Sheet : #11 (Biomimetic approach in modern

dental practice )
date : 2/5/2015
refer to slide : #1 ( Dr.mohammad )
done by : Khaled Hamarneh

The concept of biomimetics in dentistry aims to enable us to restore the biomechanical, structural and aesthetic integrity of the tooth. By using adhesive technology in combination with porcelain and composite materials we aim to provide, not just, beautiful natural restorations

with little or no destruction of healthy tooth tissue but to restore and even surpass the original structural strength of the teeth

 or nature related to life < BIO \*
trying to mimetic something ( to mimetic nature ) < MIMMETIC
APPROACH > we need a minimal invasive approach ( we try to avoid surgical approach , and make a minimal invasive procedure since it has less complications and less cost as well )

\* we have to be honest with our patients ….for ex : we don’t have a permanent restoration we have definitive restoration and provisional restoration and the patient should know that .

\* if we will get the same result in restoration and crwon , we do a restoration .

\* restorative cycle : once it started it will not end
if we have minimal caries and you can mange it by prevention we don’t prepare it since our filling have to be replaced each 5 years and after 15-20 maybe I will need crown and after afew years maybe the tooth will not be restorable .

\* we have to handle with the patient as we treat a member of our family .

\* any restoration material causes a load or pressure on the other remaining teeth , especially the **amalgam and the non bondable restoration**

\* its important to know the size of burs that we used

-\*any thing contains mercury it will not be used anymore except for amalgam which will be used but not in that much extent (so amalgam is phase down , not phase out )

\* so its all about : Minimally invasive dentistry
 1- Early detection ( with degree of certainty )
2- Minimal surgical invasion
 3- Repairing defective restorations

\*\* RTC successful rate in Jordan dose not exceeds 40% !!

- don’t use a sharp probe while the examination

-prevention cost is much much less than treatment , for ex : implant average price in the Jordan is 600 jd

\* Radiography :
1 -Conventional
2- Digital enhancement : computer image ( not a real image )
3- Subtraction radiology : Comparison between 2 radiographies one before 6 months and the other is after 6 months ) to know if there is secondary caries

 that wee take for RCT is called preapical radiography and the one for caries is called bitewings

Enhanced visual technique : to be discussed next year -

- In Jordan and many of countries they considered the dentists as they are a surgeons so we have to know all of the surgical principles ( DDS : doctor of dental surgery ) , since 60% of our work is in operative field . even though we are not onlu a surgeons we have to think .

-Preventive phase
 caries > need four things : time , food , tooth , microorganism



- so we need to have
\* Diet control

\*Fluoride application

\*Fissure sealant

Plaque control \*
 ( Miranda has the most worst effect on the teeth among acidic drinks , since it’s the more acidic one and it has a staining effect )

Restorative phase :

1- Preventive resin restorations.

2- Composite/GIC/Compomer.

3- Amalgam restorations.

4-Endo Tx

5- Extra coronal restorations

( in descending order..which mean we start with prevention then composite then…etc )

History of Dentistry
 G.V. Black : father of modern dentistry ( doctor said that actually he is father of old dentistry :
he talked about surgical approach and extension for prevention ( for ex : caries in mesial fissure and I prepare mesial and distal fissures for prevention )



in this picture , we can do amalgam preparation for caries in the 7, but for 5 and 6 we do composite

**TECHNIQUES**

***fissure Sealing***

Flowable resin material ( resin without filler )placed on newly erupted molars for the prevention of dental caries on pits and fissures.

Long term clinical studies have indicated that pit and fissure

sealants provide a safe and effective method of preventing caries

used mainl in children

**Interproximal Lesions :**Tunnel Prep

Indicated when the proximal lesion is 2.5mm below the contact point.

Performed by accessing the carious dentine from the occlusal surface,

while maintaining the **marginal ridge**.

The proximal ridge is only broken if caries has broken into enamel, or it

must be left as it is (Composite Resin)

disadvantages of tunnel prep:

Technically difficult to do, due to **low access and visibility.**

Study showed that tunnel preps had better results than a slot prep, in 3

years.

Adhesive material used to fill cavity.

Sandwich technique is recommended (GIC first and then Lamination with

**Slot Prep**Also known as mini-box.

These preps involve the removal of the marginal ridge, but do

not include the occlusal pits and fissures, if caries removal in

those areas is unnecessary.

Cavities normally have a box or a saucer shape, and are restored

with composite resin.

Clinical studies have shown 70% survival at an average of 7years

**Repair Vs Replacement of Defective restorations :**

Repairing of restorations is becoming a major part, than

replacement since more tooth structure is lost by

replacement of restoration

Replacement is common due to concerns:
bond strength, residual caries, recurrent caries

\*\* Ryge criteria (1973):
1- ***Alpha:***

Excellent, fulfilling all quality criteria; tooth

and/or surrounding tissues are adequately

protected

2 Highly acceptable, though one or more criteria

is not ideal; minor modifications can be made

to the restoration but is not necessary ( ex : polishing of old restoration )

2 - ***Bravo*:**

Sufficiently acceptable but with minor

shortcomings in areas where any

instrumentation may result in damage to the

tooth; no adverse effects are anticipated
( ex: minimal caries on old restoration in highly aesthetic area, class 5 )

3- ***Charlie:***

Unacceptable but repairable

( for ex : caries on the margins of the old restoration in huge class 5 )

4- ***Delta***:

Unacceptable and must be replaced

( fracture of the tooth or fracture of the post , so its impossible to repair it )
discoloration with pulp irritation

INNOVATIVE TOOLS USED IN MID
we all used hand pieces :
\* high speed ( 400,000-600,000 ) round/ min
\* speed hand pieces (10,000-40,000) round / min
\* main disadvantage of hand pieces with burs is heat generation which is painful so there is another technique (**Air Abrasion** )

**Air Abrasion ( like sand plastic )**

Pseudo-mechanical, non-rotary method of cavity cutting and

removing dental hard tissue.

Several studies have shown that the bonding of enamel and

dentin surfaces prepared with air abrasion is much better

than that with conventional carbide burs and acid etching.8

Kinetic energy is used to remove carious tooth

it’s a narrow stream of moving aluminum oxide particles is directed

against the surface to cut.

As particles touch the surface, they abrade it with force, without

the use of heat, vibration or noise.

These particles exit out of the tip of a hand piece, thus it is an

end-cutting device.

The amount of structure cut can be adjusted by:-

Changing the pressure

Changing the particle size

Amount of powder flow, Size of Tip

Tip Angles, and the distance of the tip from the tooth

Advantages:

Reduced Noise, Vibration and sensitivity

More rounded line angles

Disadvanatages:

Cannot be used in all patients; asthmatics, and patients with other

pulmonary problems

Dust control is a problem

Not efficient in removing large amalgam restorations

Does not remove gross caries well, as it doesn’t cut soft and resilient

substances, a spoon excavator has to be used in conjunction with these

Depth of cavity cutting is hard to control

 
 **Laser Cavity Preparation :**Laser stands for - **L**ight **A**mplification by **S**timulated **E**mission of

**R**adiation.

Device that generates a precise beam of concentrated light

energy.

Different wave-lengths are used for cutting different surfaces.

Some good for soft tissue and some good for hard tissues.

Types used in dentistry include:Erbium:yttrium-aluminum garnet

lasers, and chromium:yttrium-scandium-gallium-garnet

Can remove soft caries as well as hard tissues

Can remove caries selectively while maintaining healthy dentine

and enamel

***Does not produce smear layer* ( most important one , since there is no derbies so we can NOT use GI after laser since its bonding depends on free calcium in the debries )**

Can be used without aneasthetics

Adhesive restorative materials are used with these preps.

Laser is generated in machine, then guided by gold mirrors along

the hand-piece to emit from the tip with a water-jet.

Pressure of water does cutting, and guidance is achieved by red

laser.

Laser Cavity Prep

**Advantages:**

No Vibration

Little noise

No Smell

No Numbness associated with anesthesia

**Disadvantages**:

The lack of tactile sense

Cuts hard tissue more faster than soft demineralized dentin on

cavity floor

Dental

**Dental adhesion and Dental adhesive joint**its all about minimal intervention Direct/Indirect composite restorations (Micromechanical)
mantel dentine is the first one .

Goodluck! ☺