

The --- Dental Probe

The Maltese Dental Journal





Are your patients' dentures truly clean?

Even visibly clean dentures can have hidden dangers.

The denture surface contains pores in which microorganisms can multiply and thrive.¹ Up to **80%** of patients use toothpaste to clean their dentures.^{2,3} As dentures are approximately **10x** softer than enamel,⁴ the abrasive nature of toothpaste can create scratches, which may lead to increased microbial colonisation,⁵ resulting in gum irritation or denture malodour for your patients. These inadequate cleaning methods can cause the appearance of your specially made and well-fitting dentures to deteriorate and affect your patients' denture wearing experience and satisfaction.

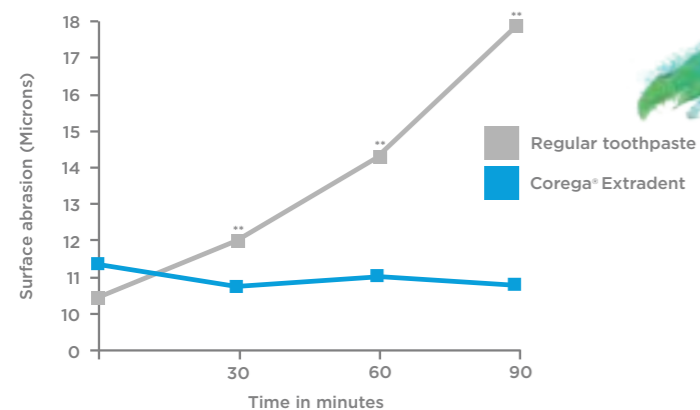


Corega® Extradent denture cleanser – specially designed for dentures

- Corega® Extradent cleanser offers patients the **dual benefits** of **mechanical** and **chemical** cleansing*
- Corega® Extradent cleanser is proven to **penetrate the biofilm[†]** and **kill microorganisms** even within hard-to-reach denture surface pores⁶
- Corega® Extradent cleanser is **non-abrasive⁷**, unlike toothpaste, and does not create scratches, which can lead to increased microbial colonisation

Offer your patients proven daily protection with Corega® Extradent denture cleanser

Brushing with Corega® Extradent was associated with significant ($p \leq 0.005$) reduction in depth of abrasion compared with a regular toothpaste⁷



Examiner blind, randomised three-period crossover study done on 26 subjects simulating brushing for 90 minutes using toothpaste (Crest cavity protection RDA-95) and Corega® Extradent denture cleanser on an acrylic denture prototype. Surface changes observed at baseline, 30, 60 and 90 minutes. Abrasion was assessed using surface profilometer. ** $P \leq 0.005$.

* When used as directed; † *in vitro* single species biofilm after 5 minutes soak

References: 1. Glass RT *et al. J Prosthet Dent.* 2010;103(6):384-389; 2. Marchini L *et al. Gerodontol.* 2004;21:226-228; 3. Barbosa L *et al. Gerodontol.* 2008; 25:99-106; 4. GSK Data on File; Literature review. August 2013; 5. Charman KM *et al. Lett Appl Microbiol.* 2009;48(4):472-477; 6. GSK Data on File; Lux R. 2012; 7. GSK Data on File; L2630368. October 2006.

Corega is a registered trade mark of the GSK group of companies.



Help your patients eat, speak and smile with confidence with the Corega® denture adhesives and Corega® Extradent denture cleansing tablets.

Editorial

By Dr David Muscat

Dear colleagues,

It has been a sweltering summer. I hope you all had a nice break. The cover photo is by Dr Josef Awad – Valletta Panorama.

The DAM is working on prospective hands on courses. The Christmas party is earmarked for the 8th December. A Full day Kerr Endodontics course entitled 'The Simplicity, Durability and Flexibility in Endodontics' is being held in conjunction with the DAM on Friday 29th September at the Hilton. The guest speaker is Dr Anca-Maria Badescu. The DAM is currently negotiating an implant course for its members

A sailing event is also being planned. We are working on a new mobile phone package for our members.

Best regards,

David

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



Dr David Muscat (Secretary DAM), Dr David Vella (President DAM), Her Excellency Marie Louise Preca, Dr Kenneth Spiteri (DAM member) and Dr Nicholas Busuttill Dougall (IT Officer DAM) at a recent official visit to the Presidents Palace at San Anton

SUNDAY EMERGENCY TREATMENT

Dear Colleagues,

We are currently in the process of preparing for the third cycle of the **ANNUAL EMERGENCY SUNDAY LIST OF ATTENDING DENTISTS.**

For the unacquainted, a different dentist answers calls on a common line (**9906 1800**) between 8.30am and 11.30am. Emergency treatment is provided against an additional surcharge of €50.00. An average of 2-3 patients are seen normally and dentists answer the line up to a maximum of 2 Sundays per year. Dentists working in the same practice can have a separate placement if so desired.

The roster date is randomly drawn up and is binding however dentists can easily exchange dates amongst other participants utilising a **WhatsApp** group.

The scheme will continue until emergency treatment provision is re introduced at Mater Dei Hospital or the minimum number of participants is not reached.

Dentists interested can simply send their name and mobile number on **maltadentalemergency@gmail.com.**

Unlike previous years current participants need to reapply.

Daniel Cassar Darien

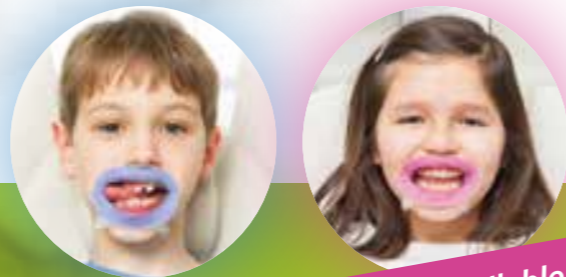
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ENDODONTICS - Full Day Course Program -MALTA



In conjunction with the
Dental Association of Malta

Date: Friday 29th September 2017

Time: 8:30 – 17:00hrs

Location: Hilton Malta, Portomaso, St.Julian's

“The Simplicity, Durability & Flexibility in Endodontics”

Guest Speaker: Dr. Anca-Maria Badescu

On behalf of: Kerr™ Endodontics

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.....OBTURATION.....

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- No follow-up treatment needed



INTRODUCTION TO LUMINEERS

From the Lumineers Presentation for certified Lumineers in Malta by Page Technology Ltd
By Dr Michael Schneider from Denmat





New Sensodyne Rapid Relief

ACTS FAST

to help prevent moments like these



CHMLT/CHSENS/0032/17

Help patients **BEAT SENSITIVITY PAIN FAST**



*With twice-daily brushing

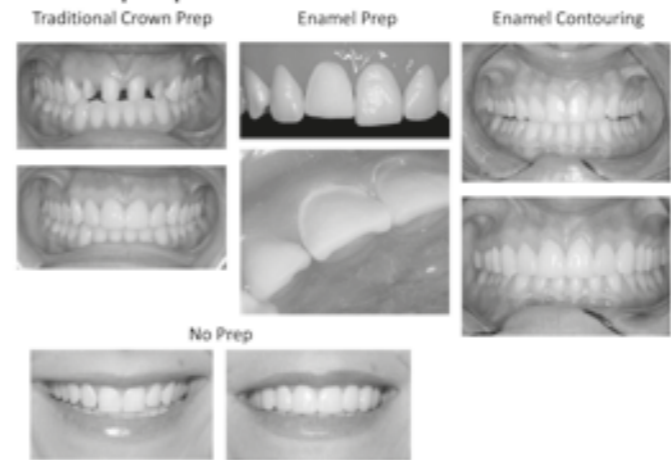
New Sensodyne Rapid Relief is a unique formulation engineered for speed that supports accelerated occlusion of dentine tubules.¹ It provides clinically proven relief in just **60 seconds** after brushing sensitive areas,^{2,3} giving patients long-lasting protection* from sensitivity and its impact on everyday life.^{4,5}

Reference: 1. Accepted for presentation at IADR 2017, Abstract no: 2631820. 2. GSK Data on File 207211, January 2017. 3. Accepted for presentation at IADR 2017, Abstract no: 2635085. 4. Parkinson CR et al. Am J Dent. 2015 Aug;28(4): 190-196. 5. Baker S et al. Longitudinal validation of the Dentine Hypersensitivity Experience Questionnaire (DHEQ). Poster presented at IADR/AADR/CADR General Session & Exhibition; 2013 March 20-23, Seattle, Washington. Date of preparation : June 2017. CHMLT/CHSENS/0032/17

INTRODUCTION TO LUMINEERS

Continues from page 7.

Tooth preparation is not black & white



Why do so many Dentists still employ traditional prep techniques?

- Old porcelain had to be made thick or it would break. Thanks to better materials, veneers can now be made as thin as 0.3mm.
- Traditional prep was taught in school and at institutes such as LVI.
- Skepticism about esthetics of min-prep or no-prep veneers.
- Traditional prep techniques are easier than minimal or no-prep techniques.
- **LUMINEERS address all of these concerns!**

LUMINEERS are fabricated from Strong & Beautiful Cerinate Porcelain



- Lumineers are crafted from next-generation Cerinate pressed feldspathic porcelain reinforced with leucite nano-crystals delivering a highly esthetic product.
- Due to its superior strength of 236 MPa, LUMINEERS can be made as thin as a contact lens, allowing placement without significant removal of enamel and without removal of dentin.
- Now 30% stronger than the original LUMINEERS.
- Cerinate porcelain exhibits low wear rates against opposing dentition when compared to conventional porcelain.
- Cerinate is the only porcelain backed by over 20 years of evidence-based research.
- Cerinate continues to be made exclusively by DenMat in Santa Maria, CA.

Proprietary digital design technology & manufacturing process deliver consistent, predictable results as thin as 0.3mm



*Hand-waxed cases make up less than 3% of all cases, only utilized upon doctor request or on urgent rush-cases

Ideal First Case Indications

- **LUMINEERS & all thin veneers are HARDER to place than traditional veneers.**
- **Dentists unfamiliar with minimally invasive veneer techniques should start with simple cases:**
 - Normal Class I bite
 - Lack of wear facets
 - No TMJ symptoms
 - Good centric relation

Prep Styles and Definitions

Prep Style	Definition	Prep Example
No Prep	<ul style="list-style-type: none"> • LUMINEERS are placed over existing teeth without the removal of tooth structure. • May require minor enamel removal to eliminate undercuts or sharp edges. • No definitive margins. • No temporization required. • Anesthesia may not be required. • No prep technique is ideal for: <ul style="list-style-type: none"> • Small teeth • Limited malalignment • Minor diastemas • Limited staining 	
Enamel Contouring	<ul style="list-style-type: none"> • Enamel is contoured slightly on surface to produce optimal esthetics and create a foundation suitable for placing LUMINEERS. • No definitive margins. • No temporization required. • Anesthesia may not be required. 	
Enamel Preparation	<ul style="list-style-type: none"> • Partial removal of enamel to define margin and allow for draw. • Requires temporization. • Requires only 0.3 - 0.5 mm of enamel removal, causing no sensitivity for the patient. • Typically no anesthesia required. • Requires the use of 4x magnification and a fitted carbide bur. 	
Traditional Preparation	<ul style="list-style-type: none"> • Reduction of tooth structure down to dentin to define margin and allow for draw. • Requires temporization. • Requires anesthesia. • Necessary due to decay, extreme protrusion or rotation, malalignment of the occlusal line due to severe malalignment. 	

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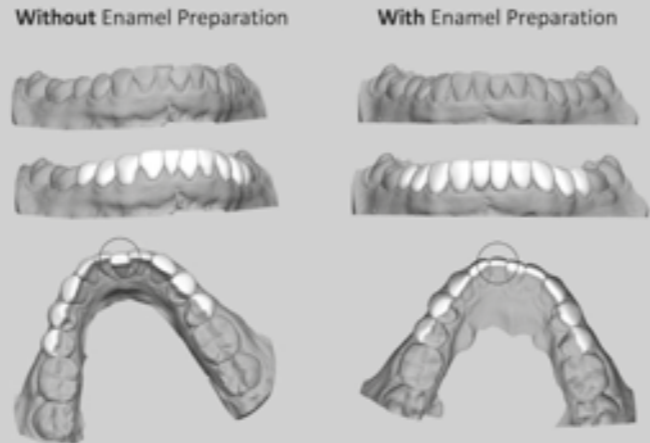
INTRODUCTION TO LUMINEERS

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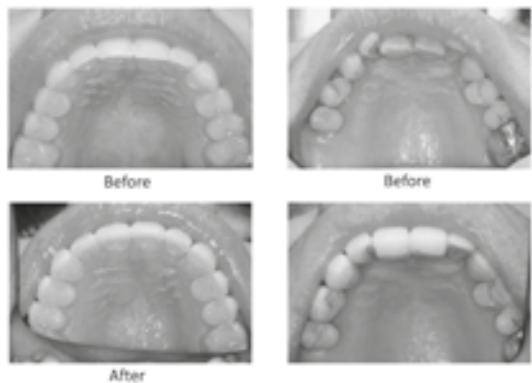
Case Diagnosis: No Prep



When is some tooth reduction required?



Restoration Thickness and Lingual Surface Considerations



Case Diagnosis: Minimal Misalignment



Smile Evaluation & Treatment Plan

- Smile Evaluation**
- Teeth #8 and #9 were rotated
 - Multiple diastemas between laterals and cuspids
 - Diastema between #9 and #10
 - No excessive gingival display
- Treatment Plan**
- 8 LUMINEERS for teeth #5-12 with Enamel Prep on #8 and #9 to reduce the rotation of these teeth



Final Result: Alignment restored to the maxillary arch, diastemas closed, smile whitened, happy patient



TePe Nova Toothbrushes



- Handle** Polypropylene (PP). Inlay: Thermoplastic elastomer (TPE).
- Filaments** Polyamide (PA). The coloured filaments of the tip indicate the texture: Pink tip - x-soft, Yellow tip - soft, Blue tip - medium
TePe Nova Medium has 1450 filaments/TePe Nova Soft has 1900 filaments/TePe Nova Extra Soft has 2660 filaments.
- Neck** Can be angled without heating.
- Product features**
- Tip for increased accessibility.
 - End-rounded filaments for gentle cleaning.
 - Tapered brush-head for improved access.
 - Ergonomically designed non-slip handle for secure grip.



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DEVELOPMENTALLY MISSING TEETH

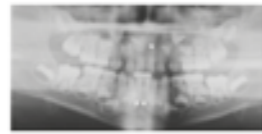
Dr Simon Camilleri PhD MOrth FDS
ITI Study Club, Malta – 15 June 2017

Thanks to: Dr Edward Sammut, Dr Mark Diacono and
various orthodontic postgraduates at MDH and KCL

Developmentally missing teeth



Developmentally missing teeth



A tooth is defined as developmentally missing if
• It has not erupted into the oral cavity
• It is not visible on a radiograph

Permanent dentition Prevalence

	Males %	Females %	Total %
Europe (White)	4.6 (4.5-4.8)	6.3 (6.1-6.5)	5.5 (5.3-5.6)
North America (White)	3.2 (2.9-3.5)	4.6 (4.2-4.9)	3.9 (3.7-4.1)
North America (African American)	3.2 (2.2-4.1)	4.6 (3.5-5.8)	3.9 (3.1-4.6)
Australia	5.5 (4.4-6.6)	7.6 (6.0-9.2)	6.3 (5.4-7.2)
Saudi Arabia (White)	2.7 (2.0-3.4)	2.2 (1.2-3.1)	2.5 (1.9-3.1)
Chinese Mongoloid	6.1 (4.0-8.1)	7.7 (5.4-10.0)	6.9 (5.3-8.4)

(Pinder 2004)

Aetiology



• Grahnen (1956) showed that incisor-premolar hypodontia transmission was most likely genetic and transmitted in autosomal dominant fashion
• Arte (2001) Failed to find causative gene

Developmentally missing teeth

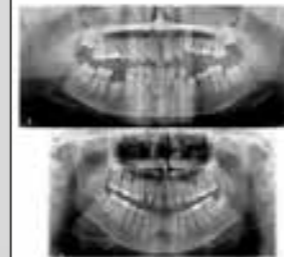


Definition of
• Hypodontia - 6 missing teeth or less
• Oligodontia - more than 6 missing teeth
These definitions do NOT include 3rd molar agenesis
• Anodontia - no teeth at all

Psychosocial

Hypodontia affects quality of life
Measure is Oral-Health Related Quality of Life (OHRQoL)
• Impact of hypodontia is considerable
• Gender related (girls > boys)
• Not related to number/location of missing teeth
• Provision of prostheses improves score (Anwegi 2013)

Epidemiology Caucasian data



- Commonest missing tooth is 3rd molar - 20-30%
- Lower second premolar - 3.4%
- Upper lateral incisor - 2.2%

(Yonezu 2000)

However if only 1 or 2 missing teeth then laterals most frequently absent

(Arte 2001)

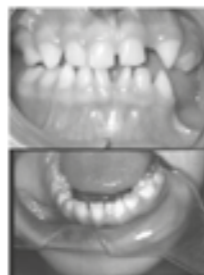
Epidemiology Local data



Survey of 530 schoolchildren in 2003
Results of published studies show:
• High prevalence of lateral incisor hypodontia (>3%)
• High prevalence of ectopic teeth, especially maxillary canines (>5.5%)

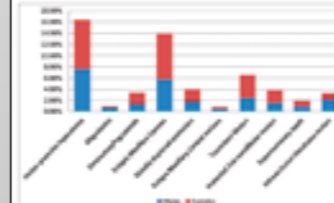
(Lambert & Knight 2007)

Deciduous dentition Prevalence



• Less common in primary dentition – 0.4 to 0.9% (Grahnen and Granath 1961) though higher in Japanese (Yonezu et al 1997)
• Generally one or two teeth missing, no sex bias (Arte 2001)
• Strong correlation between hypodontia in primary and permanent dentitions

Epidemiology Local data



In a hospital-based survey, the prevalence of hypodontia and other dental anomalies was found to be significantly higher than that in the published literature
(Lambert 2003, 2004)

Epidemiology Origins of Population



• Origins of population uncertain, possibly Phoenician/Carthaginian
• Islands invaded and left uninhabited by Tunhians about 800 AD, repopulated primarily from Sicily 100 years later
• Disease and slave-gathering raids suppressed population growth

(Marriner, 2004; Camilleri et al 2005; Camilleri et al 2006)

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DEVELOPMENTALLY MISSING TEETH

Continues from page 13.

Epidemiology Origins of Population

- Military security from Knights of St John and hygiene through British Forces allowed exponential population growth from <20,000 to >400,000 in a space of 20 generations
- Genes present in early population may be over-represented in present population through 'genetic drift'
- Phenomenon known as 'Founder Effect'. Several examples in Maltese medical literature.

Epidemiology Origins of Population

- National Geographic Study in 2004- similarities to Lebanese people
- Cassar et al (2008)- Maltese most similar to Western Sicilians
- DiGaetano et al (2008)
 - Eastern Sicilians bear some similarities to Greeks
 - Western Sicilians carry Phoenician/African genetic markers

Genetics

Dozens if not hundreds of genes directly or indirectly involved in tooth development
Dysfunction of any one may result in agenesis

Genetics

Syndromic
Generally inherited in a recessive pattern
Hypohydrotic ectodermal dysplasias

- EDA EDAR EDARADD genes
- Abnormal development of ectodermal structures including skin hair, nails, teeth, and sweat glands
- Multiple missing unerupted and and conical teeth
- Severe forms require multidisciplinary specialist treatment

Genetics

Nonsyndromic

- Autosomal dominant
 - MSX1
 - PAX9
 - AXIN2 - linked to colorectal cancer
 - WNT10A - found in 30-50% of cases of nonsyndromic tooth agenesis
- Variable expression
- Variable penetrance

Environmental


- Disease (rickets, nutritional disturbance)
- Irradiation
- Chemotherapy
- Prevalence of hypodontia reported higher in twins - possibly due to higher nutritional demands (Keene 1971)
- Discordance of identical twins may be due to different position in uterus leading to different blood supply - nutrition?

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DEVELOPMENTALLY MISSING TEETH

Continues from page 15.

Management

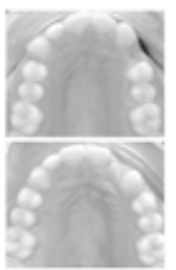


Interceptive

Missing incisors

- May extract Bs to allow mesial movement of canine
- Will preserve ridge thickness
- May then be distalised if required, ridge will resorb by 1% in 4 years

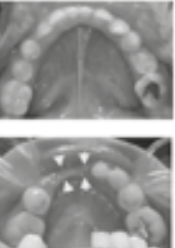
– Kishik VJ. Maxillary lateral incisor implants: planning with the aid of orthodontics. Int J Oral Maxillofac Surg. 2004;32:48-56.
– Orlitzky MS, Kishik VJ. Alveolar ridge changes in patients congenitally missing mandibular second premolars. J Prosthet Dent. 1994;71:134-143.



Interceptive

Periodontal ligament maintains alveolar bone

- Photo here - 25 year old with absence of permanent lower canines and incisors
- Deciduous teeth lost 3 months previous to this image
- Deciduous teeth should be left in situ as long as possible in order to preserve the ridge



Interceptive

Second premolars


If crowding is present:

- Extract D at age 7-8.
- This will allow the E and underlying 5 to drift forwards and hopefully eliminate or reduce the space
- 6 will not tip mesially as supported by E

BUT

- Panoramic radiographs not routinely taken before age 9-10
- Calcification date of 5 highly variable

So this is not a common procedure



Interceptive

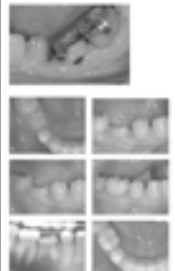
Retained deciduous molars

- If no crowding and the crown/root in good condition may leave in situ as these last a long time.

Berklin K, Bennett J. The long-term survival of lower second primary molars in subjects with agenesis of the premolars. Eur J Orthod. 2000;22(3):243-55.

Submerging deciduous molars may be built up with composite and eventually ceramic onlays

Keeping the occlusion high may break the ankylosis




Interceptive

Individuals with hypodontia have an increased prevalence of ectopic maxillary canines

- Palpate for canine bulge in sulcus at age 10
- If not present, review 1 year and palpate again
- If still not palpable, radiographs (DPT or parallax views)
- If ectopic, extract Cs
- Prognosis depends on position of canine

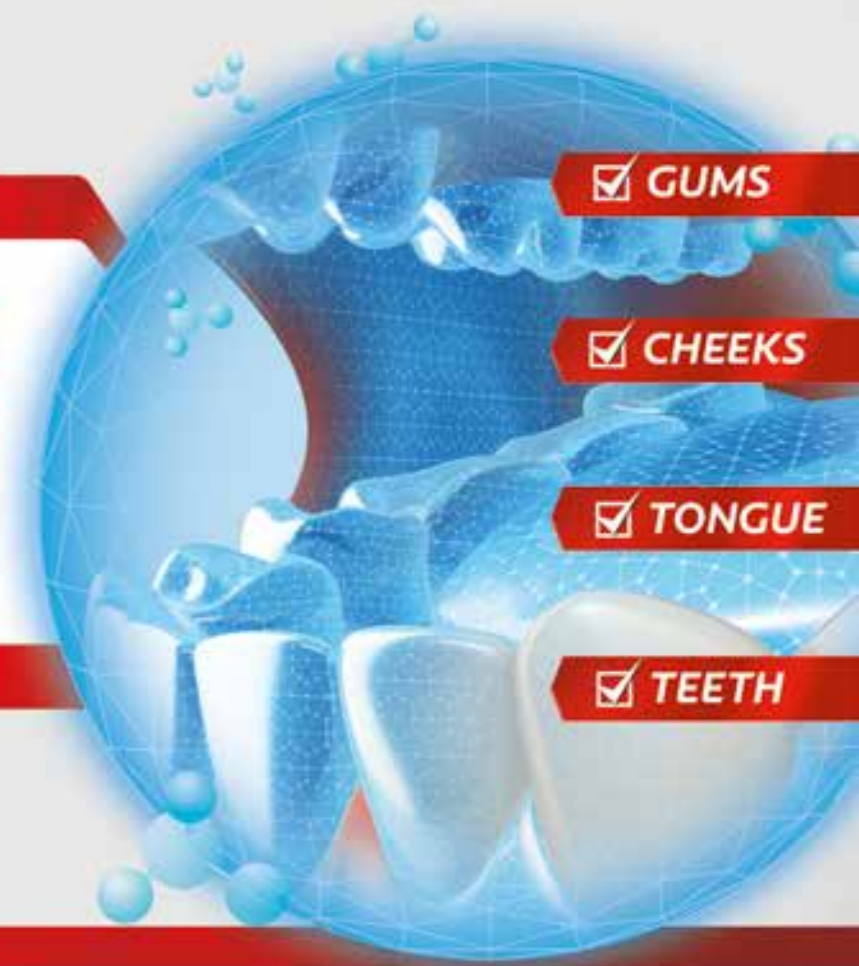
In severe (>8mm) crowding: Do not extract any deciduous teeth. Nothing should be done to encourage mesial drift of permanent teeth



Continues on page 18.

Colgate

COLGATE TOTAL®
PROVIDES PROTECTION*
TO 100% OF THE
MOUTH'S SURFACES¹



- Regular toothpastes[†] only protect the hard tissue, which is 20% of the mouth²
- The remaining 80% of the mouth is the tongue, cheeks, and gums, which can provide a bacteria reservoir for plaque biofilm recolonization

WHY SETTLE FOR 20% WHEN YOU CAN OFFER PATIENTS PROTECTION TO 100% OF THE MOUTH'S SURFACES?



*In addition to fluoride for cavity protection, Colgate Total® provides 12-hour antibacterial protection for teeth, tongue, cheeks, and gums.

[†]Defined as non-antibacterial fluoride toothpaste.

References: 1. Fine DH, Sreenivasan PK, McKiernan M, et al. J Clin Periodontol. 2012;39:1056-1064. 2. Collins LMC, Dawes C. J Dent Res. 1987;66:1300-1302.

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DEVELOPMENTALLY MISSING TEETH

Continues from page 16.

"I'M SORRY. WHAT OTHER OPTIONS ARE THERE?"

Open or close spaces Orthodontic considerations

- Space available (or can be created) for prosthesis
 - Number of missing teeth
- Incisor relation
 - Class 2 – easier to close
 - Deep overbite – stability of overbite reduction?
 - Class 3- easier to open
- Buccal segment occlusion – can this be altered?
- Symmetry and centreline in unilateral cases
- Gingival margin levels

Open or close spaces And of course

WISHES OF PATIENT

Autotransplantation

Placement of premolar teeth in incisor area

- Premolar usually extracted due to crowding
 - Preferably root tip formed but apex still open
 - if apex closed, will require RCT – reduces prognosis
- Space must be available or be created
- Socket area must have adequate bone
- Extraction must be atraumatic and preserve periodontal ligament

Open or close spaces Orthodontic considerations

Space required in incisor region determined by:

- Golden proportion
 - Lateral incisor should be 2/3 (66%) width of central
- 1-5 to 2mm space on either side of implant for papilla formation
- Roots must be parallel or slightly divergent to allow implant placement
 - Take long cone periapicals before treatment and prior to debond to confirm final root position

Open or close spaces Restorative factors

- Size/height of teeth
 - Affects prognosis of bridges or adhesive restorations
- Relative size, colour & shape of canine
 - Can be ground incisally and mesiodistally
 - Built up & rounded
 - bleached

Diagnostic (Kiesling) setup very useful to visualize results –patient consent

Age changes Implant placement

- Lower face grows maximally during puberty, is considered complete by 16 yrs in females and 18 yrs in males
- However this is not 100% true, facial growth carries on throughout life and has been shown to continue to middle age, albeit by a few millimetres.
- Individuals with extreme jaw growth are most likely to continue growing – beware of high angle cases

Implants and Growth

Odman et al – pig model – new teeth erupted more coronally and buccally relative to the implants, as jaws grew

Open or close spaces

<h4>Disadvantages of opening</h4> <ul style="list-style-type: none"> •Adults only •Age changes and altered tooth positions in adjacent teeth leading to deteriorating aesthetics •Crown shape and colour problems with prosthetic crown •Lack of interdental papilla infill •Alveolar bone loss leading to marginal discolouration •Neighbouring tooth bone loss 	<h4>Disadvantages of closure</h4> <ul style="list-style-type: none"> • Reopening of spaces • Unsightly gingival architecture • Constriction of the dental arch. • Altered functional occlusion. • Retraction of the upper anterior segment. • Dark buccal corridors when smiling
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Open or close spaces

<h4>Advantages of closure. Avoids:</h4> <ul style="list-style-type: none"> • Excessive reduction of tooth structure, • Related gingival health problems • Surgical morbidity • Incomplete papillary fill • Gingival discoloration • Cost and maintenance of a prosthesis • Excellent acceptance by patients • Can be done at any age • Excellent aesthetic results, utilising modern restorative techniques • Allows the hard and soft tissues to remain in a natural state, making it better suited to respond to the changes over time. 	<h4>Advantages of opening</h4> <ul style="list-style-type: none"> • Ideal arrangement • Preserves symmetry • Allows canine guidance
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Although canine guidance not possible, periodontal studies show that space closure gives better long term results than space opening

Implants and Growth

Thilander et al – showed implants stayed put and body grew around them. Implants in 15 patients (mean age 15 years, followed for 3 years) infra-occluded as patients continued to grow. When the same pts were followed up for another 5 years, further infra-occlusion occurred even though patient's skeletal growth had stopped.

Implants and Growth

•Sennerby – showed implants halted development of alveolar process around them

Continues on page 20.

DEVELOPMENTALLY MISSING TEETH

Continues from page 19.

Orthodontic Management

- Overbite reduction
- Space closure/opening
- Aesthetic considerations
- Miscellaneous problems

Overbite reduction



- Hypodontia cases often have reduced vertical dimensions
- Forward growth rotation makes OB reduction difficult – and makes prosthesis placement difficult
 - Biteplanes
 - During treatment
 - Ant. Biteplanes/Turbo-bites – Must have lower incisors
 - Retention
 - Curves of Spee
 - Intermaxillary elastics
 - Intrusion arches
 - TADS

Space opening



Retention

Space closure
The less crowding originally, the greater tendency to re-opening of spaces

- Removable retainer
- Fixed retainer – beware of detachment*, particularly upper arch – 58% within 4 years**
- Adherent movement of teeth
- Combination



*Larsen T, Alau M. A prospective clinical evaluation of immediate lingual retainers. *Scand J Orthod* 2012; 34: 470-474
**Schwartz E, Rul S. Upper fixed retainers. *Angle Orthod* 2011; 81: 1250-1256.


Space closure



- Reduced number of teeth - anchorage problems
- Steep cusps/low angle- hinders tooth movement
- Space closure may be difficult, particularly in Class 1 or Class 3 cases
 - Intermaxillary elastics
 - Headgear
 - TADS

Space closure Aesthetic considerations



- Golden proportions 
- Gingival margin heights and neck widths also important in camouflage
- Lateral gingival margin lower than that of incisor and canine
 - That of canine should be equal to incisor
 - Premolar neck narrower than canine – rotate
- Adjust bracket positions accordingly

Retention

- Space opening**
- Place prosthesis
 - Removable
 - Short term - VFR with prosthetic tooth
 - Longer term - URA with wire stops
 - Can incorporate biteplane to control OB
 - Immediate Maryland



Other movements of teeth

- Aligning
 - Facilitates prosthesis placement
 - Improves aesthetics
- Uprighting
 - Paralleling of abutments
 - Space required distal to the tooth to be uprighted?
 - Uprighting by crown movement, root movement or a combination of both?
 - Should extrusion of the tooth be permitted with the uprighting procedure?
 - Does the tooth at the other side of the space require any movement?



Space closure Aesthetic considerations



- Ideal position for peg laterals to be built up is slightly closer to central than canine – 1/3:2/3
- Distal edge of lateral is curved, therefore more amenable to contouring
- Mesial edge is straighter

Space closure Aesthetic considerations



- When replacing a central with a lateral
- Middle of space
 - Tip crown distally to allow equal contouring on both sides
 - Intrude to allow
 - Equal gingival margin levels
 - Placement of restorative material incisally
 - Reduce overbite
 - Result will rarely be 100% due to difference in neck width

Other movements of teeth

Intrusion



Forced eruption

- Unerupted teeth
- Crown lengthening

Teamworking is essential

- Treatment of severe hypodontia-oligodontia—an interdisciplinary concept. *Worsaae N1, Jensen BN, Holm B, Holsko J. Int J Oral Maxillofac Surg.* 2007 Jun;36(6):473-80. Epub 2007 Apr 12 [Denmark]
- 112 patients with oligodontia, 10 of which had ectodermal dysplasia
- Base population of 500,000, birth-rate of 6,000 per year
- Publicly funded but treated in hospital and private practice
- 97% needed orthodontics
- 90% of completed cases required implants to support fixed restorations
- 73% required ridge augmentation, 43% sinus floor augmentation
- 18% nerve transposition, 27% orthognathic surgery

Continues on page 22.

DEVELOPMENTALLY MISSING TEETH

Continues from page 21.

Teamworking is essential

- Communication is essential
- Orthodontist needs to know:
 - Position of prosthetic teeth
 - Spacing requirements
 - Type of restorations
 - Temporary
 - Final
- Orthodontist will then advise what is feasible
- Discussion will be required, face to face or electronic

Tough cases, Imperfect results

- Implant Treatment in Patients with Severe Hypodontia: A Retrospective Evaluation.** Creton M, et al. 2010 JOMFS 68(3):530-8
- 294 patients with oligodontia or severe hypodontia
 - 44 pts (of which 6 were syndromic) received 214 implants
 - mean age 21.9, mean 9.6 missing teeth
 - Mean observation of **2.9 years**
 - Cumulative success of 89.9% at 5 years (mainly early losses)
 - 25/44 pts needed bone augmentation

“Conventional Prosthodontics”

- The systematic review mixed overdentures, crowns, bridges, resin retained prostheses
- Overdentures had a high failure rate
- FPDs/RRBs had similar survival rates as per expectation (80-99% after 4-15 years).



Which replacement?

- Treatment Options
 - Implants
 - Conventional pros
 - Tooth Autotransplants
 - Preservation of deciduous
- Terheyden and Wusthoff. Occlusal rehabilitation in patients with congenitally missing teeth – dental implants, conventional prosthodontics, tooth autotransplants and preservation of deciduous teeth – a systematic review. Int Journal of Implant Dentistry 2015; 1:30

Implants in younger patients

- SURVIVAL IS AFFECTED BY AGE**
- Children <13 years 72.4%
 - Adolescents 13-18 years 93.0%
 - Adults >18 years 97.4%
- [mean 4.6 years follow-up, mixed studies, half retrospective]



Autotransplants

- Success Range (64% outlier) 79-96% at 7.6 year followup
- Immature teeth do better than mature teeth
- Premolars (93%) do better than molars (60%) (one study)
- Better pulp and perio conditions if tooth was not moved orthodontically (one study)
- Several studies showed 100% survival of transplants

Deciduous Teeth

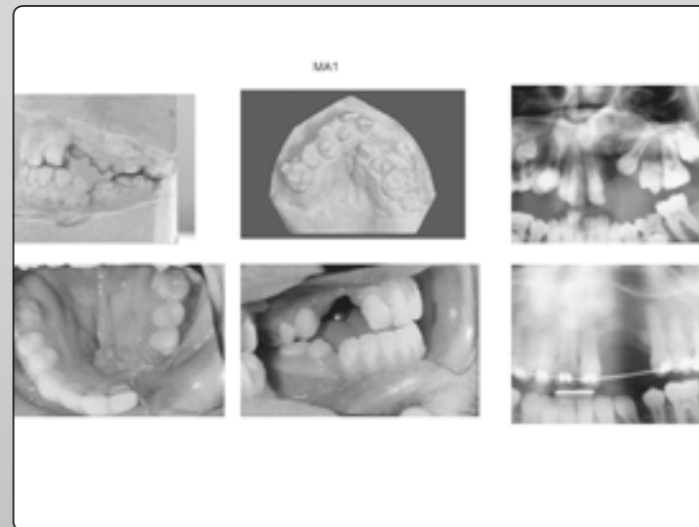
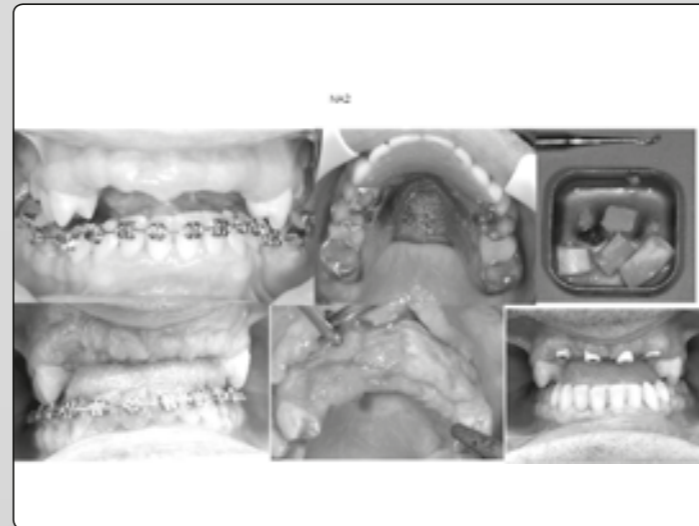
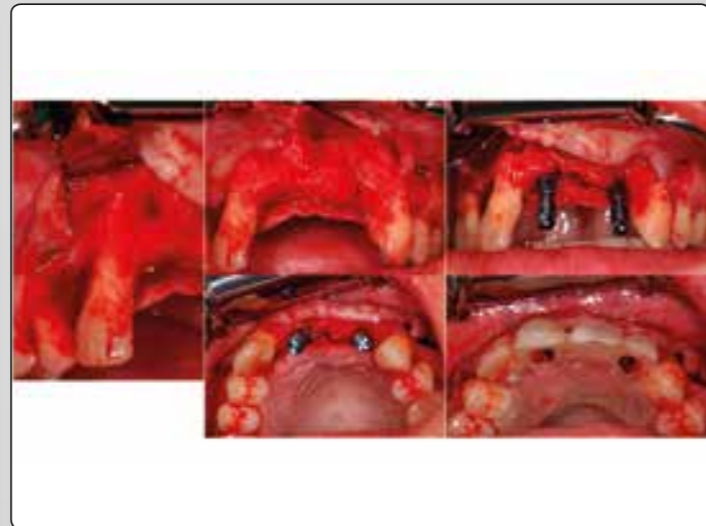
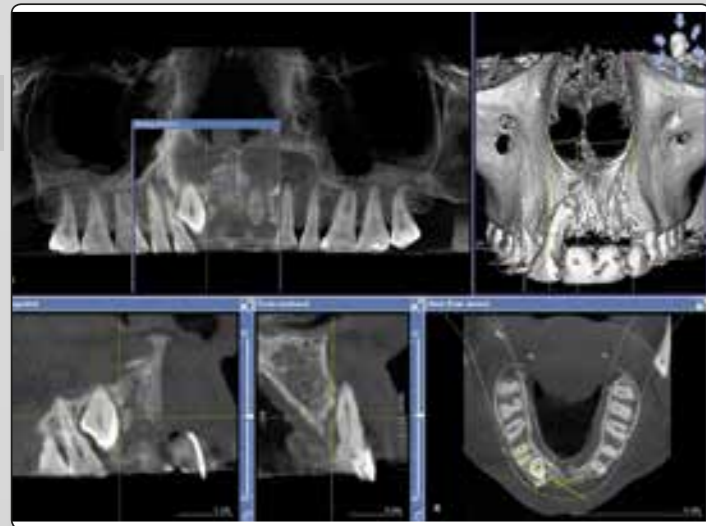
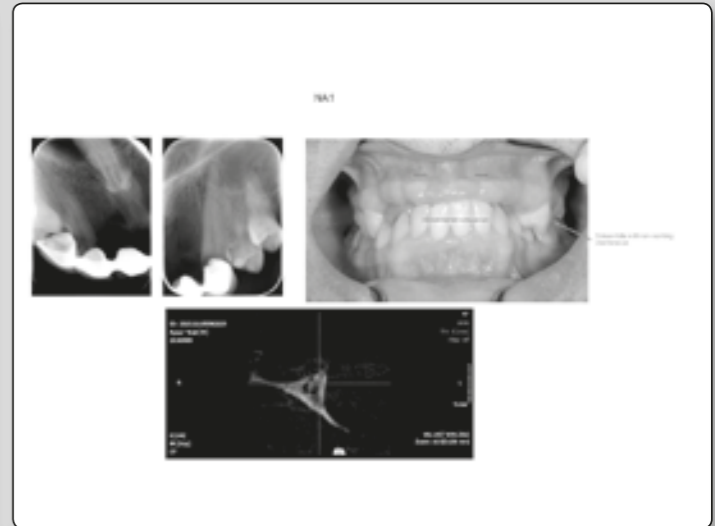
- Six studies collected, reported survival of 86-91% at 12 years of followup
- Many surviving deciduous teeth (12-88%) have root resorption or infra-occlusion



Continues on page 24.

DEVELOPMENTALLY MISSING TEETH

Continues from page 23.





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1. D. Herrera, L. Pérez, N. Escudero, B. Alonso, J. Serrano, C. Martín, and M. Sanz, University of Complutense, Madrid, Spain. Evaluation of cetyl-pyridinium chloride formulations in orthodontic patients: periodontal outcomes. Oral presentation at IADR Munich (September 2009).

2. B. Alonso, C. Martín, T. Pérez, M. Otheo, E. Cañete, D. Herrera, and J.C. Palma, Facultad de Odontología, Universidad Complutense de Madrid. ETEP Research Group, Madrid, Spain. Evaluation of Cetyl-Pyridinium Chloride Formulations in Orthodontic Patients: Orthodontic-related Outcomes. Oral presentation at IADR Munich at IADR (Munich September 2009).



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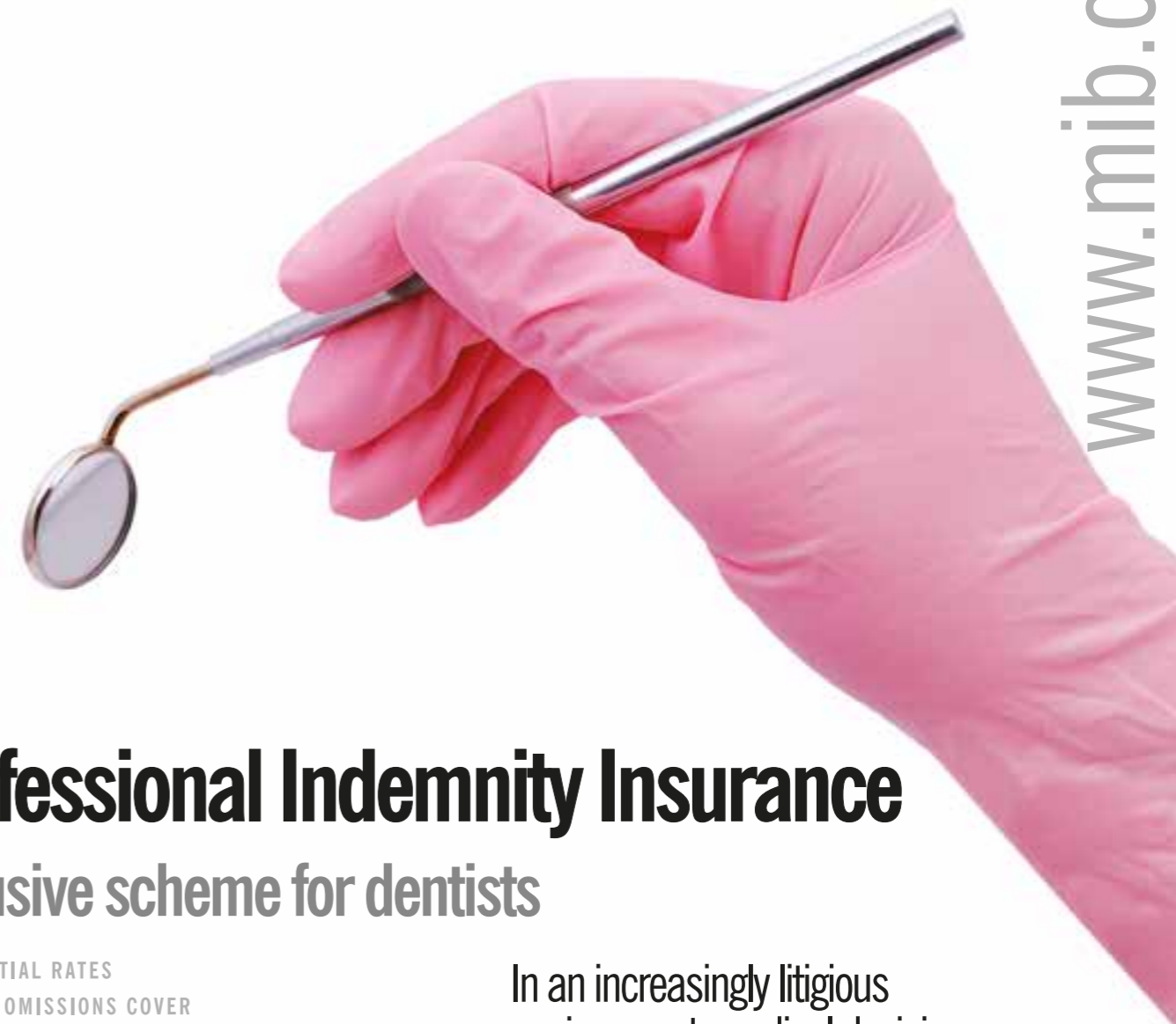
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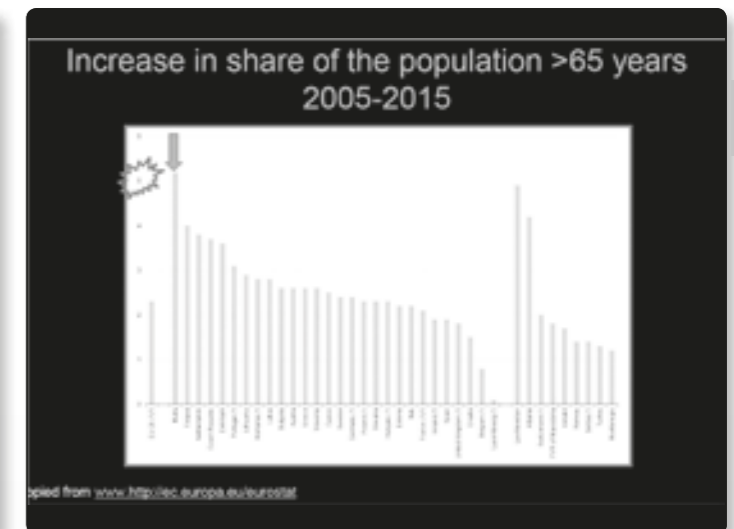
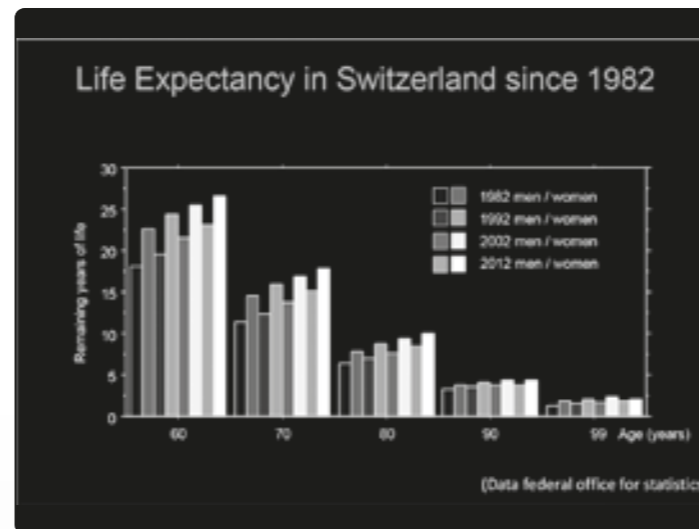
- CASE 1**
Extreme bone defects
- CASE 2**
Implantation and simultaneous guided bone regeneration and/or splitting crest technique
- CASE 3**
Full and partial immediate implantation and immediate loading
- CASE 4**
Closed and open sinus lift procedures
- CASE 5**
Extremely narrow alveolar ridges (<4mm)

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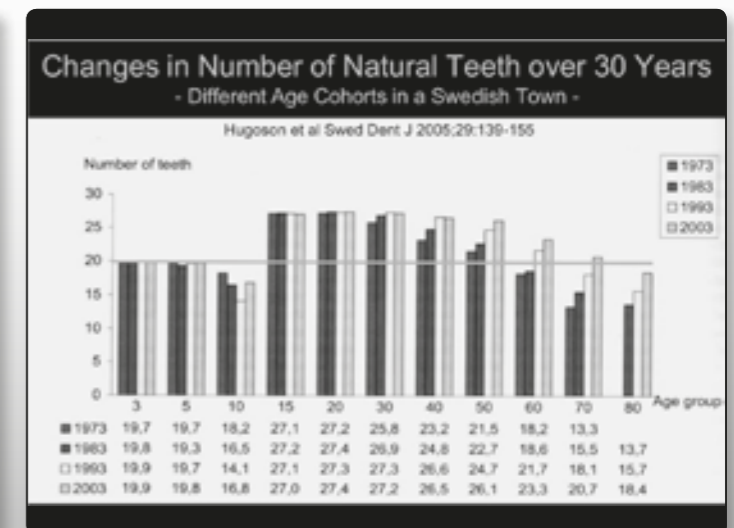
CHALLENGES IN GERIATRIC DENTISTRY

Professor Fauke Muller
University of Dentistry,
Gerodontology Division, Geneva
UOM Lecture at Valletta Campus



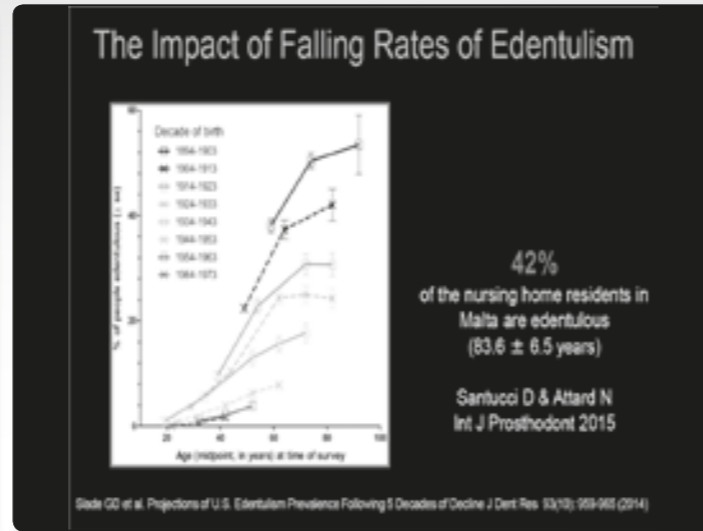
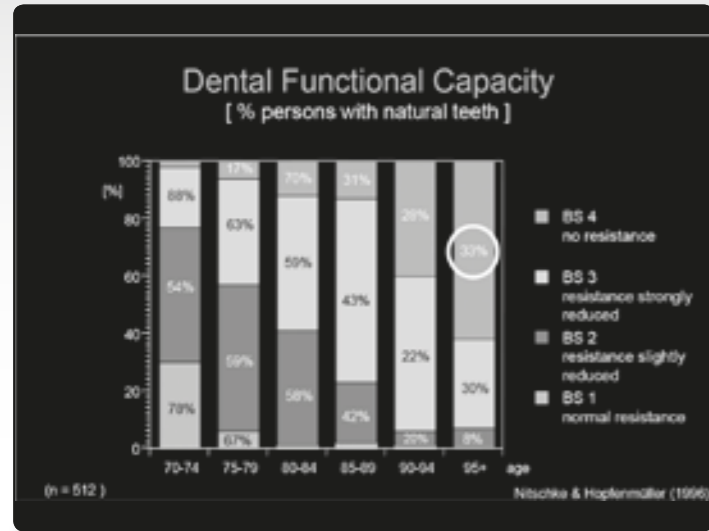
Challenges in Dental Care for the Frail Elderly

- mobility, team of carers, logistics
- communication
- multimorbidity and polypharmacy
- psychological alterations (depression, dementia, Alzheimer)
- motivation
- legal context
- physical resistance to dental treatments



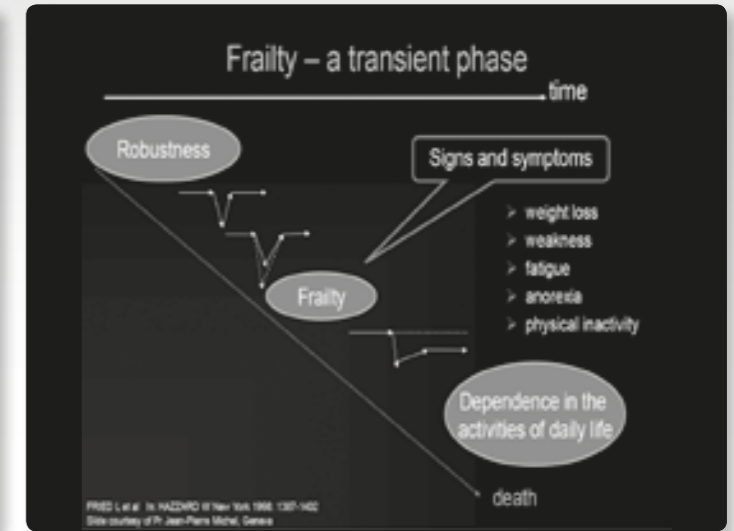
CHALLENGES IN GERIATRIC DENTISTRY

Continues from page 29.



Challenges of full denture wearing in old age

- > difficult anatomical conditions
- > diminished motor skills
- > impaired mastication
- > malnutrition
- > often hyposalivation
- > low tactile sensitivity
- > reduced neuroplasticity
- > psycho-social limitations



Functional Impairment with Age

- ◇ cardio-vascular system
- ◇ immune system
- ◇ locomotion
- ◇ nervous system
- ◇ vision, hearing, smell, tactile perception
- ◇ muscles (force / co-ordination)
- ◇ bone (atrophy, loss of mineral density)
- ◇ mucosa (atrophy, loss of elasticity)
- ◇

the functional impairment of physiological body functions is approximately 1% per year after the age of 35 years

The Activities of Daily Living

Basic ADLs

- > Functional mobility
- > Bathing and showering
- > Dressing
- > Self-feeding
- > Personal hygiene and grooming
- > Toilet hygiene

Instrumental ADLs

- > Housework
- > Preparing meals
- > Taking medication as prescribed
- > Managing money
- > Shopping for groceries or clothing
- > Use of telephone or other form of communication
- > Transportation within the community

Multimorbidity - Definition

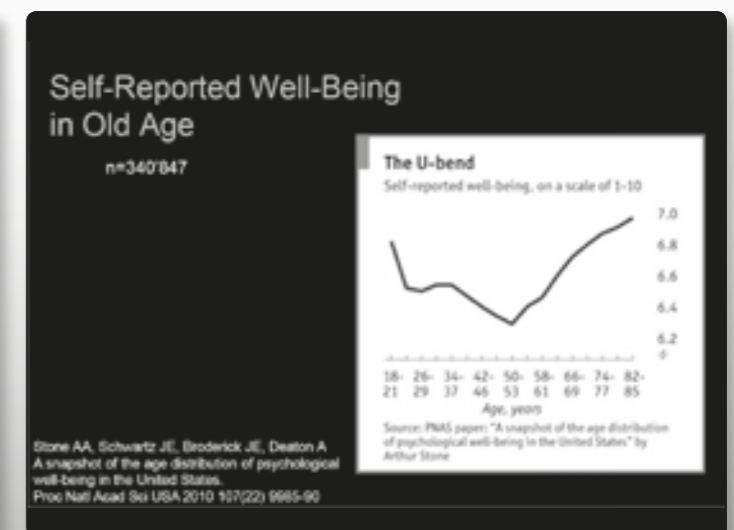
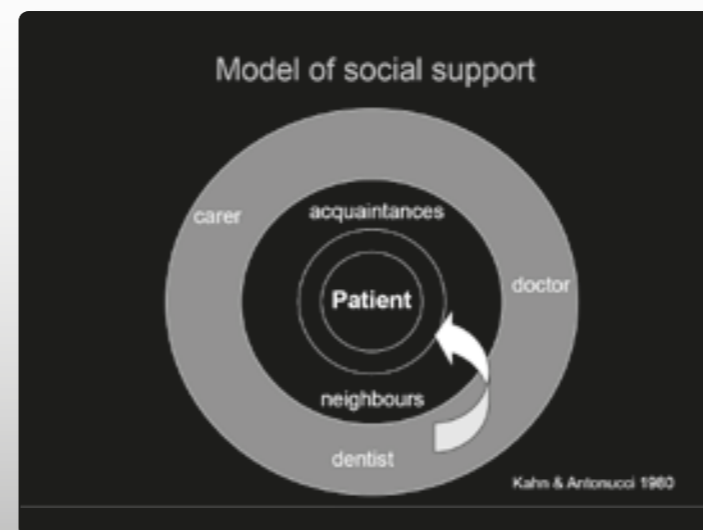
> presenting with 3 or more chronic conditions which require drug intervention

Changes of the Orofacial System in Old Age

bone	macroscopic	histological	functional
			atrophy
			coarse dilatation of the spongiosa mesh
			bone marrow → fat marrow
			brittleness
muscles	macroscopic	histological	functional
			atrophy
			fibre diameter ↓ -destruction
			interstitial fat- and connective tissue ↑
			contractibility ↓
			stimulus threshold ↓
			enlarged motor units

Changes of the Orofacial System in Old Age

mucosa	macroscopic	histological	functional
			epithelium thins out
			pale, silky and mat shine
			no. of fibroblasts ↓
			collagen fibres ↑
			elastic fibres ↓
			elasticity ↓
			mechanical properties ↓
TM-joint	macroscopic	histological	functional
			degenerative diseases
			flattening of articular fossa
			freedom of movement ↑
nerves	macroscopic	histological	functional
			reflexes prolonged



Continues on page 32.

CHALLENGES IN GERIATRIC DENISTRY

Continues from page 31.

Dental Appearance

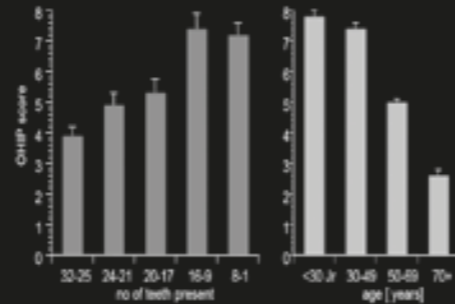


D Locker (2003)
Baycrest Oral Health Study
LTC aged 87 years
24.9 %
suffer from their dental appearance

Jokovic & Locker (1997)
907 persons living at home >50 ans
21.6 %
suffer from their dental appearance

Oral Health Related Quality of Life (OHRQoL)

evaluated by OHIP-14 (Oral Health Impact Profile)



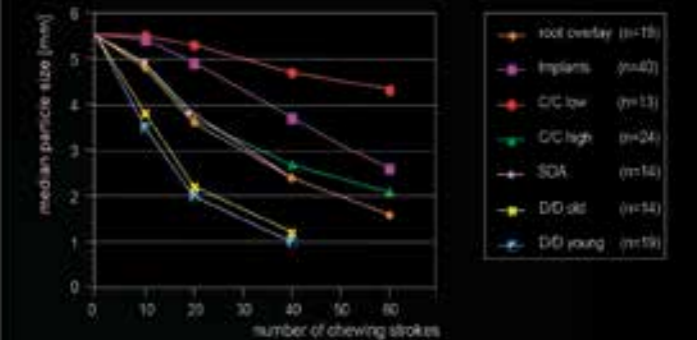
Data from Steele et al. How do age and tooth loss affect oral health impacts and quality of life? Community Dent Oral Epidemiol 32:107-14 (2004)

Basic ethical principles of the treatment of vulnerable elders

According to Shuman and Liebeau, Special Care Dentistry (1996)

Autonomy	Right to self-determination
Nonmaleficence	Duty to do no harm Duty to prevent harm to others Duty to remove harm from others
Beneficence	Obligation to do good on behalf of others
Justice	Obligations to treat others fairly, not discriminate, distribute resources fairly
Truth-telling	Duty to tell the truth
Fidelity	Obligation to keep promises

Particle Size and Number of Chewing Strokes



(Fortijn-Tekamp et al. J Dent Res 2005)

Self-Perceived Dental Treatment Need

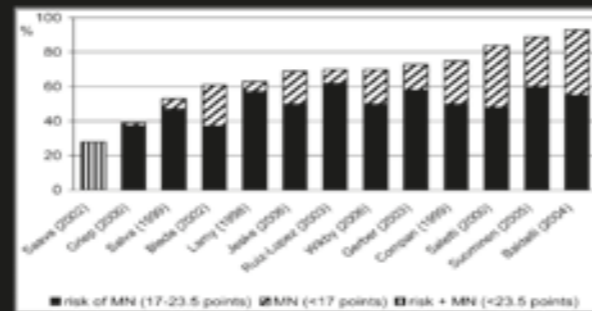
80 patients, 60 – 90 years, St. Bonifatius Hospital, Lingen, Germany

“ Do you think that your teeth and dentures are in a good health ? ”



Wickop, H., Wöstmann, B., Swiss Dent 19: 5, 1998

Prevalence of Malnutrition in Institutionalized Persons

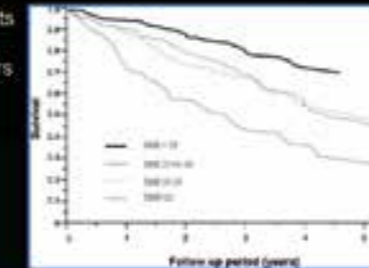


Pauly L et al. Nutritional situation of elderly nursing home residents. Z Gerontol Geriatr 40:3-12 (2007)

BMI and Mortality in Elderly Patients

Weiss A. et al. Journal of General Internal Medicine, 20(1): 19-24 (2007)

- n = 470 hospitalized patients
- age 81.5 years
- observation period 4.2 years



In elderly patients, a high BMI is associated with a reduced mortality



(van Woven 2001; Geurts 2000; Millwood 2000)

Communication with Elderly Persons

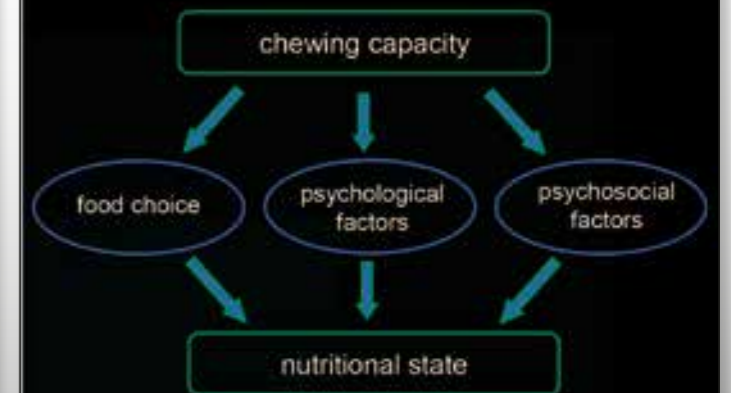
- respect the different generation
- don't wear a mask
- speak rather clear than loud
- avoid technical terms
- transparency of treatment sequence (questions?)
- integration of accompanying persons (transmission after treatment)



Communication with Demented Patients



Always keep at least two of the three channels open



Continues on page 34.

CHALLENGES IN GERIATRIC DENTISTRY

Continues from page 33.

Chewing Activates Regional Cerebral Blood Flow

n=12 dentate volunteers
Tasks: clenching, chewing, tapping

- > MCAV's
- > EMG masseter
- > PaCO₂
- > heart rate

Hasagawa Y et al. (2007) Influence of human jaw movement on Cerebral Blood Flow. J Dent Res 86:64-69

Interplay of Mastication, Nutrition, Cognition & ADL

Weijerberg et al. (2011) Neuroscience and Biobehavioral Reviews 35: 438-457

— CORRELATION
— CAUSAL /
- longitudinally observed
- chance and bias eliminated
- consistent associations
- cause precedes effect
- dose-response gradient
- association is specific.

The results of animal and human experimental studies suggest a causal relationship between mastication and cognition

These findings have compelling implications for the care for the frail and elderly, suffering from dementia

Side Effects of Xerostomia

1/3 of the residents of an LTC with an average age of 83 years complained about the sensation of a dry mouth (Locker 2003)

- > mastication
- > deglutition
- > speech
- > mucositis
- > denture intolerance
- > abrasion
- > caries

Prevalence of Xerostomia

Study sample

- > elderly LTC residents with compromised health
- > average age 83 years
- > 2/3 dentate with an average of 16 residual teeth
- > 1/3 < sensation of dry mouth
- > The dry mouth had a significant impact on the residents' Oral Health Related Quality of Life (OHRQoL)

Locker D (2003) Special Care Dentistry

Dental Hygiene in Hospitalised Elderly (n=151)

Palstra P, Van't Hof-Grootenboer M M, Witter-Dijk J, van't Hof-Grootenboer E T. Oral health and treatment needs of the long-term hospitalised elderly. Gerodontology 21:93-99 (2004)

Project Teamwork-Dentistry

Principle Investigator
Prof Christoph Benz

- > 600 residents in LTCs around Munich
- > mobile prophylaxis
- > instruction of the caring personnel
- > dental therapy through „good-father“ dentists

In 2 years

- > 65% less emergencies
- > 70% less extractions

Unilateral Mastication Stimulates Salivary Flow

> salivary flow of the parotid gland during unilateral mastication

Results
salivation increases with

- > ipsilateral mastication
- > mandibular deformation
- > masseter muscle activity

Reichner S, Schmalhofer HP. Parotid Secretion during Unilateral Mastication. J Dent Res 1987; 66: 1119-1123

The combination of abundant plaque and severe xerostomia can render a patient edentulous within a very short period of time, this is often unknown to carers

Unable to undergo restorative treatments the patient acquires with the edentulism an additional handicap

The patient's consent becomes an issue!

Enhancing Research: Implementation of an oral hygiene protocol in nursing homes

Mondzorg
Dr. G. De Vries

Implementation of an oral hygiene protocol in 7 randomly allocated nursing homes in Flanders

- > after 5 years obtained plaque levels were unsatisfactory
- > impact of intervention unclear

obtaining adequate oral hygiene levels in nursing homes remains an important ongoing challenge

Vriesbeke L, De Vriesbeke J, Deel C, De Schrijn J, Schepers E. The implementation of an oral hygiene protocol in nursing homes. Community Dent Oral Epidemiol. 2011 Oct;39(5):416-25

Effects of Duraphat 5000 ppm on root caries

Srinivasan M, Srinivasan M, Tandan W, Aggar A, Wirth EJ, Ramana M, Ehsani NP, Sharma L, Mohan V, Nanda R. High-fluoride toothpaste: a multicenter randomized controlled trial in adults. Community Dent Oral Epidemiol. 2014; 42(1): 55-62 (2014)

Preventive Effect of Oral Hygiene on Pneumonia in Elderly People in Hospitals and Nursing Homes

- > Absolute Risk Reduction (ARR) from 6.6% to 11.7%
- > Relative Risk (RR) 0.30 to 0.61
- > Number Needed to Treat (NNT) from 9 to 15

Approximately 1 in 10 cases of death from pneumonia in institutionalised elderly may be prevented by improving oral hygiene

Gyngö M et al. Journal of the American Geriatric Society 56: 2124-2130 (2008)

Continues on page 36.

CHALLENGES IN GERIATRIC DENISTRY

Continues from page 35.

Modifiable Risk Factors for Aspiration Pneumonia

> from nine modifiable risk factors, only for inadequate oral care [HR 1.60; 95%CI 1.06-2.35; P=0.024] and difficulty swallowing [HR 1.65; 95%CI 1.04-2.62; P=0.033] were identified

(Quagliarello et al., 2005)

> patients with 10 or more natural teeth and periodontal probing depths >4 mm showed a 3.9 fold risk to die from pneumonia than those without periodontal pockets

(Awano et al., 2008)

Denture Wearing during Sleep

Inuma, T et al. Denture wearing during sleep doubles the risk of pneumonia in the very elderly. J Dent Res Mar(4) Suppl:265-266 (2015)

- > 524 randomly selected seniors, mean age 87.8 years
 - oral health status
 - oral hygiene behaviors
 - medical assessment (and blood chemistry analysis)
- > followed annually for 3 years until first hospitalization for or death from pneumonia

Among 453 denture wearers, 186 (40.8%) who wore their dentures during sleep were at higher risk for pneumonia than those who removed their dentures at night (P = 0.021).

In a multivariate Cox model, both perceived swallowing difficulties [HR] 2.31 and overnight denture wearing [HR] 2.38 were independently associated with an approximately 2.3-fold higher risk of the incidence of pneumonia

Oral Comfort during Sleep

Whilst denture is not worn

- > avoid injury from sharp edges or attachments in the mouth
- > keep denture dry
- > soak denture in the morning before insertion



Reversible treatment concepts!

Photo © Stephen Banks, Oral Health Care for the Final Elder, Eds W MacEntee, FRCR, C. Wyatt, Blackwell (2011)

7 Telemedicine - teledentistry



ADVANTAGES

- > access even in rural regions
- > first diagnostics at distance allows preparing the right instruments
- > support for young dentists in decision making / performing tx

INCONVENIENTS

- > investissement in technical equipment – IT knowledge
- > limited diagnostic vaule
- > no dental intervention possible

Continues on page 38.

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CHALLENGES IN GERIATRIC DENTISTRY

Continues from page 36.

La médecine du XXI^e siècle?

e-DENT project 2014
piloted by Nicolas Graudéas
University of Montpellier

- > first experiences with tele-dentistry in France
- > aims to include LTC residents

Stomatologie, Nicolas Graudéas, Jean-François Huet
e-DENT: une expérience de télémédecine en EHPAD
European Research in Gerodontology (La Recherche Européenne en Gerodonte), vol. 3, 2, juin 2014, p. 11-18

Public Health Concepts for Dental Care

	Practice	Practice in LTC	Bus	Mobility	Flying dentist	Hygienist	Tele-dentistry
displacement of patient	+/-	++/-	+/-	++/-	++/-	++/-	++/-
financial involvement	-	-	-	-	-	-	-
logistic complexity	+	-	-	-	-	+++	++
working conditions	+++	+++	+++	-	-	-	⊖
quality of care / interventions	+++	+++	+++	++	+	⊖	⊖
infection control						+++	+++

Potential Barriers for Dental Care

- > reduced mobility of the patients
- > expenses out of own pocket
- > reluctance of dentists to deliver care for the elderly
- > inadequate knowledge in Gerodontology
- > inadequate working conditions / Dental facilities in LTCs and at domicile
- > shift in priorities of elderly multi-morbid patients

Public Health Issues in Geriatric Dentistry

- > increase awareness of health policy makers, dentists, health professionals and patients
- > identify barriers for utilisation of dental care
- > reduce administration
- > provide adequate equipment for dental care at home or LTC
- > undergraduate teaching
- > structured post-graduate training

Demands from Health Policy Makers

- > recognize of dentistry as part of medicine
- > integrate oral health in every general prevention campaign
- > strengthen interdisciplinary approaches
- > add gerodontology to the dental, medical and nursing curriculum
- > allocate sufficient funds for (oral) health care

Oral Health Model of the SSGS



- > Spitex nursing personnel
- > nursing personnel
- > LTC management
- > consulting physicians
- > dentists
- > dental hygienists
- > Universities
- > health authorities

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*in comparison to all conventional restorative composites

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