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The Dental Probe

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DENTAL ASSOCIATION OF MALTA
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Editorial

By Dr David Muscat

Dear colleagues,

The DAM Mediterranean Dental Conference was held on 27/28 September at the Hilton and was a resounding success. We also had gala reception on the 28 September at The Quarterdeck bar.

The lecturers included:

- Dr Subir Banerji from Kings London
- Dr Apollonius Allen Facial and reconstructive surgeon Ark Academy UK
- Dr, Matthias Mahring Dental materials specialist Oldenberg University Germany;
- Dr David Andrew Maxillofacial radiologist Sheffield University
- Dr Simon Atkins specialist oral surgeon Sheffield University
- Dr Jonas Lorenz Maxilllofacial surgeon Goethe University Frankfurt
- Dr Minas Leventis Oral surgeon Athens University .
- Dr Rebecca Komische a dental practitioner from Germany gave a presentation on Orthodontic aligners.

Sponsors included:

PLATINUM

- Bart Enterprises Ltd
- Marletta Enterprises
- Page Technology
- MOI (Masters in Oral Implantology, Frankfurt)

SILVER

- Chemimart
- Cherubino
- Metropolis Ltd(Perioaid)
- Collis Williams (Sunstar Gum)
- A and M Mangion(Keral)
- GSK
- ProHealth (Kin)
- Suratek
- Bryant Dental

BRONZE

- Oral B
- Perfecta

This event took a lot of time and effort on the part of the committee. Dr Noel Manche and Dr Nik Dougall spearheaded the event.

We recently had a very good lecture in St Julian's on Dental Lasers organised by Bart Enterprises and this is written up in this issue.

An ITI study group entitled 'Finding success and Avoiding Complications' by Professor Dean Morton was held at Palazzo Castelletti in conjunction with Bart Enterprises Ltd.

Recently another was held at the same venue with the same sponsor and this was a lecture entitled 'Bone Augmentation in conjunction with implant treatment' by Dr Peter Nilsson. These events are co-ordinated by Dr Edward Sammut.

Between 17–19 October there is an Invisalign course in Athens in conjunction with Page Technology. Between 21–23 October there is a hands-on Ivoclair Vivadent course organised in Lichenstien in conjunction with Bart Enterprises Ltd.

A Straumann course was also held in Portugal in early October and several Maltese dentists attended.

On 30 October there is the annual 'Smile For Health' conference organised by the Department of Health.

We hope to see most of you at the DAM Christmas party on 21 December so please keep that date free.

The cover photo is entitled "Apple's Eye" by Dr Josef Awad.

Best regards,

David

Dr David Muscat B.D.S. (LON)
Editor / Secretary, P.R.O. D.A.M.

The Mediterranean Dental Conference held at the Hilton

27–28 September, 2019

More photos on page 22

The committee of the Dental Association of Malta at the Mediterranean Dental Conference

LASERS IN DENTISTRY

A SUMMARY OF THE PRESENTATION BY MR DAVID JARMAN

Sales Synergy and Product Management Leader,
Dentsply Sirona in conjunction with Bart Enterprises Ltd.
At Le Meridien, St Julian's on 24th July 2019.
Summarised by Dr David Muscat.

A laser is light amplification by stimulated emission. There are three modes: continuous, chopped and peak pulse.

Laser interactions with tissue involve transmsission, dispersion, absorption and reflection.

Lasers may be used for

- Disruption (destruction of cells due to plasma leakage)
- Ablation (removal,smoothing)
- Vaporisation (evaporation)
- Coagulation (hemostasis)
- Photodynamics (photochemical)
- Biostimulation (acceleration of metabolic processes)

Lasers are differentiated by their active medium. Dental soft lasers are used for biostimulation.

Continues on page 6.

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Dental hard lasers are used on dental hard substances, soft tissue, and bacterial reduction in endo and perio.

Other applications are cysts,incisions, abscesses,gingivectomy,operculectomy,epulis and gingival troughing.)

Lasers used in dentistry have a wavelength range between 200nM (UV range) and 10,600nM (IR range).

The Laser endo light when used results in a better prognosis if root gangrene is removed with it.

With laser applications one is more precise. There is less damage to the adjacent tissue when compared to electrosurgery. Lasers are use for hemostasis. With the Sirolaser Blue one may cut without contact.

One may achieve uncomplicated wound healing and scar free healing – no sutures. It is rare to have post op pain and swelling.

Lasers are also used as pain therapy for herpes and aphthous ulcers. No anaesthetic is needed.

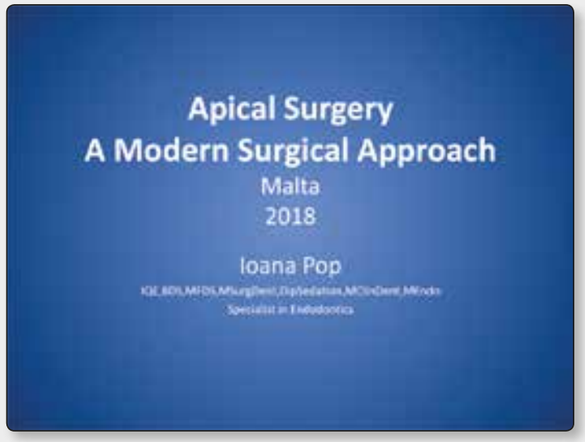
One achieves immediate pain relief and there is improved wound healing.

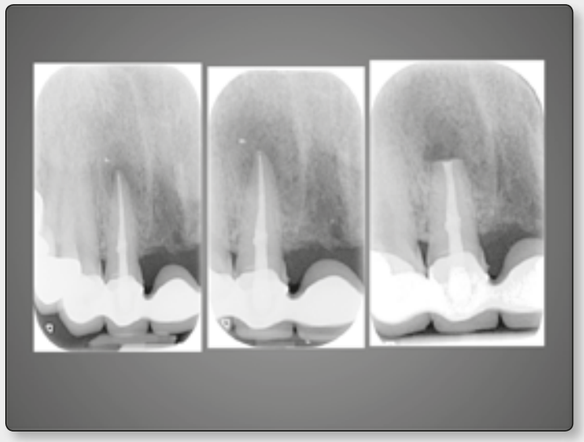
Photobiomodulation (PBM)- the principle is to use a 660nM wavelength. This causes an absorption peak in cytochrome c oxidase (CCO) which is mainly responsible for the reactions of the cell to the laser penetration.

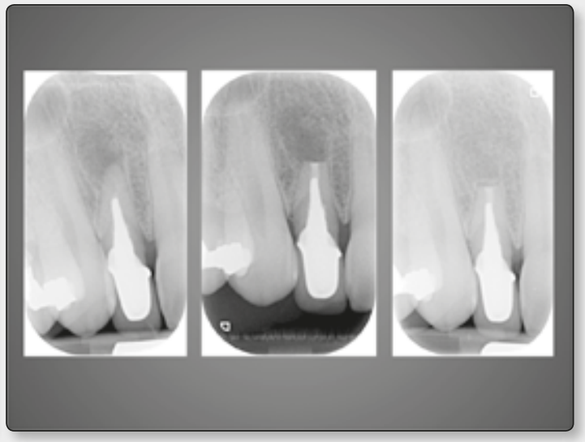
The indications of PBM are controlling inflammation, managing oedema, enhancing tissue repair, reducing pain and enhancing tissue and muscle performance.

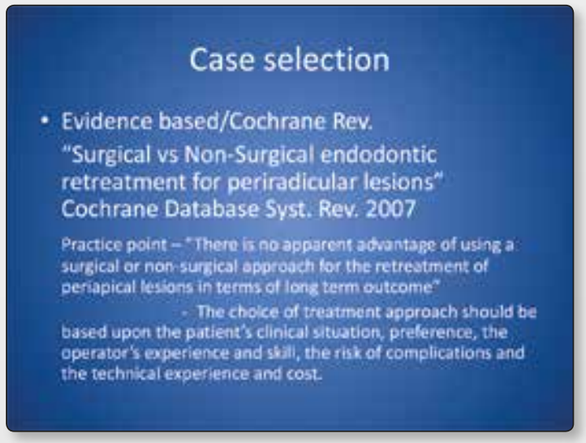
APICAL SURGERY
A MODERN SURGICAL APPROACH

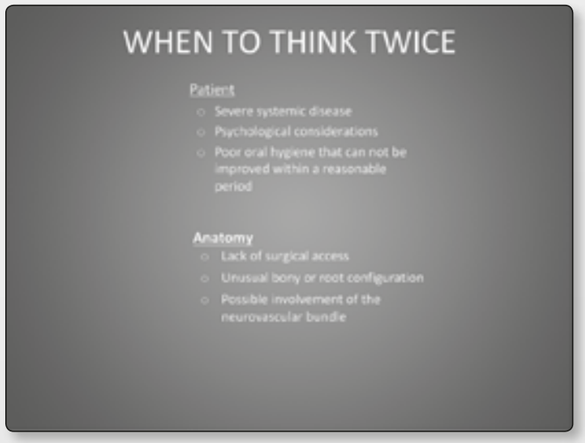
By Ioana Pop
IQE,BDS,MFDS,MSurgDent, DipSedation,MClinDent,MEndo
Specialist in Endodontics

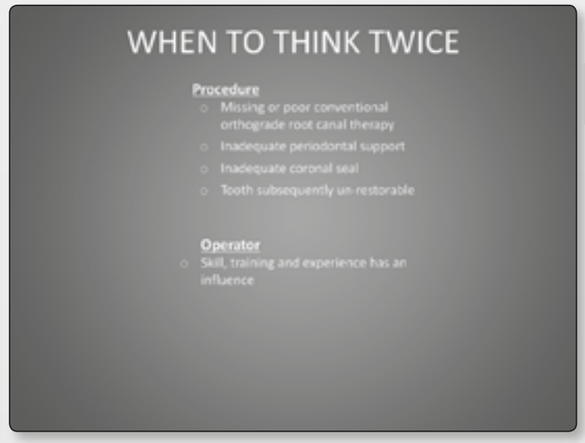


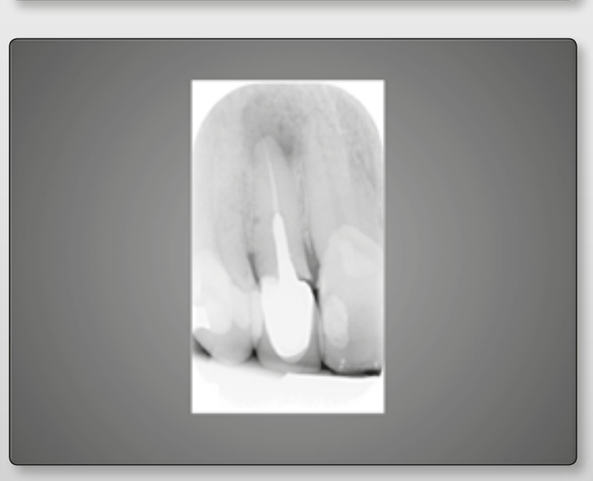












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APICAL SURGERY
A MODERN SURGICAL APPROACH

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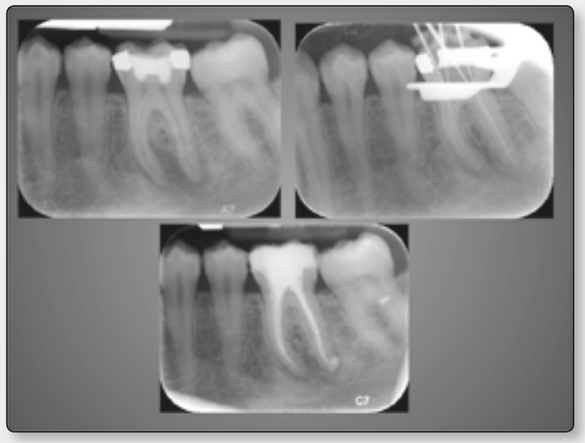

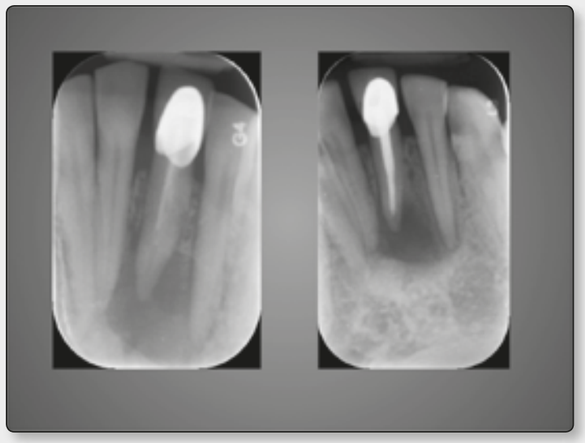

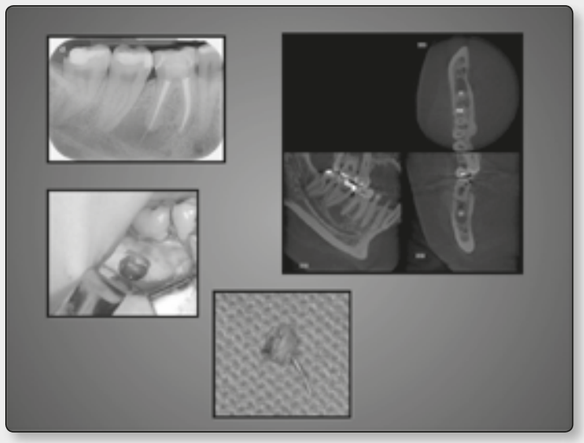

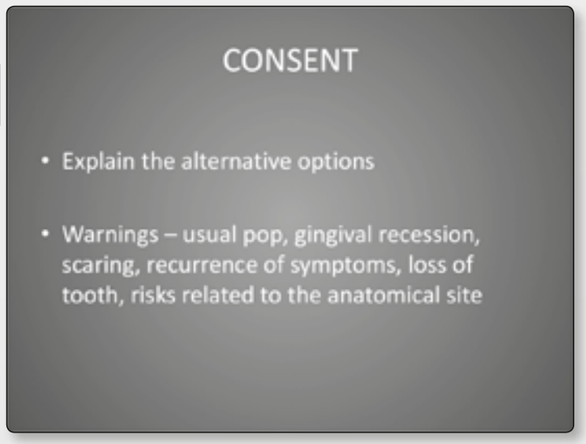

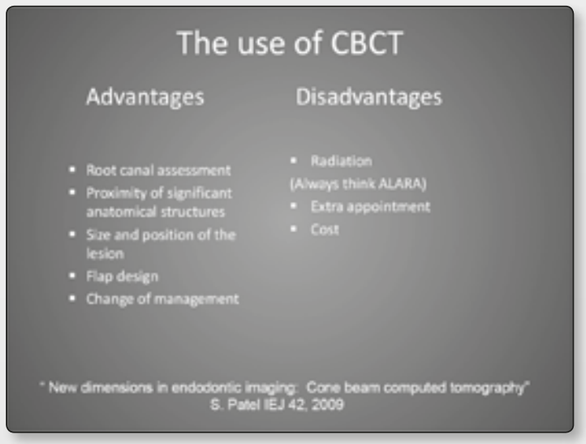

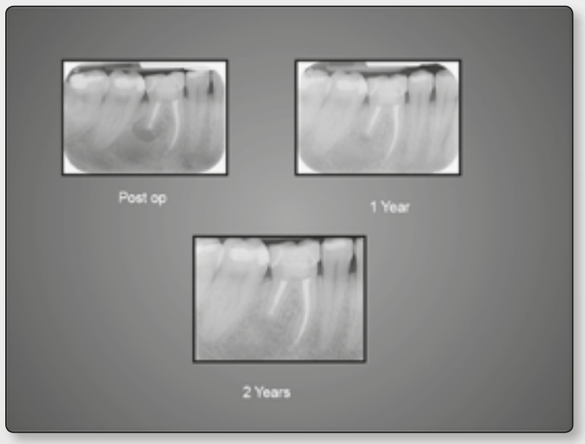

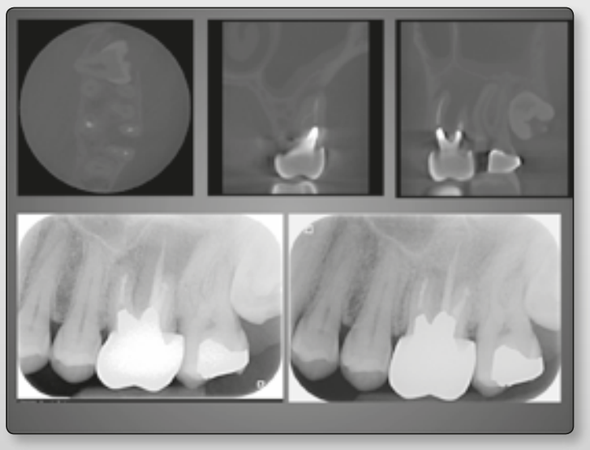

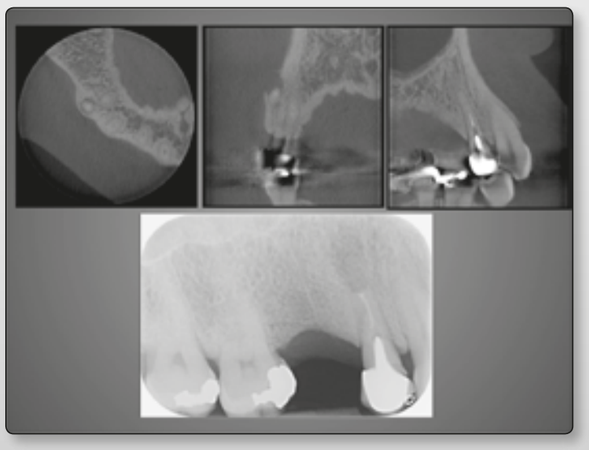

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APICAL SURGERY
A MODERN SURGICAL APPROACH

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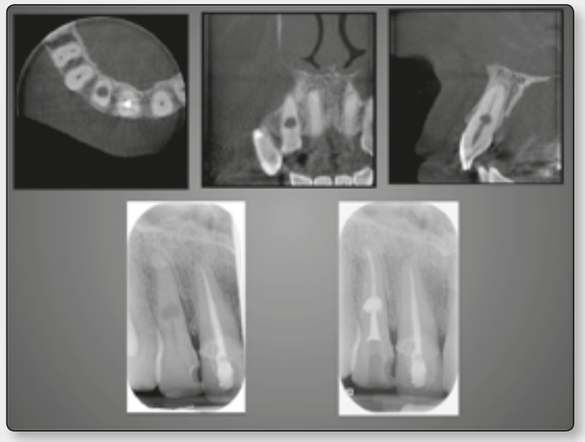


SURGICAL PROCEDURE

- SOFT TISSUE MANAGEMENT
- HARD TISSUE MANAGEMENT
- ARMAMENTARIUM
- MAGNIFICATION
- RETROGRADE FILLING MATERIALS

SURGICAL PROCEDURE

"An approximate 60% success rate has been reported (Friedman 1998) when root-end resection was traditionally performed with a bevel of 45' to allow visualization of the main canal, followed by a root-end cavity preparation with a round bur.

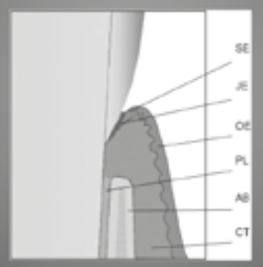
IEJ, 41, 469-475, 2008

SURGICAL PROCEDURE

"With the introduction of the intraoral microscope, root-end resection at 90' and apical preparation using an ultrasonic retro tip to the depth of 3 to 4 mm, this allowed success rate of over 90%(Tsessis et al. 2006)"

IEJ, 41, 469-475, 2008

SOFT TISSUE MANAGEMENT



SOFT TISSUE MANAGEMENT

Anatomy

- oral epithelium extends from the mucogingival junction to the tip of the gingival crest.
- The sulcular epithelium is located between the gingival crest and the most coronal portion of the junctional epithelium.
- The junctional epithelium extends from the base of the gingival sulcus to a level approximately 2 mm coronal from the alveolar bony crest.

In a healthy situation without attachment loss, the junctional epithelium reaches the cemento-enamel junction. The junctional epithelium is closely adapted to the tooth surface to fulfil sealing and attachment functions.

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APICAL SURGERY
A MODERN SURGICAL APPROACH

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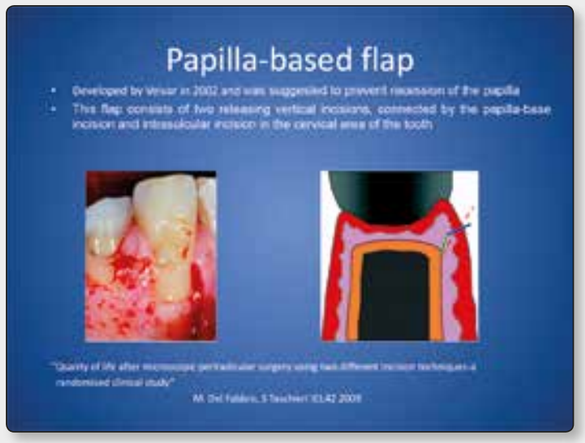

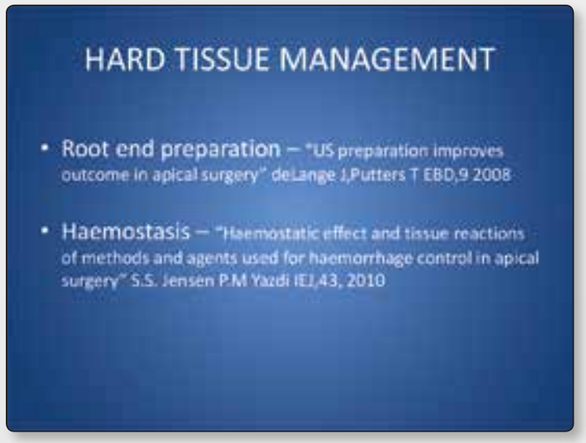

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APICAL SURGERY
A MODERN SURGICAL APPROACH

Continues from page 14.

Magnification

Does Microscope Use Improve Treatment or Success? I use one! Maybe

- The surgical field can be inspected at high magnification so that small but important anatomical details, like the extra apex or lateral canals, can be identified and managed.
- The integrity of the root can be examined with great precision for fractures, perforations, or other signs of damage.
- Removal of diseased tissues is precise and complete.
- Distinction between the bone and root tip can easily be made at high magnification.
- At higher magnification the osteotomy can be made smaller and this results in faster healing and less postoperative discomfort.
- Surgical techniques can be evaluated.

Pecora G, Andreana S. Use of dental operating microscope in endodontic surgery. Oral Surg Oral Med Oral Pathol 1993;75:751– 8.

RUBINSTEIN, R. (2005). Magnification and illumination in apical surgery. Endodontic Topics, 11: 56–77.

Retrograde filling materials

- Amalgam – disadvantages
- MTA
- IRM/EBA
- GIC, Composite resins, Compomers, Diaket

"Randomized clinical trial of root-end resection followed by root-end filling with MTA or smoothing of the orthograde GP root filling" R Christiansen,L L Kirkevang IEJ 42, 2009

" Root-end filling materials: rationale and tissue response" Endodnontic topics 2005, 11, 114-130

Guided tissue/bone regeneration

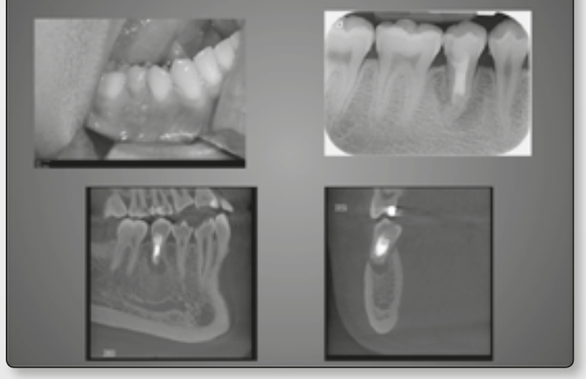
In cases with large periapical lesions and damaged periosteum, the ingress of soft tissues into the cavity post-operatively can lead to suboptimal healing.

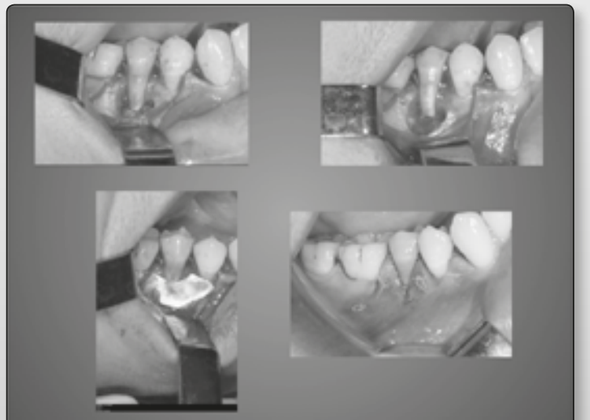
In order to prevent this, a membrane can be used to cover the defect and provide support for the overlying mucoperiosteal flap.

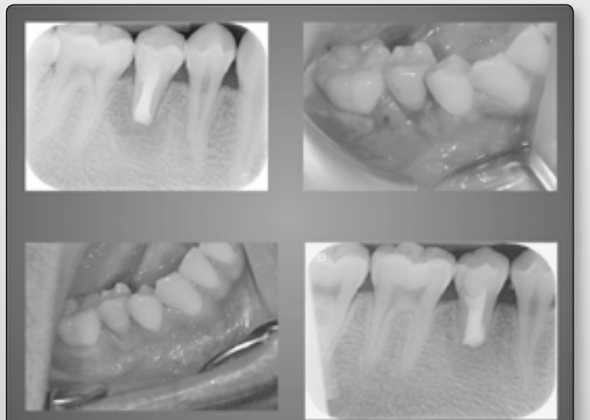
Indications – Through and through lesions
- Apico-marginal lesions
- Improve the site of a future implant?

Taschiery – "International Journal of Periodontology and Restorative Dentistry" - June 2008 - for the through and through lesions the outcome is significantly better with GTR
- "Journal of Oral and Maxillofacial Surgery" – June 2007 – GTR+ bone substitute = no significant difference in outcome for lesions > 10mm

Guided tissue regeneration







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APICAL SURGERY
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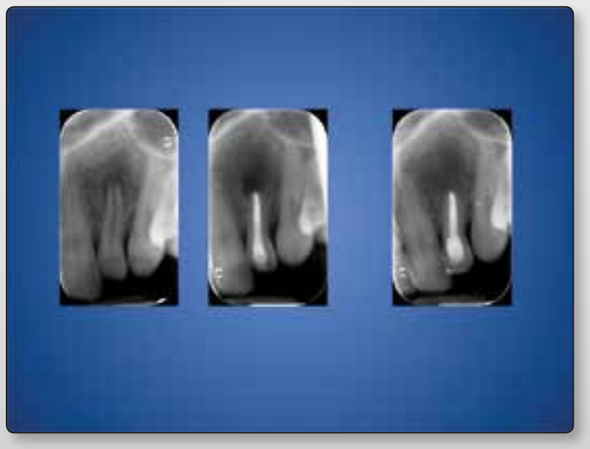

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APICAL SURGERY
A MODERN SURGICAL APPROACH

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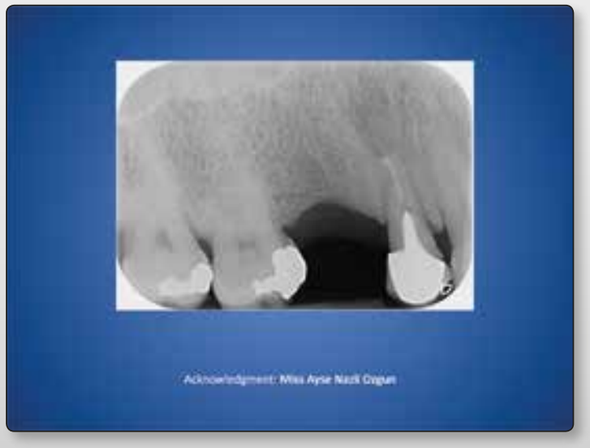

PAYMENT FORM

Please cut out this section and send with a cheque for 50 euro payable to **Dental Association of Malta** for your 2020 DAM membership – the best 50 euro investment ever!

TO:

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The Dental Association Of Malta,
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_____

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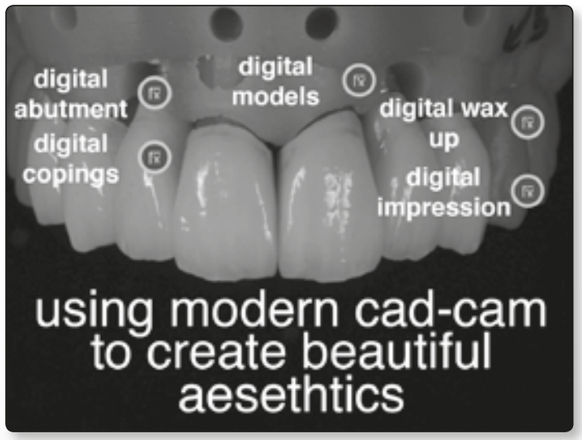
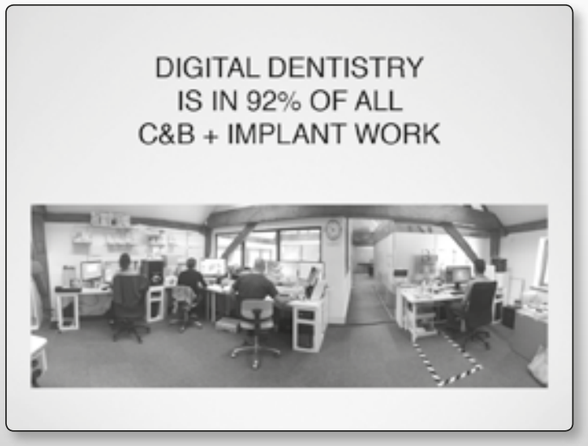
The Mediterranean Dental Conference at Hilton, Malta

27–28 September, 2019

APPLYING DIGITAL DENTISTRY TO THE PATIENT'S JOURNEY (PART 2)

Mr Matt Perkins BDS MSc MClinDent MFD RCSI FDS RCSEd
Specialist in Periodontics, ITI Fellow





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PROFESSIONAL INDEMNITY COVER IS NOT ENOUGH

In today's world a Professional Indemnity Policy for professionals is a must, however in the overall business risk spectrum is this enough?

In the real world as we all know, things do happen and one of the worst scenarios one can face in life is when your own health or life or that of your loved ones is threatened by serious illness or even death.

We do not need to go into the obvious grief one's family will go through in such an eventuality; however, one thing that many people fail to identify is the problem that arises vis-a-vis your business or practice when the worst happens.

In this regard, we would like this article to be a simple eye opener to consider safeguarding, your health, your livelihood and the standard of living of your dependants, in your absence.
Therefore, we invite you to contact us to discuss the various options available. Such covers can take the form of the following insurance products:

- **Life Assurance** – Protection cover including permanent Disability and Critical Illness.
- **Life Assurance and Savings/ Retirement**– Protection plus a savings element.
- **Health Insurance** – Covering private healthcare in Malta or abroad.
- **Personal Accident / Career Ending** – Protection plus limited income protection.

Everyone has a different attitude towards risk. Can we afford not to at least consider that there is always the possibility of adverse matters happening?

Contact MIB for a no obligation quotation on:
T. +356 234 33 234
E. info@mib.com.mt
or contact Tonio Borg using the details below.

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www.mib.com.mt

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APPLYING DIGITAL DENTISTRY TO THE PATIENT'S JOURNEY (PART 2)

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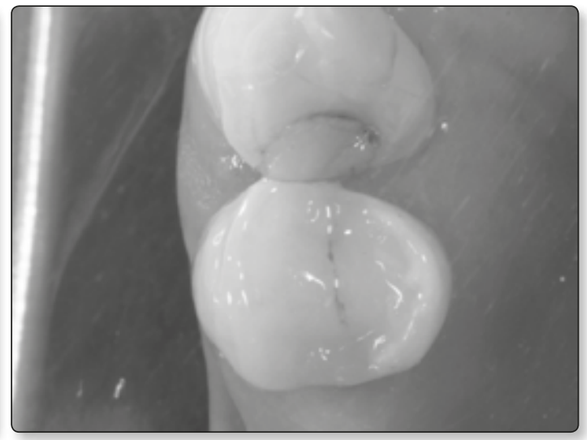

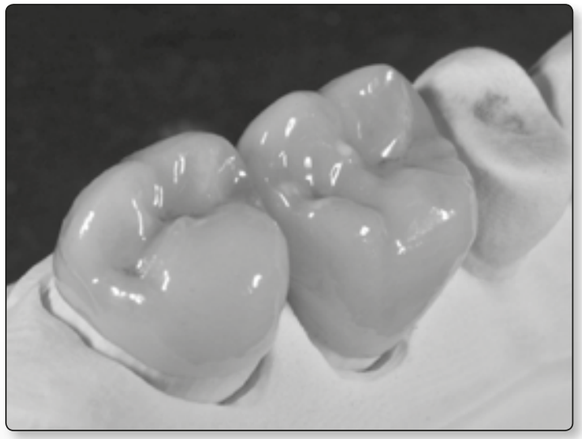

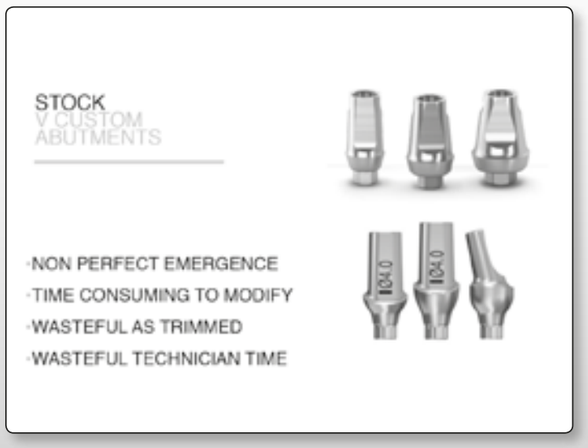

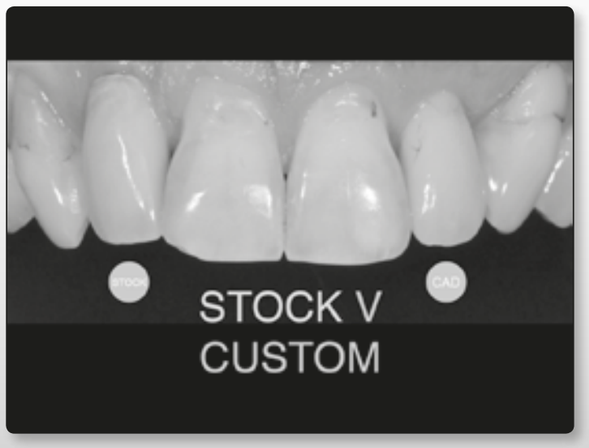

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APPLYING DIGITAL DENTISTRY TO THE PATIENT'S JOURNEY (PART 2)

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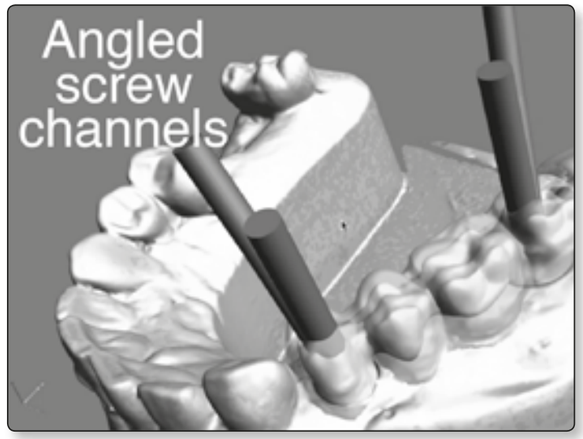

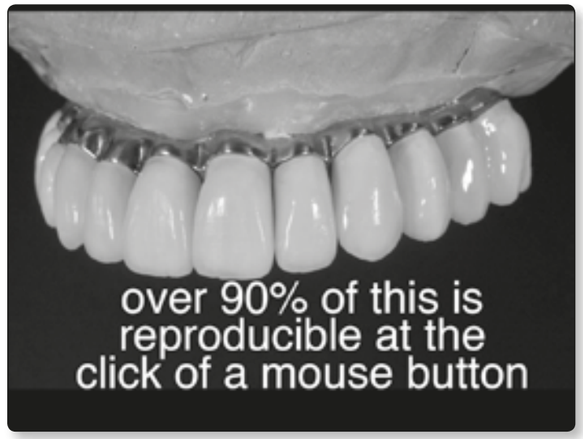

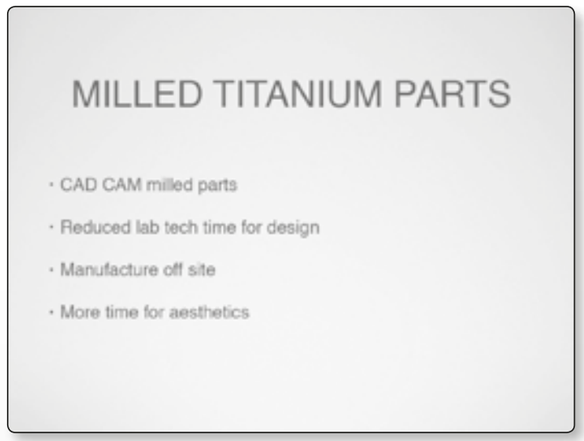

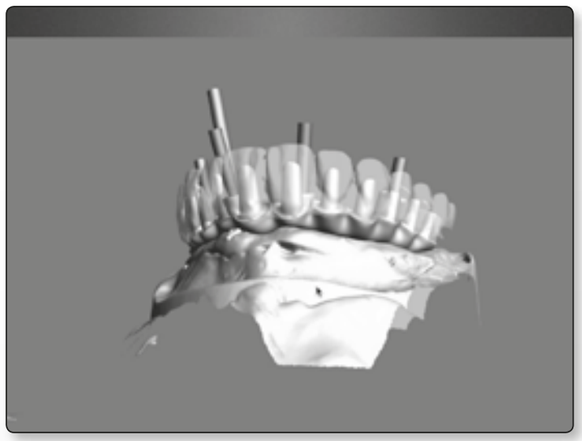

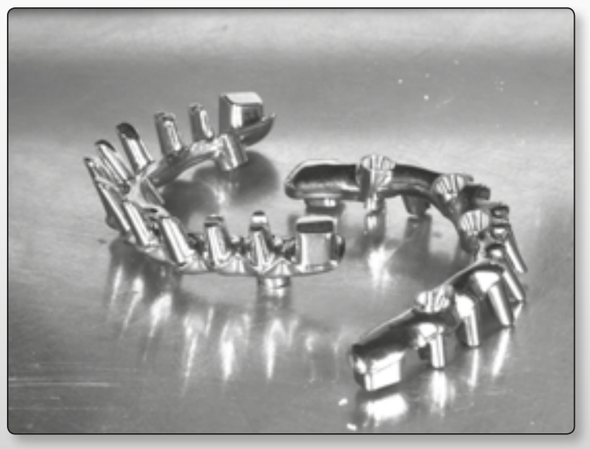

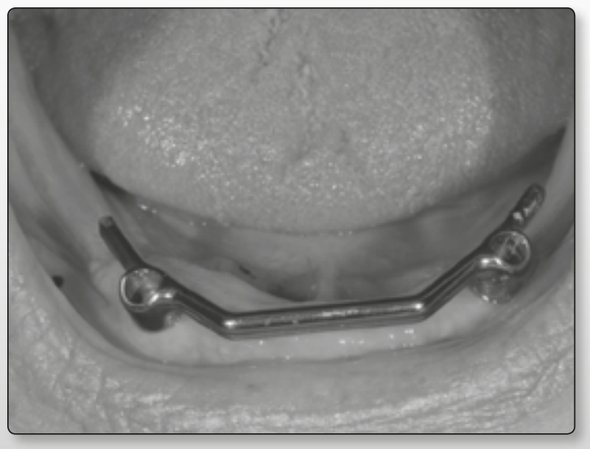

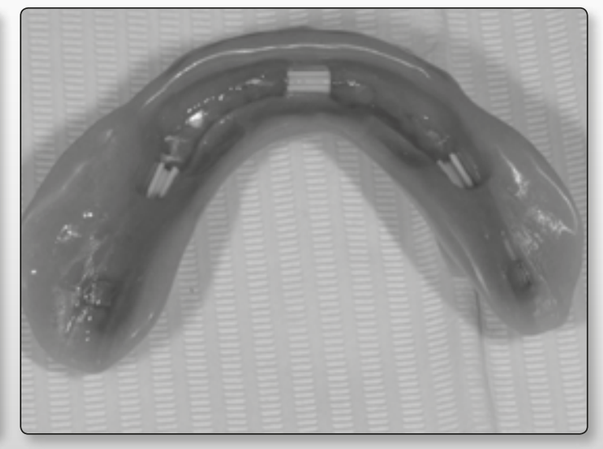

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APPLYING DIGITAL DENTISTRY TO THE PATIENT'S JOURNEY (PART 2)

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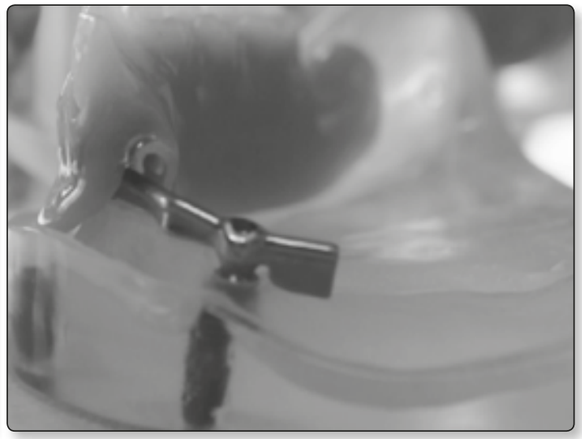

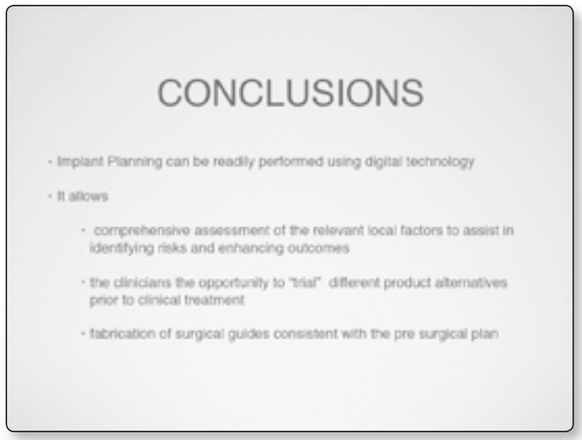

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MANAGEMENT OF A FAILED IMPLANT WITH A SELF-HARDENING BIOACTIVE SYNTHETIC BONE GRAFT

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ABSTRACT
This case report highlights the use of a bioactive in situ hardening synthetic resorbable bone substitute, composed of beta tri-calcium phosphate (β-TCP) and calcium sulfate (CS), for the minimally invasive treatment of a demanding case of a failed implant in the aesthetic zone.

A standardized staged approach and a digital implant planning with fully guided placement enabled the correct replacement of the implant and the simultaneous regeneration of vital bone and newly-formed thick keratinised soft tissues, thus minimizing the patient morbidity, complication risk, cost, length and complexity of the procedures; resulting to a successful outcome, regarding aesthetics and function.

CASE REPORT
A female patient, 38 years of age, presented with a wish to restore the soft tissue defect buccally to her implant 11. According to the patient, due to trauma 10 years ago, she lost both her upper central incisors, which were replaced at that time with 2 Xive S Plus implants (Dentsply, Mannheim, Germany) – both 5.5mm in diameter and 9.5 mm in length – and separate implant crowns.

Clinical examination revealed a soft tissue dehiscence with exposure of the labial mesial and apical threads of the implant 11 (Fig. 1). There was no clinical mobility of the implant nor other signs or symptoms. Regarding the adjacent implant 21 there were no clinical problems associated. The initial CBCT scan showed significant bone loss, with complete bone loss at the buccal aspect of the implant 11 (Fig. 2). The same radiological findings were also observed for implant 21.

The diagnosis was that the implant 11 was not salvageable, and implant 21 had a poor prognosis. It was decided to treat firstly only the failed implant 11, as removal of both implants 11 and 21 at the same time would result in severe collapse of the area, that would be very difficult to restore. The treatment plan consisted of removal of implant 11, placement of a new implant 6 weeks post-op with simultaneous bone augmentation according to the Fairbairn and Leventis (2015) published protocol [1], and loading of the implant 12 weeks post-op with the final restoration.

Under local anesthesia, the non-salvageable implant 11 was "atraumatically" removed without raising a flap.

Firstly, the screw-retained crown was removed (Fig. 3) and the implant was easily mobilised and removed using the implant driver and the ratchet in an anti-clockwise direction (Fig. 4). Then, the site was thoroughly curetted and debrided of any soft tissues with the use of Lucas hand bone curettes and degranulation burs (Ethoss EK Strauss Degranulation Bur Kit, Ethoss Regeneration Ltd, Silsden, UK), followed by rinsing with sterile saline.

After completion of the procedure, a severe buccal hard and soft tissue defect was evident (Fig. 5). The patient used an acrylic partial denture as a provisional prosthesis during the whole healing period, without applying any pressure on the surgical site.

The site was left to heal spontaneously under secondary intention. After 6 weeks, the area was free of any inflammation and uneventfully covered by newly-formed soft tissues (Fig. 6). A new CBCT scan and digital impressions were taken and a digital workflow was carried out by Paltop Digital Solutions using the Implant Studio software (3Shape, Copenhagen, Denmark) in order to identify the ideal size of implant and its precise 3D positioning (Fig. 7).

According to the digital plan a surgical guide was 3D printed. Under local anesthesia, a site-specific, papilla-sparing, full-thickness flap was designed, as described by Greenstein and Tarnow in 2014 [2] and carefully raised, revealing a large 3-wall bony defect with completely missing buccal plate (Fig. 8).

The site was then debrided from all soft tissues; the surgical guide was fitted and all the drilling steps were carried out in a fully-guided manner (Fig. 9). A 3.75x11.5 tapered implant (Paltop Advanced Plus, Paltop Dental Solutions Ltd, Israel) was placed in the planned 3D position (Fig. 10).

After placing the cover screw, the site was grafted (Fig. 11) utilizing a self-hardening resorbable synthetic bone grafting material (EthOss, Ethoss Regeneration Ltd, Silsden, UK), consisting of β-TCP (65%) and CS (35%), as described by the authors in previous publications [1,3,4]. No barrier membranes were used.

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Fig. 1: Initial situation of the failing implant 11. Note the buccal soft and hard tissue defect, leading to the exposure of the implant threads.

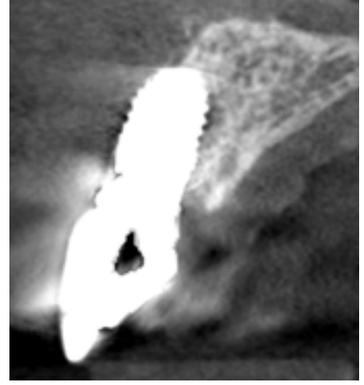


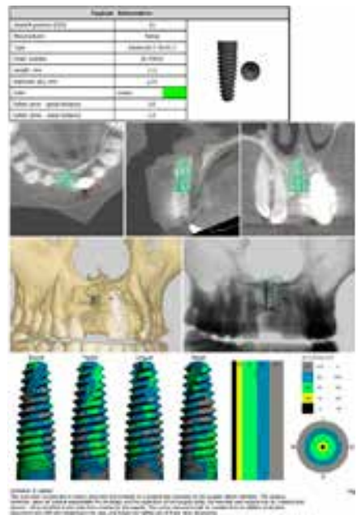
Fig. 2: Initial CBCT. The wide diameter (5.5mm) and the wrong positioning of the implant in the upper central incisor area contributed to the loss of the buccal hard and soft tissues.

Top – Fig. 3: Clinical view after removing the screw-retained implant crown.

Right – Fig. 4: "Atraumatic" removal of the failed implant using the implant driver in an anti-clockwise direction.

Far right – Fig. 5: The site immediately after removal of the implant, presenting a severe lack of soft and hard tissues buccally.

Top – Fig. 6: Secondary intention healing for 6 weeks to allow the body create new soft tissues.



Right – Fig. 7: Digital planning of the case. A 3.75x11.5 implant was selected, and the optimal positioning was digitally planned.

Far right – Fig. 8: Site specific, papillae sparing flap raised, revealing the bone defect.

Fig. 9: The surgical guided fitted on the adjacent teeth and a fully-guided osteotomy was carried out using the dedicated NSK handpiece (Nakanishi Inc., Tokyo, Japan).

Fig. 10: Fully-guided accurate 3D placement of the implant.

MANAGEMENT OF A FAILED IMPLANT WITH A SELF-HARDENING BIOACTIVE SYNTHETIC BONE GRAFT

Continues from page 35.

The flap was repositioned and sutured without tension with 5-0 monofilament sutures (Fig. 12) and a periapical x-ray was taken (Fig. 13). Antibiotic therapy consisting of 500mg amoxicillin every 8 hours for 5 days and mouth rinsing with oxygen-releasing mouthwash (blue®m, Zwolle, Netherlands) every 8 hours for 10 days were prescribed. The sutures were removed one week post-op (Fig. 14).

After 12 weeks, the healing was uneventful (Fig. 15). A periapical x-ray showed excellent osseointegration of the implant and consolidation of the grafting material (Fig. 16). A linear crestal incision was made to access and remove the cover screw, and the secondary stability of the implant was measured by resonance frequency analysis (PenguinRFA, Integration Diagnostics Sweden AB, Göteborg, Sweden).

An ISQ-value (Implant Stability Quotient) of 75 was recorded, demonstrating high stability. A healing abutment was placed, and after allowing the soft tissues to mature for 2 weeks (Fig. 17), an open-tray impression was taken and the final screw-retained crown was fitted resulting to a successful outcome, regarding aesthetics and function (Figs. 18 and 19).

At follow-up 1 year post-operative, the architecture and the volume of the site had been successfully restored and the ridge buccally was covered by thick regenerated keratinized soft tissues (Fig. 20). A CBCT at this point showed that the buccal bone was successfully regenerated (Fig. 21).

DISCUSSION

In the presented case, a simplified staged approach was designed and followed in order to replace the failed implant and to reconstruct the missing hard and soft tissues in a minimally invasive, safe and successful way. The first step consisted just in simple non-surgical removal of the failed implant without performing any kind of soft and/or hard tissue augmentation, in order to allow the area to heal spontaneously for the next 6 weeks.

This initial healing period was of great clinical importance as it enabled the host to regenerate new soft tissues that covered the buccal dehiscence as well as the crestal area of the site, while allowing at the same period of time the immune system to remove any remnants of local infection.

In this way, there were enough volume of soft tissues during the second step of the treatment to cover the placed new implant and the graft, without the need to advance the flap or use additional soft tissue grafting, which would increase the morbidity, length, complexity and cost of the procedure.

The hard tissue reconstruction was achieved utilizing a synthetic fully resorbable grafting material (EthOss) which consists of β-TCP (65%) and CS (35%). As shown in preclinical and clinical studies conducted and published by the authors [1,3-8], as well as documented in thousands of similar cases of failing teeth that are treated according to the published protocol [1], such biomaterials can accelerate and enhance the regeneration of high quality vital bone around placed implants in such localized osseous defects, without the need of using additional barrier membranes.

The bioactive β-TCP element, apart from being osteoconductive, shows an osteoinductive potential which might further improve the bone healing process [9-11], while the CS element is bacteriostatic and produces an in situ self-hardening scaffold that doesn't need additional stabilization with the use of collagen membranes or other meshes. In this way, the CS acts as an "integrated barrier membrane", halting the ingrowth of soft tissue during the early phases of bone regeneration.

Both CS and β-TCP are fully resorbable biomaterials, having an appropriate resorption time in relation to bone formation [5,6], leading to the fast regeneration of vital host bone without the long-term presence of residual graft particles. The CS element will resorb over a 3-6-week period, thus increasing the porosity in the β-TCP scaffold for improved vascular ingrowth and angiogenesis, while the β-TCP element resorbs by hydrolysis and enzymatic and phagocytic processes, usually over a period of 9-16 months [12-16].

In the presented case, virtual dental implant planning allowed not only for a prosthetically driven approach, but also for the selection of the appropriate implant diameter and its precise positioning into the bony envelope, which are fundamental parameters for the successful reconstruction of the missing bone buccally [17,18]. In this case, the wrong positioning of the failed implant, and its wide diameter seem to be the most important factors that resulted in the severe biological and aesthetic complications of the initial treatment 10 years ago.

Continues on page 38.

Far left – Fig. 11: The area was grafted with 0.5cc β-TCP/CS (EthOss). No membranes were used.

Left – Fig. 12: Periapical x-ray immediately post-op.

Top – Fig. 13: Repositioning of the mucoperiosteal flap and suturing with 5-0 monofilament sutures.

Top – Fig. 14: Uneventful healing of the site one week post-op.

Above – Fig. 15: Clinical view 12 weeks post-op. The architecture of the area has been successfully restored. Note the zone of thick keratinised soft tissues that have been regenerated by the host to cover the reconstructed high quality bone around the implant.

Fig. 16: Periapical x-ray 12 weeks post-op.

Top – Fig. 17: Two weeks after uncovering the implant.

Above – Fig. 18: Final result.

Left – Fig. 19: Periapical x-ray after fitting the screw-retained implant crown. The grafting material is turning over, being replaced by the regenerated bone.

Top – Fig. 20: Clinical view 1 year post-op revealing a stable outcome and further maturation and adaptation of the soft tissues.

MANAGEMENT OF A FAILED IMPLANT WITH A SELF-HARDENING BIOACTIVE SYNTHETIC BONE GRAFT

Continues from page 36.

In conclusion, this case highlights the benefits of early implant placement with simultaneous bone augmentation for the management not only of extraction sites, but also for the treatment of more demanding cases of failing implants with soft and hard tissue deficiencies.

The specific selection of materials and methodology, which is routine practice for the authors, enabled the minimally invasive, safe, cost-effective and successful regeneration of the soft and hard tissues in the presented case, without the need of utilizing soft tissue grafting and barrier membranes.

Although a resorbable biphasic β-TCP/CS graft was used for bone regeneration, the architecture and dimensions of the ridge were preserved one year after loading of the new implant. The loading of the implant 12 weeks after placement, which enhanced the metabolic activity and triggered the remodeling of the surrounding regenerated vital bone.

This biological activation of the reconstructed high quality vital bone seems to be a key factor for long-term site volume stability, which in turn provides the stable healthy bony scaffold over which the new soft tissues will further mature and thicken, as documented, published and observed in these treatment scenarios by the authors.

Fig. 21: CBCT 1 year post-op showing the regeneration of the buccal bone.

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