Dental materials sheet #4

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Endodontic materials :

\* Our aim in endo therapy is preventing infection by : 1. Removal of pulp tissue : we either have necrotic or inflamed pulp tissue

 2. Cleaning and shaping

 3. 3 dimensional obturation of the canals

The main problem in endo in bacteria if u r living in a bacteria-free environment then leave the exposed pulp tissue and nothing will happen . A study was done in 1965 by a Japanese doctor on rats, some of the rats were born in a bacteria-free environment and other rats in a normal environment then they drilled their teeth and they exposed the pulp then they left them in their environments after a time they killed the rats and they did surgical sections to find out what happened to the pulp the results were:

\*the rats that were raised in a normal environment had irreversible pulpits and infection and necrosis

 \*the rats in the bacteria free zone >> the pulp formed new dentine and they were disease free

So the main problem here is bacteria .the main aim of RCT is to eliminate bacteria and prevent any further disease



This is a 3d image of an upper molar before RCT (red) and another one after RCT (green) when we do super imposition take a good look u'll notice that there's a lots of red areas that haven’t been touched by the instruments so how are they cleaned? By irrigants

"FILES shape IRRIGANTS clean"

Due to the difficult and different morphology of the canals especially in molars its really difficult to clean them using files because they're rigid and thin and the main problem is that u can't see what's inside and which surface are u touching and which surface u r not that’s why irrigation is really important because it does what the files can't do which is disinfection and sterilization of the canal

 We can never reach the level of sterilization what we try to do is to reduce the number of bacteria below the biological level and the filling should reach the rest of the bacteria to prevent reinfection

You cant leave the canals empty after doing the pulpctomy you have to put something in them you can either put irrigants if in short period of time or medicaments if long period of time(several weeks)

One of the major medicaments is calcium hydroxide or non setting calcium

objectives of irrigants:\*

Lubrication of instruments used to shape the canal.

Flushing out of gross debris.

Dissolution of organic and inorganic tissue.

Antimicrobial effect.

Cheap.

* \*Chemically inactive irrigants : these have no chemical activity only the physical activities like flushing and washing like:
	+ Water
	+ Saline
	+ Local anaesthetic solution
	+ \*Chemically active irrigants : these have chemical properties beside the physical ones like:
	+ Sodium hypochlorite (NaOCl).
	+ Oxidizing agents as Hydrogen peroxide (H2O2)
	+ Chelating agents as EDTA.

Sodium hypochlorite (bleach, Clorox) the best the cheapest why? Because its antibacterial effect is the best till now and its excellent ability to dissolve the tissues

It has bad taste and bad side effects and it doesn’t remove the smear layer

We need good isolation while using it because Hypochlorite is very toxic

while irrigating the needle should be loose <the needle can go in and out easily while giving the irrigant > don’t forcefully push the irrigantion into the canal if u do this then definitely the irrigant will go beyond the apex

 Hypochlorite accidents :

There's a pic in the slides the dentist was treating lower molar

If this happens the patient will stop u instantly there will be sever instant pain then it will start to swell really fast

The pain will disappear in 2 days thankfully but the swelling will remain for 7-10 days

There will be change in color in the skin it becomes reddish then bluish then violet then yellowish (traffic light)

How to manage it?

First u have to reassure the patient and tell him this accident is not fatal if the pt is in pain give him more anesthesia (if in lower jaw block again if in upper give infiltration but in a site a little bit farther from the accident place) try to do aspiration in the swelling place to decrease the pressure if the case was necrotic give antibiotics sometimes steroids are given and sometimes if it was sever the pt should be hospitalized

While using hypochlorite try to use a SAFE TIP NEEDLE (the exit is at the side of the needle not at its end) so even if u jammed the irrigant it'll be less dangerous

 Smear layer : a layer formed from dentine chips and loads of bacteria

Hypochlorite cant remove it but this layer should be removed because its like a barrier so hypochlorite cant reach the dentinal tubules in the infected dentine (they are full of bacteria)

Hydrogen peroxide (H2O2) : no one likes to use it these days because of its bubbling effect

Chlorhexidine :

we find it in irrigants and primers and mouthwashes (chorsidin? used especially in perio)

-excellent antibacterial and antifungal

- in endo we use 2%concentration

-in perio we use .4% concentration

-disadvantages :staining

-its Substantivity 12 week ,,,that means the antimicrobial effect still effective up to 12 week cuz of that we use it at the end of irrigation

-another problem with it ….does not dissolve the organic debris so it not universal irrigant

Chelating agent :

-EDTA (ethylene diaminetetraceticacid )\ Commercialname:RC pre /file-eze

-excellent to remove smear layer

-soften dentine

-disadvantage:its not antibacterial

If the canal was calcified we use chelating agents to open it . it removes calcium and soften it

Note :there's no ideal irrigant

MTAD :

Bio pure

-mixture of tetracyclic acid +detergent

-contain antibiotic for antimicrobial effect

-the acid for dissolve the smear layer and the detergent is to increase the surface tension

You have to memorize Table on slide 19 for the exam

- its Substantivity is 4 week

Another irrigants :

-sterile water

-LA (decrease the pain and safe so even if it went beyond the apex its ok)

-saline (.9%)

Note :the best irrigant protocol is alternative use of naocl with EDTA (we use EDTA then we use naocl then EDTA and so on ……)then u use chx bcuz of its Substantivity effect and between each irrigant we use saline to avoid interaction

Naocl= sodium hypochlorite

Some ppl prefer to irrigate with saline between irrigants while following this protocol

-what the concentration of naocl ?

The higher concentration ,,,the higher the chance for accidents and toxicity

-the lower,,,,,, lower activity

-another disadvantage for naocl:

Its Inactivated by light and very quickly inside the canal so we must use it more than one time (use a lot and alots of irrigant)

-we never use the instruments inside the canal until we assure that it wet (the file just open the road but the irrigant it wash, clean, disinfect

Again files shape irrigants clean

-the best concentration is 2.5-3% not high and not low

Good luck …