

Aesthetic rehabilitation of the worn smile

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The problem of worn teeth

A very common aesthetic problem – the patient who “wants longer teeth”

Multifactorial aetiology... so always a complex problem

Classification of tooth wear

By aetiology - attrition/erosion/abrasion/abfraction

By severity - Smith & Knight (BDJ 1984)

... both are of limited use as they do not tell us what to do with the patient

When do we intervene and restore the patient?

When patients request aesthetic improvement

Patient has intractable sensitivity

Patient has pulpal exposure

When further loss will make teeth unrestorable or cause pulpal exposure

Topics for today

1. Wear diagnosis
2. Aesthetic treatment planning
3. Material selection
4. Clinical management: creating space for the restorations
 occlusal management

1. Diagnosis of tooth wear

Aim of the diagnostic process = to identify the patients who are bruxers

Possible causes of tooth wear

Attrition = tooth-tooth wear

Erosion = chemical process

Abrasion = foreign substance

Abfraction = tooth flexure

Assessment

Which surfaces are worn – are they in occlusal contact or not?

Evenness of wear (U v L, anterior v posterior)?

Shiny / dull surfaces?

Are the enamel / dentine equally affected?

Attrition

Tooth-tooth wear

Places of occlusal contact

Shiny, sharp wear facets match

Wear facets fit each other

Enamel and dentine at same level

Erosion

Commonest cause

Wear facets match but are dull

Dentine cupped out with enamel around

Locations of no occlusal contact

4 main subtypes

Gastro-oesophageal reflux

Bulimia

Carbonated beverage drinkers

Citrus fruit eaters

Gastro-oesophageal reflux

Lingual surfaces of all upper teeth

Occlusal surfaces of lower molars

Can be asymmetrical (sleep side)

Upper & lower teeth have same wear

Bulimia

Erosion on premolars forward

Mostly on lingual surfaces

Upper incisors more worn than lowers

Carbonated beverages

Swishers/fizzers

Mostly buccally on upper anterior teeth

Satin appearance

Islands of wear into dentine on buccal cervical surfaces in early stages

Citrus fruit suckers

Anteriors have screwdriver-blade appearance

Buccal & palatal wear

Uppers and lowers have equal wear

Other causes

Carbonated beverage poolers

Citrus fruit mullers

Cocaine abuse

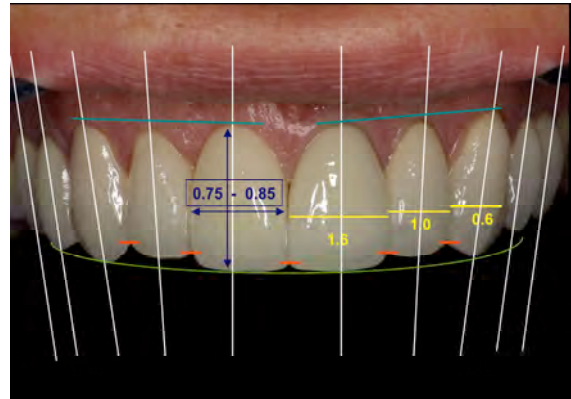
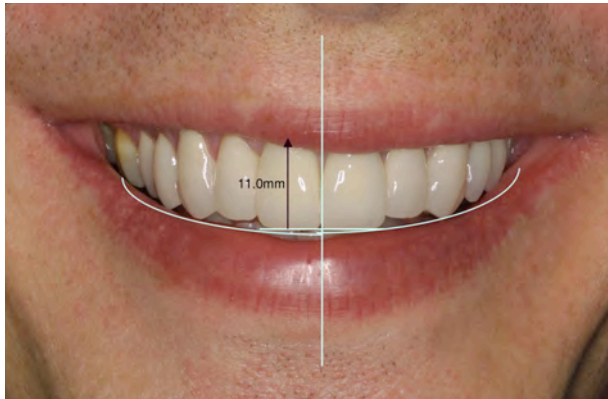
Swimmers - chlorine erosion

Ruminators

Sand eaters

2. Aesthetic treatment planning

Aim: to decide on the end result of treatment and make the smile fit harmoniously into the face



Smile design sequence Stage

Comment

1. Assess lip line and smile line	<i>Note if lip line is average, high or low Note if smile line is positive, flat or reversed</i>
2. Position incisal edge of upper central incisors	<i>Just above lower lip on full smile Or to fit with smile line extrapolated from cusp tips of posterior teeth to mirror lower lip line</i>
3. Position dental midline	<i>To be coincident with (or parallel to) facial midline</i>
4. Make central incisor proportions correct	<i>Height should be 11mm; Height-width proportion in the range 0.7-0.8</i>
5. Use golden proportion to calculate other tooth widths	<i>Central : lateral : canine = 1.6 : 1.0 : 0.6. Consider alignment of incisal edges to anterior arch form.</i>
6. Align long axes of teeth & consider buccal corridor	<i>Centrals should be parallel, laterals 5° distal tip, canines 10-12°. Long axes of buccal corridor teeth parallel to canines. Consider alignment of cusp tips to posterior arch form.</i>
7. Idealise gingival aesthetics	<i>Lateral incisors are not higher than line drawn between centrals and canines</i>
8. Idealise connector heights	<i>Contacts become shorter as you progress distally (50-40-30 rule)</i>
9. Plan embrasure form	<i>Embrasures move apically and become more rounded as you progress distally</i>
10. Design labial anatomy	<i>Where to position line angles?</i>
11. Decide on colour graduations & incisal translucency	<i>In accordance with patients age and desired appearance</i>
12. Decide on overall case colour	<i>In accordance with patients age and desired appearance</i>

3. Materials selection

Which material to use?

Materials selection for Non-bruxers vs. Bruxers

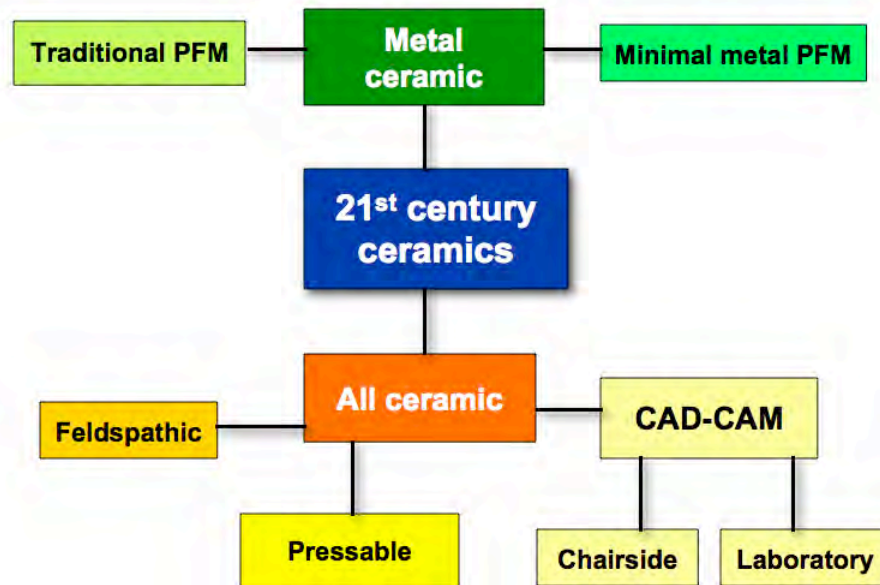
Which areas of the mouth are potentially a problem?

Is one ceramic better than another?

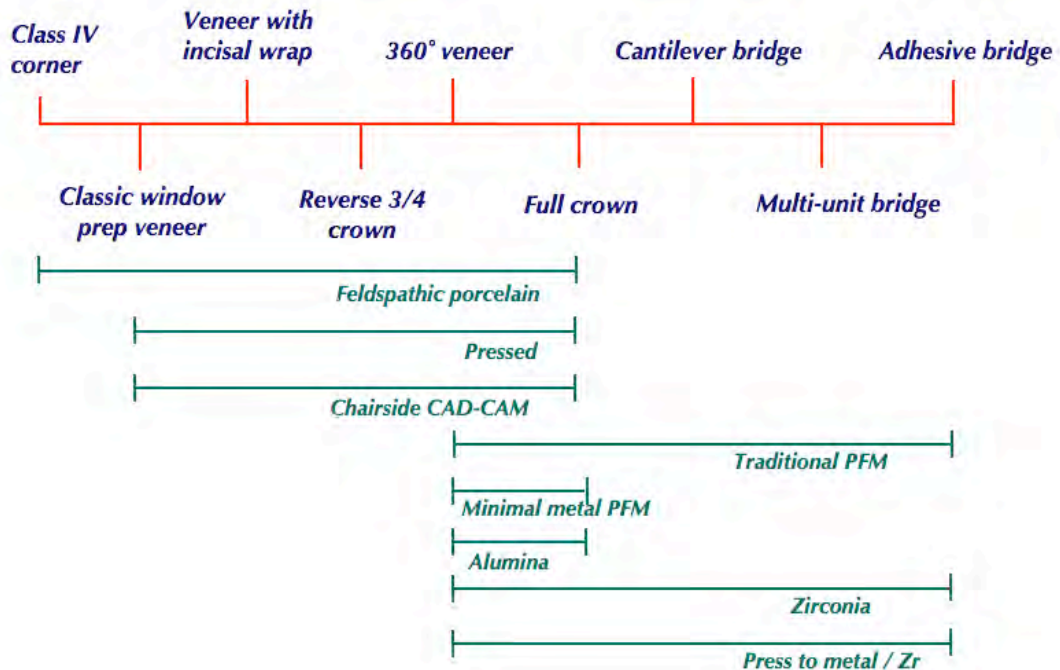
Understanding the marketplace — what is best?

Depends on...

- ... desired appearance
- ... what you need to mask
- ... how strong it needs to be
- ... what the prep will be
- ... how fast is needs to be made



What can I do with [...] ? - the range of possibilities with different ceramics



Which is best?

- Feldspathic vs. pressed vs. others
- Try to keep everything in same material across the arch
- A world-class ceramist can make beautiful restorations from anything...
... but for non-bruxers, whatever your ceramist does best will look best

Strength

1. PFM / Press to metal
2. Zirconia
3. Procera alumina
4. In-ceram
5. Captek
6. Pressed / Chairside CAD-CAM
7. Feldspathic

Conservative prep

1. Feldspathic (0.5mm)
2. Pressed (0.7mm)
3. Chairside CAD-CAM (1mm)
4. Captek / Press to metal (1.2mm+)
5. PFM / In-ceram / Procera (1.5mm+)
6. Zirconia (2.0mm+)

Dark preps

- Localised block-out w/ opaque composite (on tooth) or opaque porcelain (inside veneer)
- Use more opaque porcelain to mask
- Adjust prep to thicken porcelain
- Use opaque cement to mask

Opacity

1. PFM / Captek / Press to metal
2. Cercon/Lava
3. Procera alumina (feldspathic highly
4. In-ceram (customisable)
5. Chairside CAD-CAM
6. Pressed

Speed of production

1. Chairside CAD-CAM
2. Pressed
3. Feldspathic
4. PFM/Captek/Press to metal
5. In-ceram
6. Procera alumina
7. Zirconia

Which cement?

- Feldspathic – Adhesive resin cement, e.g. Nexus/Variolink
- Pressed - Nexus/Variolink (Press to metal - Unicem)
- Captek - GIC or Self-etch composite cement e.g. Rely-X Unicem
- Chairside CAD-CAM – Unicem/Nexus/Variolink
- In-ceram - Panavia (Unicem)
- Procera alumina - (GIC) / Panavia / Unicem
- Zirconia – Unicem
- PFM - ZnPO₄, GIC, Unicem

Non-bruxers

Literature shows good success for all-ceramic anterior restorations

Higher failure rates in posterior areas

BUT "classic" ceramic prep designs & cementation may fail in posterior areas

The role of adhesion in restoration survival

Non-bruxer = material not important...

... so use whatever your lab does best

... or use composite as definitive restoration

Bruxers

Bruxers place 4-5x higher forces on their teeth...

i.e. so much that differences between all ceramic materials are insignificant

Literature shows good success for metal-ceramic restorations in posterior areas of bruxers

Medium-term studies are showing good success with Procera Alumina

Zirconia not around long enough (yet) for conclusive long term evidence

Where is the risk?

Wear that is not from attrition

= low risk for materials selection

= composite or ceramic equally good

4. Management of Tooth wear

Do we need more space?

If there has been significant palatal tooth surface loss & compensatory over-eruption...
... then may need to create space for restorative material

Options for creating space

Tooth preparation
Localised over-eruption (Dahl concept)
Open occlusal vertical dimension

Functional case difficulty assessment

Simple case

Preps do not go through contact points
(i.e. change of length/colour only)
Upper anterior teeth only
Occlusion unchanged



Does it need...
Mounted? No
Splint? Not usually

Moderate case

Preps go through contact point
(i.e. change of mesiodistal proportions)
Upper anterior teeth only
Occlusion unchanged



Mounted? Possibly
Splint? Not usually

Complex case

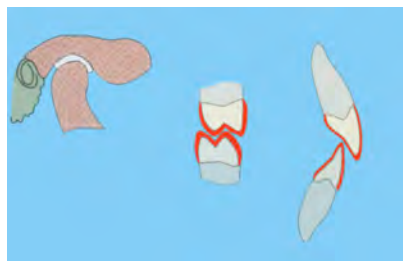
Any case involving lower teeth or multiple upper anterior crowns
Potential to change anterior guidance – intentionally or not



Mounted? Yes
Splint? Possibly

Reorganised case

Many/all functional surfaces involved
Reorganised occlusion, i.e. full-mouth case, or any significant change in occlusion
Can change all aspects of occlusal scheme (intentionally or not)



Mounted? Yes
Splint? Possibly

Occlusal management: Conformative, reorganised or disorganised?

	Conformative	vs. re-organised
What?	RCP = ICP Anterior guidance Mutual protection No NWS interferences Cusp-fossa contacts	RCP = ICP around RAP Anterior guidance Mutual protection No NWS interferences Cusp-fossa contacts
When?	Individual crown 3-4 units of posterior bridgework or RPDs 3-6 units of anterior bridgework or RPDs Stable posterior occlusion Few teeth to restore Vh slide No need to create anterior space No occlusal disease	If only 2 or 3 posterior teeth will remain in contact after preparation of others If no posterior occlusal contacts will remain at <u>desired</u> vertical dimension Unstable posterior occlusion Many teeth to restore Hv slide Need to create anterior space Signs of occlusal disease

Deciding what to do

Tooth preparation may lead to pulpal exposure in the wear case

... but if we open the vertical dimension the case becomes MUCH more complex

... therefore try to avoid this by localised overeruption (Dahl's concept)

Dahl-concept appliances to create space for restorations

Dahl et al (J Oral Rehabil 1975)

... treatment of severe localised attrition

... using cast Co-Cr splint to open bite...

... and allow overeruption of other teeth

Now usually carried out by direct composite addition to the tooth surfaces

Restorative opening of OVD to create space for restorations

Work around CR position

1mm opening in molar region = 3mm at central incisors

What is the limit of this kind of opening?

Long-term provisionals

By direct buildup or lab-made

To "test-drive" a new occlusion

To stabilise the mouth and thereby gain "control" of the case

To make rapid improvements whilst other treatment is carried out

To try out aesthetics / phonetics

How long to wait before final restorations?

Until patient comfortable / happy

Until endo / perio tx complete

Until implants integrated

Other resources

www.advanceddentalseminars.com

www.bacd.com