Dear colleagues,

It has been an eventful year. The DAM has been ably led this year by Dr David Vella supported by an efficient Committee.

The DAM has organised the conference of the Council of European Dentists in Malta for the first time. This year the International Periodontology conference as well as the conference on Gerodontontology were held in Malta.

At the time of writing we are looking forward to the Annual Smile for Health conference. Various dental companies as well as the ITI and Nobel study groups, the University of Malta and Ludes Universities organise lectures and events on a regular basis.

The DAM Christmas party is to be held at the Villa Le Meridien Hotel St Julian’s on Friday 8 December.

The DAM is currently involved in several issues such as Dental Clinic standards, Numerous Clausus, Dental Specialist lists; proportionality, dental technologists and advertising, amongst others and we will keep you informed and updated and if necessary call an EGM so you can voice your opinion.

The cover photo is ‘St Pauls Islands’ a photograph by Dr Clifford Camilleri, another of our Association’s talented photographers.

To send an article to the editor please send on editor@dam.com.mt

Best regards,

David

Dr David Muscat B.D.S. (LON)
Editor / Secretary, P.R.O. D.A.M.
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MEDICATION RELATED OSTEONECROSIS OF THE JAW/MRONJ
Stephanie Sammut, Consultant in Oral Surgery

Learning Objectives
- To understand the risk factors for MRONJ
- To review the clinical signs and symptoms of MRONJ
- To review the pathophysiology for MRONJ
- To consider management strategies for patients on anti-resorptive medications
- To review treatment options for patients with MRONJ

Anti-resorptive drugs
- Bisphosphonate: Oral and IV
- Anti-angiogenic drugs - e.g. bevacizumab and sunitinib
- RANKL inhibition - Denosumab

MRONJ – AAOMS Definition
Exposed or necrotic bone or bone that can be probed through intact extra-parotid tissue in the maxilla or mandible which lasts for more than 8 weeks
- In a patient with concurrent bisphosphonate treatment with anti-resorptive drugs and no history of radiation therapy to the jaws or obvious metastatic disease to jaws

Bisphosphonate Drugs
- Used in management of metabolic and malignant bone disease
- Oral and intravenous forms
- Nitrogen/hydrogen containing
- Reduce bone pain, improve quality of life and delay pathological fractures
- Bind to hydroxyapatite in bone and remain in bone for a long time even after cessation of treatment

Continues on page 6.
Curasept ADS® – The System combining mouthwash and toothpaste in case of Periodontitis.

- Full effect
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Help keep your patients on a journey to healthy gums

At least **50%** of adults suffer from gingivitis globally, but **2 out of 3** take no action.

Periodontal disease impacts daily life

Patient insight research shows that gingivitis can have a negative impact on daily life causing anxiety, embarrassment and affecting social life, especially when symptoms become noticeable to others.

parodontax® toothpaste helps to free patients from the wider effects of gingivitis.

After 30 days, patients reported:

- **Less anxiety**: 2 out of 3 patients no longer worried about their gum health.
- **Better social life**: 2 out of 3 patients no longer avoided social situations.
- **Greater confidence**: 2 out of 3 patients were more confident.

Treat and Maintain

In addition to good oral hygiene and professional advice, patients with, or susceptible to gingivitis may benefit from the addition of parodontax® for their optimum gum health.

**4X greater plaque removal**

**48% greater reduction in bleeding gums**

Recommend parodontax® toothpaste to help patients maintain their optimal gum health between dental visits.
MEDICATION RELATED OSTEONECROSIS OF THE JAW / MRONJ

Prevention
- Prevent dental disease / Education
- Consider alternative dental therapy
- Chlorhexidine mouthwash
- Probiotics, antibiotics, no evidence
- Drug holiday – Denosumab
- *Atraumatic* surgery

Risk Assessment
- Environmental Factors
  - Reason for therapy
  - Duration of therapy
  - Relative potency of drug
  - Other concurrent medication
  - Stanozol
  - Antifungal + xiph
  - Dental-oral surgery
  - Patient factors: age, diabetes, obesity etc.

Duration of drug therapy
- Drug Holiday
  - Drug persist in skeletal tissue for years
  - No evidence that risk of MRONJ will be reduced
  - Previous treatment with anti-resorptive/antiangiogenic drugs
  - Bisphosphonates remain in body
  - Allocate patients to risk group as if they are still taking drugs
  - Denosumab – 9 months

Dentoalveolar surgery
- "procedures which impact on bone"
- 60% of MRONJ cases follow an extraction
- However, MRONJ can be spontaneous
- Or be the result of mucosal trauma
- Incidence of MRONJ following extractions
  - 2.3% in cancer patients
  - 0.15% in osteoporosis patients
  - Implant fit!

Risk Assessment
- Genetic Markers
  - Biochemical turnover markers

Biomarkers: C-terminal telopeptide (CTX)
- Breakdown product of collagen Type I
- Considered a surrogate marker of bone turnover
- CTX level in the blood serum’s proportional to the degree of osteoclastic resorption
- Level of morning fasting serum CTX – risk indicator of developing BONJ
- CTX Values:
  - Healthy patient: between 100 and 300 ng/ml
  - Increased in MRONJ: > 1,000 ng/ml
  - CTX values improve following a 6-month drug holiday.

Patients on established anti-resorptive regime
- HIGH RISK
  - Cancer patients
  - Treatment of osteoporosis with a bisphosphonate or RANKL inhibitor for more than 3 years
  - Treatment of osteoporosis with a bisphosphonate or RANKL inhibitor for more than 5 years
  - Concave defects
  - Previous diagnosis with MRONJ

- LOW RISK
  - Concave defects
  - Treatment of osteoporosis with a bisphosphonate or RANKL inhibitor for less than 3 years
  - Treatment of osteoporosis with a bisphosphonate or RANKL inhibitor for less than 5 years
  - Previous diagnosis with MRONJ

Initial management of patients at-risk of MRONJ
- Don’t be afraid to treat these patients
- Ideally assess patients BEFORE they start drug therapy
- Prevention
- Get patient as dentally fit as feasible

Prevention
- Education – small risk of MRONJ
  - Preventative advice
  - Healthy diet/water, oral hygiene
  - Rinsed oropharynx
  - Preventable co-morbidities
  - Non-smoking
  - Oral hygiene
  - Atraumatic treatment
  - Regular recall to dentists
  - Seek help early – loose teeth, exposed bone, pus, parapharyngeal etc.

Management of patients on anti-resorptive therapy
- Patients about to start/recently started anti-resorptive therapy:
  - Prevention
  - Education
  - Oral advice
  - Nutrition and health + scaling, restorations, endo
  - Extract any teeth of hopeless prognosis without delay

Patients on established anti-resorptive regime
- HIGH RISK
  - Does the tooth really need to come out?
  - Can’t save it? Endo! Root stump?

- LOW RISK
  - Treat like a patient who is not on anti-resorptive therapy
  - Consider timing of extractions

Continues from page 9.

Continues on page 12.
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THE SMART BONE
2 DAY COURSE IBI

Lecture on Periodontology by Professor Giorgio Carusi, Specialist in Odontostomatologie. Summarised by Dr David Muscat.

TREATMENT OF SOFT TISSUES

The design and thickness of the flap is very important. How can one increase keratinised tissue to maintain a healthy flap during the healing process after a bone graft? You must decrease tension of the flap.

Do not touch the surface of the root and do not touch the subcrestal fibres if you do not have a perio problem. If you put the flap back in the original place you will get a long junctional epithelium. Cells will move along the wall of the flap until the position of the cementum. This is not a reattachment but a migration of epithelium. The epithelium needs vascularisation from the connective tissue. Cells migrate on the connective tissue flap. The name is wrong as it is not an attachment but an adhesion which can be opened like a zip by gram negative bacteria.

THICKNESS OF THE FLAP

1. **Total Thickness Flap**
   - A blade enters into the marginal sulcus, leaning on the bone crest and by an elevator we denude completely the bone surface. When we detach the periosteum from the bone, the periosteum loses its attachment for 12-14 days with the interruption of its vascularisation.

2. **Partial Thickness Flap**
   - Keep the periosteum and the part of the connective tissue on bone. We do not remove the cortical surface, with less resorption of bone. For the design we must keep the blade parallel to the bone surface. It is a more difficult procedure. There is a relaxing mesial incision.

To avoid a perforation of the flap at the level of the muco-gingival line from mucosa to keratinised gingiva. If you cut from keratinised gingival to mucoza you can perforate. You will cut muscle and elastic fibres. To move the flap you have to remove these fibres. If you go over the mucogingival line by 4-5 mm you can move the flap by 10mm. If you do a total thickness flap you can move 1mm.

It is important to move the flap without tension. If you leave tension, the flap opens and epithelium migrates along the wall of the flap - you get exposure of the flap, necrosis and failure.

RESORPTION

There is a relationship between the amount of connective tissue above the alveolar process and bone resorption. If you have thick connective tissue over bone we have resorption on the periosteal side. If we have thin connective tissue you have resorption on both the periosteal and periodontal side.

This is due to the thickness of the connective tissue. With thin tissue the resorption is large.

With a total thickness flap with 5 mm radicular bone exposition and apically repositioned flap of 5mm – you will get after 6-10 days resorption of bone of 5mm after 5-6 months you will get a loss of 2.5mm bone.

Continues on page 16.
With a partial thickness flap and 5mm of bone exposed and a flap apically, after 10 days you get 1.9mm of bone loss.

After 3-6 months you get 1.3mm of bone loss. (studies at Boston university 1974).

THE DOUBLE THICKNESS PALATAL FLAP
The deattachment of a partial thickness flap (primary flap) that will be positioned again and of a connective periodontal flap.

The incision of the primary partial thickness flap is exactly at probing depth. Reduction of the tissue step due to the thickness of the palatomucosa. The secondary flap is detached and taken away. This is connective tissue and can be used for the implant without a second operation.

THE BIOLOGICAL PROCESS OF HEALING
Biological principles are very important. Pay attention to the area between the first and third molar area where one finds the greater palatine artery. This is 15mm from the midline raphe.

The average palate-safe distance from CEJ is 12mm. In a shallow palate safe distance is 7mm. In a high palate distance 17mm.

BLADES USED
A beaver knife no 64 or 67. A round knife. Very small—three times smaller than average and the operator uses magnification.

It is preferable to eliminate the LJE completely if one gets recurrent peri-implant disease. It is rare, and some patients may prefer to have a stable LJE but the patient must have good OH.

POSITIONING OF THE FLAP
Do not remove supracrestal fibres on the buccal aspect. If these fibres are good you can put the flap back in its original position but use a double thickness flap. The palatal flap will be placed at the level of the bone crest so will thus be at a different level than the buccal aspect.

When the attachment apparatus is present one gets reattachment. When the attachment apparatus is not present you get a long junctional epithelium.

ORTHODONTIC TREATMENT WITH PERIODONTAL PATIENTS ONLY USE 20G OF FORCE. STRONG FORCES MAY EXTRACT TEETH. One needs to allow time for the periodontal ligament to absorb hyalisation.

SUPRACRESTAL FIBRES
It is a mistake to remove supracrestal fibres with root planning. There is no probing depth. With a partial thickness flap you maintain supracrestal fibres. With a full thickness flap you remove supracrestal fibres.

THE APCIALLY POSITIONED FLAP
You will get an exposition of the roots, hypersensitivity, caries and lengthening of the crown and recurrent periodontal disease. Hypersensitivity is the main problem and can be treated with MI varnish. A shallow sulcus is a result of an apically positioned flap. Supracrestal fibres have a small epithelial attachment. One uses a subperiosteal suture to keep the flap in position. The limitations are that there is not sufficient width of connective tissue bed. The advantage is a stable maintenance of the flap position. Materials — a half circle round section needle with a 5(nI) thread.

THE SUB PERIOSTEAL SUTURE
With the needle we penetrate the buccal flap 3-4 mm from the gingival margin and then go subperiosteal by piercing the peristome 3-4 mm from the bone crest, thus stabilising the flap exactly at the bone crest completely eliminating the pocket. You get a shallow sulcus bit not a long junctional epithelium.

BULLAEMIA
These patients induce vomiting and destroy their teeth. What is typical is a girl who has a conflict with her mother. Use an apically positioned flap of a partial thickness variety. Keep at the level of the crest. Reconstruct teeth with composite and use ceramic at a later stage.

HOW DO WE OBTAIN NEW ATTACHMENT

The conclusion of the study was ‘When there is periodontal disease only the migration of epithelial cells can save the root from resorption.’ Later studies showed that when you get new cementum, you get new attachment, and this was proven as Sharpeys fibres were seen on microscopy.

THE SMART BONE
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Adaptive Motion changes the motion of the file based on the applied stress on it thanks to a feedback algorithm. As the file cuts into dentine the motion then changes from rotary to reciprocation (clockwise and counterclockwise rotation).

Since this is a twisted file, there is a less likely chance of a microfracture.

R phase heat treatment reduces canal work at apical third-only will work in coronal part.

Endodontic tips When filing one should go in three times with each file and irrigate. If you block the apical third it will take long to unblock it. The system comes with three files Green, Yellow and Red. Small and Large sizes.

The green takes the longest time to reach working length as it is making the taper. Yellow has a small taper so it goes down quickly to the apical third. For optimal function 500 rpm is used (as opposed to Protaper which uses 300 rpm). You use 400g or 3N settings for these files. You must press the pedal before entering the root canal and take foot off the pedal after you are out as otherwise it will block. Maximum 3 entries.

Do 1. TF and TTA ADAPTIVE MOTION 2. Always press the foot pedal before entering root canal 3. Max 3 entries 4. Irrigate after every 3 entries

Don’t 1. USE EDTA with this system 2. Stop foot pedal while file engaged in root canal 3. Use rotary file without rotation in root canal

Sodium hypochlorite • Should be used for 40 minutes. • 19% • 0.5-6% depending on country • Organic part of debris

• Decreasing concentration will decrease toxicity but also antibacterial effect.

If you dilute you have to use for longer. It does not destroy all bacteria and it has an unpleasant smell. If you heat it, it becomes more active but it is impossible to heat and maintain the temperature inside. Also heating it makes it more toxic.

Hazards-allergy; goes beyond an open apex; getting into the bloodstream if you inject under pressure. Blood circulates at 3-8mm lg. What is above 6mm lg is problem-this is possible as some systems are used under pressure.

One may also use a negative pressure. If one has an accident with sodium hypochlorite, one must wash with saline. Use painkillers; prednisolone 400mg or 3N settings for these files. You use 300 rpm). You use 300 rpm. You use 400g or 3N settings for these files. You must press the pedal before entering the root canal and take foot off the pedal after you are out as otherwise it will block. Maximum 3 entries.

EDTA • 17% • Prolonged exposure can cause excess removal of dentine. It removes the inorganic parts of the smear layer. It has little if at all antibacterial effect.

If EDTA and Hypochlorite mix you will get effervescence these bubbles will cause a blockage in the lateral canals and dentinal tubules. If you use EDTA you need to wash away the hypochlorite first with distilled water.

Citric Acid

This needs oxygen to work so will not work at apical third-only will work in coronal part.

IRRIGATION REQUIREMENTS • Irrigate through the canal. • Creation of a current. • Removal of irrigant and debris

Problems The irrigant may not reach the apex due to surface tension of the liquid. Rinsing with negative pressure is safer. One needs aspiration inside the canal. The Endovac allows one to safely deliver an abundance of sodium hypochlorite to the full working length. In addition one is using fresh irrigant all the time.

The Endovac Pure injects and removes NaOCl. There is a microcannula in it which has 4 holes. The tube has a diameter of 0.32. It is impossible to go further the apices as the liquid is connected to the suction all the time with apical negative pressure. The instrument can also be used to drain pus from the periapical area. It has a cap which goes over it like a crown. One can select a low speed or a high speed. 1.5 mms/ min per root canal is enough as this is very efficient. One can use it after one reaches a working length with a size 35. It also dries the canal out so you do not need to use paper points.

Obturation • Single • Lateral • Thermafil(Carrier Based Condensation) • Obtura (Vertical Warm Condensation) • System B(Continuous Wave Of Condensation) • Thermafi – this is difficult to remove as it has a plastic in it and is used for the core. It is a problem if one has to retreat. Also because of the heat the patient feels pain. It is also expensive.

Lateral Condensation – time consuming; expensive; can create voids; more cones; one needs to push more which can lead to a fracture. One must note that all gp points are hand rolled so there is a possibility of human error and the length advertised may not be correct. One must always check the length and if too long one may use the TIPSNIP which is a GP point cutter.

Sealants ZNOECLEGENOL and calcium hydroxide have a long history of success.

Zinc Oxide eugenol has a powder base with a liquid catalyst non toxic and non irritant and has a high radiopacity. The working time is 1-4 hours or 6-8 hours-two types. The setting time is less than 2 hours.

The Elements free device Before using this one needs to prefit the plugger into the canal. Then leave 1 mm shorter than the apex. Use the TIPSNIP for this.

The reason for this is that when you pack with heat and pressure it will go down a bit more and fit perfectly. If you have a 004 taper then use an 04 plugger-or else one size up to 06.

The plugger is heated to 200 degrees and then placed in to melt the gp so that it can enter the lateral canals.

First go to working length minus 4-5 mms – so there is a new working length for the heat plugger. Place the gp 3 to 4 mms into the sealer and place in the root canal. Then use the heat plugger-go through the middle of the liquid. Condense and close the gaps. Melt the gp and then stay on it for 10 seconds. The last step inject the gp.

This excess will be easy to remove so one can place a post.

The first part uses System B – after 4 seconds of heat the heat is switched off automatically as a safety feature.

A sound is emitted. The screen also displays the temperature. The device can also be used to cauterize gingivae.
DATA GATHERING: A PREREQUISITE FOR TREATMENT PLANNING IN IMPLANTOLOGY

By Dr. Dennis Cutajar BChD MSc

ABSTRACT:
In this day and age, it is no longer acceptable to simply treat individual teeth in a technically proficient manner. Patients are giving increasing importance to their general appearance, and expect to receive a high level of oral care, which is physiologically and mechanically sound, and also aesthetic. (F.M. Spear, 2007) It is up to the clinician to discuss and decipher what the patient expectations are, if they are realistic and achievable, and whether or not he or she is technically proficient to provide the necessary therapy. (R.E. Goldstein, 1984) This text aims to provide a concise overview of the data-gathering phase required for restorative driven treatment planning, in order to achieve predictable, functional and aesthetic outcomes in implantology. It is beyond the scope of this paper to give a detailed explanation of each and every procedure that could potentially be involved in the clinical examination. Only the salient points will be discussed, with an emphasis on those more pertinent to the restorative clinician.

CLINICAL RELEVANCE:
The importance of adequate restoration-driven treatment planning for implant placement may be readily found in the literature and cannot be underestimated. Even when a multidisciplinary team is available, perhaps consisting of a multitude of specialists, dental technologists, radiographer, oral surgeon and restorative dentist, it is the latter who is often the first and final point of contact for the patient. Wood and Vermilyea have implied that the dentist restoring the implants, after coordinating the required consultations with appropriate specialists, should be responsible for the treatment planning. (M.R. Wood, 2004) Following stringent, evidence-based therapeutic pathways, allows clinicians to be thorough and predictable in their treatment planning, and more analytical of their work once this is completed.

THE TREATMENT PATHWAY
Aschheim, 2015

• Step 1: Diagnosis and treatment planning
• Step 2: Placement of the implant
• Step 3: Provisional restoration
• Step 4: Impressions for definitive restoration
• Step 5: Insertion of definitive restoration
• Step 6: Maintenance

The data-gathering phase is essentially a prerequisite for each one of these steps.

PRESENTING COMPLAINT AND ITS HISTORY
The patient’s presenting complaint may enable the clinician to decide on whether or not the patient’s expectations are realistic. This may be pursued with a mixture of simple open and closed questions such as:
• Are you happy with the appearance of your teeth?
• If no, what would you change to improve it?
• Would you rather have white, perfectly aligned teeth or natural looking teeth with slight imperfections?

MEDICAL DENTAL AND SOCIAL HISTORY
Patient data-gathering is normally initiated by taking a detailed history in a logical, systematic manner, which enables clinicians to minimize the risk of missing out vital information. This may influence the quality of the overall care provided for the patient. (Greenwood, 2015) Absolute and relative contraindications need to be carefully assessed and discussed with the patient.

SMOKING
The negative impact of smoking on implant success has been well documented in the literature. Patients should be well aware of this risk prior to consenting for implant treatment. (D. Hinode, 2006)

DIABETES MELLITUS
Diabetes mellitus, a metabolic disorder, has the potential to negatively affect the patient’s ability to heal and resist infections. Patients with uncontrolled diabetes are thought to be moderately more susceptible to late implant failure, due to a reduction in tissue turnover and impaired tissue perfusion. (Michael G. Newman, 2014)

METABOLIC BONE DISORDERS
Osteoporosis is a skeletal disorder in which there is decreased mineral density. There is conflicting evidence in the literature regarding implant success, and clinicians may be prudent to allow for longer healing times prior to implant loading. (B. Frithjøg, 2001)

CORTICOSTEROIDS
Chronic use places patient at a greater risk for secondary adrenal insufficiency, especially during lengthy, stressful procedures. (J.W. Little, 2008)

BISPHOSPHONATES
IV bisphosphonate therapy is considered to be a greater risk than oral therapy. However caution should always be exercised especially in patients with a history of more than three years of use. (Assael, 2009)

RADIATION THERAPY
Radiation therapy as a highly significant risk factor in implant therapy, especially when patients have received doses greater than 60 Gy/Literature regarding the benefit of using hyperbaric oxygen therapy to reduce the risk of osteoradionecrosis is still inconclusive. There are reports implying significant improvements in implant survival rates. (G. Granstrom, 1999)

Psychologic and mental conditions Psychiatric syndromes such as schizophrenia and paranoia, patients with mental instability, irrational fear, phobias and unrealistic expectations may be considered to be cases in which implant therapy is an absolute contraindication. (Michael G. Newman, 2014)

ALCOHOL CONSUMPTION
Excessive alcohol consumption may be associated with bleeding tendencies, unpredictable metabolism of certain medications and a greater risk of infection spread. (J.W. Little, 2008) A recent study showed that increased alcohol intake had a negative influence on osseointegration in rats. (C.P.de Deco, 2015)

THE CLINICAL EXAMINATION
Clinical examination of any patient should include teeth, periodontium and the articulatory system. (S.J. Davies, 2008b) However the general dental examination should start as soon as a patient walks into the treatment area. Care should be taken to note the patient’s gait and general body symmetry, their ability to speak coherently and maintain eye contact, their complexion, signs of pallor, yellowness or excessive redness or cyanosis, undue breathlessness or sweating, all of which may provoke suspicion regarding potential underlying medical issues. (Rain, 2003)

PSYCHOSOCIAL ASSESSMENT
This should be carried out at every appointment. Lesions should be meticulously recorded with reference to their size, shape, shape, color and texture. Intra-oral photography is useful as a visual baseline record for future comparison. (FGDP, 2009)

TOOTH EXAMINATION
Following the examination of teeth, the clinician should have a clear record of which teeth are missing, and ideally why they had been lost. Primary and secondary caries lesions, existing restorations and non-carious tooth surface loss should be recorded together with their prognosis. Evidence of misaligned teeth, over-eruption, tipping and drifting may warrant orthodontic referral prior to implant placement. (Rain, 2003)

PROSTHETIC EVALUATION
Existing prosthesis may be examined for deficiencies in function and aesthetics. (FGDP, 2009) Patient input on existing prosthesis may prove to be invaluable to gauge patient expectations. A current online tool of note is the SAC assessment tool, which enables clinicians to reflect on normative guidelines, regarding both restorative and surgical cases, formulated by the ITI at a Consensus Conference in 2007. (L.Lokander, 2009)

PERIODONTAL EXAMINATION
This is normally initiated with a basic periodontal examination, and followed by a more thorough examination if warranted, allowing the clinician to record details on probing depth, evidence of bleeding on probing and recession, tooth mobility and fremitus. (L.L. Chapple, 2002)
The unfavorable blood supply and protective reflexes associated with implant borne prostheses may cause tissue level reactions to be less predictable than those occurring in a dentate individual. They are likely to happen more quickly, with less warning and are more likely to be catastrophic or irreversible. They may be harder for patients to avoid and may also occur as a result of less load or frequency then seen in the natural dentition.

Accurate implant placement is facilitated by the combined use of prosthodontic stents and 3D imaging. (M. Z. Kola, 2015) (Talwar N, 2012)

If possible, the occlusion of implant borne restorations should conform to the existing occlusion. If re-organization is required, it may be prudent to utilize long-term provisional restorations to gauge the patient’s active capabilities. (Davies, 2010)

Occlusion may be verified against pre-treatment records, in line with the limitations of implants. As natural teeth move more readily under occlusal loading, implants should be maintained in light occlusal contact. Since the patient’s occlusion is likely to change over time, for example due to physiological or pathological wear, the occlusion of implant borne prostheses should be regularly monitored with thin articulating paper. (Misch, 2005)

**RADIOGRAPHIC ASSESSMENT**

The American Academy of Oral and Maxillofacial Radiology (AAOMR) has provided a review of the available literature regarding selection criteria for the use of radiology in implantology. Recommendations have been provided for three distinct phases; the initial examination, the preoperative, site specific assessment and finally, postoperative imaging (D.A. Tyrndall, 2012)

**THE INITIAL EXAMINATION**

The initial radiographic examination should be based upon the patient history, clinical examination and treatment plan. The imaging modality of choice is usually panoramic radiography supplemented by periapical radiographs, allowing the clinician to assess the overall oral health status.

Panoramic radiographs are useful as an initial diagnostic tool, due to their ability to detect gross pathology in the entire dentition and general anatomic features such as the TMJ, inferior dental canal and the maxillary sinus. Their main disadvantage is their inconsistent magnification and geometric distortions. (D.F. Tamimi, 2014)

Periapical radiographs are readily available and, with the correct use of the long cone paralleling technique, give an accurate representation of the mesio-distal and vertical dimensions of the site. (E. Whaites, 2013)
DATA GATHERING: A PREREQUISITE FOR TREATMENT PLANNING IN IMPLANTOLOGY

Continues from page 23.

Occlusal radiographs may provide information regarding the facio-lingual width and the mandibular contour. However, this information may be readily found in diagnostic study models, and their use is rarely justifiable. (D.A. Tyndall, 2012)

SITE SPECIFIC

The main shortcomings of conventional radiography are that they rarely provide a 3D visualization and reliable measurements of the implant site, especially in the facio-lingual direction. Hence, the preoperative, site-specific assessment should ideally include cross-sectional imaging in the form of CT or CBCT. (Brown, 2008)

In both, the diagnostic information is collected by a x-ray attenuation of voxels of the imaging volume by a single detector, which converts it to different shades of gray. The main difference on how they acquire data is that, in a CBCT, the entire volume of information is collected in one revolution, while it is collected in stacks, or multiple revolutions in the case of a CT scan. (C. Angelopoulos, 2011)

CBCT is currently the technique of choice, mainly due to its lower radiation dose, better availability and lower cost.

In general, software available for CBCT is more practical for implantology than that available for CT. 3D imaging is especially useful if augmentation procedures are being considered or have been carried out prior to implant placement. (D.A. Tyndall, 2012)

POSTOPERATIVE

Imaging may be used to confirm the correct location of the implant following its insertion. Conventional radiography is normally considered preferable to CBCT as titanium implants may produce artifacts, including beam hardening and streak artifacts, which may mask changes in peri-implant bone. (D.A. Tyndall, 2012)

Periapical radiographs may readily be used to assess for the presence, and maintenance of osseointegration.

They may also be used to evaluate the fit of impression posts prior to impression taking, to evaluate the fit between abutments and implant and in the case of cemented crown and bridgework, to ensure that all excess cement has been removed. (D.F. Tamimi, 2014)

SUMMARY

It may be argued that, with the contemporary, stringent standards in undergraduate dental schools, most clinicians graduate having the knowledge and technical competence to carry out several restorative and prosthetic procedures as well as minor oral surgery associated with implantology.

What is commonly perceived to be more challenging is the ability to formulate a comprehensive, multidisciplinary treatment plan, which allows for holisitc care, suiting the patient as an individual rather then the individual’s dentition.

This is only possible when information pertinent to the individual case can be accessed and made sense of. (Bain, 2003) Hence rather then being daunted by the process, clinicians planning and / or providing implant-borne restorations should ensure their data gatherings thorough, systematic and pertinent to the individual being cared for.
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Decision in Maltese Dental Technologists Case

Court reaffirms that protection of health and life of humans take priority in EU Treaties

The Court of Justice of the European Union (CJEU) judgement from 21 September 2017 (Case C-125/26) reaffirmed that Member States may determine the degree of protection which they wish to afford to public health and the way in which that degree of protection is achieved.

Since the levels vary between Member States, they must be allowed a measure of discretion.

Starting point of the case was a court proceeding in Malta, in which the plaintiffs – clinical dental technologists – are seeking official recognition for the profession of ‘Clinical Dental Technologist’ in Malta to enable clinical dental technologists from other EU Member States or Maltese nationals who obtained the relevant qualifications from another EU Member State to freely and autonomously practice in Malta.

As a result of its considerations, the Court followed that the protection of public health constitutes an overriding reason in the general interest capable of justifying a restriction of the freedom of establishment and that it is appropriate for a Member State to require compulsory intermediation of a dental practitioner to protect patients’ health and safety. The case is now referred back to the Maltese Court.

The Council of European Dentists (CED) welcomes this judgement and urges the Commission and Member States to ensure that the protection of public health is considered as a priority in policy making.

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# Functional Appliances: An Evidence-Based Appraisal

By Jan-Marc Muscat

Continues on page 30.

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### Working Definition

"An orthodontic appliance which harnesses (uses) the facial and masticatory muscles to produce changes in arch or tooth relationship"

Prof. RT Lee 2011

### Role

- **Primary role is in the correction of Class II malocclusion**
- Mild Class III — Reverse twin blocks
- Anterior open bite cases — Frankel IV
- Habit breaking appliance
- Obstructive sleep apnoea

### Indications in Class II

- ‘Classic’ functional appliance case
- Interceptive treatment
- Compromise treatment
- Anchorage reinforcement

### Mode of Action

- Their primary mode of action is by producing a distalising effect on the maxillary dentition and anterior force on the lower (dento-alveolar changes)
- Mills (1928; 1983) found a 2mm apparent change in mandibular growth
- Alter soft tissue environment — (in)direct effects
- TMJ changes favourably in an anterior direction albeit this is temporary (Pancherz & Fisher 2003)

### Evidenced Based Rationale

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### Randomised Controlled Trials

- To date all RCTs in this field have concluded that the average enhancement of mandibular growth is approximately 2mm with a fairly large standard deviation
- O’Brien et al. 2003 • Multicentre RCT (244 patients aged 8-10 change 70% dentoalveolar 50% skeletal)
- Cochrane Review 2003 – “there are minor beneficial changes in skeletal pattern, however, these are probably not clinically significant”

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**FUNCTIONAL APPLIANCES: AN EVIDENCE-BASED APPRAISAL**

**Timing of treatment**
- Depends on the trifecta:
  - Dental factors
  - Psychological factors
  - Growth

**1. Dental Factors**
- Since the changes achieved are primarily dento- alveolar, it follows that the best time to start is when permanent teeth have erupted
- A substantially earlier start/two-stage treatment risks prolonging treatment with resultant patient fatigue
- Problems with appliance retention due to shedding/morphology of primary teeth
- Issues with co-operation

**2. Psychological factors**
- "There is no doubt that social responses conditioned by the appearance of the teeth can severely affect an individual’s whole adaptation to life this places the concept of hand-eye-motor-visual in a much larger and more important context."

**3. Growth – Can we predict?**
- **Growth – Can we predict?**
  - **Growth – Can we predict?**

**3. Growth – conflicting views**
- Bacetti (2000) efficacy is dependent on coincident treatment with the pubertal growth spurt
- Tulloch (1997), Ghafari (1998) little to be gained from precisely timing the treatment to specific aprematurity markers
- O’Brien 2005 suggested that total beneficial growth is at its maximum when growth is at its most helpful (12.5)

**Compliance**
- O’Brien 2003 83% Compliance rate with a significantly lower failure-to-finish rate in the younger patients when treated by the same operator with same appliance
- Banks 2004 patients younger than 12.3 years were three times more likely to complete functional treatment with twin blocks

**Choosing a functional appliance**
- Does an appliance produce different skeletal/dental effects?
- Is it more easily tolerated?
- Does it work more rapidly?
- Easier to make and repair?
- Can concurrent procedures be carried out?
- Cost?
Choosing a functional appliance

- Johnston (1986)
  “Despite claims to the contrary, the superior functional appliance has yet to be demonstrated.”
- Several studies however hint at incisal tipping and skeletal response as being inversely related.
  Efforts should be made to limit former.

Choosing a functional appliance....

- The list of functional appliances keeps growing every year
- At times seem to be reinventing the wheel
- Twin Block is the most commonly functional appliance in the UK...used by 75% of orthodontists (Chadwick et al. 1998)

Twin Blocks – hours of wear

- Systematic Review (Al-Moghrabi et al. 2017)
  “Compliance with removable orthodontic appliances and adjuncts is suboptimal, and patients routinely overestimate duration of wear.”

Twin Blocks – Duration of treatment

- BOS Advice
  - Treatment time varies
    - Based on how severe the problem is
    - Most of the work with the brace is usually completed in 9 to 12 months
    - After this a period of nights only wear may be advised to maintain the improvement

Twin Blocks – Clark 1982

Advantages
- Well tolerated
- Easy to repair
- Fairly easy to advance
- Compensatory expansion is easy
- Suitable for mixed or permanent dentition

Disadvantages
- Compliance and adaptation issues as with any other removable appliance
- Retention issues with lower appliance
- Posterior open bite

Twin Blocks – tips

- 8-8mm thick bite is the secret of success with twin blocks
- Over-correction
- Watch your centrelines!

Twin Blocks – design

- Yaqoob (2012) → no difference in dental and skeletal effects with respect to labial bow
- van der Plas (2017) → lower incisor capping does not significantly reduce lower incisor proclination
- Trenouth & Desmond (2014) → presence of a Southend clasp limited incisor tipping

Twin Blocks – hours of wear

- General recommendation is for full-time wear
- Shafer et al. 2015 → most patient only wore their appliances 9 hours per day!

Involve the patient

- Colours → works with fixed appliances!
- Careton (1995)
  showed that active interest in patients headgear charts increased headgear wear significantly.

Treatment Stability

- Maxillary changes more stable than mandibular (Panahi 1991)
- Good buccal interdigitation reduces need for relapse
- Lower lip coverage/competence
- Systematic Review (Brock. 2015)
  Good stability expected but evidence limited to Herbst treatment

Good buccal interdigitation

- Trim upper block whilst maintaining A-P inclination
- Transition to fixed appliance with clip-over anterior bite plane or Hg
- Tail out wear – lazy?

Summary

- There are limited advantages to providing early orthodontic treatment (Class III malocclusion)
- Most of the reduction in staging is achieved by tooth movement. There is minimal skeletal change and this cannot be proscribed.
- While most treatment times are not essentially completed to be better in younger age groups
- There are many differences in the treatment result of fixed and removable functional appliances
- The twin block is the most popular functional appliance in the UK
- There is no point in holding on or leaving off the labial bow on a twin block
- No one can grow a mandible
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