UGANDA DENTAL ASSOCIATION

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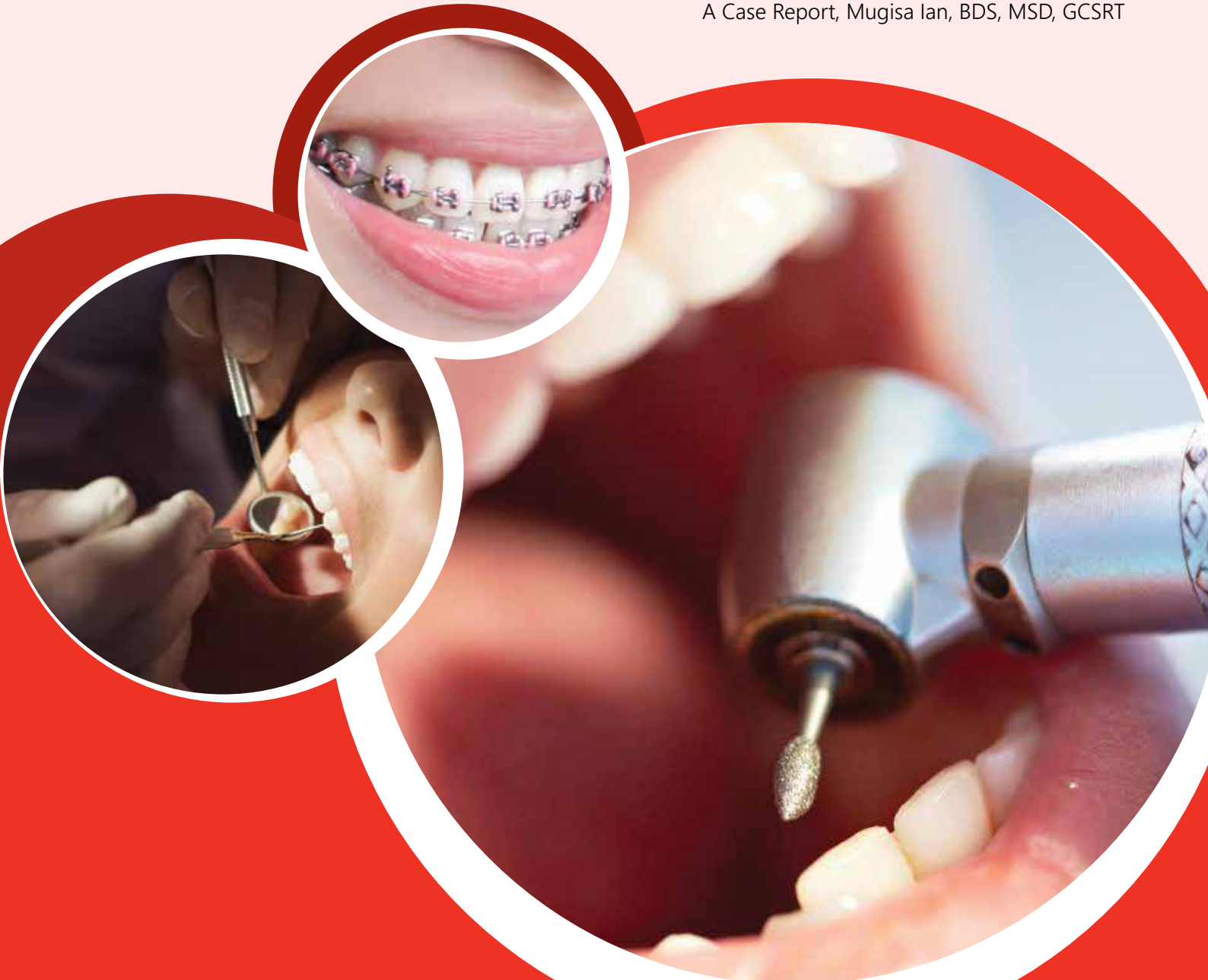

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EDITORIAL MESSAGE

The question is HOW?

Technology through digitalization has taken over all aspects of our life in the whole world. Our entertainment industry has quickly embraced this. The movies we watch are quickly transitioning from 2D to 3D, Imax and 4D. The Medical world has jumped onto the wagon with the introduction of 3D reconstruction scans, 3D and 4D ultrasound scans, high-tech diagnostics, the list is endless.

The world wants to see more, do more, achieve more and be more accurate all of which may not be easily achieved without aiding the human hand. The human hand alone has been found wanting and, in many cases, has been supported by the advances in technology.

This technology wave has not spared Dentistry. Dentistry all over the world has moved into the cutting-edge era in which we want to magnify the root canal system until we see the apex before we obturate, we want molten gutta-percha which will flow into the accessory canals and seal them off, we want to see the exact details of margin of the crown preparation done and we want to cement the crown immediately, we want to see how the teeth are anchored in the bone without necessarily extracting them, we want the one step technique of bonding composites, the list is endless. Our wants and wishes keep on growing because the time available to us and to the patients keeps on decreasing and yet their demands are increasing.

Many of our wants and wishes, in our practice of Dentistry, are addressed by the tide of technology that is rising higher and higher each day. As the tide of cutting-edge technology rises, two things come to my mind: what contribution have I made to this tide and how am I able to surf this tide. The question to all Dentists is: How can I/we surf this rising tide of cutting edge technology in Dentistry?

Dr. Charles Kasozi
UDA Editor.
BDS (MUK)
PAN DENTAL SURGERY

PRESIDENT'S MESSAGE

Upon ascending to presidency of our prestigious organisation, the UDA, let me begin my thoughts by thanking my predecessors, for the great foundation laid, that has stood the test of time. They have poured out their hearts, lives and soul into the continued existence of this organisation which would otherwise not be.

Strong foundation as the saying goes, does support massive structures both horizontally and vertically, we have been at the effort to expand horizontally by including as many of the national practitioners, as possible same as vertically by creating more benefits for those who join.

As your president, I'm only a representative of all of us as members, a voice for what you're doing, have done and will do. More than often, we find ourselves referring to UDA as a body only we are affiliated to and not us.

It's time now that I call upon us to own, this non profit making organisation, take part in all activities as one so we can then have a uniform, strong voice, beyond just monetary hand.

There's great room on the vertical altitude to grow UDA, as other organisations have grown, with regular publication of our journals, research and enrich our educational abilities of prestigious Makerere and its affiliates in the field of clinical dentistry.

I greatly appreciate the heart of those members of ADI (academy of dentistry international). To which I was recently inaugurated as a fellow that has endeavoured to reach out to the whole world regards to oral health. It's such benefits that we are privileged to have great speakers like Dr. Gerhard Seeberger, the president elect of the organisation, professor Claudio Fernández, all of whom have met their costs to be here and have happily done so

Nothing would have been possible without a great team of executives like you know them, great treasury under the stewardship of Dr. Steven Mugabe, educational sector, CPDs under Dr. Edward Kalyesubula now winged by Dr Nelson Kalyesubula, Dr. Arinaitwe Deus as Secretary General and Ms. Denique Murungi our only employee who has done well to keep you all in the loop of what's happening in the UDA.

I have enjoyed such great mentorship from. Dr. James Magara, who has stood by to guide me on certain decisions and direction for the UDA, along with the great influencers in the world of dentistry and hope to extend the same to the incoming executive.

It's at this point that I encourage all our seniors to step right back into leadership and mentorship scheme of the UDA so as to have a unified vision that's attainable for them.

Kind regards,
Dr. Baliddawa Hannington
President
Uganda Dental Association

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OUR MANDATE

To coordinate, harmonize / standardize the dental profession in Uganda.

OUR MISSION

To strengthen the dental profession through utilizing the synergies of its membership

OUR VISION

An effective and professional dental system that is accountable, sustainable and accessible.

THE EDENTULOUS MAXILLA
Conventional management with implants

Kafeero Jimmy

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Implant rehabilitation of an edentulous maxilla remains one of the most complex restorative challenges due to a number of variables that affect the aesthetic and functional aspect of the prosthesis.[1] These challenges relate to maxillary anatomy , bone resorption patterns following tooth loss , and the resultant relationship with the lower arch providing limited available bone for implant placement.[2-6]

Progressive ridge resorption makes predictable surgical , functional and aesthetic dental implant treatment more difficult. [5-9]
The clinician should have a thorough knowledge and understanding of facial aesthetics and complete denture principles before treatment planning these complex cases. [10]

Treatment of edentulism with a fixed prosthesis supported by osseointegrated fixtures appears to be a highly efficient method of giving predictable long-term results in a large patient population[11]. In a study involving 700 patients and 4636 fixtures at least 92% of Maxillae had continuous prosthesis stability at 15 years .Mertens et al [12] demonstrated a 99% implant survival rate and 100% prosthesis survival rate at 8 years in a prospective study.

This discussion summarises the treatment planning considerations for conventional implant rehabilitation of an edentulous maxilla to assist clinicians in selecting appropriate treatment options based on individual patient clinical presentation.

History

Patient's complaint and expectations - Avoid promising a patient a fixed prosthesis not until a definitive treatment plan has been made.

Patients wearing a satisfactory full upper denture are likely to have high expectations from implant supported prosthesis.
History of presenting complaint - Reason for loss of teeth. History of periodontal disease history of multiple implant failure of implants before- cluster phenomenon Medical history –Factors that impair wound healing like uncontrolled Diabetes mellitus, Bisphosphonates (oral or intravenous). There are few absolute medical contraindications to implant treatment; relative contraindications are normally related to the level of control of medical condition.

Social History

The negative implications of smoking on outcome of implant treatment are well documented by Bain and Moy.[13]
Excessive alcohol consumption impairs wound healing

Dental history - Regular attendance for hygiene sessions and maintenance are key. Treatment tends to take a long time and many appointments.

Examination

Extra-oral

Maximum opening - for placement of distal implants and allowance for prosthetic components

Muscle tenderness / hypertrophy of masseter- This may be secondary to parafunctional habits which in turn predisposes to mechanical failures (screw loosening or fracture, abutment fracture , veneering material fracture, implant fractures) and possibly bone loss.

Smile line

Tjan et al classified the smile line into high ,medium and low.[14]This should be assessed in both static and dynamic positions . It is critical to diagnose the highest position of the upper lip in an exaggerated smile as this will affect the type of fixed prosthesis and management of the prosthesis tissue junction (PTJ)

This further determines whether bone will need to be removed to create space .The clinician must avoid visibility of the PTJ as it is difficult to match the gingival colour to gingival coloured prosthetic material.
The smile line should further be assessed with and without existing prosthesis.

The prosthetic teeth height will affect the amount of prosthetic gingival display.

Symmetry- of the midline and facial tissues.

Lip Support

With and without the denture (if any) .It determines if a fixed or removable prosthesis will be fabricated . Preoperative photos both profile and smile will aid in this process.
Ideal lip support is a range and its assessment and perception is affected by the factors below[10]

1. Maxillary anterior teeth
2. Alveolar loss
3. Nose length
4. Angulation of the tip of the nose , and hence the nasolabial angle (usually NLA : men 90^0-95^0 and women 100^0-105^5)
5. Angulation of the chin : class III skeletal gives an illusion of inadequate support

Patient needs to make a final decision on the acceptable lip support as this will determine the design of the fixed prosthesis.

Intra-oral

Soft tissues

Linea alba and tongue faceting - indicate parafunction hence may need an occlusal splint.
Gingival biotype – Thick biotype favourable .This reacts to surgery and prosthetic intervention by pocket formation. Thin biotype on the other hand is more prone to recession.
Keratinised band – presence facilitates oral hygiene
Periodontal status – cut off of probing pocket depth (PPD) ≤5mm with no bleeding on probing and excellent plaque control . The outcome of implant therapy in periodontitis patients may be different compared to individuals without such history as evidenced by loss of supporting bone and implant loss[15].

Hard tissues

Opposing dentition- implications on occlusal scheme (see later)

Any caries, fracture or wear
Prognosis of remaining teeth : This can be objectively assessed considering the; periodontal condition, endodontic condition, surrounding structures, remnant tooth substance and other factors like aesthetics, strategic importance of a tooth.

Alveolar Ridge: Resorption
Firm /fibrous / round/flat / sharp / undercut
The maxilla tends to resorb medially and upwards .In the anterior region, horizontal resorption is almost twice as much as vertical ridge resorption [2,4,6] developing a class III tendency. This creates a biomechanical disadvantage of cantilevers and compromised soft tissue aesthetics[16,17].
Posteriorly, vertical and horizontal bone resorption occurs at a similar rate resulting in a class III tendency and increased inter-arch space. Pneumatisation of the maxillary sinuses in addition to vertical bone loss reduces available bone for implant placement.[2,6,17]

With the upward and inward resorption of the maxilla there tends to be a discrepancy between ideal location of teeth and implants with implications on ; oral hygiene, soft tissue support ,tongue space and patient acceptance

Evaluation of bone: Location (most bone is usually in anterior maxilla and tuberosity areas) , volume ,width and density . Preferably with a CBCT scan.
Tuberosities: may compromise fitting of a removable prosthesis

Management of inadequate bone volume in posterior maxilla

Sinus Augmentation procedures

This can be with autogenous bone grafts and / or biomaterial. And Implant placement can be simultaneous with sinus lift (single stage) or as a separate procedure when grafted bone has healed up for primary stability (two stage technique.

Lateral window sinus lift described by Wallace in 2003 and Del Fabbro in 2004 is most widely used today , and is considered predictable ,particularly when autogenous

bone is used [18,19]. Current research demonstrates that bone substitutes ,e.g. xenograft material (Bio-Oss) , may be as effective as autogenous bone grafts, and may be mixed with autogenous bone or used as an alternative bone graft material.[20]

Summers' technique- Less invasive one stage surgical technique for sinus floor elevation via the implant osteotomy using osteotome ;with simultaneous implant placement [20]. Residual bone height of 6mm is recommended for implant primary stability .Concave tipped osteotomes of increasing diameter are used via crestal approach to advance particulate bone beyond sinus floor and elevate sinus membrane. A two stage approach is recommended for cases with less than 6mm residual bone height . Bone graft material placed on the osteotome tip may be delivered via the osteotomy to directly beneath the sinus membrane for membrane tenting [22]. The osteotomy is then filled with graft material and the implant placed after at least 6months bone healing .

In 2000 Cosci modified this crestal approach describing a one stage technique with a minimum of 3 mm residual bone , using an atraumatic lifting drill to reduce risk of perforation of the sinus membrane and placing short 8mm implants [23,24]. This closed crestal surgical technique using shorter implants may lead to fewer complications compared to an open lateral window technique designed to place implants of at least 10mm[20].

Alternative techniques to sinus Lift:

Onlay bone augmentation : May be used for horizontal or vertical bone augmentation in the edentulous maxilla [9,25]. Multiple surgical techniques and grafting materials are available to augment bone in the horizontal direction ,including autogenous bone , allografts and xenografts . There is currently insufficient evidence to identify a preferred approach [8,9,25].Vertical ridge augmentation is less predictable ;clinicians and patients must consider procedure benefits versus risks when considering significant bone augmentation 9,26. There is currently insufficient evidence to support the efficacy of bioactive agents including platelet rich plasma with implant treatment [(8)]. Titanium screws may be preferable to resorbable polylactide acid screws to fix only block grafts.

-zygomatic implants : These are long implants that are directed lateral to or through the sinus into the zygomatic process [27,28] and have also been described for placement into the pterygomaxilla [29].Theses surgical procedures are more complex and invasive than the lateral window sinus lift and crestal approaches to implant placement , and have significant risks and complications.

Short Implants : It is an alternative approach in limited residual bone without use of bone augmentation [20]. This is a current research focus with advantages including less invasive surgical approach , avoidance of grafting procedures, reduced surgical risks , shorter treatment time and reduced cost [30].

Tuberosities : may compromised fitting of a removable prosthesis

Existing Dentures:

Assess

- Occlusion – dynamic and static
- Retention (loss of retention can be due to improper occlusion, inaccurate centric relation, increased or decrease OVD)
- Stability
- Anterior tooth relationship- function and phonetics
- Close speaking space
- Tissue support and why patient wants to go for implants.

Expectations are high if patient has a satisfactory removable upper full denture. Document problems to be with implant supported prosthesis.

- Aesthetics

  Minimal resorption is required for a fixed prosthesis

  Removing labial flange gives an idea of lip support, allows access for cleaning in a fixed prosthesis but risk of air escape and eventual impact on speech.

Occlusion :

Currently there is no evidence- based implant specific concept of occlusion[31].

Skeletal pattern - perception of lip support .

Incisal relationship , over jet , overbite

Over eruptions : tend to reduce prosthetic space

Occlusal vertical dimension (OVD) : if incorrect

- Decreased biting force

- Angular cheilitis
- TMJ pain / dysfunction
- Poor aesthetics and facial contours
- inadequate speech

Guidelines for full arch implant supported fixed prosthesis occlusal scheme [1,31].

RCP = ICP

If opposing arch anything other than a full denture :

- Mutually protected occlusion with shallow anterior guidance.
- Simultaneous bilateral contacts in centric relation (CR)
- Majority of contacts anterior to cantilever if any.
- Lateral excursions
- Group function; requires more adjustments.
- Or Canine guidance with anterior disclusion; easier to manage, but higher potential for screw loosening around canines).
- Infra occlusion of cantilevered unit by 100µm to reduce fatigue and technical failure.
- No Non-working side interferences (NWSI)

Diagnostic wax up with and without flange;

Note the following

- Maxillary incisal edge position- as determined by aesthetics & phonetics (fricatives)
- Maxillary cervical edge position and aesthetic tooth proportions (height and width of teeth based on aesthetic tooth proportions not patients residual ridge)
- Smile line
- Gingival display – if excessive, alveolaplasty may be indicated, to conceal the PTJ during function.
- Maxillary lip support - as discussed earlier

The prosthesis design will depend on prosthetic space available and parameters above

CBCT – Bone volume , sinuses, pathology, bone quality .

Where existing denture is satisfactory , it can be modified with radiopaque markers to be used as a radiographic / surgical stent.

The table below shows factors to consider in implant occlusion[6].

Implant Occlusion		
Increase support area	**Improve force direction**	**Reduce force magnification**
Bone Quality • Extended healing time • Progressive loading • Under prep for primary stability **Bone Quantity** • Implant number (6-8 for fixed) • Implant diameter (≥ Regular platform.) • implant length ≥10mm • Implant surface (moderately rough) • implant distribution	**Occlusal morphology** • Flat Central fossa • Reduce cusp inclination • Reduce occlusal table • Along implant axis • Centred contacts	**Occlusal contacts** • Position • Distribution **Types of prosthesis** • Reduce cantilever length • Cross bite • Splinting • Implant position

Protrusion

6. Shallow anterior guidance with no balancing contacts.

Freedom in centric relation (1- 1.5mm)

In overload situation there is 3 times more late implant failures.

Splinted implant allow for cross arch stabilisation.

Investigations:

Mounted casts at correct OVD – assess prosthetic space (Minimum 12- 14mm)

Treatment plan

Provisional and Definitive

7. Alternative treatment options
8. Stabilisation of primary disease

Implant planning : Teeth factors and implant factors

Implant placement :

1 stage or 2 stage surgery 32, with or without onlay bone augmentation / Sinus lift .

Or using shorting implants to avoid augmentation

procedures.
The distribution of implants depends on arch form (square/ovoid/ tapered) and bone availability .
Regular / tilted or Zygomatic implants.

11. Longer healing: As determined by bone quality and quantity, primary stability of implants on placement and medical history .
12. Loading: In a systematic review there was a high level of scientific and clinical validation for conventional loading in fixed maxillary prostheses [33].
13. Impressions: open tray or closed try , pickup or transfer coping ,
14. Verification jig with Sheffield test for a passive fit.
15. Provisional fixed prosthesis – Should be worn long term for at least a year
16. Definitive prosthesis - a copy of satisfactory provisional prosthesis in all parameters
17. Maintenance – regular hygiene sessions
Patient should be made aware of the limitations, possibility of modification of treatment plan, placement of additional implants and implications of implant failure.

Prosthesis Design

It can depend on amount of tissue loss, position anterior teeth in relation to residual ridge, smile line and need for gingival coloured prosthetic material.

- In severe resorption, removable advised: cleansability, lip support, speech
- Cantilever: Best avoided or minimised (to 1 molar tooth(10-12mm) / 1.5 of Antero-posterior (AP) spread . Higher rate of failure with cantilevers1,34.
- Screw retained versus Cement retained prosthesis: Retrievability , risk of perimplantitis if excess cement is extruded beneath soft tissues.
- One unit or multiple pieces: Lost wax technique sections should be no more than 35 mm ,for passive fit. Hence pre or post ceramic soldering.
- Need for gingival coloured prosthetic material
- PTJ – shape of prosthesis here to favour oral hygiene but no air escape . This could be Convex / I – shape/, L- shape .

Designs[35] :

Metal- Ceramic
Fixed hybrid / Profile prosthesis
Fixed- removable

Materials

1 Precious metal (Gold) and Porcelain

Advantages :

comparable wear of enamel to gold
Tried and tested
Disadvantages**:**

cost

Lack of passive fit
Difficult to repair
Shrinkage on firing ceramic

2 Cr –Co and Porcelain

Advantage

Passive fit (milled)
High melting point (good for firing)

Disadvantage

Wear of implant head

3- Ti frame (CAD-CAM) and Acrylic

Advantages

Easy repair
Cheap

Disadvantages

Wear of acrylic
Staining
Delamination (may need replacing acrylic in 7-10 years)

4 Zirconia frame and Ceramic veneers

Advantages

Aesthetic

Disadvantages

Fractures and difficult to repair

5 Titanium framework (CAD-CAM) with individual coronal tooth prep to accommodate Ceramic crown(Emax /Zirconia) and apical veneering with composite or acrylic . (Profile Prosthesis)
Ceramic is very aesthetic and durable and the acrylic / comp is easy to repairs.
As the ceramic crowns are individual, replacement is

easy as well Very good long term but expensive.

6 Fixed – removable (Marius Bridge) - an overdenture ,milled or cast bar . Acrylic to as gingiva coloured prosthetic material, flanged, all support from implants, U – shaped with no palatal coverage.

Maintenance:

Initial review at 6 weeks
Regular OH sessions (3/12)
Super floss, gauze strips, interdental brushes, waterpik to clean beneath prosthesis.
Occlusion – needs to be evaluated and adjusted if needed on a regular basis to prevent potential overloading [31].
Repairs – chairside or Laboratory . May need spare set of prosthesis.
Radiographs: 0 , 1, and 5years

Full upper arch clearance

SAMPLE REPORTS

CASE 1 :

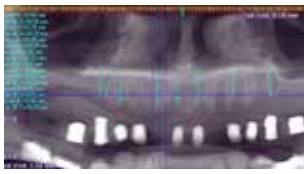
55 year old female presented with failed upper dentition. She reported history of sequential extraction of upper posteriors over the years resulting in loss of posterior support. Patient lost self-esteem due to a bad smile. Patient wanted to improve both function and appearance. Traumatic occlusion and complete overbite on presentation.

Full upper arch clearance plus an immediate acrylic full upper denture. No flange to assess lip support.
Performed alveolaplasty to conceal the PTJ during function. The relined denture was modified for use as radiographic and surgical stent. Two stage surgery.

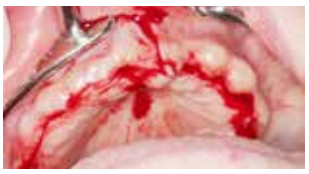
Restored with a CAD-CAM Titanium framework veneered with acrylic on six implants. Prosthesis designed with palatal aspect of upper anteriors finished in metal and upper first molars with gold onlays to reduce the rate

Resorption on healing

Relined denture



CBCT with denture in situ



Flap design

Alveolaplasty

Denture used as surgical stent

End of first stage surgery

After 3 months healing

Palatally based crestal incision for second stage surgery

Acrylic sleeve over healing abutments

Open tray fixture level pickup impression

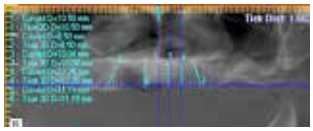
Before

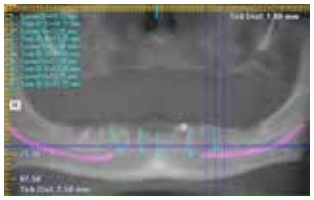
After

CASE 2

60 year old male patient presented with a failed dentition.
Poor oral hygiene and history of smoking. Very strong gag reflex
Full upper and lower clearance was done, 10 implants placed under sedation (two stage surgery) 4 weeks post extraction.

Restored with a CAD-CAM Titanium framework veneered with acrylic fixed prostheses with screw retention .Minimised cantilevered component to one molar tooth.





Defect in UR3 position

Autogenous bone graft UR3 site

A mix of multiunit abutmens and fixture level healing abutments

Verification jigs

Wax try in

L- Shaped prosthesis

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"Ebinyo"— The Practice of Infant Oral Mutilation in Uganda

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Infant oral mutilation (IOM) is a traditional method of extracting un-erupted teeth practiced in several Sub-Saharan African countries including Uganda. This practice is referred to as "ebinyo" by Bantu-speaking Ethnic groups, though it has several terms depending on cultural group and researcher. The un-erupted tooth is gouged out as a cure for medical symptoms in infants that include high fevers and diarrhea.

The spreading of IOM practice in African populations is blamed on poor health literacy with regard to the common childhood illnesses. One study in Uganda revealed that adverse cases following IOM seen in the hospital peaked in tandem with the malaria and diarrheal disease cases. This paper is a review of the practice with a particular focus on Uganda as presented in literature compiled from PubMed, Dentaid, Google Scholar, Local Uganda sources, and the authors' observations. The paper explains reason for the persistence of the practice, and to further inform on IOM to health practitioners who were previously unaware of the practice.

Introduction

Traditional methods of treating illnesses are still practiced in several parts of Africa (1–3). These traditional methods may not be scientifically explainable, yet societies continue to apply them as a means to prevent and treat diseases. World Health Organization reports that 80% of African populations use traditional medicine for cultural and economic reasons as their primary source of care [(3)]

Traditional methods of treatment may be injurious as has been observed by several authors on a practice referred to as infant oral mutilation (IOM). In the literature, authors also refer to IOM by other terms that include tooth extirpation, germectomy, deciduous canine buds enucleation, nylon teeth, and false teeth[(4–7)]. The most common term for IOM practice is Ebinyo which is derived from the Bantu- languages and loosely translates to "false teeth."

Infant oral mutilation is where un-erupted teeth, usually in the position of canines, are gouged out by a non-formally trained person. The raised areas on the infants gum are identified and then using a sharp instrument the soft un-mineralized tooth is extracted as the "offending worm." The range of rudimentary that may be used include bicycle spokes, hot needles, pointed knives, nails, and other sharp objects (5, 6, 8–10). The procedure is carried out in the belief that it will prevent or treat symptoms such as fevers or diarrhea seen in an infant [(5, 7–10)].

Gollings (active document) reports that the earliest literature report on the practice was found in tribes of the Nilotic Sudan in 1932. The practice is now reported to have spread to several Sub-Saharan Africa countries that include Uganda, Chad, Sudan, Ethiopia, Somalia, DR Congo, Kenya, Tanzania, Rwanda, and Burundi. Studies also report individuals migrating from these African nations may continue this practice in Europe, Australia, and the Americas [(11–14)].

Method

This paper is a review of IOM in Uganda. It has been compiled from PubMed, Dentaid, Google Searches, Local Uganda sources, and supplemented by anecdotal evidence from the authors. The search terms were as follows: Infant oral Mutilation, Ebinyo, Ebino, Canine extirpation, and enucleation. The authors reviewed articles, media presentations, and reports.

History of IOM in Uganda

Uganda is a landlocked country located in the Eastern part of Africa. Uganda is bordered by South Sudan to the North, Kenya to the East, DR Congo to the West, and Rwanda and Tanzania to the South. Uganda gained its independence from Britain in 1962. There was a military coup in 1971, followed by a period of instability in the country up until 1986; as a result, this period has scarce documented research.

The current population of Uganda is approximately 40 million. Uganda has a rapid population growth, reported as increasing from 9.5 million in 1969 to 35 million in 2014 [15]. Only 25% of the population lives in urban areas. Uganda has several ethnic groups, each with their own language, customs, and traditional practices [16]. These ethnic groups can be grouped into Bantu speaking and non-Bantu speaking, with the former living mainly in the Southern regions while the latter living in the Northern regions.

The first mention of IOM in Uganda is in a study carried out in 1969 by Pindborg [17]. They reported that 16.1% of the children of the Acholi tribe of Northern Uganda had missing canines due to IOM. The dental mutilation gave credence to the existing myth to extract teeth as a remedy to childhood fevers.

In 1971, Halestrap who had observed some dental anomalies in Uganda populations caused by customary and superstitious practices assumed they were on the decrease as modern health practices were being adopted. He then proceeded to document the practices so as to keep a written record under the assumption that the practices would be disused in later years [18]. This author clearly described the regional distribution of the different traditional practices in Ugandan cultural groups, stating that the "deciduous teeth enucleation" was only practiced in the Northern region of the Uganda and not in any other parts. This is in concordance with the findings of Pindborg as a practice of the Northern region. When the country was more stable, in 1989, the Uganda Ministry of Health carried out a survey and reported 95% of a focus group they studied in a Southern district of Uganda had heard of Ebinyo, thereby indicating a spread [19].

Trends of IOM Practice in Uganda

Infant oral mutilation is currently reported all over Uganda. In 40 years, IOM prevalence is now reported by Tiromwe et al. (20) to have almost tripled to over 50% in the Northern district that Pindborg studied [17]. Furthermore, the tribe of the Baganda that had no traditional practices interfering with their normal dentition in 1971, in more recent studies is implicated as having introduced IOM to the South Western regions [9, 10]. Literature further states that elder persons are more likely to report IOM as a new condition, while the younger people believed the practice always existed [5, 9, 10]. Similarly, the authors (Betsy Kasumba and Margaret N. Wandera) have observed dental consultations at conventional clinics are more likely from grandmothers rather than mothers before taking a child for "Ebinyo" treatment. IOM has been found to be done more in rural, than urban children, and more likely to be done on children who were under the care of a caretaker than a parent (20). However, the levels in urban areas are considerably high, as reported in a study of children attending child clinic in the Capital city Kampala in 2007 where 24% who had undergone IOM.

Impacts of IOM

The adverse impacts of this procedure may be categorized into the immediate and the long term. Since the fever or diarrhea symptoms of the infant do not get the appropriate treatment, there is the likelihood of the pre-existing illness to worsen. Additionally, the non-sterile invasive method used to gouge the tooth out may result in bleeding and infection. These may be so severe to cause anemia, septicemia, osteomyelitis, or meningitis [8, 20–23]. A study of hospital admissions in Northern Uganda observed that children who had undergone IOM were among the 10 most common hospital admissions and had the third highest case fatality rate
(CFR = 21%) [24].

The long-term impacts are observed especially in the dentition and include malformation, non-eruption, hypoplasia, dysplasia, missing teeth, displacement and impaction, compound odontoma, and orthodontic complications [7, 11, 17, 21]. The teeth most commonly affected are the mandibular canines. A study of 14-year olds in the city of Kampala found that in the mandible, missing canines were as common as missing first molars.

The occurrence of missing canines could be explained as result of IOM and had impact on the children occlusal status [25].

Attitudes of Uganda Populations to IOM

In Uganda, IOM is carried out commonly by traditional healers, though other respected members of the community may conduct the procedure. The literature mentions family members, traditional midwives, school teachers, and even local priests conducting IOM [5, 20, 22] Traditional healers remain widespread in Uganda as with most of Africa, especially in the rural areas where the populations rely greatly on their services. In a study of traditional healers, 40% had no formal education, whereas 46.6% had only primary school education [26]. Traditional healers take up their role as a cultural heritage. Ellis and Arubaku [23] state that families initially consult a traditional healer before hospital, and even while at hospital may continue the dialog. In the National Oral Health Plan, when participants were asked about Ebinyo, more than 50% stated that the best treatment is by a traditional healer [19].

A later study conducted in a Kampala clinic in 2007, guardians reported traditional healers were responsible for 55% of IOM observed (MW). The authors conclude that this reflected the poor health literacy of the studied Uganda population. In a study by Nuwaha et al. [27] in a western part of Uganda, it is reported that socioeconomic conditions do not influence IOM as a preferred choice of treatment. In neighboring Tanzania, IOM was outlawed in 1980s, but as of 1990s, it was still occurring in areas that have poor access to health services [28]. Therefore, IOM persistence and spread may be due to poor health literacy and limited access to health services in these populations.

This continued inhumane practice of IOM is conducted at an age where the antibodies protection passed on to a child during pregnancy and from breast milk is decreasing. The child, thus, becomes susceptible to various infections. These infections present with symptoms of fevers, diarrhea, and vomiting that IOM is performed to treat. Notably, a high proportion of morbidity and mortality in under 5-year olds in Sub-Saharan Africa is from these infections [27, 29]. The prevailing mismanagement of the infections, such as IOM in the Uganda population, thus presents as a contributory factor to the health burden of children [2].

Conclusion

Infant oral mutilation should be eradicated. The interventions ought to involve traditional healers and offer improved access to primary health care, especially in rural areas. The majority of the studies in literature focus on the dental impacts of IOM with minimal reporting on the reasons for delay seeking proper care from conventional health services.

Health professionals in particular pediatricians should be informed and liaise with dental practitioners to develop strategies to eliminate this practice. Further research into the conditions that are promoting such beliefs should be explored.

Author Contributions

MW and BK contributed to the concept of the manuscript. Furthermore, they worked together to develop the design and select the content. Both authors agreed to the final version and approved it ready for submission.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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A 4 year old with severe early childhood caries (S-ECC);

A Case Report

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Introduction

Dental caries is a multi-factorial, infectious process that is characterised by biofilm-induced acid demineralisation of the inorganic structure and destruction of the organic substance of the tooth (Colak, 2013, Kawashita et al 2011). Early childhood caries has been defined as the presence of one or more decayed (cavitated or non cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger. The presence of one or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of ≥4 (age 3), ≥5 (age 4), or ≥6 (age 5) surfaces constitutes S-ECC. Any sign of smooth surface caries in a child less than 3 years old is also indicative of S-ECC (Poureslami and Van Amerongen, 2009).

Epidemiology

Early childhood caries is one of the commonest childhood illnesses. Its prevalence has been noted to vary within and among populations with the disadvantaged children being at an increased risk of developing the disease (Colak, 2013, Kawashita et al 2011). The highest prevalence has been reported in Africa and East Asia while that in the developed countries has been estimated to range from 1% to-12%. In Africa, the prevalence of ECC has generally been reported to range between 38%-44% (Colak, 2013). Studies conducted in Uganda have reported high prevalence figures; 45%, 59%, and 65% respectively among 3, 4 and 5 year olds in Kampala and her peri-urban area of Nakawa division (Kiwanuka et al 2005). More recently, Birungi et al reported a prevalence of 38%-41% among 5 year olds in Mbale (Birungi et al, 2015).

The disease has a multi-factorial aetiology, with a number of factors responsible for its initiation and progression (Poureslami and Van Amerongen, 2009). These factors include a susceptible host, micro-flora with cariogenic potential (Streptococcus mutans, and Lactobacilli), a suitable substrate (dental plaque and/or bio-film) necessary for the survival of the pathogenic flora and time for changes to take place (Colak, 2013, Kawashita et al 2011, Poureslami and Van Amerongen, 2009). The definition of ECC encompasses the multiple causative factors, which include socio-economic, behavioural, and psychological factors and the inappropriate feeding methods. Thus, the risk factors that play major roles in the occurrence of the disease include high count of *mutans streptococci,* frequent consumption of foods containing fermentable sugars, and poor oral hygiene practices, low socio-economic status, level of education of the caregiver and non exposure to fluoridated water supply or other sources of fluoride (Poureslami and Van Amerongen, 2009, Zafar and Saddiqui, 2009).

Clinical features

The initial lesion usually appears as a whitish band of decalcification along the cervical margin or the occlusal surface of teeth coinciding with areas of plaque distribution. This sub-surface lesion can easily be reversed by tipping the demineralisation-remineralisation balance towards remineralisation (Kawashita et al, 2011). Continued demineralisation progresses to cavitation, further enhancing plaque accumulation in the rough cavitated lesions. The smooth surfaces of the primary upper incisors are affected first followed by the occlusal surfaces of the primary molars in succession as they erupt (Tahmassebi and Brosnan, 2007). The lower primary incisors are usually spared because of the protection provided by the tongue and saliva from the submandibular and sublingual glands (Kemoli, 2013).

The detrimental effects of ECC include pain, abscess formation, difficulty chewing, malnutrition, and low-self esteem. The disease is often associated with dental fear and anxiety, aversion to treatment and affected patients may at times require sedation and/or general anaesthesia

to undergo comprehensive treatment (Tahmassebi and Brosnan, 2007).

Management

Recognising that oral health plays an integral role in the individual's general health forms the core principle for the prevention and management of ECC. It is therefore important to employ a comprehensive approach incorporating multiple, parallel, short- and long-term strategies to prevent the disease successfully (Zafar and Saddiqui, 2009; Tahmassebi and Brosnan, 2007).

Preventive strategies include; educating prospective parents in the pre-natal and peri-natal period, delaying and/or preventing the transmission of *S. mutans*, from the parent/care giver to the infant, establishing a dental home as early as the child's first birth day, caries risk assessment and regular tooth brushing with fluoridated toothpaste at least twice a day (Zafar and Saddiqui 2007).

Treatment entails reviewing the patient regularly based on their caries risk assessment, re-emphasising oral hygiene instructions, giving dietary advice to both the child and parent, instructions on fluoride use and fissure sealing for the permanent teeth as they erupt. These measures together with continued dental health education are more cost-effective than restorative treatment. The need for restorative intervention becomes eminent when cavitation results into breakdown of the tooth structure (Tahmassebi and Brosnan, 2007; Zafar and Saddiqui 2007). The extent of the disease process and the child's developmental level would influence the clinician's behavioural management approaches to employ while providing definitive care for the child. Overall, the treatment of ECC is very expensive in terms of cost and time and thus measures should be undertaken to prevent occurrence of the disease. Preventive measure if undertaken appropriately result into more predictable outcomes and a better, improved oral health related quality of life (Tahmassebi and Brosnan, 2007).

Case Report

A 4 year old African Male child presented with a chief complaint of severe toothache RUQ x 1/52. Initially, the pain was mild but gradually worsened and could only be relieved by taking an analgesic. The pain would on occasions keep the child awake at night.

This was the child's second dental visit. Parents reported that he had a tooth restored in the RLQ a year ago. It was also reported that he brushed once a day with a toothbrush and Colgate herbal toothpaste unsupervised. His 24-hour diet recall contained moderate frequency of cariogenic foods.

The medical history and a review of other systems were unremarkable. He was the third born in a family of three, stayed with both parents and was in nursery school. The father reported to have several dental related problems that needed treatment.

On examination, the child was in fair general condition and his behaviour was classified as Frankl 2. Extra-orally, his face was symmetrical with no swelling or visible scars. The lips were competent at rest and the facial profile straight. He had normal hair texture and distribution. The TMJ movements were essentially normal.

Intra-orally, the oral hygiene was fair with moderate plaque deposits on the posterior teeth and supra-gingival calculus deposits on the buccal aspect of 55. The mean plaque score was 1.08 (Silness and Löe, 1964). There was generalised moderate physiologic pigmentation of the gingiva. The gingival margin appeared round and slightly swollen and slight bleeding on probing was noted on the lingual and buccal aspect of 55. The mean gingival index was 1.00 (Löe and Silness, 1963). There was a small, soft, slightly tender buccal gingival swelling associated with 55 and a gingival polyp palatal aspect of 55. The adenoids were enlarged and appeared to obstruct the oropharynx.

The child had U-shaped maxillary and mandibular arches and was in primary dentition stage with only 71 missing (had just exfoliated). The child had a flush terminal plane molar relationship on the right and left side and there was no primate and physiologic spacing noted. There was decay noted on 55PO, 54O distal pit, 52BIP, 51 and 61DP 62BIP, 64O mesial pit, 65O distal fissure, 75DO, 74O, 84O and 85DO amalgam restoration with secondary decay. 51 and 61 also had white chalky areas on the cervical third and small brown stains in the arrested lesions on the labial surfaces. The lesions on 62 and 52 were also arrested.

Investigations included intra-oral photographs, anthropometric measurements, a 6-day diet diary and x-rays.

Overall, the child's weight and height were normal for his age. The 6-day diet chart noted moderate frequency of cariogenic foods in the child's diet.

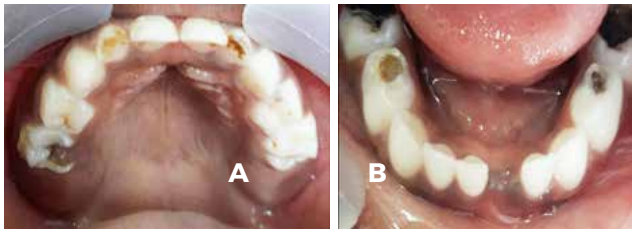

Fig 1: Occlusal views; A-maxilla, B-mandible show plaque deposition on the buccal aspect of 55^{PO}, 52^{PIF}, 62^{PIF}, 75^{O}, 74^{O}, 84^{O}, and secondary decay 85^{O}

Fig 2: OPG of the patient

The OPG was of good diagnostic quality, had 28 permanent teeth present and the eruption pattern was normal.

- The root development of first permanent molars had started (nearly 1/3 formed) and was beginning for 41, 42, 31, 32 11 and 22.
- Crown formation of the second permanent molars, canines, and premolars was 1/2 formed.
- The child's dental age was 5 years.
- There was dentinal radiolucency noted on 75, 74, 65, 64 and pulp exposure of 55, 85 and associated inter-radicular radiolucency.

Diagnosis

4 year old African Male with severe early childhood caries, the significant findings were;

- Dental alveolar abscess secondary to extensive decay of 55
- Irreversible pulpitis 85, 75
- Occlusal caries 54, 64, 65, 84, 74

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- Irreversible pulpitis 85, 75
- Occlusal caries 54, 64, 65, 84, 74

Management

Individualised treatment objectives were set and a comprehensive treatment plan developed for the child. These objectives included controlling infection, relieving pain and discomfort, modifying the child's and parents' attitude and behaviour to oral health and treatment. These would in turn enable the clinician improve the child's oral hygiene, restore the integrity and function of the dentition, achieve cariostasis and maintain a health oral cavity.

Treatment involved prescribing antibiotic and analgesics, applying basic behavioural modification procedures, dental health education and diet counselling. Pulpectomies of 55, 85 and pulpotomies 75 and 84 were done, and restored 54, 65, 64, 52 and 62 with compomer. 55, 85, 75, and 84 were

Post-op records

Fig 3: Postoperative photographs, frontal and lateral views (right and left) respectively showing restored 52, 62, 51 and 61 had exfoliated and a class I angle's molar relationship on the right and left

Fig 4: Post-operative photographs, occlusal views of the maxillary and mandibular arches respectively. 55, 85, 84, 75, 74 restored with compomer and the first permanent molars have erupted

Fig 5: Post-op Bitewing radiographs showing crowned 55, 85, 84, and 75

Fig 9: Maxillary and mandibular occlusal views showing the stainless steel crowns on 55, 75, 84 and 85

Discussion

This case report describes how early childhood caries can be comprehensively managed such that the risk of developing caries in the permanent dentition is minimised. Without a doubt, preventing the occurrence of the disease is the most cost-effective measure as restorative treatment is often challenging not only to the child and parent/ caregiver but also to the clinician (Kemoli, 2013, Tahmassebi and Brosnan, 2007). In addition, the successful outcome of restorative treatment is hinged on a number of factors and failures do commonly occur and re-treatment or extraction of the involved teeth and space management may have to be undertaken.

The indications, objectives, and type of pulpal therapy depend on whether the pulp is vital or nonvital. This is based on the clinical diagnosis of normal pulp, reversible pulpitis, symptomatic or asymptomatic irreversible pulpitis or necrotic pulp. Following treatment, the tooth should remain asymptomatic without adverse clinical signs or symptoms like sensitivity, pain or swelling. The post-operative radiographs should show no signs of pathological external root resorption. Any radiographic infectious process should resolve within 6 months as evidenced by bone deposition in the pre-treatment radiolucent areas (AAPD, 2014).

The child's oral hygiene was improved and the affected teeth restored. No post-operative symptoms or signs have been noted and a recall schedule involving 6 months periodic checkups, re-emphasising oral hygiene instructions and fluoride vanish application. The pits and fissures on the permanent first molars were sealed within 4 months after emerging into the oral cavity when adequate moisture control could be achieved. It's advised to seal the pits and fissures shortly after eruption because this is the period when these teeth are most susceptible to decay.

Continuous monitoring of the developing dentition and anticipatory guidance will be done. Periodic bitewing x-rays to assess the proximal surfaces of the posterior teeth preferably every 12-24 months for this child will also be taken.

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Restoring a Single Central Anterior Crown using CEREC CADCAM technology.

A Case Report

Dr Mawano Timothy BDS (WITS,SA)

The dental world continues to embrace the use of technology in the diagnosis and treatment of dental ailments everyday. CADCAM (Computer Assisted Design and Computer Assisted Manufacture) technology is one such technology that is getting incorporated more and more into the work flows of dentists and dental technicians.

With an increasing number of dentists having CADCAM units in their practices or sending their laboratory work to CADCAM enabled dental laboratories, Uganda is no exception to this trend.

The introduction of CADCAM systems and machinable ceramics have made the "single visit dentistry" concept possible. Restorations can be fabricated and customized to the patient's requirements right at the dental chair side which in-turn leads to a decrease in the number of required patient visits and chair time.

In order to get the best of out CADCAM systems, their seamless integration into the dental treatment workflow is very important.

They should make dental treatment quick and efficient and fabricate restorations that will yield long term success. Most CADCAM systems consist of two components: the acquisition unit: which is used to create image, create digital impressions, design the restoration and, the milling unit which manufactures the restoration from the design made. Some systems have a dental furnace with them that works with their milling units for ceramic materials that require firing CEREC is one of these systems and has been a pioneer of CADCAM technology in the dental field for the last thirty years.

Several studies 1,2,3 have shown that restorations from these CADCAM systems can have great long term success with great internal and margin fit and thus they have now been incorporated into the digital work flows of most dental treatment procedures especially those of restorative or prosthodontic nature.

To show how a CADCAM system can be used in your dental practice, let me share this case with you in which I restore a fractured tooth 21 using the CEREC system.

A male patient in his mid thirties presented with a discoloured and fractured tooth 21 (Fig 1) that he wanted restored. Tooth 21 had undergone successful endodontic treatment and this was confirmed with peri-apical radiographs. The decision was made to restore tooth 21 with a ceramic crown in order to achieve the aesthetics the patient desired.

Fig 1: Pre-operative picture of tooth 21

Restoring a single anterior can be a very challenging endeavour due to the high aesthetic demand its position in the mouth creates; the shade has to match or blend in with that of the surrounding teeth, attention has to be paid to the transition line angles and contours as these affect the way light reflects of the tooth etc. Luckily these and other aspects of the restoration can be analyzed and adjusted at the chair side with the CADCAM system as detailed below. Once the tooth is prepped to receive a ceramic crown, a digital impression/ scan (Fig 2) is taken of the maxilla with the prepped tooth 21. The maxilla is imaged and finally the buccal bite is also imaged.

This gives us a good idea of the occlusal relationship of the teeth and how much contact pressure is being placed on the teeth.

The margin is then identified and marked on the tooth prep (Fig 2). The ability to zoom up to 20x ensures that the smallest detail on the prep can be identified and corrected on the prep. Features like prep check (Fig 3) can show, using different colours, the amount of clearance you have from the adjacent and opposing dentition

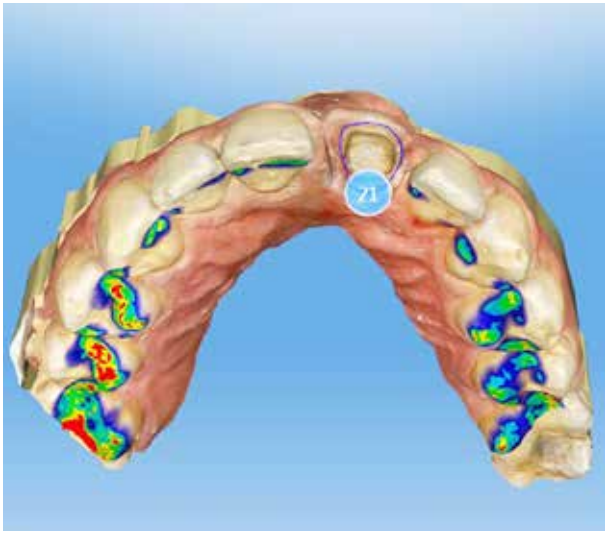
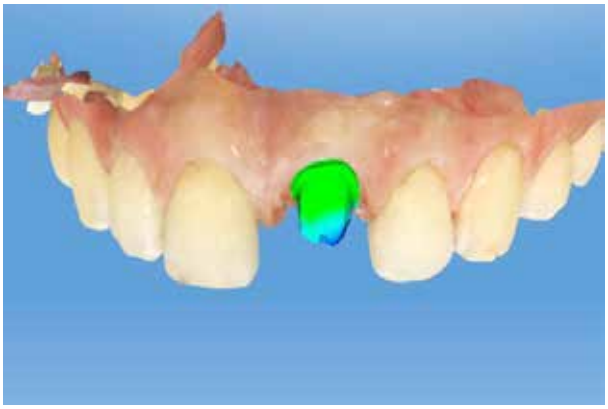


Fig 2: Picture showing margination of tooth 21



Once the margin has been marked, the CADCAM software proposes a restoration (a crown in this case) that would best fit the preparation (Fig 4). This is made from algorithms that base their final result on the morphology of the adjacent and opposing teeth and not from generic "stock" tooth shapes. This results in an initial restoration proposal that blends in with the rest of the dentition.

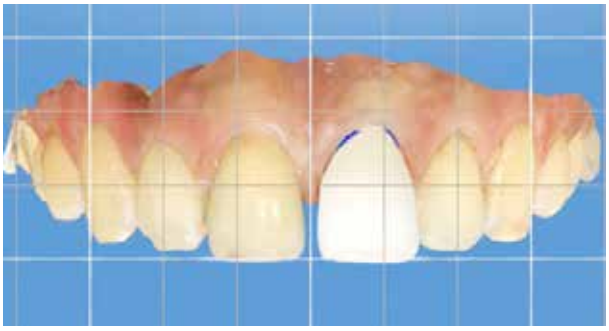


Fig 4: Picture showing initial crown proposal for tooth 21

Important aspects of the restoration i.e. the material thickness, spacer dimensions for the luting agent, contours, width and height of the restoration can be refined at this point to the clinician's liking. Proximal and occlusal contacts can also be assessed and adjusted accordingly to provide a great fit.

One of the tools that is a great asset, especially when restoring anterior teeth, is the shade analysis tool. With it, the shade of the teeth that have been imaged can be identified and presented in either the classical VITA shade guide format or the newer VITA 3D shade guide format (Fig 5).

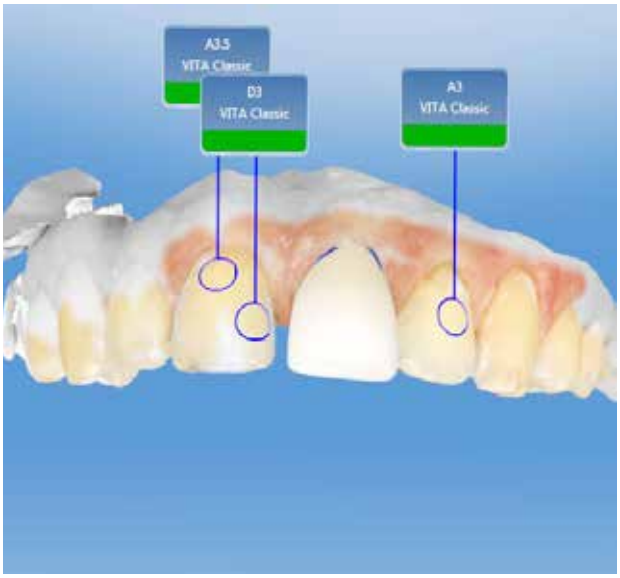


Fig: 5: Shade Analysis of tooth 21

Once all the adjustments haven been made to the proposal, a ceramic block can then be placed into the milling machine from which the restoration can be fabricated.

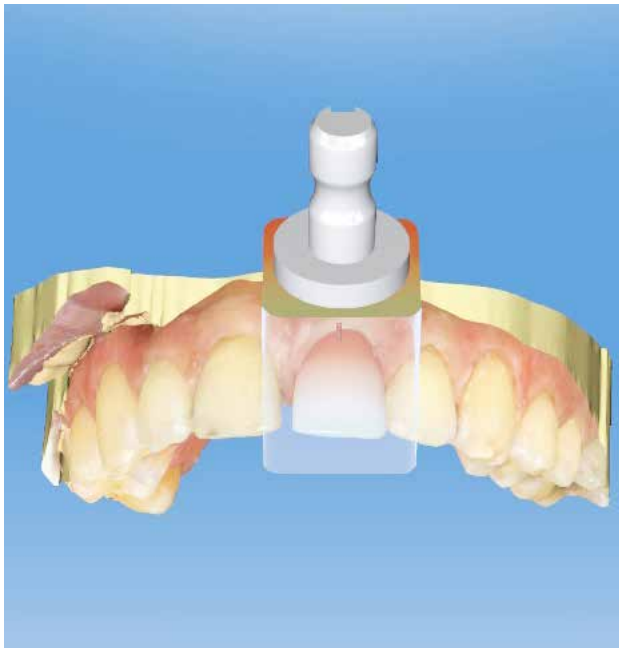


Fig: 6: Picture showing the Manufacture phase

Multi layered blocks like the empress multi, which I chose for this case because I felt it would bring out the aesthetic appearance the patient sought, have a gradation of chroma as you traverse along the height of the block. This change in chroma is advantageous as the amount of chroma on the restoration can be altered by moving the position of the restoration in the block (Fig: 6). Once milled, the empress was stained with emax stains, fired and then polished before adhesively bonding it to the prepped tooth 21 with variolink dc neutral cement.

In the end the patient was happy with the final restoration (Fig: 7), (Fig: 8) and that I was able to do all this in a single ninety minute visit.

This freedom to identify and refine all these aspects of the restoration gives me greater control on how the final restoration looks and fits in the patient's mouth.

With all that technology is doing to create much faster, and efficient ways to deliver dental treatments, many work flows are being created to allow for integration between the different technologies. An example of such, is the integration of Cone beam Computer Tomography (CBCT) data with CEREC CADCAM systems in order to easily plan for implant placement and restoration with very little hassle. 3D printers are now making inroads into dentistry especially with the manufacture of surgical stents and models.

With such gains being made into the dental field by modern technologies, it is becoming more and more apparent that dentists start to focus on how they can integrate them into their treatment work flows so that they can be more efficient at what they do.

Fig 7: Immediate Post operative picture of tooth 21

Fig 8: picture Comparison of Before and After

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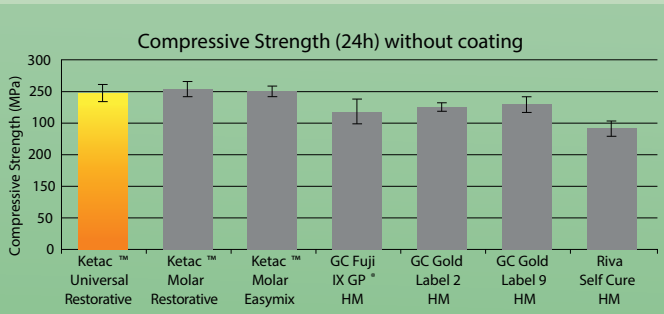

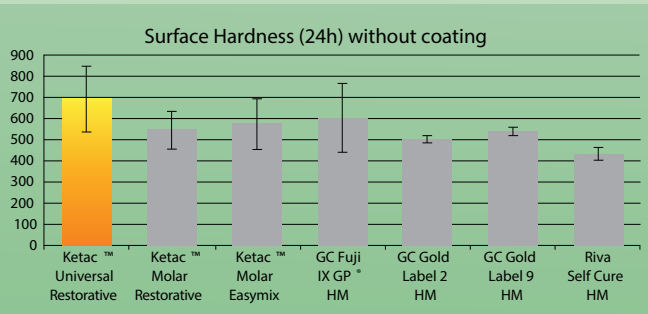

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ABSTRACT 1

Prof. Claudio Fernandez

Lecture Topic:

The new Branemark Institute protocol for increased access to better health and well being of edentulous patients.

Lecture Relevance:

Introduce a new treatment modality for improved access to dental treatment for edentulous patients with high success rates, reduced treatment time and low costs.

Lecture Abstract:

The continuous expansion of elderly populations in several parts of the world require adequate management also of the oral health conditions. Management of the edentulous patient are among the challenges we face in elderly patients as it's important to keep adequate oral health functions for well being. The new three implants mandible fixed bridge protocol developed by the Branemark Institute in Brazil, restores safely and predictably the oral health functions with relevant reductions of treatment time and costs. Based on biomechanical principles of stability, the implants are placed in a specific design with well defined angulation and dimensions, using an innovative multifunctional implant guide. The new protocol reduces treatment time and the use of products by more than 50%, promoting improved conditions to enhance the access for dental treatment, as well as securing higher profit returns to the oral health professionals.

Mini CV:

Claudio Fernandes is Professor of Prosthodontics, Fluminense Federal University at Nova Friburgo. He is also Chair of UFF/NF Center for Sustainability in Dentistry, Scientific Chairman of the joint education-dental initiative "Social Practices Literacies for Oral Health" Chairman of the Academy of Dentistry International – Chapter Brazil, Head of the Brazilian Delegation at ISO/TC106, and Consultant to the FDI Science Committee from 2009-2017.

ABSTRACT 2

DR. Gerhard Seeberger

Introduction:

Rehabilitation of edentulous areas in the upper maxilla of shallow gingival type patients is best achieved with aesthetic implant-abutments or aesthetic implants in zirconia. However, aesthetic abutments do not avoid the disadvantages of two-piece implant systems. Today the micro-roughness of zirconia one-piece implants is similar to that of titanium implants allowing reasonable soft-tissue and bone healing times.

Materials and Method:

IThreaded on-piece zirconia implants with an implant diameter of 4.1 mm and 3.3 mm and a micro-rough surface of 10 mm of length have been used in three different situations. In edentulous areas with immediate loading, in fresh alveolar sockets with immediate loading and in edentulous areas after bone splitting with immediate loading. Two different antibiosis protocols have been followed. Short therapy in edentulous sites and conventional antibiotic therapy starting 36 hours before tooth extraction have been followed. Implant bed preparation has been performed with drills, as well as with chisels and bone-spreaders in edentulous sites, while a no-drill procedure combined with the use of bone-spreaders has been chosen to manage extraction sockets. The implant insertion torque has been measured with a torque controlled ratchet. All implants but one have reached more than 35 Ncm of insertion torque (< 30 Ncm upper left incisor). All implants have been loaded immediately with provisional crowns guaranteeing infra-occlusion.

Results:

All implants have healed in without complications. Final restorations have been placed between 4 weeks and 10 weeks after implant insertion.

Conclusion:

Although longer healing times are indicated for zirconia implants to achieve osseointegration, it seems that immediate loading protocols do not differ significantly from protocols set for titanium implants. An insertion torque over 35 Ncm is the standard for immediate loading also for zirconia implants. Further studies are needed to consolidate this statement.

ABSTRACT 3

Dr Elkhadem Ahmed

Lecture Topic:

Growth modification in Class II division 1 malocclusion: Myth or fact?

Lecture Abstract:

Increased overjet characterises class II division 1 malocclusion. Two main treatment protocols are suggested: One phase or two-phase approach. One phase (orthodontics only) approach recline on waiting until all eruption of all permanent teeth, then apply full strap-up and correct the overjet. While two-phase approach depends on the orthopaedic phase where growth modification is induced with a functional appliance, then an orthodontic phase later. This lecture will discuss the following points:

1. Definition of Class II div 1 malocclusion
2. Typical cephalometric findings in class II div 1
3. Treatment protocols: One phase versus two-phase approach
4. Classification for appliances used in stage one.
5. Do we grow bones using orthodontic appliances? Evidence-based approach.
6. The choice for effective treatment protocol.

Mini CV:

Claudio Fernandes is Professor of Prosthodontics, Fluminense Federal University at Nova Friburgo. He is also Chair of UFF/NF Center for Sustainability in Dentistry, Scientific Chairman of the joint education-dental initiative "Social Practices Literacies for Oral Health" Chairman of the Academy of Dentistry International – Chapter Brazil, Head of the Brazilian Delegation at ISO/TC106, and Consultant to the FDI Science Committee from 2009-2017.

ABSTRACT 4

Dr.Tiromwe

Background:

Mbarara Kindergarten School is a privately owned school located in Booma in Mbarara Municipality. Its students are mainly from "high class" or financially well to do families in Mbarara. The management requested for a dental check-up of its children as they had noticed some student absentism due to dental complaints.

Objectives:

The main objective of the study was to establish the dental caries prevalence and make necessary recommendations to the parents through the School Management.

Methods:

A total of 249 children aged between 3.5 to 5.5 years were examined for dental caries by an experienced dental surgeon. Children were examined for dental caries under field conditions. The children were examined in supine position while seated on a chair facing the examiner. Examination for dental caries was conducted with a plane mouth mirror and dental explorer. The Early Childhood Caries (ECC) were diagnosed and recorded using the dmft according to World Health Organisation (WHO) 1997 criteria. The clinical findings were recorded by a kindergarten teacher who had been given some training by the examiner.

Results:

A total of 249 children with a mean age of 4.6 years were examined. Of the examined children,133 (53.4%) were girls and 116 (46.6%) were boys. A total of 91 children (36.5%) had dental caries with a decayed, missing and filled teeth (dmft) index of 1.0 with the decay (d) component accounting for 97.6%. Of the children with dental caries, 51 (56.0%) were females.

Conclusion:

The dental caries prevalence of 36.5% is high. A comprehensive community-focused oral health care intervention that includes oral health education is recommended. Key words: Dental Caries, dmft, WHO

Dental Materials Application and Their impact on Clinical Outcomes

A Case Report

Mugisa Ian, BDS, MSD, GCSRT

Careful selection of materials is very crucial to the success of clinical dental outcomes. Even more important, is the knowledge of how to handle and apply them during clinical procedures. The success of every speciality of dentistry is dependent on the reported performance of the materials used and how they are placed.

Some of the desirable properties of dental materials include biocompatibility, easy handling/applicability, durability, good colour stability and stain resistance. This article will attempt to highlight techniques that will maximize the use of dental materials in restorative dentistry.

Techniques to maximize bonding to dentin and enamel

Bonding is the placement of a biocompatible adhesive on a prepared tooth surface in order for it to adequately hold the restoration you intend to place over it.

There are generally three steps in bonding and these include: Etching, priming, and applying the adhesive. The delivery system in which these are applied may be determined by the generation of bonding agent. For this article, 4th generation to the 8th generation will be highlighted.

Table showing steps in bonding using the different generations of bonding agents

4th Generation (3 bottle, 4 step)	5th Generation (2 bottle, 3 step)	6th Generation (2 bottle, 3 step)	7th Generation (single bottle, 2 step)	8th Generation (Single step)
Acid etch, rinse	Acid etch, rinse	Acid etch+primer	Acid etch+Primer +Adhesive	Acid etch+Primer +Adhesive (self-cure)
Primer application	Primer + Adhesive			
Adhesive is placed		Adhesive is placed		
Apply resin	Apply resin	Apply resin	Apply resin	Apply resin
Examples:	Examples:	Examples:	Examples:	Examples:
Scotchbond, optibond	Prime and Bond	Clearfil SE	Prompt L Pop	Surpass

When applying bonding agent to tooth surface, it is important to consider the configuration factor (C-factor). The C-factor is the ratio of bonded surfaces to unbonded surfaces in a tooth preparation. The higher the C factor, the higher the disruption from polymerization. This often results in shrinkage stress and microleakage.

Important pointers to consider during bonding process:

1. Active Etching: this refers to the process of actively displacing the bubbles on the surface of the prepared tooth in order to allow the etchant to treat a wider surface

area of the tooth. Most etchants are formulated in gel form and tend to form bubbles.

For preferred outcomes, it is important to etch dentin for at least 10 seconds. Prepared Enamel and Sclerotic dentin are better treated for 20 seconds.

2. Applying bonding agent to moist dentin: Current research has shown that the shear bond strength is higher with moist dentin than over dry dentin. Dry dentin often cause the collagen matrix to collapse and yet this is important for a good bond to form. However, there is often a challenge for most practitioners in determining how wet a surface should be prior to application of bonding agent. The surface should not be flooded with water but it should be blotted to remove excess moisture. A good primer can help to overcome the challenge of dry dentin.

3. Utilize plaque/caries disclosing agents. This is important to identify surfaces that may not be fully instrumented and may present a challenge to the bonding.

4. Always take note of the expiry date and batch/lot number and record that in the client's charts. This is essential in tracking the performance of the material. It can be helpful when informing the manufacturer about a batch which may have presented challenges.

5. Make sure to utilize the same manufacturer for your bonding components (Etchant, Primer and Adhesive) .This is because the manufacturers report material performance based on their proprietary chemistries. When you mix brands (Etchant, primer and bond), you may not always be guaranteed the same bond strength.

6. Follow strict step wise manufacturer instructions. Although this is straight forward, it is important that you read the attached package insert even if it is for the same product you are accustomed to. Dental practitioners often get used to applying a certain product with success but they may not always update their knowledge and techniques when they acquire newer materials. This is especially important at a time like this where so many new products are being introduced on to the market.

7. Only dispense the bonding agent and primer when you are ready to apply it. This is because the active ingredients that enhance bonding (acetone, alcohol) are volatile and evaporate when left open. This may be a challenge for multiple chair practices where the same bottle is used to dispense for a number of operatories.

Limit the time the adhesive and primer are left on the disposable wells

8. Use appropriate well calibrated curing light (calibrate with a curing light meter) Halogen lights tend to generate heat. LED lights use less power but may be restricted in curing wavelengths . Additionally, ensure that the light guide is cleaned of old resin so that the correct intensity is maintained. As curing lights are used longer, they may under perform because their mechanical components are wearing out.

9. Storage of bonding agent Bonding agents should be refrigerated to maintain their efficacy. Most vaporizing substances are best stored at freezing temperatures. This also applies to acetone and alcohol.

10. Use good lighting and magnifying loupes This is essential for better visual examinations. Dental practitioners are at risk for spinal cord injury because of postural problems. Magnifying loupes can assist to reduce the predisposition.

11. Use a digital clock that captures temperature and humidity. Even though the temperature and humidity may not fluctuate so much, it is important to record this on the client's chart. These may have an effect on the performance of the dental materials you are applying.

12. Read the ingredients of the bonding agents. Certain people are allergic to hema that is found in certain bonding agents. Ensure that your client is not allergic to any of the components listed on the bonding agent.

13. Utilize diluted Chlorhexidine (2%) to treat the dentin prior to bonding. This helps to deactivate salivary enzymes that may inhibit the bonding agent.

Techniques to maximize handling and application of dental composite resins

Dental composites are technique sensitive and require careful application.
These are some useful consideration for good clinical outcomes.

1. Use non-stick hand instruments for packing and placing composites.

   Ultra-smooth titanium is good to prevent stringing back of the composite

2. Use appropriate calibrated curing light and include a sleeve to protect the guide

3. Utilizing a composite warmer to improve the flow of the composite. Packable composites tend to be difficult to adapt and a composite warmer can improve the flow and adaptation of the resin when placing in a prepared cavity.

4. Use the appropriate shade guide for good results. Ensure that your composite kit has the correct shade guide. This is crucial to correct color matching and good aesthetic outcomes.

5. Utilize good finishing burs for smoothness and reduction of risk for plaque retention

6. Invest in a good polishing system. Dentsply caulk produces Enhance PoGo kit which produces a good ultra-polish finish.

7. For big cavities with high Configuration-factors (C factor), consider the use of low shrinkage composite resins such as 3m'S Filtek LS (Silorane-dimers) OR SureFil (Dentsply).

In Conclusion, knowledge of Dental materials and their application, is very helpful in order to achieve good clinical outcomes. They are technique sensitive and it is important to ensure proper case selection prior to their application.

Dental lab CAD/CAM technologys

Besigye Howard CDT

Today, everything seems to be going digital. From Photography, Music, Engineering to medicine and dentistry. High tech words like CAD/CAM, intraoral scanning, extraoral scanning, 3-D milling, and 3-D printing are not new to our ears.

CAD is the abbreviation for 'computer-aided design' and CAM is 'computer-aided manufacture'. The whole CAD/CAM process, that is: data capture or acquisition, design software, materials, and production process results in increased predictability, precision, accuracy, quality and efficiency. Other benefits include: the access to new, almost defect-free, industrially prefabricated materials and improved turn-around time.

All CAD/CAM systems consist of three components:

- A digitalization tool/scanner that transforms geometry into digital data that can be processed by the computer (intra or extra oral scanner).
- Software that processes data and, depending on the application, produces a data set for the product to be fabricated
- A production technology that transforms the data set into the desired product (mill or printer). In dentistry three different production concepts are available:
- Chair-side production such as CEREC.
- Laboratory production Everest such as: KaVo, inLab (Sirona) or even assembled from various manufacturers.
- Centralized fabrication in a production center such as PROCERA.

Laboratory production

This type of production is very similar to the traditional working sequence between the dentist and the laboratory. The dentist sends the impression to the laboratory where it is scanned or a master cast is fabricated first. All other CAD/CAM production steps are carried out completely in the laboratory. With the assistance of an extra oral impression or model scanner, three-dimensional data are produced on the basis of the master die. This data is processed using dental design software. After the CAD-process the data is sent to a special milling device that produces the real appliance which is then sintered in a high temperature furnace in the dental laboratory. Finally the exact fit of the appliance can be evaluated and corrected on the master cast.

STEP 01

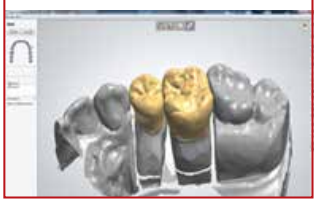
The impression or model is scanned

STEP 02

The impression is digitalized on the computer

STEP 03

The teeth are designed with the aid of a special CAD software



STEP 04

The restoration is Positioned on the disc and milled in the milling machine

STEP 05

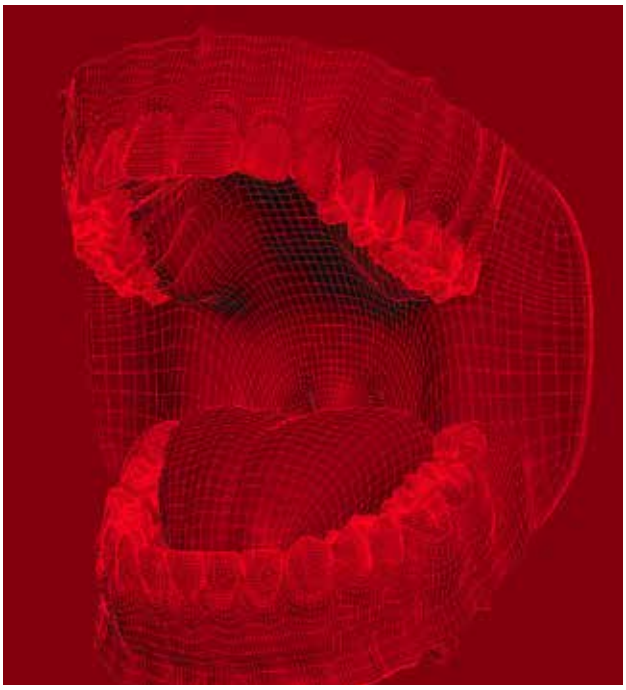
Before sintering, the restoration is colored using the brush infiltration technique

STEP 06

After sintering, the restoration is individually characterized using stains

STEP 07

The finished restoration on the model



This system offers the labs the ability to merge old-school dental techniques with new digital technologies and improves turnaround time.

For the dentist, who cannot go CAD/CAM, this system offers the opportunity to benefit from the new digital technologies and materials such as zirconium that are only available using CAD/CAM technology. It should be noted that the buy-in expense for the complete chairside production unit makes it economically unreachable for the majority of dentists in this country. Furthermore, the whole chairside CAD/CAM process demands a dedicated group of skilled persons to allow the dentist time for other patients. There is a reduced need for hiring new employees and buying new technology on the part of the dentist.

The materials used in CAD/CAM range from ceramics(MILLED EMAX AND ZIRCONIUM OXIDE), polymers (PMMA), composites, metal and wax to create burnout patterns before conventional casting or pressing.

CAD/CAM technology however is not intended to replace the skills needed by a dentist or dental laboratory technician but to enhance them. And with a handful of dentists using the intraoral scanning technology in Uganda, the conventional impression and models still remain "the in- thing" to create CAD/CAM generated restorations.

Therefore, as with any other dental restorations, the success of CAD/CAM restorations is entirely dependent on a good preparation, a detailed impression (conventional or digital), knowing your materials, good communication and understanding the science and art behind the design principles involved in meeting the dentist and patient needs and expectations.

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Management Of Odontogenic Infections: Pharmacologic Role

Dr. Nakyonyi Maria Gorretti BDS(MUK)

JUBILEE DENTAL CLINIC.

Odontogenic infections are infections arising from teeth and closely surrounding tissues.

Odonto- teeth, genic- birth.

These range from low grade, well localized infections that require minimal treatment to severe life threatening deep fascial space infections within a short while.

Predisposing factors include: dental caries, pericoronitis, periodontitis, trauma to the dentition and supporting structures or complications of dental procedures and periodontal abscess.

They are of two types:

a. Simple odontogenic infections:

I. Don't extend beyond alveolar process
II. First course of treatment
III. Immunocompetent

b. Complex odontogenic infections:

I. Extend beyond the alveolar process
II. Immunocompromised
III. Recurrent episode

Examples of simple odontogenic infections include a vestibular abscess.

Complex odontogenic infections include: buccal (25.4%), submasseteric (22.4%), submandibular (17.5%), parapharyngeal, retropharyngeal, temporal, canine, pretonsillar, parotid, submental, sublingual etc.

Complications associated include: suppurative mediastinitis, intracranial extension, carvenous sinus thrombosis, lemierre syndrome, maxillary sinusitis, ludwig's angina, carotid artery erosion, osteomyelitis, retropharyngeal spread, airway obstruction, pleuropulmonary involvement and hematogenous dissemination with septic shock and disseminated intravascular coagulopathy indicate the potential serious nature of the infections.

The infections are usually polymicrobial involving normal endogenous flora that can be found on plaque, mucosal surfaces and gingival sulcus.

Common causative bacteria are primarily aerobic and anaerobic gram positive cocci plus anaerobic gram negative rods.

Dr. Kityamuwesi et al noted that streptococcal group was found to be at 23.5% while staphylococci aureus was at 19.4% and these were found to be the frequent isolates found in Uganda.

Other facultative microbes included: Escheria coli (10.2%), Hemophilus influenza (7.1%), staphylococcus epidermidis (4.1%), Klebsiella pneumonae (4.1%), Enterococcus species (3.1%) ,streptococci aggalactiae, proteus mirabilis, corynebacterium, citrobacter freundii among others.

Anaerobes included: anaerobic bacilli (12.2%), anaerobic streptococci, prevotella (p.oralis, p.buccae), porphyromonas gingivalis, peptostreptococci and fusobacterium.

G.K.B. Sandor et al also noted that in periodontitis and pericoronitis, the following bacteria were isolated: peptostreptococci, fusobacterium and bacteriodes while in periodontal abscesses prevotella intermedia, fusobacterium and capnocytophaga were sighted.

Anaerobic gram negative rods (bacteriodes, fusobacterium, prevotella) were more frequently isolated from patients with severe infections than from mild. Fusobacterium nucleatum was predominately associated with severe infections.

Anaerobic gram negative cocci and anaerobic gram positive rods appear to have little or no role in the cause of odontogenic infections instead they appear to be opportunistic organisms.

Pathogenesis:

After the initial inoculation into deeper tissues, the facultative S.milleri group can synthesize hyaluronidase which allows the infecting organisms to spread through connective tissues.

This is seen in the first 3 days characterized by a soft, mildly tender, doughy swelling with edema.

On penetration into the connective tissues, 3-5 days after, a cellulitis type of infection is seen characterized by a hard, red, acutely tender, boardlike swelling and this a very aggressive stage. Infecting mixed flora stimulate the intense inflammatory response.

Metabolic byproducts from the streptococci then create a favourable environment for the growth of anaerobes, the release of essential nutrients, lowered pH in the tissues and consumption of low oxygen supplies.

The anaerobic bacteria are then able to grow and as the local oxidation – reduction potential is lowered further, the anaerobic bacteria predominate and cause liquefaction necrosis of tissues by synthesis of collagenases. Collagen is broken down and invading white blood cells necrose and lyse, microabscesses form and may coalesce into a clinically recognizable abscess between 5 – 7 days.

Abscess stage is characterized by smaller size, with a soft center containing pus, not aggressive. At this stage, anaerobic bacteria may eventually become the only organisms found in culture. Clinically, the progression of the infecting flora is from aerobic to anaerobic. Drainage of the abscess through skin or mucosal surgical drainage, hallmarks the resolution stage as the immune system destroys infecting bacteria and the process of healing and repair ensue.

Infection spreads equally in all directions but preferentially along lines of least resistance e.g. cancellous bone before cortical bone and also determined by the relationship of the site of perforation of bone to the muscle attachments of maxilla and mandible.

Antibiotics alone may arrest but not cure the infection because the infection is likely to recur when antibiotic therapy has ended without treatment of the underlying dental cause.

Principles of management of odontogenic infections:

- Determine the severity of infection
- Evaluate state of patient's host defence mechanisms
- Determine the need to refer to an oral and maxillofacial surgeon
- Treat infection surgically
- Support patient medically
- Choose and prescribe appropriate antibiotic
- Administer antibiotic properly
- Evaluate patient frequently

Determine the severity of infection:

Complete history: including onset, course, rapidity of progress of infection.

Elicit patient's symptoms I.e. dolor (pain), tumour (swelling), color (warmth), rubor (erythema, redness), function laesa (loss of function).

For functio laesa, assess for trismus (less than 2 finger breadths), difficulty in swallowing and chewing, dyspnea.

Ask for general state of the patient i.e fatigue, feverish, weak and sick are said to have malaise. Malaise usually indicates a generalized reaction to moderate to severe infection.

Inquire about treatment (previous professional and self treatment and compliance).

Medical history: check for vital signs: temperature, RR, PR, BP. Patients who have systemic involvement of infection have elevated temperature to 101^0F or higher (greater than 38.3 ^{0}C).

Pulse rate increases as patient temperature increases.

Pulse rate increase up to 100 beats/min is common in patients with infections: rates higher than 100beats/ min have a severe infection and should be treated more aggressively.

The vital sign that varies least with infection is BP. Only if the patient has significant pain and anxiety will there be an elevation of systolic BP, however septic shock results in hypotension.

Close observation of the RR. This is due to the potential of complete airway obstruction as a result of extension into the deep neck fascial spaces. Patients with mild to moderate infection may have elevated RR greater than 18 breaths per minute.

Patients who have normal vital signs with only a mild temperature elevation usually have a mild infection that can be readily treated.

Abnormal vital signs indicate serious infection and

require more intense therapy and evaluation by an oral and maxillofacial surgeon.

Patients with a severe infection have a "toxic appearance" which presents with glazed eyes, dehydration, open mouth and sick appearance.

Local examination of the swelling: inspection, palpation, intraoral examination for cause of infection. Consistency of the swelling may vary from a very soft and almost normal through a firmer fleshy swelling i.e inoculation stage to an indurated swelling (tightened muscle) – cellulitis to a fluctuant swelling with pus in the center of an indurated area – abscess .

Radiographic examination: panoramic xray preferred due to trismus. Presence of airway or eyelid swelling and neck involvement warrant a diagnostic CT scan to avoid potentially disastrous complications.

Categorize examination to stage of infection

Soft tissue infection in inoculation stage may be cured by removal of odontogenic infection with or without supportive antibiotics and infections in cellulitis or abscess stages require removal of the dental cause of infection plus I&D and antibiotics.

Abscess stage indicates increased host defences. In some patients, an indurated cellulitis may have areas of abscess formation within it.

Evaluate state of patient's host defence mechanisms:

Part of medical history is designed to estimate patient's ability to defend themselves against infection.

Infections in compromised patients become severe more rapidly. These conditions allow more bacteria to enter the tissues or be more active or they prevent the humoral or cellular defences from exerting their full effect e.g. uncontrolled diabetes, end stage renal disease with uremia, severe alcoholism with malnutrition. These result in decreased function of the leukocytes, including decreased chemotaxis, phagocytosis and bacterial killing.

Worsening control of hyperglycaemia correlates directly with lowered resistance to all types of infection.

Leukemias, lymphomas, many types of cancer result in decreased white cell function and decreased antibody synthesis and production. HIV infection attacks T lymphocytes, affecting resistance to viruses and other cellular pathogens. Fortunately, odontogenic infections are caused largely by extracellular pathogens hence HIV seropositive individuals are able to combat odontogenic infections fairly well until AIDS has progressed into advanced stages, when the B lymphocytes are also severely impaired. Nonetheless, care of the HIV seropositive individual with an odontogenic infection is more intensive than for an otherwise normal patient.

Chemotherapeutic agents can decrease circulating WBCs to low levels less than 1000cells/ ml hence inability to defend themselves against bacterial invasion.

Immunosuppressive therapy e.g. cyclosporine, azathioprine, corticosteroids decrease T and B lymphocyte production hence severe infections. Immunosuppressive effects can last a year after completion of therapy.

Vigorous treatment in such patients and referral to an oral and maxillofacial surgeon: alongside parental antibiotic therapy.

Prophylaxis is needed in such compromising conditions to decrease risk of postoperative wound infection.

Determine the necessity of an oral and maxillofacial surgeon:

Reasons for referral:

- Rapidly progressing infection
- Dyspnea
- Dysphagia
- Dehydration
- Moderate to severe trismus
- Swelling extending beyond the alveolar process
- Elevated temperature, greater than 38.3^{0}C
- Severe malaise and toxic appearance
- Compromised host defences
- Need for general anaesthesia
- Failed prior treatment

Treat infection surgically:

Primary principle of management of odontogenic infections is to perform surgical drainage and to remove the cause of infection

Goals of surgical management:

- Remove cause of infection
- To provide drainage of accumulated pus and necrotic debris. Surgical treatment may range from something as simple as endodontic access

opening and extirpation of necrotic pulp to treatment as complex as wide incision of soft tissue in the submandibular and neck regions for a severe infection or even drainage to the mediastinum.

Examples of cases:

I. A carious tooth with a periapical radiolucency and a small vestibular abscess→endo/extraction with/without I&D. if the tooth is not to be extracted, it should be opened and its pulp removed which results in elimination of the cause and limited drainage through the apical foramen of the tooth.

II. If the tooth cannot be salvaged and is not restorable, it should be extracted as soon as possible.

Extraction provides removal of the cause of infection and drainage of accumulated periapical pus and debris

I&D may be required for an infection that has spread beyond the periapical region.

Uses of pus evacuation:

- Dramatically decreases bacterial load and necrotic debris
- Reduces hydrostatic pressure in region decompressing the tissues, which improves local blood supply and increases delivery of host defences to infected area
- I&D of a cellulitis serves to abort spread of infection into deeper anatomic spaces

Adequate drainage is very essential if endodontic opening of the tooth does not provide adequate abscess drainage, it is essential to perform an I&D.

Care should be taken when performing an I&D to avoid damage to mental and facial nerves plus parotid gland and frenum.

Indications for culture and sensitivity:

- Infection spreading beyond the alveolar process
- Rapidly progressive infection
- Previous multiple antibiotic therapy
- Non responsive infection after 48 hours
- Recurrent infection, compromised host defences (harbour unusual pathogens).
- In C&S, surgeon should request a gram stain, aerobic and anaerobic cultures and antibiotic sensitivity testing in writing.

Support patient medically;

Factors to put into consideration:

- Immune system compromise,
- Control of systemic disease
- Physiologic reserves. ie children and dehydration, malnutrition

Medical consultation i.e. Treatment team selects therapies designed to enhance the immune system, combat infection medically with bactericidal antibiotic and optimize surgical management of the infection.

Many systemic diseases also reduce the ability of the patient to resist infection and to undergo treatment. In diabetes, control of blood sugar is directly correlated with resistance to infection. Host response to a significant infection increases blood sugar levels and hence insulin requirements of a diabetic person.

CVS disease decreases ability of host to respond to stress. Therefore optimizing control of hypertension, cardiac dysrrhythmias and atherosclerotic heart disease is an essential part of the comprehensive management of odontogenic infections.

Medications may also affect the treatment of odontogenic infections. E.g. patient receiving anticoagulant therapy with warfarin may need reversal of the anticoagulation before surgery. Patients with systemic issues need a full team of specialists.

Some patients without medically compromising diseases may have reduced or altered physiologic reserves to draw upon as they combat an infection. Children are particularly susceptible to dehydration. Fever increases the daily adult requirement by about 800ml per degree F per day and daily caloric requirements by 3 – 5% per degree per day.

However temperatures up to 103F may be beneficial in combating infections therefore judicious control of highly elevated fever along with active hydration and nutritional support are important components of the management of odontogenic infections.

Because of pain and difficulty in swallowing , patients

frequently have not had adequate fluid intake, nutritional intake or rest.

During the immediate post treatment period, patients should be encouraged to drink sufficient water or juice and take high calorie nutritional supplements. Patients should also be prescribed adequate analgesics for pain relief so that they can rest.

Choose and prescribe appropriate antibiotics:

Antibiotics must be viewed as a double edged sword.

Their misuse provides little benefit to offset the associated risks and expense of antibiotic administration.

Antibiotics alone may arrest but not cure the infection because the infection is likely to recur when antibiotic therapy has ended without treatment of the underlying cause.

Antibiotics don't hasten wound healing and don't provide any benefit for non bacterial (eg viral) conditions. Antibiotics must never be used as a replacement for appropriate surgical drainage and/or debridement and should only be used as adjunctive therapy.

Patients who have inflammatory pulpitis have severe pain, but the pain results from the local inflammation reaction within the pulp not from bacterial infection spreading into deeper tissues hence no need of routine antibiotic therapy.

Factors influencing the decision to use an antibiotic;

1. Seriousness of the infection.
2. Whether adequate surgical treatment can be achieved.
3. State of patient's host defences.

Principles of antibiotic use:

a. Determine the need for administration
b. Use empirical therapy routinely
c. Use narrowest spectrum antibiotic
d. Use the antibiotic with the lowest incidence of toxicity and side effects
e. Use a bactericidal antibiotic if possible
f. Cost of antibiotic

Indications for antibiotic use:

I. Swelling extending beyond the alveolar process
II. Cellulitis
III. Trismus
IV. Lymphadenopathy
V. Temperature higher than 101^0F
VI. Severe pericoronitis
VII. Osteomyelitis and medically compromised patient

Contraindications of antibiotic use:

Toothache (caries, pulpitis)

Periapical abscess(I.e. a draining abscess/ fistula containing chronic infection usually only requires extraction of offending tooth and not antibiotics.

Treatment of the dry socket is primarily palliative and dry socket is not treated as an infection. Although bacterial pathogens may play a role in dry socket, the clinical problem of dry socket is self limiting and appears to be due to premature fibrinolysis(loss of blood clot).

Irrigation with hydrogen peroxide or chlorhexidine plus extraction of the partially erupted tooth will result in resolution.

Dry socket

Multiple dental extractions in a non compromised patient

Mild pericoronitis

Drained alveolar abscess

Use empirical therapy routinely:

Odontogenic infections are caused by highly predictable bacteria hence antibiotic sensitivity is well known and consistent.

C&S not necessary routinely.

Effective orally administered antibiotics effective against odontogenic infections:

- Penicillin (allergy, frequency and number of pills)
- Amoxicillin
- Clindamycin
- Azithromycin
- Metronidazole
- moxifloxacin
- ceftriaxone

These antibiotics are effective against aerobic and facultative streptococci (except metronidazole) and oral anaerobes.

Metronidazole is effective only against obligate anaerobic bacteria hence should be reserved for a situation in which only anaerobes are suspected (or in combination with an antiaerobic activity e.g. penicillin)

Clearly patient frequently fail to take the medication in the way in which it was prescribed, patient compliance decreases with increasing number of pills per day. 1 pill; 80%, 2 pills; 69%, 4 pills; 35%. ie amoxicillin & clindamycin; thrice, erythromycin; four times; moxifloxacin; once daily.

Penicillins and cephalosporins;

Bactericidal, peak serum levels 1 -2hrs post ingestion. With all penicillins other than amoxicillin, food can delay absorption and can result in low peak serum levels. Side effect; anaphylaxis.

Oral penicillin G is not recommended as empiric therapy for odontogenic infections, gastric acid inactivates the drug with the result that 30% of the oral dose is absorbed.

Phenoxymethylpenicillin (penicillin V) is the penicillin of choice for odontogenic infections. Has higher acid stability than penicillin G, produces plasma levels

2 -5 times higher than equivalent dose of penicillin G.

Clavulin, a combination of amoxicillin and beta lactamase inhibitor clavulanic acid, retains activity against beta lactamase producing organisms (p. melaninogenicus) commonly associated with odontogenic infections.

1st and 2nd generation cephalosporins, while having a significantly broader spectrum of activity than penicillins, do not offer any advantage over pen V in treating odontogenic infections ; this is due to principle odontogenic pathogens.

Increasing rates of resistance (penicillin) have been observed with members of the genus Bacteriodes and prevotella, due to increasing beta lactamase producing bacteria.

Due to increasing prevalence of penicillin resistance, the Stanford Guide to Antimicrobial Therapy recently replace pen V with clindamycin as the drug of choice in treating odontogenic infections. Penicillins have historically been used as first line therapy in these cases; but increasing rates of resistance have lowered their usefulness.

Becterial resistance of this class of agents is perdominately achieved through production of beta lactamases. Clindamycin because of its broad spectrum activity and beta lactamase degradation, is an attractive first line therapy in the treatment of odontogenic infections.

First line therapy in non penicillin allergic ; clindamycin/ pen V/ metronidazole. If no resolution, clindamycin/ amoxclav + metro, if they fail refer.

Penicillin allergy; clindamycin, no resolve refer.

Ceftriaxone:

3rd generation, with a long half life I.V/I.M once daily. Broad spectrum against gram positive and negative aerobic bacteria and some anaerobes.

Achieves high concentration in bone and has shown to be as efficacious and cost effective antimicrobial alternative to penicillin G(IV).

Macrolides;

Erythromycin, clarithromycin and azithromycin; bacteriostatic agents that inhibit RNA dependant protein synthesis.

Upto 50% of fusobacterium resistant to erythromycin.

Macrolides shouldn't be considered as first line therapy in treating odontogenic infections, only reserved for patients with penicillin allergy.

Newer macrolides clarithromycin and azithromycin have improved pharmacokinetics compared to erythromycin.

Tetracyclines;

Limited use though effective on both gram positive and gram negative bacteria.

Doxycycline and minocycline possess better anaerobic activity than tetracycline, but neither of these should be considered 1st line therapy for odontogenic infections.

Metronidazole;

Bactericidal, highly active against most anaerobes, but lacks activity against aerobic bacteria.

In serious infections, metronidazole is best used in combination with penicillin to ensue coverage against gram positive bacteria. However the combination of 2 drugs with different dosing schedules may lower patient compliance.

Very rare resistance; rapid absorption after oral administration. Absorption is not affected by food, although peak serum levels may be delayed.

Well tolerated. Excellent anaerobic gram negative activity, coupled with its low degree of toxicity, make it a good candidate in the treatment of O.Is.

Clindamycin;

Excellent against gram positive organisms, including anaerobes and beta lactamase producing strains.

Low concentrations of the drug are bacteriostatic, but bactericidal activity is achieved clinically with usual recommended doses.

Oral – 90% absorption; absorption delayed but not decreased in food ingestion.

Not indicated in new born

Has excellent activity against aerobic gram positive cocci e.g. staph.aureus, streptococcus spp and most anaerobes, including penicillin resistant strains of Bacteriodes, prevotella, pophyromonas.

Safe in penicillin allergic patients in endocarditis rather than erythromycin.

Floroquinolones;

Ciprofloxacin, norfloxacin, ofloxacin and levofloxacin.

Bactericidal, potent gram negative activity including activity against pseudomonas spp; their activity against gram positive bacteria is marginal.

However due to the spectrum of organisms associated with odontogenic infections, use of floroquinolones in the treatment of acute odontogenic infections should not be considered.

Moxifloxacin;

Tolerable new broad spectrum 8 methoxy quinolone with good oral tissue penetration, bioavailability and adequate resorption time after oral dosage.

Effective on gram negative and multi resistant aerobic and anaerobic bacteria and atypical organisms.

Oral versus IV;

MOST infections when treated in a timely manner can be adequately managed using oral therapy.

Patients with no airway sweling,eyelid swelling or neck involvement, who have normal oral intake and systemically feel well are good candidates for oral therapy.

However IV antibiotics and hospital admissions should be considered when swelling of the airway, swelling of the eyelid or neck involvement is present, or the patient's level of activity and oral intake is reduced.

Presence of airway or eyelid swelling and neck involvement warrants a diagnostic CT scan to avoid potentially disastrous complications.

Use the narrowest spectrum antibiotic:

Narrow spectrum are used for simple odontogenic infections while broad spectrum are used for complex odontogenic infections.

Ability to kill bacteria of narrow range to minimize drug resistance

Penicillin specific to streptococci and little effect on staphylococci on skin and G.I bacteria.

High penicillin resistance hence no longer first line as before.

Other examples of broad spectrum; ceftriaxone, clindamycin also mentioned here, etc.

Narrow spectrum:

- Penicillin, metronidazole (due to the obligate anaerobic activity only)

Broad spectrum:

- Amoxicillin
- Amoxicillin – clavulanic acid
- Azithromycin
- Tetracycline and moxifloxacin
- Ceftriaxone
- Clindamycin

Use the antibiotic with the lowest incidence of toxicity and side effects:

Factors to put into consideration:

- Allergic reactions i.e. penicillins, cephalosporins etc
- Drug interactions I.e. agonistic and antagonistic
- Pregnancy and children
- Underlying medical state
- Older safer than newer antibiotics.
- Penicillin allergy (2-3%)
- Azithromycin and clindamycin→ low incidence of toxicity and side effects.
- Pseudomembranous colitis (0.1 – 17%)→ clindamycin, ampicillin, cephalosporin, chloramphenicol
- Erythromycin → not effective against oral pathogens, interacts with clarithromycin in the liver microsomal enzyme system
- Moxifloxacin→ muscle weakness, mental clouding, fatal drug interactions with commonly used CVS drugs, not safe in children and pregnancy
- cephalosporins→ allergic as penicillin
- Tetracyclines → no longer useful except topical administration; photosensitivity, G.I problems, nausea, diarrhea, abdominal cramping and tooth discoloration when ingested systemically.
- Metronidazole → mild toxicities, G.I disturbances, metallic taste.
- Patients should be warned not to consume alcohol while on this medication as an "antabuse" reaction (nausea, vomiting, abdominal cramps) can occur.
- Crosses placental barrier and should be withheld during the 1st trimester. Use of metronidazole during the 2nd and 3rd trimester not recommended but can be considered if potential benefits are weighed against possible risks.
- Aminoglycosides e.g. gentamicin, amikacin not safe in pregnancy due to ototoxicity
- Vancomycin → "red neck" or red man syndrome, anaphylaxis
- Chloramphenicol →death in prematures and newborns, hemoptysis, hematemesis, hematuria, pseudomembranous colitis.
- Clindamycin interacts with warfarin to increase the INR.

Bactericidal Versus Bacteriostatic:.

Bacteriostastic interfere with bacterial reproduction and growth hence allowing host defences to move into the area of infection; phagocytose existing bacteria and kill them.

Bactericidal antibiotics usually interfere with cell wall production in newly forming growing bacteria. The resultant defective cell wall is not able to withstand osmotic pressure differential between the cytoplasm and the environment, and the bacteria virtually explode. The antibiotic virtually kills the bacteria whereas WBCs, complement and antibodies of the host play a less important role in fighting bacteria.

Bactericidal; penicillins, aminoglycosides, metronidazole, cephalosporins, vancomycin, cotrimoxazole, floroquinolones e.t.c

Bacteriostatic; azithromycin, chloramphenicol

- Bactericidal preferred in host compromised defences

Bacteriostatic should be minimized in patients with compromised host defence systems

- Cheaper drugs preferred to expensive drugs if all other factors are held constant.
- Expensive drugs; moxifloxacin, vancomycin e.t.c

Antibiotic Use and Susceptibility Pattern:

- In a study done in Uganda, ½ of 130 patients had a history of antibiotic use with no prescription.

Common reasons for resistance:

- Overuse of antibiotics
- Unnecessary prescriptions
- Presence of antibiotics in food and water supplies
- Mutation/ exchange of genes within the genus.
- About 7 -12% of antibiotic prescriptions in all prescriptions are for odontogenic infections.
- All s.viridans were resistant to penicillin G, cotrimoxazole, ampicillin and tetracycline and susceptible to vancomycin.
- Staph. Aureus were resistant to cotrimoxazole, ampicillin and susceptible to vancomycin, cefotaxime, augmentin, linezolid,moxifloxacin.
- All strep. Pneumoniae isolates showed susceptibility to chloramphenicol, clindamycin,

ceftriaxone, erythromycin and ciprofloxacin while being resistant to penicillin G and cotrimoxazole.

- In previous study in malasia, strep. Pneumonae isolates exhibited lower values of resistance to cotrimoxazole.
- E coli were highly susceptible to imipenem, amikacin, ciprofloxacin and gentamicin but all existed resistance to amoxicillin – clavulanate, ampicillin, cotrimoxazole, cefotaxime and levofloxacin
- Ethiopia showed E coli to have high resistance to cotrimoxazole as well as erythromycin, amoxicillin and tetracycline.
- This trend of resistance may be explained by the spread of multi drug resistant plasmids containing genes for the extended spectrum beta lactamase production.
- Generally, most bacterial isolates were resistant to cotrimoxazole which could be due to frequent prescription of the drug especially among Ugandan health practitioners and prophylaxis against Pneumocystis jiroveci pneumonia in HIV infected patients.
- NB: chloramphenicol effective against vancomycin resistant enterococcus.
- Gentamicin effective against gram negative bacteria i.e. pseudomonas, proteus, E coli, K. pneumonae, enterobacter aerogenes, serratia and gram positive staphylococci.
- Gentamicin is ineffective against anaerobes.
- Amikacin effective on multidrug resistant, aerobic gram negative bacteria especially pseudomonas, acinetobacter, enterobacter, E coli, proteus, klebsiella and serratia, also gram positive bacteria ie staphylococcus and norcardia, non responsive m.tubercular strains.
- Vancomycin is crucial in treatment of aggressive s.aureus of endocarditis.
- Overall, gram positive and gram negative isolates had poor susceptibility to cotrimoxazole and ampicillin but high susceptibility to chloramphenicol.
- All gram negative isolates (E coli, K pneumonia, Proteus mirabilis and citrobacter freundii) were susceptible to amikacin and imipenem, but had poor susceptibility rates to ceftazidime, cotrimoxazole and ampicillin.
- Regrettably, use of broad spectrum antibiotics has resulted in decreased sensitivity of oral bacteria with a growing number of resistant strains.
- Distinct differences in resistance pattern are related to; individual hospitals, geographic regions, antibiotic prescribing regimen.
- The WHO prescription guidelines and the MOH, clinical guidelines recommend use of phenoxymethyl penicillin, amoxicillin, erythromycin, metronidazole and procaine penicillin fortified in the management of denta abscesses, gingival infections, periodontitis and other perioral infections but no studies have been done in uganda to assess their efficacy in odontogenic infections.

Conclusion:

Antibiotics should be used only when clear evidence exists of bacterial invasion into deeper tissues that is greater than host defences can overcome.

Zirconia; The White Gold in Digital Dentistry.

Dr. Musinguzi Esther Marilynn

Ceramics are very important in the science of dental biomaterials.Among all dental ceramics, zirconia is the material of choice in contemporary restorative digital/ CAD-CAM dentistry.

This is so mostly because of its biocompatibility, high fracture toughness, and radiopacity.

It has been applied for fabricating crown and bridge restorations, endodontic posts, implant abutments and aesthetic orthodontic brackets, however the highest clinical success and evidence lies in partial prostheses (crowns and bridges).

Keywords; Zirconia, dentistry, CAD/CAM, aesthetic, strength.

INTRODUCTION

Zirconia has been known as a gem since ancient times, the name comes from the Arabic word "Zargun" (golden in colour).

Zirconia is a silicate mineral majorly mined from Australia, Brazil, India, Malysia, Russia, & USA. It was first used for medical purposes in 1969 for orthopaedic application.
Due to increasing interest in aesthetics and concerns about toxic and allergic reactions, we as dentists have been looking for strong metal-free tooth-coloured restorations. Therefore, the development of new high strength dental ceramics, which appear to be less brittle, less limited in their tensile strength, and less subject to time dependent stress failure has dominated the later part of the 20th century. These capabilities are highly attractive in prosthetic dentistry, where strength and aesthetics are paramount.

DENTAL APPLICATION OF ZIRCONIA

Although many types of zirconia-containing ceramic systems are currently available, only three are used to date in dentistry, these are;

- yttrium cation-doped tetragonal zirconia polycrystals (3Y-TZP),
- magnesium cation-doped partially stabilized zirconia (Mg-PSZ) and
- Zirconia-toughened alumina (ZTA).

(The Open Biomaterials Journal, 2014, Volume 5 Marfa et al.)

Zirconia crown #26

Zirconia-Based Crown and Bridge

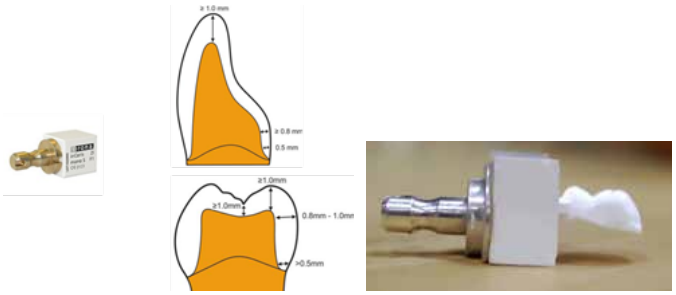
Zirconium is becoming one of the most chosen materials for dental crowns because it is;

- Extraordinarily tough
- Can withstand wear and tear
- Translucent enough to be similar to natural teeth
- Less tooth removal
- No Metal fuse
- Modifiable size, shape and color
- Biocompatible

Tinschert et al. compared survival time of different metal-free core for three unit fixed prostheses and reported that zirconia-ceramic with alumina oxide had the highest initial and most favourable long-term strength.

Processing: CAD/CAM;

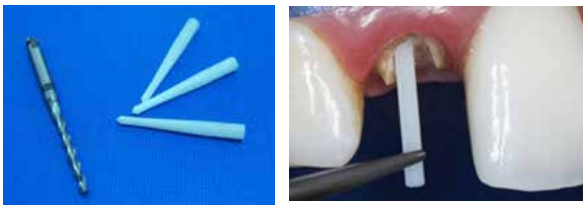
Tooth prep, Uniform circumferential reduction; 0.8-1mm, Circumferential chamfer, Occlusal; of 1.0-1.5mm, Chamfer margin; 0.5-1mm



Zirconia-Based Dental Posts

In situations where all-ceramic restorations are used for restoring anterior teeth, metal posts may result in unfavourable aesthetic results, such as a grey discoloration of translucent all-ceramic crowns and the surrounding gingival margin.

Additionally, corrosive reactions with prefabricated posts may cause complications involving the surrounding tissues and oral environment, including a metallic taste, oral burning, sensitization, oral pain, and other reactions. These concerns have led to the development of white or translucent posts made of zirconia and other ceramic materials.



Zirconia-based dental posts (From Koutayas et al.: Eur J Aesthetic Dent, 2009; 4: 348-380.)

Zirconia posts are available as smooth, tapered and parallel, or tapering at apex and parallel at the coronal aspect. Zirconia posts also offer possible advantages with respect to aesthetics and biocompatibility however Dietschi et al. reported that the zirconia posts have poor resin-bonding capabilities into radicular dentine after dynamic loading and have poor retention into resin cores.

Zirconia-Based Implant & Abutments

Utilizing zirconia as implant-supported restorations is due to the higher toughness and the lower modulus of elasticity of zirconia. In stabilized and transformation-toughened forms, zirconia provides some advantages over alumina in order to solve the problem of alumina brittleness and the consequent potential failure of implants. These abutments are distinguished by their tooth-matched colour, their good tissue compatibility, and their lower plaque accumulation.

The Open Biomaterials Journal, 2014,Volume 5&3;pfm bridge changed to zirconia implants and crowns

Due to scarcity of clinical studies, the replacement of titanium implant by zirconia implant is still under comprehensive especially for zirconia abutments and implant-supported. Are metal-free/full Zirconia restorations

Replacement of conventional (precious) metal-based restorations with zirconia is entirely possible, but should only be carried out by dental technicians who have undertaken special training in this field.

Zirconia-Based Aesthetic Orthodontic Brackets

Polycrystalline zirconia brackets, which reportedly have the greatest toughness amongst all ceramics, have been offered as an alternative to alumina ceramic brackets. They are cheaper than the monocrystalline alumina ceramic brackets but they are very opaque and can exhibit intrinsic colours making them less aesthetic. Good sliding properties have been reported with both stainless steel and nickel-titanium archwires However, Keith et al. found no significant advantage of zirconia brackets over polycrystalline alumina brackets with regard to their frictional characteristics.

Conclusion

Digital dentistry introduces precision and perfectionism into clinician skills; let us embrace it with open wide arms. Materials, software and their applications keep evolving and improving to the benefit of the patient and the dentist. Zirconia is matching up to our expectations with amazing results!!!

Time and our work processes: Digital Dentistry

Dr. Mutyabule Tom

BDS (MUK). MSc (UNIV OF LONDON), F.IC.D, CERTIFIED ISCD CEREC TRAINER C.IMPLANTOLOGY (UNIV OF PRETORIA). Diploma of IAA in IMPLANTOLOGY, (UNIV OF FRANKFURT). Post grad Diploma in IMPLANTOLOGY (UNIV OF PRETORIA). Fellow of the Pierre Fauchard academy.

With only 8 hours a day for official work in an industry that is mainly "procedural" it is always helpful if we are equipped with the tools necessary to do our work faster and more efficiently and deliver a service to our clients with ease. In a world which is now driven by time speed has become a very big factor in what we do and how we run our businesses.

Patient management software should be part and parcel of a busy practice. Some have the capacity to offer reports and give an analysis of the day to day running of the practice in addition to making the calender more interactive and easier to communicate with the clients on a routine and daily basis. IT also eases work for reception staff like it happened in an office where the staff at the reception used to take 5 hours to do patient appointments for the next day but that changed to less than 20 min! Some can actually read the patient insurance card information through a scanner and automatically upload the patient data and show the available balances if available on the insurance card !

HANDPIECE STERILISATION.

The cycle of scrubbing, cleaning, oiling and sterilising a handpiece can take as much as one hour!!

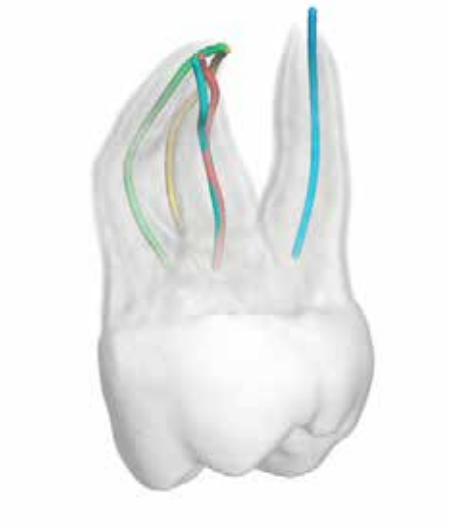
WITH THE DAC UNIVERSAL THE PROCESS CAN TAKE AS SHORT AS 15 MIN! More efficient and a longer life to the handpieces. IT can also be used for other autoclavable instruments in the same short time: 15 mins.

This has the effect of reducing the no of handpieces a busy practice needs to stock and a big effect on the staff work style of the ones in the sterilasation room. Lastly it has been stated that handpieces need to be flashed with cold water first before oiling and the autoclaving cycle to ensure maximum sterility

DAC Universal

RESTORATIONS CROWNS BRIDGES AND MORE

Making restorations in the conventional manual impression style requires several visits . Research has shown that patients prefer one visit dentistry where possible and always find the digital impressions more comfortable than the manual impressions. Now with the DentisplySirona Omnicam speed fire set up it is possible to deliver a Zirconia crown in one hour! the only system to do so at the moment. This is on track to change the way and speed of delivery of dentistry like never before. Many functions are opening up to make life easier for both the dentist and the patient



3 D Endo software.

With the advent of CBCT systems it has changed the management and improved the style of delivery of many surgical procedures.

Now it is possible to accurately analyse the root canal system of the patient and see from the hitherto unavailable mesial or distal view of the root canal system to analyse the curvatures. The 3 D endo software has shown that the conventional access cavities we do based on 2 D radiography are many times not the most ideal for straight path of insertion of the files . Now with 3 D endo we have the opportunity to plan the root canal treatment right from the shape of the access activity prep, know the curvatures in the roots, know the check lengths and necessary maximum file size before actually staring the procedure.

3 D VIEW OF A TOOTH BEFORE THE ROOT CANAL PROCEDURE.

It is now also possible to plan Ortho treatment digitally. Even bracket placement position can be determined and planned digitally. This cuts the time for placing brackets on the patients teeth to as short as 10 minutes or less !!!!! procedure.

There is no doubt that as technology evolves so will our treatment styles. BE READY FOR THE TECHNOOGY TRAIN.

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Some of SBI's completed projects



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