities can easily exhibit depths of 10 mm or more, and the irradiance decreases according to the distance (Fig 10). The use of a curing device that delivers sufficient irradiance also across clinically relevant distances is advised.

Risk factors

An important prerequisite for direct restoration is that the individual tooth does not present with undermined and thus weakened residual coronal walls.[47] In posterior teeth, large

WORLD'S
NO.1
DENTURE CARE
BRAND*

gsk

SUPER
COREGA

DENTURE CARE

EAT, SPEAK AND SMILE WITH CONFIDENCE

* Value Retail Sales data for GSK-branded denture care products, 12 months ending February 2019.
GlaxoSmithKline Consumer Healthcare South Africa (Pty) LTD. 57 Sloane Street, Bryanston, 2021
Refer to carton for instructions of use.

For any product safety issues contact GSK Consumer on +27 11 745 6001.
CHZAF/CHPOLD/0004/19

Table 1. Minimally invasive treatment recommendation for incisors, premolars, and molars

Teeth	Treatment	Cavity configuration					Risk factors
		Access cavity	One ridge lost	Both ridges lost	One wall remaining	No walls remaining	
Premolars and incisors	Glass fiber post	No	No	Yes	Yes	Yes	Parafunctional patterns, dietary habits, periodontal status, tooth location, number of adjacent teeth, gender, or patient age may necessitate crowning
	Coronal restoration: incisors	Composite filling	Composite filling	Ferrule and crown	Ferrule and crown	Ferrule and crown	
	Coronal restoration: premolars	Composite filling	Composite filling	Cusp coverage	Cusp coverage	Ferrule and crown	
Molars	Glass fiber post	No	No	No	No	Yes	
	Coronal restoration	Composite filling	Composite filling	Cusp coverage	Cusp coverage	Ferrule and crown	

Cuspal coverage is typically carried out indirectly (adhesive composite or all-ceramic onlay, partial crown). In context with a crown preparation, creation of a ferrule is deemed beneficial. Use of the smallest post size available is advised.

cuspal heights and group function may generate greater lateral forces compared to canine-protected occlusions.[48] With respect to molars, factors such as occlusal patterns and parafunctional habits play a pivotal role. In the treatment planning sequence, periodontal status,[49-51] tooth location, number of adjacent teeth, requirement as a survey crown for a removable partial denture, parafunctional habits, gender, and the age of the patient are important diagnostic criteria for evaluating the requirement for a full coverage crown. Another important risk assessment during the treatment planning process is the patient's dietary habits. Harder type foods such as nuts and hard candies place enormous stress on teeth, especially those with restorations. Consumption of large quantities of these specific foods will cause a tooth with a large filling to flex, thus increasing the likelihood of fracture. Chewing gum and ice weaken the adhesive interface significantly and may cause the tooth to break even when eating something softer in consistency. Parafunctional habits such as nocturnal bruxism will significantly lower the lifespan of fillings and crowns.[35,52]

Summary and clinical recommendations

Importance of coronal seal

There is a strong link between endodontic treatment of the root and restoration of the crown. The quality of the coronal restoration is at least equal to or even more important for the endodontic treatment outcome than the quality of the actual root canal treatment. Hence, endodontic treatment cannot be considered completed unless the crown is adequately restored.

Post versus no post

Post placement remains a viable approach to restoration of ETT with extensive coronal structure loss. Owing to their mechanical and clinical properties, adhesively luted glass fiber posts can be considered the gold standard of care. For endodontically treated premolars with substantial coronal defects there is sound scientific evidence from prospective randomized controlled clinical trials that glass fiber post placement enhances clinical outcome. In the same trials, the use of fiber posts is shown to protect against root fractures. This correlation becomes clearer the more coronal tooth structure has been lost. Based on those trials, it is recommended to place a fiber post in premolars if three or more coronal surfaces, including the occlusal surface, have been lost.

There is a lack of clinical data regarding adequate treatment of root filled incisors and molars. For anterior teeth with limited tissue loss, reconstruction with composite without a post is recommended. There seems to be a trend, however, towards providing additional retention through fiber post placement due to the anatomical limitations and biomechanical load patterns. Therefore, the same approach to fiber post placement is advised for incisors and premolars. Molars may be unaffected by the use of a post if they present with significant residual amounts of coronal hard tissue or if cuspal coverage is planned. Results from a RCT in which molars were also considered suggest that fiber post placement significantly prolongs the time to clinical failure of the restoration only in cases where no coronal walls remain at all. On those grounds, fiber post placement in molars is

IPS e.max®

500 MPa

High strength, high esthetics

Since its introduction, IPS e.max® lithium disilicate has been relied upon for its high strength and high esthetics by clinicians worldwide. Now, after 10 years of continuous quality testing, IPS e.max lithium disilicate has demonstrated an average biaxial flexural strength of 500 MPa*. Due to the material's long-term clinical success and proven record of strength, crowns with only 1 mm material thickness are now possible when adhesively bonded.

The IPS e.max® you know, but even more versatile!

- **Minimally invasive preparation**
- **New translucency options**
- **500 MPa for maximum confidence**

For your next case choose the trusted, most prescribed all-ceramic in the world. IPS e.max... all ceramic – all you need.**

IPS e.max®
is now even more versatile!

*Source: R&D Ivoclar Vivadent AG, Schaan, Liechtenstein
**Based on sales figures

ivodent
0860 456 123

ivoclar vivadent®
passion vision innovation

only recommended if the tooth is decoronated.

It should be noted that placement of fiber posts according to the present studies does not seem beneficial under certain circumstances, but is also not detrimental. If the preference is for placement of a fiber post, a conservative approach for preparing the post space is recommended to ensure long-term success of the residual tooth structure. In other words, preference should be given to posts with a small diameter as opposed to posts with a large diameter.

Posts are traditionally used to increase retention of the core. Self-adapting, low shrinkage stress, bulk-fill composite technology used in conjunction with modern light-curing adhesive agents for core buildup may become a viable alternative for post placement, even in largely destroyed posterior teeth. More research in this area would be desirable.

It is not clearly established to what extent fiber posts are beneficial in scenarios where no crown is placed. Some of the investigations dealing with such scenarios look into post retained restorations while others do not. Prospective investigations comparing onlays as well as direct composite restorations in Class II cavities, both with and without a post, do not exist at the moment.

Indirect versus direct restoration

As to the question of whether the crown should be restored in direct or indirect fashion, the same approach is recommended for all types of teeth. In ETT with three or four coronal walls left, that is, at least one marginal ridge remaining, and no undermined cavity walls, direct adhesive restoration may be considered as an alternative to cuspal coverage. For posterior teeth with few or undermined coronal walls, cuspal coverage with an adhesively placed onlay, a partial crown, or a conventional crown is advised. Risk factors such as parafunctional patterns, dietary habits, periodontal status, tooth location, and more should be included in the evaluation as to whether a specific ETT can be restored with a direct composite filling, or requires full cuspal coverage or even a crown. In cases where crowning is intended, preparation of a ferrule is required.

An overview of the clinical treatment recommendation given above is provided in Table 1.

References

1. Ray HA, Trope M. Periapical status of endodontically treated teeth in relation to the technical quality of the root filling and coronal restoration. Int Endod J 1995;28: 12–18.

2. Salehrabi R, Rotstein I. Endodontic treatment outcomes in a large patient population in the USA: an epidemiological study. J Endod 2004;30:846–850.

3. Lynch CD, Burke FM, Ní Ríordáin R, Hannigan A. The influence of coronal restoration type on the survival of endodontically treated teeth. Eur J Prosthodont Restor Dent 2004;12:171–176.

4. Gillen BM, Looney SW, Gu LS, et al. Impact of the quality of coronal restoration versus the quality of RC fillings on success of RCT: a systematic review and meta-analysis. J Endod 2011;37:895–902.

5. Tang W, Wu Y, Smales RJ. Identifying and reducing risks for potential fractures in endodontically treated teeth. J Endod 2010;36: 609–617.

6. Kalburge V, Yakub SS, Kalburge J, Hiremath H, Chandurkar A. A comparative evaluation of fracture resistance of endodontically treated teeth, with variable marginal ridge thicknesses, restored with composite resin and composite resin reinforced with Ribbond: an in vitro study. Indian J Dent Res 2013;24:193–198.

7. Reeh ES, Messer HH, Douglas WH. Reduction in tooth stiffness as a result of endodontic and restorative procedures. J Endod 1989;15:512–516.

8. Naumann M, Schmitter M, Krastl G. Postendodontic restoration: endodontic post-and-core or no post at all? J Adhes Dent 2018;20:19–24.

9. Schmitter M, Sterzenbach G, Faggion CM Jr, Krastl G. A flood tide of systematic reviews on endodontic posts: methodological assessment using of R-AMSTAR. Clin Oral Investig 2013;17:1287–1294.

10. Goracci C, Ferrari M. Current perspectives on post systems: a literature review. Aust Dent J 2011;56(Suppl 1):77–83.

11. Figueiredo FE, Martins-Filho PR, Faria-E-Silva AL. Do metal post-retained restorations result in more root fractures than fiber post-retained restorations? A systematic review and meta-analysis. J Endod 2015;41:309–316.

12. Maceria F, Martignoni M, Vairo G. Mechanical behavior of endodontic restorations with multiple prefabricated posts: a finite element approach. J Biomech 2007;40: 2386–2398.

13. Lawrence R; U. S. Preventive Services Task Force. Guide to Clinical Preventive Services (August 1989). Collingdale:Diane Publishing, 1989.

14. Cagidiaco MC, García-Godoy F, Vichi A, Grandini S, Goracci C, Ferrari M. Post placement affects survival of endodontically treated premolars. J Dent Res 2007;86:729–734.

15. Ferrari M, Vichi A, Fadda GM, et al. A randomized

CEREC Primemill

Excellence made easy.

The new CEREC Primemill is uniquely equipped for superior chairside dentistry. Our fastest milling unit ever, it's also the easiest to use and compatible with the widest range of materials. Above all, it empowers dentists to deliver consistently excellent treatment for multiple indications.

The CEREC Primemill seamlessly combines with the highly accurate CEREC Primescan and new CEREC Software 5 to redefine performance in daily practice. Join us at your local CEREC event and test it yourself.

The all-new CEREC. **Now is the time.**

Learn more at: dentsplysirona.com/cerecprimemill

Please call 0860 444 330 to place your order today.

THE DENTAL SOLUTIONS COMPANY™

Dentsply Sirona South Africa
Building 11a, Lower Ground Floor, The Woodlands
Woodlands Drive, Woodmead, Sandton, 2191
Tel: 0860 444 330 **www.dentsplysirona.com**

Dentsply Sirona

THE DENTAL
SOLUTIONS
COMPANY™

Dentsply Sirona

Excellence made easy

CEREC Primemill

Speed

Our fastest-ever milling unit can process an excellent zirconia crown in under 5 minutes. It also can grind glass ceramics much faster than its predecessor. The result? Satisfied patients and high productivity.

Convenience

The CEREC Primemill sets new standards for user-friendliness, making practice integration remarkably easy. An interactive user interface guides operators step-by-step through the workflows, so you can delegate milling with complete peace-of-mind. The unit intelligently monitors key functions and components to ensure high productivity.

Quality

With control and accuracy come predictably excellent, natural-looking results. Experience it in every aspect of your restorations – from smooth surfaces and great margins to detailed fissures and the perfect fit.

Versatility

Welcome to a world where you're spoiled for choice! The new CEREC Primemill combines wet and dry milling and wet grinding with the widest selection of validated materials providing the flexibility and predictability you need to offer patients the best possible treatment.

Designed to stand out – and fit in

The new CEREC Primemill doesn't just communicate seamlessly with other CEREC devices. For their sleek design, it's likewise the perfect match – and the ideal look for a progressive dental practice.

- **The innovative LED stripe indicates unit status and milling progress.**
- **The new drawer design ensures direct access to tools and accessories.**
- **All surface areas and the chamber are easy to clean.**

Dentsply Sirona South Africa
Building 11a, Lower Ground Floor, The Woodlands
Woodlands Drive, Woodmead, Sandton, 2191
Tel: 0860 444 330 **www.dentsplysirona.com**

controlled trial of endodontically treated and restored premolars. J Dent Res 2012;91(7 Suppl):72S–78S.

16. Bitter K, Noetzel J, Stamm O, et al. Randomized clinical trial comparing the effects of post placement on failure rate of post-endodontic restorations: preliminary results of a mean period of 32 months. J Endod 2009;35:1477–1482.

17. Aurélio IL, Fraga S, Rippe MP, Valandro LF. Are posts necessary for the restoration of root filled teeth with limited tissue loss? A structured review of laboratory and clinical studies. Int Endod J 2016;49:827–835.

18. Scotti N, Coero Borga FA, Alovisi M, Rota R, Pasqualini D, Berutti E. Is fracture resistance of endodontically treated mandiblar molars restored with indirect onlay composite restorations influenced by fibre post insertion? J Dent 2012;40:814–820.

19. Lang H, Korkmaz Y, Schneider K, Raab WH. Impact of endodontic treatments on the rigidity of the root. J Dent Res 2006;85: 364–368.

20. Schwartz RS, Robbins JW. Post placement and restoration of endodontically treated teeth: a literature review. J Endod 2004;30:289–301.

21. Carvalho MA, Lazari PC, Gresnigt M, Del Bel Cury AA, Magne P. Current options concerning the endodontically-treated teeth restoration with the adhesive approach. Braz Oral Res 2018;32(Suppl 1):e74.

22. Stavropoulou AF, Koidis PT. A systematic review of single crowns on endodontically treated teeth. J Dent 2007;35:761–767.

23. Manhart J, Chen H, Hamm G, Hickel R. Buonocore Memorial Lecture. Review of the clinical survival of direct and indirect restorations in posterior teeth of the permanent dentition. Oper Dent 2004;29:481–508.

24. Naumann M, Schmitter M, Frankenberger R, Krastl G. "Ferrule comes first. post is second!" Fake news and alternative facts? A systematic review. J Endod 2018;44:212–219.

25. Li Z, Gao C, Xu Y, Xu J. Three years retrospective clinical evaluation of endodontically treated premolars restored by cast ceramic onlays (in Chinese; abstract in English). Hua Xi Kou Qiang Yi Xue Za Zhi 2015;33:263–266.

26. Mondelli RF, Ishikiriama SK, de Oliveira Filho O, Mondelli J. Fracture resistance of weakened teeth restored with condensable resin with and without cusp coverage. J Appl Oral Sci 2009;17:161–165.

27. Plotino G, Buono L, Grande NM, Lamorgese V, Somma F. Fracture resistance of endodontically treated molars restored with extensive composite resin restorations. J Prosthet Dent 2008;99:225–232.

28. Xie KX, Wang XY, Gao XJ, Yuan CY, Li JX, Chu CH. Fracture resistance of root filled premolar teeth restored with direct composite resin with or without cusp coverage. Int Endod J 2012;45:524–529.

29. Arunpraditkul S, Saengsanon S, Pakviwat W. Fracture resistance of endodontically treated teeth: three walls versus four walls of remaining coronal tooth structure. J Prosthodont 2009;18:d49–d53.

30. Sequeira-Byron P, Fedorowicz Z, Carter B, Nasser M, Alrowaili EF. Single crowns versus conventional fillings for the restoration of root-filled teeth. Cochrane Database Syst Rev 2015;9:CD009109.

31. Mannocci F, Bertelli E, Sherriff M, Watson TF, Ford TR. Three-year clinical comparison of survival of endodontically treated teeth restored with either full cast coverage or with direct composite restoration. J Prosthet Dent 2002;88:297–301.

32. Skupien JA, Cenci MS, Opdam NJ, Kreulen CM, Huysmans MC, Pereira-Cenci T. Crown vs. composite for post-retained restorations: a randomized clinical trial. J Dent 2016;48:34–39.

33. Dammaschke T, Nykiel K, Sagheri D, Schäfer E. Influence of coronal restorations on the fracture resistance of root canal- treated premolar and molar teeth: a retrospective study. Aust Endod J 2013;39:48–56.

34. Suksaphar W, Banomyong D, Jirathanyanatt T, Ngoenwiwatkul Y. Survival rates against fracture of endodontically treated posterior teeth restored with full-coverage crowns or resin composite restorations: a systematic review. Restor Dent Endod 2017;42:157–167.

35. Lempel E, Lovász BV, Bihari E, Krajczár K, Jeges S, Tóth Á. Long term clinical evaluation of direct resin composite restorations in vital vs. enododontically treated posterior teeth: retrospective study up to 13 years. Dent Mater 2019;35:1308–1318.

36. Ilie N, Hickel R. Investigations on a methacrylate-based flowable composite based on the SDR technology. Dent Mater 2011;27:348–355.

37. Ilie N, Schöner C, Bücher K, Hickel R. An in-vitro assessment of the shear bond strength of bulk-fill resin composites to permanent and deciduous teeth. J Dent 2014;42:850–855.

38. Roggendorf MJ, Krämer N, Appelt A, Naumann M, Frankenberger R. Marginal quality of flowable 4-mm base vs. conventionally layered resin composite. J Dent 2011;39:643–647.

39. Scotti N, Comba A, Gambino A, et al. Microleakage at enamel and dentin margins with a bulk fill flowable resin. Eur J Dent 2014;8:1–8.

40. van Dijken JW, Pallesen U. Posterior bulk-filled resin composite restorations: a 5-year randomized controlled clinical study. J Dent 2016;51:29–35.

41. van Dijken JWV, Pallesen U. Bulk-filled posterior resin restorations based on stress-decreasing resin technology: a randomized, controlled 6-year evaluation. Eur J Oral Sci 2017;125:303–309.

42. Van Ende A, De Munck J, Van Landuyt K, Poitevin A, Peumans M, Van Meerbeek B. Bulk-filling of high C-factor posterior cavities: effect on adhesion to cavity-bottom dentin. Dent Mater 2013;29:269–277.

43. Van Ende A, De Munck J, Van Landuyt, K, Van Meerbeek B. Effect of bulk-filling on the bonding efficacy in occlusal Class I cavities. J Adhes Dent 2016;18:119–122.

44. Platt JA, Price RB. Light curing explored in Halifax. Oper Dent 2014;39:561–563.

45. Price RB, Felix CM, Whalen JM. Factors affecting the energy delivered to simulated Class I and Class V preparations. J Can Dent Assoc 2010;76:a94.

46. Roulet JF, Price RB. Light curing – guidelines for practitioners. A consensus statement from the 2014 symposium on light curing in dentistry held at Dalhousie University, Halifax, Canada. J Adhes Dent 2014;16:303–304.

47. Scotti N, Rota R, Scansetti M, et al. Influence of adhesive techniques on fracture resistance of endodontically treated premolars with various residual wall thicknesses. J Prosthet Dent 2013;110:376–382.

48. Juloski J, Samet N. Rethinking ferrule – a new approach to an old dilemma. Br Dent J 2010;209:25–33.

49. Vire DE. Failure of endodontically treated teeth: classification and evaluation. J Endod 1991;17:338–342.

50. Fonzar F, Fonzar A, Buttolo P, Worthington HV, Esposito M. The prognosis of root canal therapy: a 10-year retrospective cohort study on 411 patients with 1175 endodontically treated teeth. Eur J Oral Implantol 2009;2:201–208.

51. Setzer FC, Boyer KR, Jeppson JR, Karabucak B, Kim S. Long-term prognosis of endodontically treated teeth: a retrospective analysis of preoperative factors in molars. J Endod 2011;37:21–25.

52. Laske M, Opdam NJM, Bronkhorst EM, Braspenning JCC, Huysmans MCDNJM. Risk factors for dental restoration survival: a practice-based study. J Dent Res 2019;98:414–422.

53. Naumann M. Adhäsive postendodontische Rekonstruktion mit Glasfaserstiften – Was gibt es zu beachten? Quintessenz 2009;60:809–820.

Reprinted with permission by QUINTESSENCE INTERNATIONAL
Atlas A, Grandini S, Martignoni M. Evidence-based treatment planning for the restoration of endodontically treated single teeth: importance of coronal seal, post vs no post, and indirect vs direct restoration. Quintessence Int. 2019;50(10):772-781. doi: 10.3290/j.qi.a43235

6th – 9th October 2020

Neodent wants to send you to Brazil!

HANDS-ON, 4-DAY TRAINING COURSE IN IMMEDIATE LOADING

Purchase a **Neodent GM package** and we will send you to the beautiful Curitiba for a chance to advance your skill and knowledge in placing dental implants at the ILAPEO Institute (Latin American Institute of Dental Research and Education).

Attendees will learn the principles, surgical and prosthetic procedures required for immediate loading and working with a GM Helix implant. Participants will have the ability to practice the course material through live patient hands-on surgery. This is an intermediate to advanced course for clinicians' actively planning, placing and restoring implants.

When: 6th – 9th October 2020

- **Travel & arrive on 5th October**
- **Course conducted on 6th – 9th October**
- **Departure & travel on 10th October**

PACKAGE DETAILS:

With the purchase of **30 GM Helix Acqua Implants and Healing Abutments,** you will receive airfare and accommodation for a multi-day seminar in Curitiba, Brazil.

Also included is;

- 1 GM surgical kit
- Transportation to and from the hotel, airport, Neodent and ILAPEO
- Welcome dinner
- Tour of the Neodent facility

COST: R76,500 incl VAT

Don't miss out! Limited seats available. Attendees will be eligible on a first-come, first-serve basis. Terms and Conditions apply.

Contact your local Straumann Group Representative or the office on +27 21 850 0823.

FACULDADE ILAPEO

NEODENT®
A Straumann Group Brand

HENRY SCHEIN®
DENTAL WAREHOUSE

Rely on Us™

THE DENTAL WAREHOUSE ANNOUNCES NEW NAME TO REFLECT BRAND EVOLUTION

The Dental Warehouse, a leading distributor of dental consumables products and provider of dental equipment, services and solutions to dentists, private clinics, universities, and governmental agencies in South Africa, announced today that it has formally changed the Company's name to Henry Schein Dental Warehouse. The change represents the Company's commitment to evolve and offer practitioners the products and services needed to operate successful practices and provide quality care to the growing number of patients seeking their services.

In 2013, Henry Schein, Inc., the world's largest provider of health care solutions to office-based dental and medical practitioners powered by a network of people and technology, established a presence in South Africa with an investment in The Dental Warehouse. Since then, Dental Warehouse has added a diversified range of high-quality dental equipment to its portfolio inclusive of dental units, intraoral scanners, CAD/CAM milling machines, and 3D printers. The Company has also enlarged the choice of high-quality implant and endodontic products available to practitioners, and as a full-service provider, offers consultative services such as professional training, and technical services.

"With the global Henry Schein network of trusted advisors, a dedicated South African team, and a comprehensive suite of high-quality solutions, we are well-positioned to provide the solutions a dental practitioner or laboratory may need to improve operational success and clinical outcomes," says Leigh Spamer, Sales and Marketing Director of Henry Schein Dental Warehouse. "We strive to help practitioners comfortably enter or expand further into the world of digital dentistry by looking at the individual technology and products available on the market today, uncovering how these solutions can best be integrated into the practice or laboratory, and seeing how it can enhance the care they provide to patients."

Henry Schein Dental Warehouse will continue to advance its long-standing goal of helping health care professionals operate more efficient practices by providing new solutions and technologies for the ultimate benefit of patients. The Company's suite of offerings includes solutions in the following categories: business solutions that help customers successfully manage and grow their business; clinical solutions that help customers stay on the leading edge of patient care; technology solutions that help customers harness innovation to benefit the clinical setting and their patients; and supply chain solutions that provide customers with the industry's broadest product selection and deepest inventory, delivering the right products at the right time.

"Henry Schein Dental Warehouse customers can

One of the Country's Leading Dental Distributors Changes Name to Henry Schein Dental Warehouse

rely on us to get individual high-touch, patient-focused support with the goal of meaningfully enhancing clinical and operational outcomes", says Ms. Spamer.

About Henry Schein Dental Warehouse

With a track record of nearly 30 years, Henry Schein Dental Warehouse is a leading South African based distributor of high-quality health care solutions to dental professionals in private practice and state health facilities.

With approximately 19,000 Team Schein Members worldwide, the Henry Schein's network of trusted advisors provides more than 1 million customers globally with more than 300 valued solutions that improve operational success and clinical outcomes. The Company's Business, Clinical, Technology, and Supply Chain solutions help office-based dental and medical practitioners work more efficiently so they can provide quality care more effectively. These solutions also support dental laboratories, government and institutional health care clinics, as well as other alternate care sites.

Henry Schein operates through a centralized and automated distribution network, with a selection of more than 120,000 branded products and Henry Schein private-brand products in stock, as well as more than 180,000 additional products available as special-order items.

A FORTUNE 500 Company and a member of the S&P 500® index, Henry Schein is headquartered in Melville, N.Y., and has operations or affiliates in 31countries.

For more information, visit Henry Schein Dental Warehouse at www.henryschein.co.za or Henry Schein, Inc. at www.henryschein.com.

Contact

Stefanie Fleige
Henry Schein
Senior Manager, International Corporate Communications
Phone: +49 40 65668 691
Email: Stefanie.Fleige@henryschein.de

HENRY SCHEIN®
DENTAL WAREHOUSE

TOLLFREE 0800 111 796
EMAIL admin@henryschein.co.za
ONLINE henryschein.co.za
LIKE US ON HenryScheinSA
FIND US ON Henry Schein South Africa

Placement of a ceramic implant after uprighting the canine with aligner therapy due to tooth agenesis

Julia Plattner[1], Vasilios Alevizakos[2] and Constantin von See[3]

This case report describes the explantation of an insufficiently osseointegrated implant, followed by placement of the Straumann® PURE Ceramic Implant Monotype using the minimally invasive guided surgery system. The dental implant and temporary restoration provided the patient with immediate comfort, good esthetics and, most importantly, preservation of tissues.

Initial situation

A 37-year old patient presented complaining about his loose implant in region 13. The patient suffers from ankylosing spondylitis, for which he takes 50 mg of golimubab every 4-8 weeks. According to the patient's report, due to hypodontia the tooth in region 13 had been replaced with an implant 12 years ago. A panoramic x-ray showed four implants (13, 15, 23 and 25). Both of the mesially erupted canines had been crowned and substituted for the lateral incisors. Tooth region 13 was restored by an implant supported bridge crown linked to the upper lateral incisor (Fig. 1). After the crowns were separated, the implant in region 13 was easily removed with forceps (Fig. 2). All other implants were firmly anchored in bone.

Treatment planning

A cone beam CT scan (CBCT) was recorded, followed by digital implant planning (coDiagnostiX™, Dental Wings, Montreal, Canada) (Fig. 3). Insufficient space was available apically for the re-implantation (Fig. 4). The minimum required distance from the implant to the adjacent tooth is 1.5 mm. In this case, the circumferential space of 1.5 mm was only present in the coronal area, but not in the apical area. To straighten up the root (tip the root mesially) of tooth 13, an aligner treatment was performed prior to implant placement. The treatment required three attachments on teeth 12, 14 and

[1] Julia Plattner
2011-2017 Danube Private University, Krems, Austria. Postgraduate program Master of Science, Orthodontics, Bonn, Germany. Private practice, Bressanone, Italy.

[2] Vasilios Alevizakos. Dr.med.dent. Danube Private University, Krems, Austria. His field of special interest is bone grafting and digital dentistry.

[3] Constantin von See. Prof.Dr. Director of the Center for CADCAM and Digital Technologies in Dentistry, Danube Private University, Krems, Austria.Head of the Master's Program for esthetic reconstructive dental medicine at PUSH GmbH.

Figure 1

Figure 2

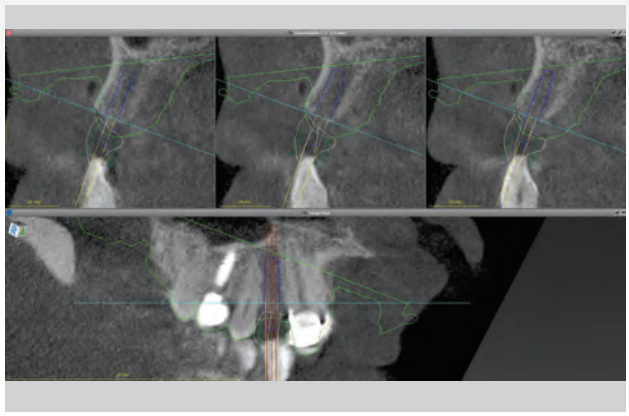


Figure 3

Figure 4

Figure 5

Figure 5a

Figure 5b

Figure 6a

22, and a total number of eight aligners had to be worn for about 23 hours a day. The patient's compliance was very good, and space was easily created. After 10 months of healing time for guided surgery, an impression was taken, and the plaster model scanned. Both the exported CBCT data and the STL files for the scanned plaster model were imported into the planning software (coDiagnostiX™, Dental Wings, Montreal, Canada), and a surgical guide was developed and printed. Figure 4 shows the preoperative intraoral situation.

Surgery

Under local anesthesia, a soft tissue punch was performed using the drill guide (Fig. 5). Next, the implant bed was prepared using guided drills and bone condensing instruments (Fig. 6). The Straumann® PURE Ceramic Implant

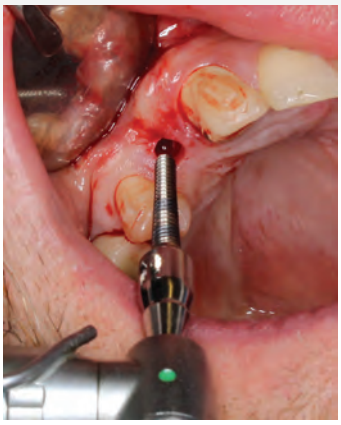


Figure 6b

Figure 6c

Figure 7a

Figure 7b

Figure 7c

Figure 8

Figure 9

Monotype (Straumann, Basel, Switzerland), with a diameter of 3.3 mm, a length of 10 mm and an abutment height of 4 mm, was then placed with a maximum torque of 35 Ncm (Fig. 7). The occlusal plane with the patient's deep bite, but with sufficient distance between the implant abutment and antagonist, was clinically checked postoperatively (Fig. 8). A postoperative x-ray was performed to check that the adjacent teeth were not injured. The implant was initially restored with a temporary denture, which was designed to maintain the group alignment of the posterior teeth. During

Wright MILLNERS

MY SMILE IS

Contagious

#MYSMILEISPOWERFUL

Opalescence BOOST

Opalescence go

Opalescence tooth whitening systems

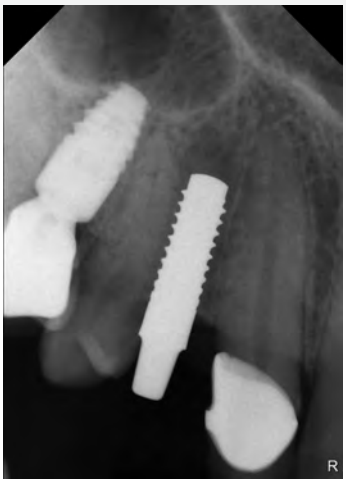
Exclusive to Wright Millners

Pictures used may be for representation only. E&OE.

@wrightmillners | Wright Millners Dental Suppliers

0860 100 200 | www.mywrightplace.co.za | www.wright-millners.co.za

ULTRADENT PRODUCTS, INC.



the retention phase of the aligner treatment, the temporary crown was blocked out in the retainer (Fig. 9).

Prosthetic restoration

After 6 months of healing time the temporary crown was removed and the Straumann® PURE Ceramic Implant Monotype showed all the signs of osseointegration. The x-ray did not show any pathological findings (Fig. 10). A precision impression of the upper jaw and a regular impression of the opposite jaw with additional bite registration was taken to instigate the production of the implant crown. After two weeks the implant crown was successfully placed with FujiCEM 2.

Final result

Both the dentist and the patient were satisfied with the functional and esthetic outcome of the restoration (Fig. 11) As shown in this case report, the use of a ceramic implant in the anterior region of the upper jaw offers an esthetic solution for replacing the missing incisor. Prior treatment using the aligner technique to improve the implant bed site may be mandatory.

Reprinted with permission by Starget

THE RIGHT CEMENT FOR EVERY CLINICAL SITUATION

The duo for all your cementation needs

The **easy** way of cementing **highly esthetic** restorations.

IPS Empress® CAD/ Esthetic
Veneers
Inlays / Onlays / Partial Crowns
Crowns

IPS e.max® CAD/Press
Veneers / Occlusal Veneers
Inlays / Onlays / Partial Crowns
Crowns / Bridges

Tetric® CAD
Veneers
Inlays / Onlays
Crowns

IPS e.max® ZirCAD
Crowns / Bridges

Endodontic Posts
Fibre Posts
Metal Posts

Metal / metal-based
Inlays / Onlays / Partial Crowns
Crowns / Bridges

The **efficient** way of cementing **zirconia** restorations.

ivoclar vivadent
passion vision innovation

0860 456 123
orders@ivodent.co.za
www.ivodentonline.co.za | www.ivohealth.co.za | www.facebook.com/IvodentSA

ivodent
Adding value

SMILE CLUB

HOW ACTIVE ALIGNERS CAN BENEFIT YOUR PRACTICE

WHAT ARE CLEAR ALIGNERS?

Clear aligners have been around for more than 20 years and work on basic orthodontic principles. They are used for the correction of crooked teeth, gaps or rotation, while achieving the desired results in an organized and planned fashion. These customized trays are virtually invisible and move the tooth in the desired direction. This is achieved through wearing a series of Active Aligners, each for 22 hours a day, 1 to 2 weeks at a time (one stage), which move the teeth per stage until their optimal alignment has been reached.

---- GIVE YOURSELF THE ACTIVE ALIGNER ADVANTAGE ----

- **70%** of patients are candidates for clear aligners
- Growing interests in Active Aligners
- **Less than 1%** of adults are undergoing orthodontic treatments

7/8mm Essix ACE® Plastic

DENTSPLY - Essix® Brand Plastics give you the quality you demand and the versatility you need.

Precise Engineering

Research backed approach through the entire manufacturing process

Attractive and Accessible

International quality priced affordably to allow access and affordability to your practice for your patients

2mm Optimised Trimline

*Research backs our 2mm trim line
2x to 4x Stronger Retention

ACTIVE ALIGNERS

*"The effect of gingival-margin design on the retention of thermoformed aligners" by Daniel P. Cowley, James Mah. and Brendan O'Toole in the Journal of Clinical Orthodontics: JCO 11/2012; 46(11):697-702.

@smileclubsa

Tel: 087 807 8724 - info@smileclub.co.za
www.smileclub.co.za

SMILE CLUB (PTY) LTD

Block 17, Woodmead Business Park
145 Western Services Rd, Woodmead, 2191

SMILE CLUB

HOW CAN CLEAR ALIGNERS BENEFIT DENTAL PRACTICES?

Until recently, teeth alignment treatment has been an Orthodontist's domain.
With the introduction of clear aligners, dental practices can now venture into this patient-driven solution, which provides good ROI, minimal chair time, and happy patients.

GOOD ROI

With more patients becoming interested in clear aligners every day, achieving a good ROI is easy. Growing your practice by offering aligner therapy provides a new revenue stream with a product that is highly sought after, easy to prescribe, and perfect for cross-selling to a majority of your patients.

HAPPY PATIENTS

Clear aligners provide an aesthetic alternative to traditional braces. As long as a patient follows important wear and care instructions, their treatment will typically be quick and unnoticeable by acquaintances. Providing alignment treatment will result in satisfied, smiling patients who have gone through a relatively painless and easy process. Happy patients lead to more patients as they refer their friends and family to your practice to get started with clear aligner treatment.

ACTIVE ALIGNERS

Active Aligners provide a virtually invisible and comfortable solution for misaligned dentition.
Every aligner is carefully designed to have exceptional precision and durability.
We understand the importance of a qualified clinician overseeing the treatment process, which is why our aligners are only available through dental professionals.
Provide your patients with an aesthetic alternative that still provides the results and professional involvement of your traditional alignment offerings.

Affordable for your patients - Growth for your practice
Online Course and accreditation

ADD ACTIVE ALIGNERS TO YOUR PRACTICE TODAY

www.activealigners.com to learn more and get started.

@smileclubsa

SMILE CLUB (PTY) LTD

Tel: 087 807 8724 - info@smileclub.co.za
www.smileclub.co.za

Block 17, Woodmead Business Park
145 Western Services Rd, Woodmead, 2191

Forward reciprocation of conventional rotary instruments – Literature review and clinical case reports

Peet J van der Vyver[1], Martin Vorster[2], Farzana Paleker[3] and Natasha Predin Djuric[4]

Introduction

Advances in metallurgy have produced more super-elastic NiTi files that manufacturers claim are strong enough to resist the forces of torsion while maintaining enough flexibility to follow complicated canal anatomy.[1] In addition to improvements in metallurgy, endodontic motors have undergone enhancement with regard to torque control and kinematics that are adjustable in several directions, which offer more effective and safer shaping of root canals.[2] Recently, the Root Pro CL (Medidenta, Las Vegas, USA) (Figure 1) and E-Connects (Eighteenth Medical, Changzou, China) (Figure 2) endodontic motors were launched; they allow clinicians to use conventional rotary instruments in a reciprocating motion.

Reciprocating motion is an evolution of the balanced force technique, offering a good alternative method to prevent procedural errors during root canal shaping.[3] Based on several studies, root canal shaping with reciprocating motion has been postulated to offer superior fracture resistance of the instruments.[2,4-6]

Reciprocating files currently on the market are designed for use in a reverse motion. This motion employs a greater engaging counter-clockwise (CCW) angle (left-cutting) with a non-cutting disengaging clockwise (CW) angle. However, some authors suggest that reciprocating motion (RM) with a CW rotation greater than the CCW motion (forward reciprocation or right-cutting) could expand the use of conventional rotary files typically designed for continuous CW rotation.[7,8]

Apart from reciprocating instruments, all the rotary systems are designed to cut in a CW direction. It is possible that the rotary instrument may neither cut nor infiltrate the canal walls if one tries to use CW cutting instruments in reciprocation motion. Since the reciprocating file systems have been designed to cut in a CCW direction, the CCW angle of motion is greater that the CW angle.[9]

Reciprocating motion with CW rotation greater than the CCW motion could allow the use of a larger number of conventional rotary glide path and file systems, as the flutes of the majority of systems are designed for continuous CW rotation (right-cutting).[10]

The alternating changes in the direction of rotation would, in theory, reduce the number of cycles of the instrument and therefore the cyclic fatigue on the instrument compared with that imposed when instruments are used in a consistent rotating

[1] Prof Peet J van der Vyver (BChD, MSc, PhD), Studio for Endodontics, Restorative Dentistry and Dental Education (www.studio4endo.com); Part-time lecturer at the University of Pretoria, Department of Odontology, School of Dentistry, University of Pretoria, Pretoria, South Africa

[2] Dr Martin Vorster (BChD, MSc), Lecturer/Dentist at the University of Pretoria's School of Dentistry, Pretoria, Gauteng, South Africa. (martin.vorster@up.ac.za) Department of Odontology, School of Dentistry, University of Pretoria, Pretoria, South Africa

[3] Dr Farzana Paleker (BChD, MSc) Extra-ordinary Lecturer, School of Dentistry, University of Pretoria South Africa

[4] Dr Natasha Predin Djuric (BDS), Postgraduate Student, University of Pretoria, School of Dentistry, Pretoria, Gauteng, South Africa and Eastern Cape Department of Health, Department of Health, Cecilia Makiwane Hospital, Department of Dentistry

Figure 1: Root Pro CL (Medidenta) Endodontic Motor

Figure 2: E-Connects (Eighteenth Medical) Endodontic Motor

motion.[5,11] Also, when an instrument is used in reciprocating motion with unequal forward and reverse angles and with limited in-and-out movements, it is less prone to bind to the canal walls.[12]

Yared[13] was the first to propose a canal preparation technique with a F2 ProTaper Universal (PTU) (Dentsply Sirona) NiTi rotary instrument used in forward reciprocation. The file was rotated within the canal in a CW and CCW movement by means of a 16:1 reduction ration contra-angle handpiece and ATR Vision motor (ATR, Pistoia, Italy).

According to Yared, the advantages of this technique are a reduced number of instruments, lower cost, reduced instrument fatigue and the elimination of possible prion cross-contamination associated with the single use of endodontic instruments.[2] A study by Paqué, Zehnder and De Deus showed that in terms of root canal curvature, a single F2 PTU file used in RM is as efficient as the conventional PTU full-sequence technique in CR in root canals of extracted human mandibular molars.[14]

Moreover, reciprocation canal preparation time with only one F2 PTU file (Dentsply Sirona) was shown to be less than the same file system used in full rotation.[5] Similar studies noted that only one file was needed to reach full working length in half the preparation time in comparison to the continuous rotation sequence. Faster canal preparation has the added benefit of reducing operator fatigue.[13,15,16]

Paqué[15] produced comparable results showing that F2 PTU in reciprocating motion is as efficient as the conventional PTU full sequence (Dentsply Sirona) technique in continuous motion. A recent study by Espir[10] showed that the unconventional CW reciprocation motion with Mtwo (VDW) resulted in effective canal preparation. Another advantage of forward reciprocating motion over continuous rotation is that it may reduce root canal aberrations.[8]

Forward reciprocation of conventional rotary instruments – Literature review and clinical case reports

With the introduction of the new motors and ProTaper Gold system, the authors tried to use only the F2 ProTaper Gold file in forward reciprocation, but it was found that the cutting efficiency was very low. However, it was found that the X2 ProTaper Next file performs very well clinically in forward reciprocation.

ProTaper Next (PTN) (Dentsply Sirona) is a rotary root canal-shaping system constructed of M-Wire NiTi, making it almost 400% more resistant to cyclic fatigue than conventional NiTi.[17] PTN features a bilateral symmetrical rectangular cross-section, with an offset from the central axis of rotation (except in the last 3 mm of the instrument (D0–

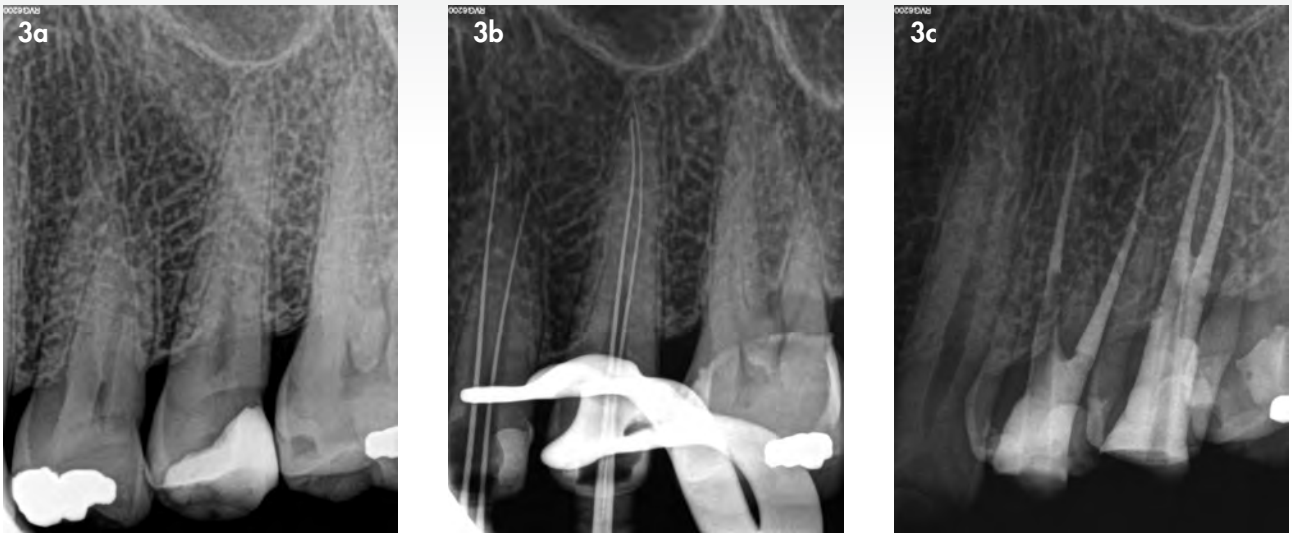


Figure 3(a) Pre-operative periapical radiograph of non-vital maxillary right first and second premolars; (b) Length determination periapical radiograph; (c) Postoperative periapical radiograph showing the result after obturation and core build-up with fibre posts (X.Posts, Dentsply Sirona) and Core.x Flow (Dentsply Sirona)

D3), allowing it to experience a rotational phenomenon known as precession or swagger.

In a recent study by the authors, the canal-shaping abilities of WaveOne Gold Glider in combination with the Primary WaveOne Gold file, a reverse reciprocating Gold-Wire file system, and ProGlider in combination with only the X2 PTN file, a conventional rotary NiTi M-Wire file used in a forward reciprocation, were analysed using micro-CT imaging. ProGlider in combination with only the X2 PTN file in forward reciprocation yielded significantly better results for both transportation and centring ability at the apical level of the root canal systems. The results of this study suggest that the ProGlider/X2 PTN file combination may be used in a forward reciprocating motion.

The following clinical case reports illustrate the clinical results obtained by using a ProGlider and only the X2 PTN instrument in forward reciprocation in either the Root Pro CL (Medidenta) or E-Connects (Eighteenth Medical) endodontic motors.

Case Report 1

The patient, a 58-year-old man, presented with bite sensitivity on his non-vital maxillary right first and second premolars (Figure 3a). Access cavities were prepared and two root canal systems were located in each premolar. Length determination was determined using an electronic apex locator and confirmed radiographically (Figure 3b). After canal negotiation and creation of a reproducible micro-glide path, the glide path was expanded by using a ProGlider (Dentsply Sirona) in reciprocation motion in the Root Pro CL endodontic motor (Medidenta, Las Vegas, USA). Root canal preparation was done using only a X2 PTN instrument, also operating in reciprocation using the endodontic motor. After irrigation, the root canal systems were obturated using PTN X2 Gutta Percha Points (Dentsply Sirona) and Pulp Canal Sealer (Kerr). Figure 3c shows the final result after obturation and core build up with fibre posts (X.Posts, Dentsply Sirona) and Core.x Flow (Dentsply Sirona).

Case Report 2

A 47-year-old man presented with irreversible pulpitis on his maxillary right first molar (Figure 4a). Three root canal systems were detected under magnification after access cavity preparation. The canals were negotiated, working length determined and a reproducible micro-glide path was prepared using a size 10 K-File. The glide path was expanded using a ProGlider (Dentsply Sirona) and root canal preparation done with a X2 PTN instrument, both in reciprocation motion in the E-Connects (Eighteenth Medical) endodontic motor. After irrigation, the root canal systems were obturated using PTN X2 Gutta Percha Points (Dentsply Sirona) and Pulp Canal Sealer (Kerr). Figure 4b depicts the final result after obturation. Note the sharp apical curvature

Kerr™
Together, we're more.™

Exclusive To

Wright MILLNERS

CaviWipes Kill Claims

3 minutes

- Mycobacterium tuberculosis var: bovis (BCG)
- Methicillin Resistant Staphylococcus aureus (MRSA)
- Pseudomonas aeruginosa
- Salmonella enterica
- Trichophyton mentagrophytes
- Staphylococcus aureus

2 minutes

- Vancomycin Resistant Enterococcus faecalis (VRE)
- Staphylococcus aureus with reduced susceptibility to vancomycin
- Hepatitis B Virus (HBV)
- Hepatitis C Virus (HCV)
- Human Immunodeficiency Virus (HIV-1)
- Herpes Simplex Virus Types 1 and 2
- Influenza A2 Virus

Free Of Aldehydes, Phenols, Bleach, Or Other Toxic Chemicals

Each CaviWipes is a 7-layer, non-woven, textured cloth

Pictures used may be for representation only. E&OE.

0860 100 200 | @wrightmillners | Wright Millners Dental Suppliers

www.mywrightplace.co.za | www.wright-millners.co.za

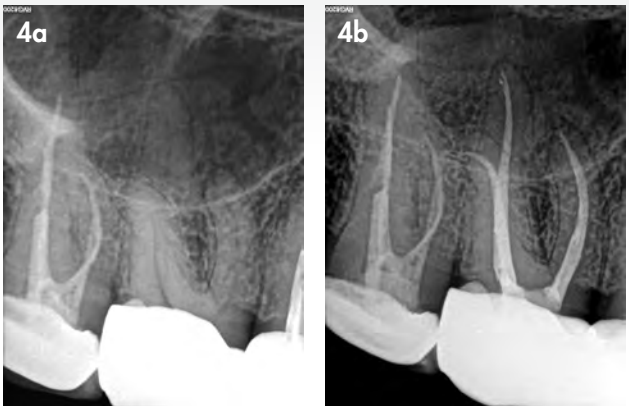


Figure 4(a) Pre-operative periapical radiograph of maxillary right first molar that presented with irreversible pulpitis; (b) Postoperative periapical radiograph showing the result after obturation depicts the final result after obturation. Note the sharp apical curvature in the distal root canal system that was maintained.

in the distal root canal system that was maintained using the X2 PTN file in reciprocation motion.

Case Report 3

The patient, a 58-year-old woman, presented with a non-vital mandibular left first molar (Figure 5a). An access cavity was prepared and two root canal systems were located in each premolar. Length was determined using an electronic apex locator and confirmed radiographically (Figure 5b). After canal negotiation and creation of a reproducible micro-glide path, the glide path was expanded by using a ProGlider (Dentsply Sirona) in reciprocation motion in the Root Pro CL endodontic motor (Medidenta, Las Vegas, USA). Root canal preparation was done using only an X2 PTN instrument, also operating in reciprocation using the endodontic motor. The canals were irrigated with heated 3.5% sodium hypochlorite using the EndoVac system (Sybron Endo) and the canals dried with paper points. The root canal systems were obturated using PTN X2 Gutta Percha Points (Dentsply Sirona) and Pulp Canal Sealer (Kerr). Figure 5c shows the final result after obturation.

Conclusion

In this series of cases, the authors illustrate the use of a ProGlider in combination with only the X2 PTN instrument, used in forward reciprocation instead of rotation. Clinically successful outcomes, with the added benefits of forward reciprocation and favourable research results when evaluating centring ability and transportation, could validate this combination as a preferred treatment modality in the future.

References

1. Cheung GS, Liu CS. A retrospective study of endodontic treatment outcome between nickel-titanium rotary and stainless steel hand filing techniques. J Endod.

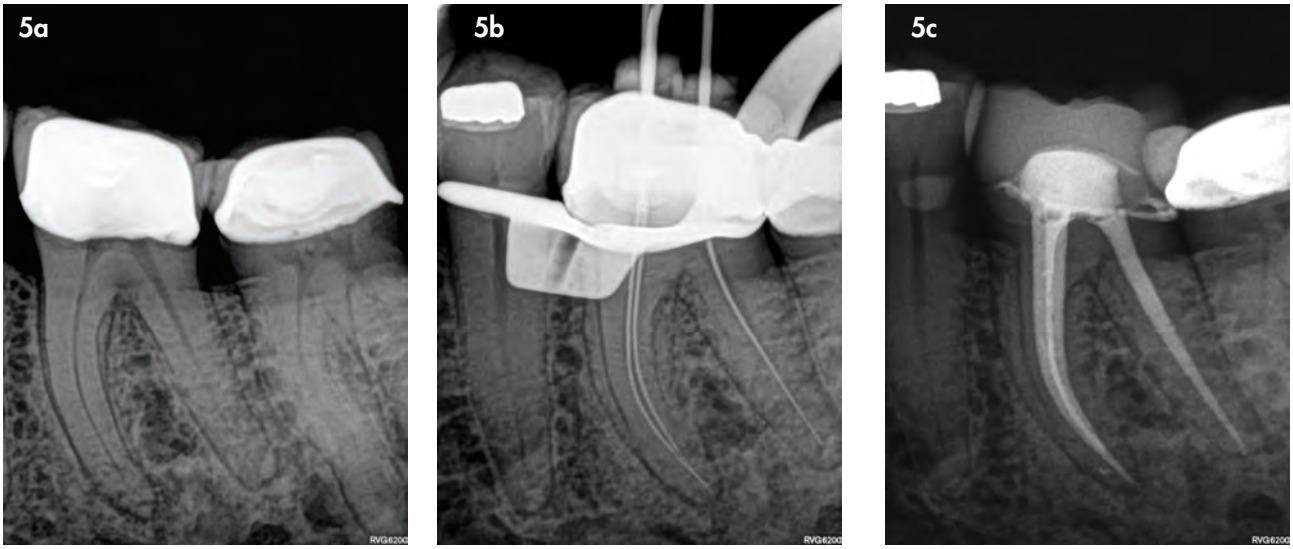


Figure 5(a) Pre-operative periapical radiograph of non-vital mandibular left first molar; (b) Length determination periapical radiograph; (c) Postoperative periapical radiograph showing the result after obturation

GT GRADIENT TECHNOLOGY

IPS e.max®

ZirCAD

Prime

Redefining all-ceramics – featuring Gradient Technology:
High-end esthetics and 1200 MPa for all indications*

All ceramic, all you need.

zircadprime.ipsemax.com

* ranging from single tooth crowns to 14-unit bridges

ivodent Adding value

Tel: 0860 456 123
info@ivodent.co.za
www.ivodentonline.co.za

ivoclar vivadent®
passion vision innovation

2009;35(7):938-943.

2. Yared G. Canal preparation using only one Ni-Ti rotary instrument: Preliminary observations. Int Endod J. 2008;41(4):339-344.

3. You S-Y, Kim H-C, Bae K-S, Baek S-H, Kum K-Y, Lee W. Shaping ability of reciprocating motion in curved root canals: A comparative study with micro-computed tomography. J Endod. 2011;37(9):1296-1300.

4. De-Deus G, Moreira E, Lopes H, Elias C. Extended cyclic fatigue life of F2 ProTaper instruments used in reciprocating movement. Int Endod J. 2010;43(12):1063-1068.

5. You S-Y, Bae K-S, Baek S-H, Kum K-Y, Shon W-J, Lee W. Lifespan of one nickel-titanium rotary file with reciprocating motion in curved root canals. J Endod. 2010;36(12):1991-1994.

6. Varela-Patiño P, Ibañez-Párraga A, Rivas-Mundiña B, Cantatore G, Otero XL, Martin-Biedma B. Alternating versus continuous rotation: A comparative study of the effect on instrument life. J Endod. 2010;36(1):157-159.

7. Gavini G, Caldeira CL, Akisue E, De Miranda Candeiro GT, Kawakami DAS. Resistance to flexural fatigue of Reciproc R25 files under continuous rotation and reciprocating movement. J Endod. 2012;38(5):684-687.

8. Giuliani V, Di Nasso L, Pace R, Pagavino G. Shaping ability of WaveOne primary reciprocating files and ProTaper system used in continuous and reciprocating motion. J Endod. 2014;40(9):1468-1471.

9. Siddique R, Nivedhitha MS. Effectiveness of rotary and reciprocating systems on microbial reduction: A systematic review. JCD. 2019;22(2):114-122.

10. Espir CG, Nascimento-Mendes CA, Guerreiro-Tanomaru JM, Freire LG, Gavini G, Tanomaru-Filho M. Counterclockwise or clockwise reciprocating motion for oval root canal preparation: A micro-CT analysis. Int Endod J. 2018;51(5):541-548.

11. Varela-Patino P, Ibañez-Parraga A, Rivas-Mundina B, Cantatore G, Otero XL, Martin-Biedma B. Alternating versus continuous rotation: A comparative study of the effect on instrument life. J Endod. 2010;36(1):157-159.

12. Ha JH, Kwak SW, Sigurdsson A, Chang SW, Kim SK, Kim HC. Stress generation during pecking motion of rotary nickel-titanium instruments with different pecking depth. J Endod. 2017;43(10):1688-1691.

13. Yared G. Canal preparation using only one Ni-Ti rotary instrument: Preliminary observations. Int Endod J. 2008;41(4):339-344.

14. Paqué F, Zehnder M, De-Deus G. Microtomography-based comparison of reciprocating single-file F2 ProTaper technique versus rotary full sequence. J Endod. 2011;37(10):1394-1397.

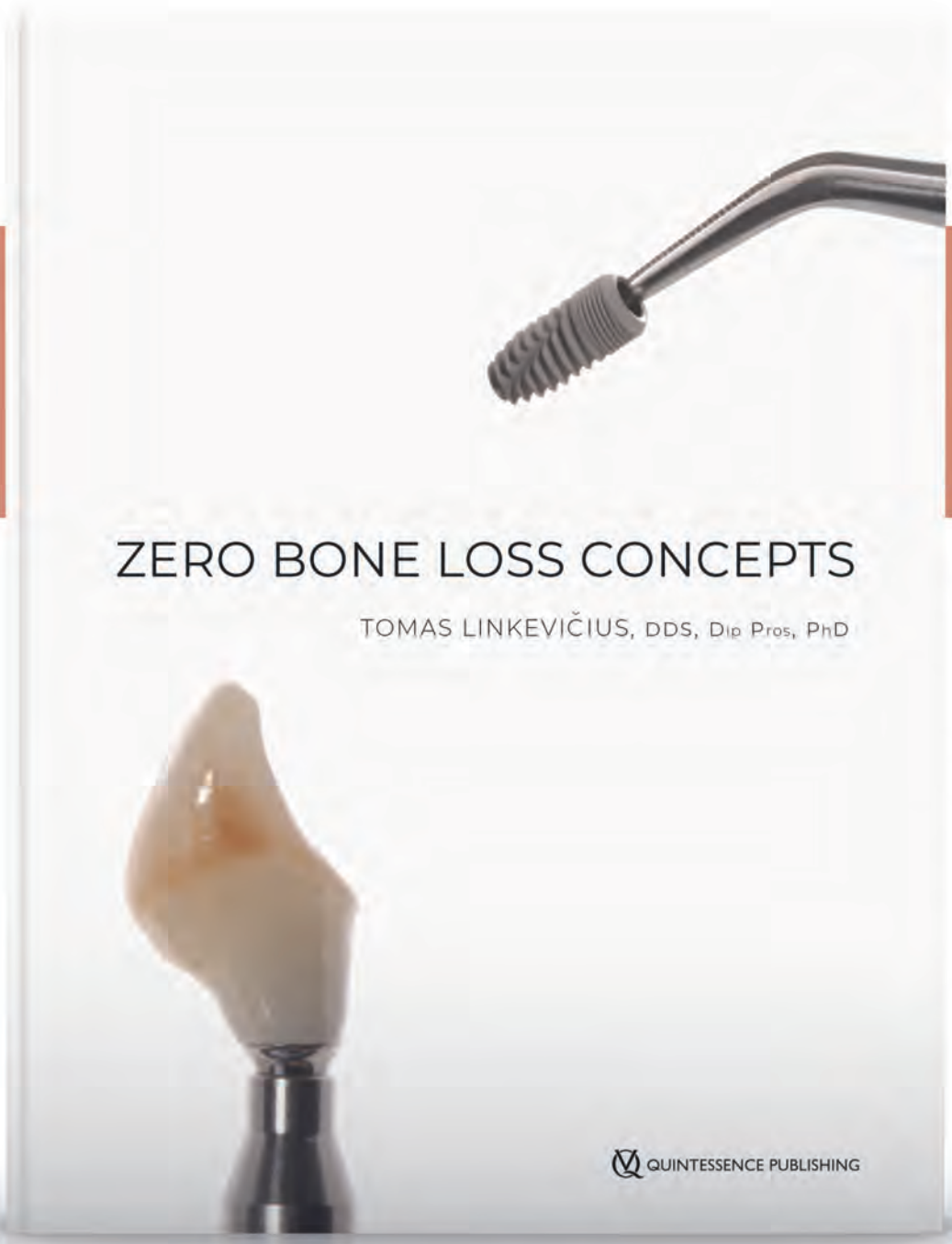
15. Paqué F, Zehnder M, De-Deus G. Microtomography-based comparison of reciprocating single-file F2 protaper technique versus rotary full sequence. J Endod. 2011;37(10):1394-1397.

16. Azarpazhooh A, Fillery ED. Prion disease: The implications for dentistry. J Endod. 2008;34(10):1158-1166.

17. Gagliardi J, Versiani MA, De Sousa-Neto MD, Plazas-Garzon A, Basrani B. Evaluation of the shaping characteristics of ProTaper Gold, ProTaper NEXT, and ProTaper Universal in curved canals. J Endod. 2015;41(10):1718-1724.

BONE STABILITY

NEW



Tomas Linkevičius

Zero Bone Loss Concepts

304 pages, 1,231 illus
ISBN 978-0-86715-799-4
€198

This invaluable guide for implant specialists on how to prevent bone loss in their patients combines the author's clinical experience with peer-reviewed scientific evidence. Different strategies to achieve zero bone loss after treatment are presented. Both the surgical and prosthetic components of promoting bone stability are considered. Detailed case presentations are outlined, all backed by evidence-based clinical studies with proven success.

www.quintessenz.de
books@quintessenz.de
+49 (0)30 761 80 667
QUINTESSENCE PUBLISHING

A simple and cost-effective makeover using the Dahl technique and composite edge bonding

Tif Qureshi[1]

The Dahl principle is a method for treating localised anterior tooth wear, before posterior wear begins (Poyser et al, 2005).

It opens the vertical dimension of occlusion (VDO), without having to treat the back teeth. The technique can be thought of as a non-invasive, preventive treatment and, for the right case, can stop a patient from developing full-mouth wear or needing oral rehabilitation. I also use it as a way of protecting anterior guidance and function.

Dahl is often viewed as an unconventional way of treating wear, but many of the traditional restorative options have expensive final outcomes, which can be a barrier for the patient. I use the Dahl technique nearly every day in my practice and have been doing so for more than 25 years.

Arguing for one type of approach over another is difficult. Few dentists have tried all the techniques extensively. However, I found that, in cases where the combined anterior wear in both arches is 6mm or less, and there is still some enamel coverage on posterior teeth, it is my preferred mode of treatment. Teeth and guidance can be restored, and within a few months, posterior contacts regained.

I usually employ traditional techniques in more severe cases. There are important caveats for using Dahl; for example, patients should have a reasonably well-aligned posterior arch, and care should be taken not to generate off-axial forces.

The Dahl principle

Modified Lucia jigs have been used as anterior deprogrammers to help the mandible find centric relation (CR). Direct composites can also be used as an anterior deprogrammer. Because of their resilience and ease of manipulation, even in small thicknesses, resin composites represent an ideal material to restore the palatal surface (Cardoso et al, 2000) and the worn lower anterior incisal and canine edges.

Dahl and Krogstad (1975) suggested creating space to treat localised anterior tooth wear by separating posterior teeth, using an anterior bite plane for four to six months.

A combination of passive eruption of the posterior teeth, and intrusion of the anterior teeth, allows the re-establishment of posterior occlusion, while holding the anterior space (Dahl and Krogstad, 1982). Dahl used a metal appliance to separate the posterior teeth, but the same result can be achieved with adhesive anterior direct composites.

[1] Dr Tif Qureshi BDS
Private Practice, Dental Elegance, Sidcup, UK.

Email: tif@iasortho.com
Website: www.iasortho.com

Figure 1: The patient wanted the aesthetics of her smile improved

Figure 2-4: The patient was reluctant to show her worn teeth and was experiencing increased sensitivity

By identifying the difference between maximum intercuspal position and CR, using pressure to gently guide the mandible, the position of the direct composite can be set slightly posterior to maximum intercuspal position (Magne et al, 2007). This will create anterior contact on the incisial edge build-ups and possibly create premature contacts on the posterior teeth. These can be improved through minor equilibration, but the residual space will eventually close through passive compensation and settling over a few months.

The following case shows how Venus Diamond composite can be used to place balanced and axial-force generating Dahl build-ups. Lower-edge direct build-ups and an upper 'Dahled' retainer are used as an interceptive method to stop a teenager developing full-mouth wear.

The Dahl principle allows such cases to be treated early to help avoid more extensive work. Why should treatment only commence once the patient has developed further wear? Is it necessary for the whole occlusal vertical dimension (OVD) to be increased with full arch restorations, to treat anterior wear only?

Figure 5: She presented with a significant amount of anterior tooth surface loss, and dentine exposure on the lower and some upper edges

Figure 6: The patient was losing anterior guidance and starting to develop posterior interferences

Figure 7: Direct build-ups were placed on the lower 4-4 worn teeth and the upper teeth were edge bonded

Teenage tooth wear

An 18-year-old female came to see me at Dental Elegance because she wanted the aesthetics of her smile improved (Figure 1). Due to anterior wear, she was reluctant to show her worn teeth and she was experiencing increased sensitivity (Figures 2 to 4).

The patient was medically fit and healthy, with good oral hygiene. She presented after orthodontic treatment with a significant amount of anterior tooth surface loss, and dentine exposure on the lower and some upper edges (Figure 5). Parafunction was the likely cause.

There was no posterior wear, but she was losing anterior guidance and starting to develop posterior interferences (Figure 6). She had no temporomandibular disorder symptoms.

Minimally invasive treatment

Treatment choices to improve her smile included providing the patient with a splint, which would prevent tooth wear caused by night-time grinding. However, this method would offer no protection during the day and it was important to preserve the dentine from further erosion. Ceramic veneers were possible, but irreversible and expensive. They would require tooth structure preparation and would begin an ongoing restorative cycle.

Direct composite veneers using the Dahl technique were an option. It was explained that the surfaces of the teeth would need complete coverage, making alterations difficult and increasing the maintenance costs.

Instead, the patient opted for composite edge bonding with the Dahl technique, and tooth whitening. She preferred the minimally invasive nature of the composite edge-bonding treatment and the lower cost. She also understood that the material was easy to adjust, add to and repair.

Tooth whitening was undertaken with super-sealed home trays and Philips Zoom! Daywhite. This whitening system contains 6% hydrogen peroxide, and the patient bleached for just 35 minutes a day, over a three to four week period.

Composite build-up

The teeth were prepared using water-based air abrasion and etched with 35% phosphoric acid. Kulzer Ibond Universal was applied and light cured, in accordance with the manufacturer's instructions.

Direct build-ups were placed on the lower 4-4 worn teeth using a freehand composite technique. Adding to the lowers increases the vertical dimension. When doing this with the Dahl principle, my aim is to prop the anteriors open, loading

WE KNOW ENDO.

Would you risk an imitation?

CHEAP ENDO IS NOT GOOD ENDO

Please call 0860 444 330 to place your order today.

THE DENTAL SOLUTIONS COMPANY™

Dentsply Sirona South Africa
Building 11a, Lower Ground Floor, The Woodlands
Woodlands Drive, Woodmead, Sandton, 2191
Tel: 0860 444 330 www.dentsplysirona.com

Dentsply Sirona

Figure 8-10: Three to four millimetres of composite were added to the anterior region

primarily on the canines. This was balanced and checked with articulating paper. A light contact was then generated on the incisors and checked with articulating paper.

Two weeks later, the upper teeth were edge bonded (Figure 7). The teeth were lengthened for functional and aesthetic reasons. During the same appointment, the upper anterior and canine guidance was adjusted and improved.

Three to four millimetres of composite were added to the anterior region (Figures 8 to 10). This separated the back teeth by 1.5mm to 2mm. During the first two weeks, some condylar seating was expected, as the anterior bonding would have a deprogramming effect.

Each tooth was restored using Kulzer Venus Diamond in layers of the Opaque Light (OL) and B1 shades (Figure 11). The composite was laid freehand in a reverse triangle technique, which blocks out the light transmission on the join (Figure 12).

I have used Venus composite for 10 years and it is the perfect material for edge bonding because of its high strength in thin sections.

It has a great colour match, which adapts and blends in well to the surrounding teeth. This is particularly useful when applying the reverse triangle technique. The dentine material has a natural opacity and helps to block out and mask transitions effectively (Figure 13). The matching enamel shades also blend well and have great polishing qualities.

Polishing and finishing

The patient's teeth were given a light polish immediately after edge bonding. The patient was recalled after a month, to ensure no posterior interferences developed.

To counteract any risk of hygroscopic expansion, the teeth were polished again with the high-gloss Kulzer Venus Supra kit. This simple-to-use system does not cut or damage the composite, and the rubberised polishers are the correct shapes to create a high lustre. The final shine was achieved

Figure 11: Each tooth was restored using Kulzer Venus Diamond in layers of the opaque light and B1 shades

Figure 12: The composite was laid freehand in a reverse triangle technique which blocks out the light transmission on the join

ESSENTIAL RANGE

Blocks

Lithium Disilicate

Wright MILLNERS

STRENGTH IN AESTHETICS

INDICATION

veneer | inlay | onlay | posterior crown | anterior crown

BUY 5 BOXES OF BLOCKS (14MM) & GET 1 BOX FREE
(Terms & Conditions Apply)

Superior Translucency • Natural-looking Colour • Suitable for dental CAD/CAM systems & Chair-side systems

Translucencies: Low & High Translucent Block Sizes: **14mm** (5 Pcs per Box) / **40mm** (4 Pcs per Box)
Shades Available: **14mm** - A1 ; A2 ; A3 ; B1 ; B2 ; C2 ; D2 & Bleach / **40mm** – A1 ; A2 ; A3 & B1
Money Back Guarantee

Pictures used may be for representation only. E&OE.

0860 100 200 | @wrightmillners | Wright Millners Dental Suppliers
www.mywrightplace.co.za | www.wright-millners.co.za

Figure 13: The dentine material has a natural opacity, and helps block out and mask transitions effectively

Figure 14 and 15: After one month, her posterior contacts were starting to settle and at the two-month review the contacts were completely closed

with a flexible felt and mylar disc, and polishing paste.

After one month, the posterior contacts were starting to settle and at the two-month review, the contacts were completely closed (Figures 14 and 15). This process appeared a little faster than usual, but younger patients do seem to 'Dahl' more quickly. Once the bite had settled down, an impression was taken using Kulzer Xantasil to fabricate a clear permanent Essix retainer for the patient to wear at night.

Ultimate preventative dentistry

The Dahl principle can offer dentists another way of approaching wear and occlusal issues, especially in mild and moderate cases. When used correctly, this interceptive method can stop patients from going on to develop full-mouth wear.

Directly bonded composite can act as a fixed Dahl appliance and is reversible. The clinical ease with which composite restorations can be modified and altered offers better control over the outcome of the treatment. I believe this is the ultimate preventive dentistry.

The patient was thrilled with her teeth. The treatment was simple, cost effective and can last for five to 10 years, preventing any further anterior wear (Figure 16). If ceramic alternatives can be avoided, many patients who simply don't have the budget can have wear issues treated and reversed at more realistic prices.

References

Cardoso ACC, Canbabarro S, Myers SL (2000) Diagnostic-based non-invasive treatment. Dental Erosion. Pract Periodon Aesthet Dent 12: 224-228

Dahl BL, Krogstad O (1975) An alternative

treatment in cases with advance localized attrition. J Oral Rehab 2: 209-214

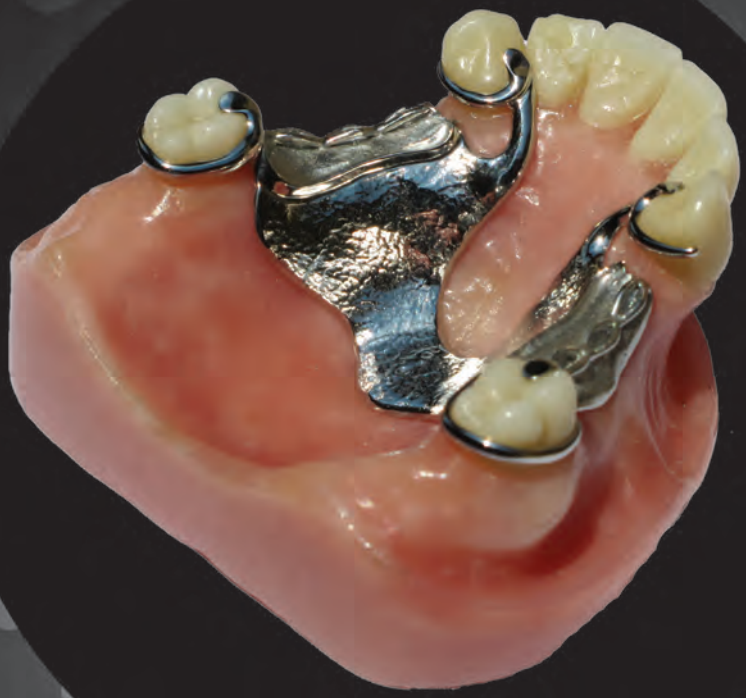
Dahl BL, Krogstad O (1982) The effect of a partial bite raising splint on the occlusal face height. An x-ray cephalometric study in human adults. Acta Odontol Scand 40: 17-24

Magne P, Magne M, Belser U (2007) Adhesive restorations, centric relation and the Dahl Principle: Minimally invasive approaches to localized anterior tooth erosion. European Journal of Esthetic Dentistry 2: 3

Poyser NJ, Porter RWJ, Briggs PFA, Chana HS, Kelleher MGD (2005) The Dahl Concept: past, present and future. British Dental Journal 198: 669-676

Reprinted with permission by Aesthetic Dentistry Today August 2019

PROGRESS DENTAL LABORATORY
SIXTY YEARS OF SERVICE



VITALLIUM®

Call Johann or Grigor: 011 483 2908 / 011 728 6713

CEREC® Primemill - making excellence easy

CEREC takes another big step forward with the introduction of CEREC Primemill, a brand-new grinding and milling unit from Dentsply Sirona. Fabricating chairside restorations is about to get easier and significantly faster. Thanks to state-of-the-art technology, a wide range of restorations can now be manufactured with more speed and outstanding results. Together with CEREC Primescan and the CEREC Software, CEREC Primemill forms a modern setup for achieving predictable results with a completely new chairside experience – for both the user and patient.

Unveiled in January 2020 at a launch in Berlin, attended by a host of leading Dentsply Sirona KOLs, CEREC Primemill ensures producing impressive restorations with precise margins and a very smooth surface which results from the high-speed-setup with two spindles and four motors. CEREC Primemill features a powerful 7-inch touch interface, an integrated camera for scanning blocks with compatible data matrix code and an RFID scanner for reading tool information. It also works with a wide range of materials. The new design offers significantly smoother operation.

"CEREC Primemill is a real game changer in the whole workflow," said Dr. Gertrud Fabel, dental practitioner in Munich (Germany) and key opinion leader for Dentsply Sirona. "Everything works significantly faster than before, the quality of the restorations is convincing due to the very fine margins and smooth surfaces, and handling is more than simple: the team can provide perfect support and thus accelerate the entire workflow to make it even more pleasant for the patient."

Guided operation for maximum convenience

When developing the new CEREC Primemill, special attention was paid to its user-friendliness: The large touch interface guides the user through all workflow processes. Each workflow step is displayed in order and shows, for example, which tools are used for the selected material and machining option. The tools are outfitted with a color code depending on the material to be processed and are therefore easy to distinguish. Each tool also contains a small radio frequency identification (RFID) tag that can be read by an integrated scanner in the CEREC Primemill. The machine informs the user about the tool's status and if or when it should be replaced with a new one. The new user guidance makes it even easier to delegate the operation of the machine.

For additional convenience, material blocks with a compatible data matrix code can be scanned with the integrated camera. With this the block information including type, size, color and zirconia enlargement factor are recorded. The unit's LED light strip also informs the user about the unit's status including a moving blue progress bar which changes to green

when the manufacturing process is finished. In addition, the interface guides the user through routine maintenance procedures and thus facilitates the easy upkeep of CEREC Primemill.

More esthetic, faster and simply excellent

With CEREC Primemill, restorations, especially those made of zirconia, can be milled even faster thanks to new tools and improved technology. The time required to fabricate a zirconia crown has been reduced by more than half: It can be cut from around 10-12 minutes to as little as 5 minutes using our new Super Fast mode.

The results speak for themselves. Using newly developed, very fine tools (0.5 mm) in the Extra Fine milling mode, the unit achieves a high level of detail for occlusal fissures as well as interdental areas on bridges, enabling users to achieve predictable, first-class results.

Superior chairside experience

The entire CEREC system takes on a new dimension with CEREC Primemill. For those customers who now want to step into the chairside CAD/CAM world and want to use CAD/CAM technology in their practice, with the all-new CEREC they get a full system with great flexibility for reliable results. Users who are already successfully using CEREC in their practice will appreciate the system with the new level of speed, high level of quality, and convenience provided by CEREC Primemill.

Dr Gertrud Fabel

"It was important for us to create real added value with CEREC Primemill, both for the CEREC newcomer and for those who have been passionate CEREC users for years," explained Dr. Alexander Völcker, Group Vice President CAD/CAM & Orthodontics at Dentsply Sirona. "We have noticeably increased the process speed while delivering outstanding restoration results. The variety of applicable materials leaves nothing to be desired and operating the unit has never been easier. The complete system does not require any data imports or exports. All processes are coordinated with one another and fully validated for an excellent and seamless chairside experience."

Dr. Alexander Völcker, Group Vice President CAD/CAM & Orthodontics, Dentsply Sirona

Bonding of ceramic veneers

Olivier Étienne[1] and Bérangère Cournault[2]

In recent years, the use of aesthetic bonded ceramic restorations has been favoured because of the aesthetic demand of our patients as well as our profession's concern to promote minimally invasive procedures[1]. Among these restorations, veneers are mostly associated to the aesthetic improvement of the smile and the techniques of tissue preservations[2].

The fragility and detachment of these fine pieces of ceramics remain the main sources of apprehension of practitioners despite excellent results reported in the many clinical studies published to date[3,4]. Admittedly, a low rate of failure is still relevant, but the understanding of the phenomena and the clinical criteria influencing the result either positively or negatively enabled to systematise the entire procedure in a better way. Among the criteria reported as determinants, the respect of an exclusive enamel bonding is essential. Indeed, the enamel can be easily etched and its composition, mainly mineral, does not make adhesion difficult as hydrated dentine can do. Hence, when the bonding system is wisely selected, the ceramic-enamel bond can reach adhesion values greater than the natural dentinoenamel junction.

In order to preserve the enamel tissue of the vestibular surfaces, several authors have proposed clinical procedures based on the analysis and preliminary composed aesthetic treatment plan. The use of silicone keys to control the reduction[5] to the transfer the treatment plan through a mock-up[6,7] are approaches that limit the preparation to the bare minimum. Then, the respect of a strict bonding protocol ensures the durability of the final result.

Clinical evaluation and aesthetic project

The initial consultation enables to take note of the patient's wishes and to confront them with the clinical and radiographic criteria. The aesthetic therapeutic decision may depend on desires such as shape modification, colour alteration, restoration of a large caries or correction of malpositions. The clinical case described below relates to a patient with oligodontia and microdontia, eager to improve her smile and to overcome the lack of permanent posterior teeth. The initial analysis (Figure 1) shows a "childlike" appearance of the smile, characterised by small anterior upper teeth associated with the presence of several diastemas.

[1] Prof. Olivier Étienne is Assistant Professor and Head of the Prosthetics Unit of the Faculty of Dental Medicine in Strasbourg (France). He is Doctor of Odontological Sciences (PhD) and devotes his research to surface characteristics and their interaction with biological tissues.

[2] Dr. Bérangère Cournault is a dentistry student in the 6th year at the Faculty of Dental Medicine in Strasbourg (France).

Figure 1: The 45-year-old patient presented with oligodontia and microdontia, characterised by the presence of many diastemas in the smile. The distribution of the teeth on the arch has been optimised by the previous orthodontic treatment which enables to envision the realisation of ceramic facets. Front view of the smile (a), intraoral view of the smile (b) and occlusal view (c).

Fig. 2: (a) The aesthetic analysis associated with an aesthetic project (smile design) enables the efficient guidance of the dental technician towards the construction of the desired wax-up. (b) The future gingival contour was drawn on the plaster (c) Then, it was covered by the modeling wax.

The aesthetic treatment plan resulting from the preceding analysis must allow effective communication with the patient as well as the dental technician. We found the use of a virtual project from a Photoshop Smile Design (PSD) approach ideal to fulfil both the communication to the patient and the technician (Fig. 2a). This way, the technician was able to carry out a preparatory wax-up (Fig. 2b, 2c), which was then transferred to the mouth through a mock-up of bis-acryl temporary resin. In this case, the PSD project made it possible to present the two treatment options to the patient:

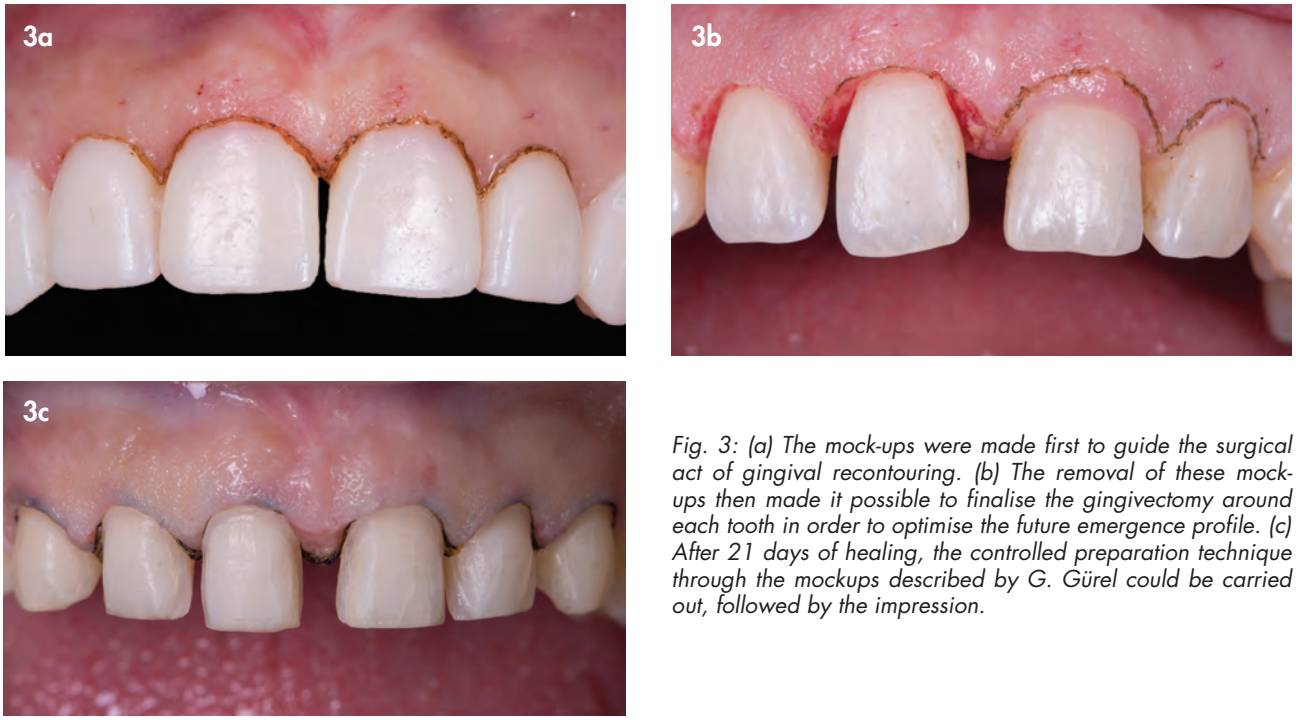


Fig. 3: (a) The mock-ups were made first to guide the surgical act of gingival recontouring. (b) The removal of these mock-ups then made it possible to finalise the gingivectomy around each tooth in order to optimise the future emergence profile. (c) After 21 days of healing, the controlled preparation technique through the mockups described by G. Gürel could be carried out, followed by the impression.

Fig. 4: (a) After removal of the provisional veneers, the dental surfaces were cleaned before trying all veneers with G-CEM Try-in Paste. When veneers are thin (<0.6mm), the colour of the bonding resin can influence the aesthetic result. (b) It is interesting to do several glycerine fitting trials to judge the final result. Here, 11 was tried with a try-in paste "A2" while 21 was tried with a try-in paste "Bleach". The brightness of 21 was preferred and therefore chosen.

partial preservation of the central diastema or complete closure of the diastema. Our common preference was to partially preserve the central diastema.

Enamel preparation

Once the mock-up was made, it served as a guide for the necessary gingivo-plasty (Fig. 3a, 3b). After gingival healing, the preparation could be started. The use of techniques to guide the preparation depth is essential. To do this, specific burs allow the practitioner to maintain enamel for the bonding, as long as a depth of 0.4 to 0.8 mm is respected. Horizontal, vertical and cervical depth marks were prepared on the buccal surface of the teeth, before starting the preparation.

The cervical limit was placed juxta-gingivally to facilitate the placement of the rubber dam during the luting later on. The proximal limits connected below the contact point to position the dento-restorative joint in a non-visible area, regardless of the angle of view. The contact point was preserved at first and then faded by an abrasive matrix tape. Finally, the free edge was reduced when it was worn, altered or dyed.

The preparation was rounded and finished with a fine-grit bur (yellow coded), or even using sonic or ultrasonic instruments, to ensure a more reliable reproduction during the impression (Fig. 3c).

Try-in and luting

The aesthetic validation was done in the chair using the dedicated try-in pastes (G-CEM Try-In Pastes), allowing the practitioner to evaluate the possible impact of the colour of the cement on the final colour of the veneer (Fig. 4a, 4b). This criterium is particularly essential when the veneer is thin and/or made of feldspar ceramic without reinforcement[8]. When all the aesthetic criteria initially desired were respected, the restorations could be luted. Firstly, the intaglio surfaces of the glass ceramic veneers (reinforced lithium disilicate) were etched with hydrofluoric acid for 20 seconds, then rinsed

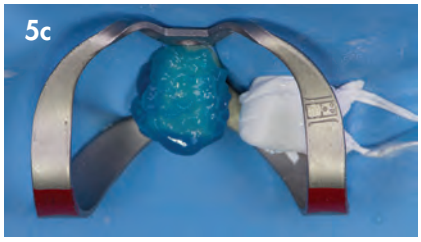


Fig. 5: (a) After rubber dam placement, the enamel of the prepared tooth was rinsed with water, to eliminate the water-soluble fitting paste. (b) Next it was sandblasted with alumina. (c) The surface was etched for 30 s with orthophosphoric acid, rinsed and dried.

Incisal Edge

- **Infection Control Specialist**
- **Dental Assistant Training**
- **Specialised Consulting**
- **Marketing and Practice Management**

Melanie Savvides has worked in the Dental Industry for the last 32 years and was the MD of one of the largest Dental supply companies in South Africa. She has travelled around the world through dentistry, attending numerous courses, workshops and events.

Melanie is passionate about Dentistry in South Africa and would like to share her experience with you.

Contact Melanie Savvides | Email: melaniesavv@gmail.com | Cell: 082 788 1832

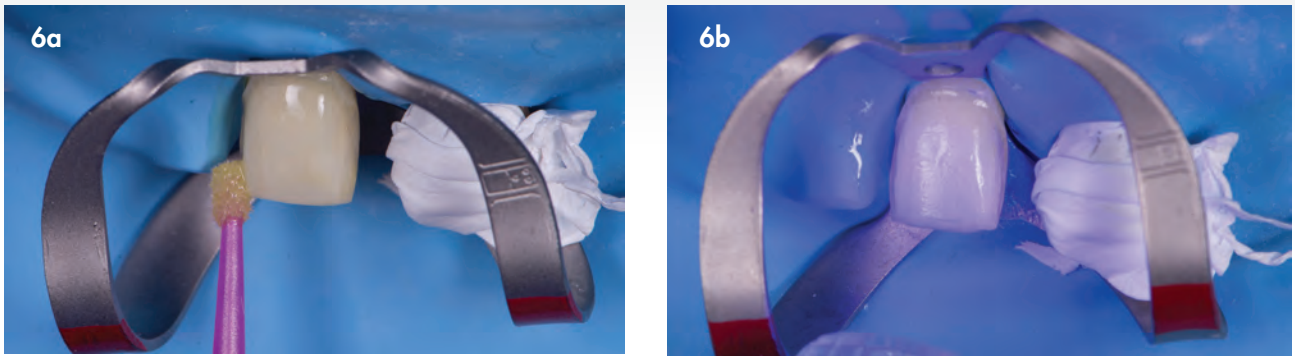


Fig. 6: (a) The universal adhesive G-Premio BOND was applied vigorously over the entire enamel surface, before being spread with oil-free air. (b) The adhesive was then immediately light-cured. Its low thickness (no more than 10 µm) does not pose any risk of difficulty to insert and seat the veneer.

and dried before being covered with a primer (G-Multi PRIMER) and left one minute minimum until evaporation.

The placement of a rubber dam guaranteed isolation from ambient humidity and sulcular fluid. The dam was supplemented by a Teflon tape which ensured the protection of neighbouring preparations on which the different products could be deposited (Fig. 5a).

After rinsing the try-in paste away with water, an alumina micro-blasting guaranteed a cleaned surface and generated a macro-roughness, enhancing the adhesion (Fig. 5b).

The choice of the adhesive approach was based on scientific evidence concluding that the best adhesion values

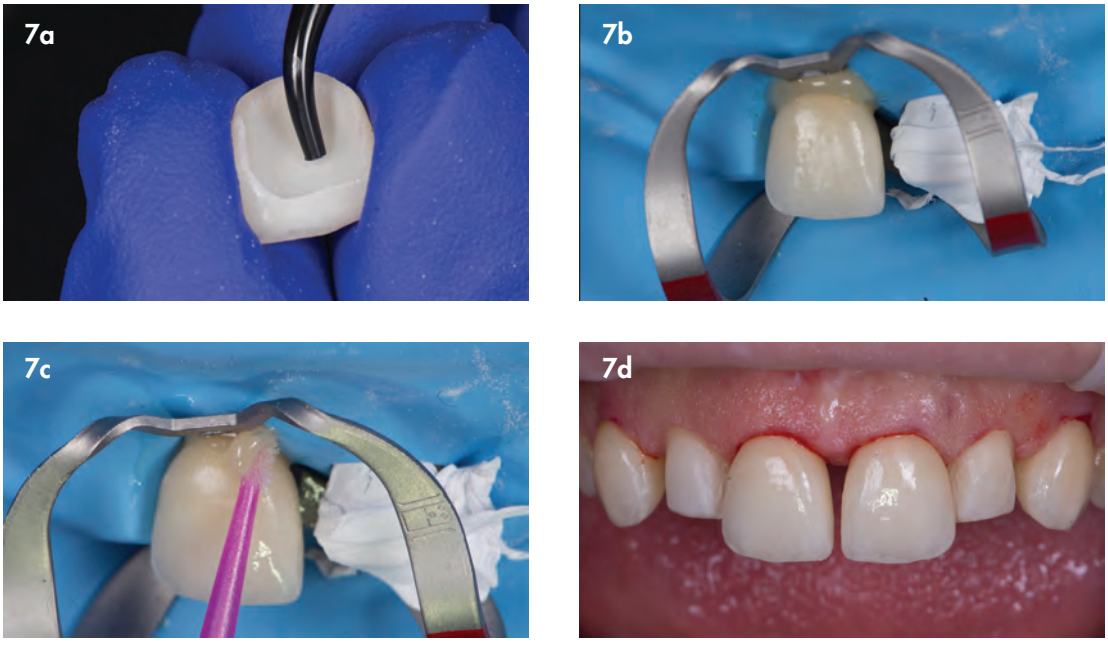


Fig. 7: (a) Each veneer was pretreated with hydrofluoric acid (20 s) and rinsed and dried before applying a coat of G-Multi PRIMER. After one minute, the veneer was dried and then coated with G-CEM Veneer light-cure resin cement in the selected colour. (b) It was positioned on the preparation before (c) removing the resin excess by wiping. This option made it possible to obtain an adhesive joint without microleakage unlike the tack-cure technique. The veneer was firmly held onto the tooth during the entire light-curing procedure. (d) When the six anterior teeth are involved in the treatment, the recommended sequence is to bond first 11 and 21, then 13 and 23, ending with 12 and 22.

Fig. 8: After a week of healing, the periodontium refound its position. The redesigned gingival contours gave the illusion of a natural emergence profile.

Fig. 9: Result after 6 months.

between enamel and ceramic are observed when the protocol includes enamel etching[9] (Fig. 5c).

The adhesive was scrubbed vigorously onto the enamel surface (Fig. 6a) before being spread by a strong dry air blow as recommended by the manufacturer. This step also contributes to the evaporation of the solvents contained in the adhesive. Finally, immediate light-curing of the hybrid layer obtained at this stage is strongly recommended (Figure 6b).

References

1. Etienne O, Anckenmann L. Restaurations esthétiques en céramique collée. Paris: Editions CdP; 2016.
2. Etienne O. Facettes en céramique. Memento, editor. Paris: Ed. CdP; 2013.
3. Peumans M, De Munck J, Fieuws S, Lambrechts P, Vanherle G, Van Meerbeek B. A prospective ten-year clinical trial of porcelain veneers. The journal of adhesive dentistry. 2004;6(1):65-76.
4. Gurel G, Morimoto S, Calamita MA, Coachman C, Sesma N. Clinical performance of porcelain laminate veneers: outcomes of the aesthetic pre-evaluative temporary (APT) technique. Int J Periodontics Restorative Dent. 2012;32(6):625-35.
5. Belser U, Magne P, Magne M. Ceramic laminate veneers: continuous evolution of indications. J Esthet Dent. 1997;9(4):197-207.
6. Magne P, Belser UC. Novel porcelain laminate preparation approach driven by a diagnostic mock-up. J Esthet Restor Dent. 2004;16(1):7-16; discussion 7-8.
7. Gurel G. Predictable, precise, and repeatable tooth preparation for porcelain laminate veneers. Pract Proced Aesthet Dent. 2003;15(1):17-24.
8. Vaz EC, Vaz MM, de Torres EM, de Souza JB, Barata TJE, Lopes LG. Resin Cement: Correspondence with Try-In Paste and Influence on the Immediate Final Color of Veneers. J Prosthodont. 2018.
9. De Munck J, Van Landuyt K, Peumans M, Poitevin A, Lambrechts P, Braem M, et al. A critical review of the durability of adhesion to tooth tissue: methods and results. Journal of dental research. 2005;84(2):118-32.

Reprinted with permission by GC get connected

KEYNOTE SPEAKER
Dr. Michael Scherer, USA

21 CME

20th GLOBAL & 15th MIDDLE EAST CONFEX

CAPP DENTAL CONFEXPO 2020

15th CAD/CAM & DIGITAL DENTISTRY
12th DENTAL FACIAL COSMETIC

MADINAT JUMEIRAH CONFERENCE & EVENTS CENTRE

EARLY BIRD REGISTRATION
995 AED (271$)
(3 Days Access)

12-14 NOV 2020 DUBAI

SPEAKER HIGHLIGHTS

Dr. Julian Caplan
UK

Dr. Stefan Helka
Germany

Prof. Andrey Akulovich
Russia

Prof. Avijit Banerjee
UK

Prof. Chung Kau
USA

- Digital Orthodontics Symposium
- Dental Technician Int'l Meeting
- Dental Hygienist Seminar
- Pre- Post-Multidisciplinary Trainings
- MOHAP Symposium (Ministry of Health)

2020

65k sq ft exhibition
12 events
30+ hands-on
110k educated dental professionals
over period of 15 years

- Dental Exhibition
- Trainings at the Exhibition
- Product Presentations at the Exhibition
- Dentistry Awards
- Scientific Poster Competition

Organized by
CAPP

www.cappmea.com/dental-confexpo
+971 50 279 3711

ADA C·E·R·P® | Continuing Education Recognition Program

Centre for Advanced Professional Practices (CAPP) is an ADA CERP Recognized Provider. ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry.

CAPP designates this activity for 21 CE Credits

Direct and indirect composite

Gregory Camaleonte[1]

The treatment

For any aesthetic treatment, the practitioner should encourage patients to express their motivations and desires. The dentist must devote time to listen, understand and offer support to the patient. After a thorough analysis of the existing problem, including clinical examination, X-rays and photos, a treatment plan should be proposed to the patient, who then may accept it or not. In case of refusal, it is important to understand the reasons and, if possible, to make another proposal in accordance with the patient's expectations as long as they are realistic; the patient has to understand and accept the limits of the second proposal. When agreement is reached, study models are needed and through the production of a diagnostic wax-up, the dentist and laboratory can show the expected outcome to the patient.

The case

Figure 1: A young female patient visited the practice to improve her smile. She asked for a fast treatment because she was getting married four months later. Her desire was to have white and aligned front teeth.

[1] Gregory Camaleonte
Private Practice, Marseille, France

Figure 2: X-rays of the deciduous teeth showed important root resorption. At this point, the patient was informed that, in order to obtain a long-lasting result, teeth URc and ULc should be extracted, space would be created between the canines and central incisors using orthodontic treatment and then implants would be used to replace UR2 and UL2 after bleaching. The patient refused this proposal and reminded us of the need for a fast solution. At this point there is the option to either stop the treatment or to find an alternative solution. It was decided to propose rebuilding the teeth with indirect composite crowns on URc and ULc and to make direct restorations to transform the canines in lateral incisors. It was explained to the patient that this treatment could accelerate the root resorption of the deciduous teeth and the patient accepted this risk.
Figure 3: First we made study models and send them to the laboratory (DT Gilles Philip laboratory). Digital design was used to guide the production of the wax-up.

Figure 4: The lab closed the spaces between canines and central incisors and transformed the deciduous teeth into permanent canines. Notice in this case that the gum level of the UR3 and UL3 is lower than the gum level of the teeth UL1 and UR1, this can be resolved in the final integration of the new smile.

Figure 5: Before any intervention, the patient has to validate the proposal made in the laboratory. To precisely transfer the sculpture into the mouth of the patient we used silicone materials (Honigum Putty and Light). With a #15 blade, the unwanted parts of the silicone stent were removed to obtain a very clean and precise mock up. At this point the patient can appreciate the final outcome and validates the treatment plan.

Figure 6: The first step of the treatment is bleaching with White Dental Beauty - 6% hydrogen peroxide for 14 days. This picture shows the initial colour of the teeth and the strong saturation of the canines.

Figure 7: After one-week of treatment (left) and final colour (right). After bleaching, a silicone impression is made and the laboratory builds composite crowns on the deciduous teeth. The patient is reminded that because of the occlusion (even if we are able to avoid occlusal contacts in static occlusion), the root resorption of the URc and ULc will certainly be accelerated. The patient is still motivated and tells us she understands the risks.

Figure 8: The composite crowns (Gilles Philip lab) were cemented with individual rubber dam. After excesses removal, rubber dam is used again from teeth UR4 to UL4 to transform UR3 and UL3 into lateral incisors using direct composites.

Figure 9: Final result after polishing procedure, before rubber dam removal

Figure 10: Direct post-op situation, immediately after rubber dam removal

Figure 11: The outcome one month later is satisfactory

Figure 12: Six months later, the patient is happy and the deciduous teeth show no mobility.

In conclusion

Before starting any treatment it is important to listen carefully to the patient's expectations. If we have to make realistic compromises, the patient has to understand and accept the limits of the new treatment plan. In the case presented here, the patient is aware the outcome won't last for many years. Despite this, the patient is grateful and returns to the clinic every six months for the situation to be assessed.

CPD QUESTIONNAIRE 10.1.1

Article: Replacing hopeless maxillary incisors with adjacent implants via an integrative biologically oriented approach Bichacho, Feraru, page 6

1. *Current cutting-edge technologies essential in today's workflow to achieve predictable, successful biologic and esthetic results include:*
a Minimally invasive surgical techniques,
b 3-dimensional (3D) computerized planning
c Biologically oriented implant systems
d All of the above e None of the above

2. *In the case described, the patient presented complaining about his:*
a Maxillary lateral incisors
b Maxillary central incisors
c Mandibular central incisors
d Mandibular lateral incisors

3.. *Radiographic and CBCT images demonstrated bone loss of more than:*
a 30%
b 40%
c 50%
d 60%

4.. *Which statement is correct: The implants selected for the case were*
a 16mm
b 13mm
c 9mm
d 10mm

5. *According to the authors, they have a preference for:*
a Cemented-retained implant restorations
b Non-cemented screw-retained implant restorations
c Both of the above
d Neither of the above

Article: Evidence-based treatment planning for the restoration of endodontically treated single teeth: importance of coronal seal, post vs no post, and indirect vs direct restoration. Atlas et al, page 20

6. *According to the authors, placement of a sufficient restoration over a poorly obturated root canal:*
a Can render the high degree of success associated with performing both procedures adequately
b Will not render the high degree of success associated with performing both procedures adequately

7. *Which statement is correct:*
a Vital teeth are more susceptible to fracture than ETT
b ETT are more susceptible to fracture than vital teeth
c Both ETT and vital teeth have the same susceptibility to fracture

8. *Which statement is correct?*
a Fiber posts have elastic moduli similar to dentin
b Glass fiber posts are associated with low catastrophic failure rates compared to other post types
c Fiber posts exhibit relatively uniform stress distribution to the root
d All of the above e None of the above

9. *What did the authors conclude is an acceptable approach for achieving good survival and success rates:*
a Composite restorations
b Porcelain fused-to-metal crowns
c Both of the above d Neither of the above

10. *According to the authors, which material is a natural choice when restoring ETT directly?*
a Glass-ionomers b Flowable bulk-fill composite
c Both of the above d Neither of the above

www.idem-singapore.com

IDEM SINGAPORE

24 - 26 April 2020
Suntec Singapore

THE LEADING DENTAL EXHIBITION AND CONFERENCE IN ASIA PACIFIC

LEARN FROM THESE WORLD-CLASS SPEAKERS AT IDEM 2020!


SDA Masterclass
Shimon Friedman


Mark Wolff


Brian B. Novy


Thuan Dao


Axel Spahr


Fadi Yassmin


Mohamed Hassanien


Mitsuhiro Tsukiboshi


Roberto Turrini


Suchada Kongkiatkamon


Peet van der Vyver

NEW FOR 2020

What's New for IDEM 2020 Conference Programme

Special Care Dentistry Symposium

Highlighting the treatment needs of patients with special needs, this full day forum is one of the first in Asia to focus on this niche topic in dentistry.

IDEM EduHub @ Level 6

Join our free on-floor sessions and learn more about topics beyond dental including marketing, volunteering and more.

SECURE YOUR PASSES FOR IDEM ONLINE

Registration

Koelnmesse Pte Ltd
Ms. Isabel Shankar
T: +65 6500 6700
E: idem-reg@koelnmesse.com.sg
+65 9622 9782

Connect with us
IDEM Singapore
IDEM Singapore
idem.sg
@IDEMSingapore

Endorsed by
aif Approved International Fair

Supported by
SINGAPORE EXHIBITION & CONVENTION BUREAU

Held in
SG singapore Passion Made Possible

Organised by
Singapore Dental Association

koelnmesse
We energize your business | since 1924

Article: Forward reciprocation of conventional rotary instruments – Literature review and clinical case reports. Van der Vyver et al, page 46

11. Alternating changes in the direction of rotation has the following advantages :
a Less binding to dentine walls during root canal preparation
b Reduced number of cycles during root canal preparation
c Reduced cyclic fatigue during root canal preparation
d All of the above
e None of the above

12. According to a study by Giuliani et al. (2014), which of the following combinations exhibited better shaping effects during canal preparation?
a Full-sequence ProTaper Universal used in a continuous rotation
b WaveOne used in reciprocating motion
c Full-sequence ProTaper Universal used in a reciprocating motion
d None of the above

13. True or False. Reciprocating files currently available on the market are designed for use in a reverse motion.
a True b False

14. In the case report presented: which combination of instruments did the authors use in forward reciprocation instead of rotation?
a ProGlider and ProTaper Next X2 b ProGlider and ProTaper Next X1
c ProTaper Next X2 only d ProTaper Next X1 only

15. Using a single-file system in forward reciprocation (according to the study by Yared in 2008) has the following advantage(s).
a Reduced number of instruments needed
b Reduction in treatment cost
c Reduced instrument fatigue during canal preparation
d None of the above e All of the above

Article: A simple and cost-effective makeover using the Dahl technique and composite edge bonding. Qureshi, page 54

16. According to the author, the Dahl concept is his preferred mode of treatment when there is still some enamel coverage on posterior teeth and the combined anterior wear in both arches is:
a 2mm or less
b 4mm or less
c 5mm or less
d 6mm or less

17. What, according to Cardoso et al, 2000, represents the ideal material to restore the palatal surface?
a Microhybrid composites
b Resin composites
c Glass-ionomer cements

18. Which statement is correct: The patient in the case described presented after orthodontic treatment:
a With temporomandibular disorder symptoms.
b With a significant amount of posterior tooth surface loss
c With a significant amount of anterior tooth surface loss

19. After 3mm - 4mm of composite were added to the anterior region, the back teeth were separated by:
a 0.5mm - 1mm
b 1mm - 1.5mm
c 1.5mm - 2mm
d 2mm - 2.5mm

20. At which review appointment were the posterior contacts completely closed?
a One month b Two months
c Three months d Four months

fdi World Dental Congress

SHANGHAI 2020

SHAPING THE FUTURE OF ORAL HEALTH

Shanghai China

NATIONAL EXHIBITION AND CONVENTION CENTER

1–4 September **2020**

ABSTRACT SUBMISSION DEADLINE

25 March 2020

EARLY-BIRD REGISTRATION DEADLINE

31 May 2020

www.world-dental-congress.org

FDIWorldDentalCongress

fdi_wdc

Positions Available

Dental Practice for Sale

HENRY SCHEIN®
DENTAL WAREHOUSE

Rely on Us™

Focus on Equipment

NOW R205 000

DCi Series 5 Dental Chair

Fully Ambidextrous Package

DCI EDGE

X-MIND Trium

W0900010

3d technology that facilitates implant planning with instant volume measurement and bone density assessment

R869 000
plus 10 Camlog Conelog Progressive Line Implants and Surgical Kit
FREE

ACTEON
MINIMALLY INVASIVE SOLUTIONS

STATIM Cassette Autoclaves

The STATIM S-cycle cassette autoclave is a fast benchtop steriliser.

STATIM will enable you to sterilise your handpieces in only eight minutes, which will optimise your clinical time management and improve efficiency

SciCan

NOW R97 999

NOW R69 999

STATIM 2000S
Includes 1 x Basket, Silicone Cover, DriPlus, Water Distiller, Delivery & Installation

STATIM 5000S
Includes 2 x Baskets, Silicone Cover, DriPlus, Water Distiller, Delivery & Installation, Without Printer, Includes Standard Cassette

Acteon Sopix and Sopix 2 SD and HD Digital Sensors

Obtain successful x-rays, everytime, with minimal exposure to radiation surgeries. Save time with fast and user-friendly sensors and make use of Sopro imagining, powerful imaging software.

NOW R39 900

S_802_0004 (SD)

NOW R52 000

S_802_3000 (HD)

Taking care of everything dental TOLLFREE 0800 111 796 admin@henryschein.co.za

LIKE US ON HenryScheinSA FIND US ON @HenryScheinSA Henry Schein South Africa

THE DENTAL
SOLUTIONS
COMPANY™

Dentsply Sirona

CLINICAL PERFORMANCE NEVER LOOKED SO GOOD.

NEW!

SmartLite® Pro

Modular LED Curing Light

We weren't satisfied with creating one of the most advanced curing lights ever. It had to be one of the best-designed as well. The SmartLite® Pro light is a unique modular curing device in a remarkable, all-metal housing. But it delivers far more than good looks. State of the art optics provide leading quality of cure for reliable outcomes. And the modular concept with exchangeable tips makes this possibly one of the most versatile dental instruments you'll ever own. SmartLite® Pro. **Designed to perform.**

R8999
incl. VAT

Dentsply Sirona South Africa
Building 11a, Lower Ground Floor, The Woodlands
Woodlands Drive, Woodmead, Sandton, 2191
Tel: 0860 444 330 **www.dentsplysirona.com**

T&C's apply. Only valid until 30 April 2020.