12 Sheet no. :

Refer to slide no. :

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# The pulp is a specialized connective tissue that serves functions throughout the life of the tooth :

 1- .like nourishment , keep the cells of the pulp vital ; it means intact

 Blood supply…

 2- undifferentiated cells : responsible of depositing dentine either pathologically or physiologically

 3- innervations : when you drink something cold or hot you feel it by the pulp

 4- proprioception : vital pulp is capable of telling you if you are biting too hard,

 \* Teeth with no pulp loosse this proprioception , so you will bite more than normal on this teeth leading to dentinal wall fracture…

# This pulp gets diseased.. the commonest one in dentistry is dental carries : which is a progressive infection caused by bacteria that use carbohydrate as a substrate producing acids , these acids dissolve organic tissues> softening

 # So carries is progressive , if not treated it will keep the invading tissues until reaching the pulp ,, but pulp has certain protective mechanisms :

 1- dentinal tubules get narrower, their permeability will be less, pulp deposits tertiary dentine (reparative or reactionary dentine ) trying to decrease the distance that the carries needs to travel ….

# pulp is as any other tissue .. inflammation will occur > same like if it is in the hand it will be swelled which is a good thing in which body will send white blood cells that will cause vasodilatation and increase permeability of blood vessels , leading to the five signs of inflammation : redness, hotness, swelling ,pain , loss of function …all these happen in the pulp but because the pulp is contained a narrow area( tooth) no swilling > when blood supply increase >> more pressure specially in nerve endings >> sever pain ( pulpitis) it could be asymptomatic but most of the time its painful

Pressure will block the blood supply >> necrosis ..pulp becomes necrotic> carries still advancing >> nothing to stop it>>> so the whole canal will be infected>> go out of the tooth >> then the body will try to use other protective mechanism which is inflammation this case it is called apical peridontitis

# So the pulp could be either normal , infected, necrotic

# reversible and irreversible terms are used to describe mild infections that pulp can heal

But when pulp is damaged and can't be healed it should be removed ..

# What is normal pulp ??

 Asymptomatic, any symptom it's not normal pulp 1-

2- Vitality test or pulp test >> by mild transient sensation not lead to any distress, doesn’t stay for long time , apply smth cold pain is found>>remove it ..the pain will disappear.. so its a normal sensation

3- radiographic x-rays >> no signs of apical pathology >>

# Normal x-ray radiograph >> shows intact lamina dura and uniform thickness of periodontal ligament around the tooth = 0.2 – 0.3 mm if this distance changes it’s a pathological condition …

# pulpitis :

1- symptomatic cuz the tooth is inflamed ,usually need a stimulus to occur like only when you eat an ice cream you feel pain>> because of the cavity formation .. ( so its stimulated pain)

2- discomfort ,carries, defective restorations , exposure of dentinal tubules

3- radiographically >> pulp still vital and around the pulp is not infected yet (normal x-ray)

 You have to differentiate this from generalized dentinal hypersensitivity >> that occur in all teeth with same side effect of reversible pulpitis>>

# remember : hypersensitivity : no pathology >>you know that most people have cementum overlap enamel ,good percentage have edge to edge , good percentage with a gap .. people doing tough brushing >> gingival recession > expose this part >> become sensitive to cold and hot …

# the simplest way to treat generalized hypersensitivity is to block these tubules by fluoride

 By precipitation ..

# if stimulus is stronger >> pathology is more severe >> increase intensity of inflammation >> irreversible pulpitis >> tooth cannot recover >> take tooth out or do root canal treatment … it will not heal

# most common presentation is pain >>spontaneous doesn’t need a stimulus , pain

 Is killing ( ten) = so painful

 Pain also is dull = boring ,not electric shock like, throbbing and

 People can't know if it's from the upper one or lower but they know its definitely from the right side

3 – if you do pulp test applying smth cold or hot > pain is severe so avoid that ..

Linger pain) always describes irreversible pulpits.)

linger smell >> smell that you will smell it continuously

Same for linger taste you will keep tasting it

linger pain >> applying smth cold meaning that the patient after removal of the cold still feeling the pain.. that’s from irreversible pulpitis ..

Radiographically : you will see some widening of periodontal space >> but usually its normal radiographic appearance ..

If u don’t treat it >> necrosis = no blood supply

mostly its come from carries ,but also if we have severe trauma enough to cut blood supply>>necrosis

you can see intact teeth with necrotic pulp..

so we don’t have blood to stop progression >> so its silent>> until infection reach periapical foramen >> keeping the use of pulp tissue as substrate >> pulp canal becomes good area for growth of such bacteria

# So at early stages patient is asymptomatic and in pulp test >> doesn’t respond , but if the patient doesn’t respond that doesn't mean that the tooth is necrotic ..

# radiographic changes :

 Early stages : widening in the periodontal spaces >> to radiolucent region

How this radiolucent happened ??

Apical peredontitis >> intra inflammatory rxn when the body send its cells during infection >> granulation tissue ; which is inflammatory tissue contains blood cells …etc

One of them is osteoclast that resorbe the bone around the tooth to create more space for granulation tissue itself … >> radiolucency

# the color of the tooth may changes because before necrosis bleeding will occur inside the pulp chamber and u will get hemosidren … etc

# necrotic tooth is asymptomatic and usually incidental finding >> all you have to do is to apply the pulp test if it doesn't respond take a radiograph and you will see the radiolucency

# apical tissues :

1- normal

2- apical peredontitis ( acute or chronic )

3- apical abscess ( acute , chronic)

# in the first case we describe it when talking about normal pulp , that is asymptomatic ,

In x- ray .. no pathology

# apical peredontitis : inflamed apical tissues , you touch the tooth or tap it stings!!

 But this doesn’t mean that the pulp is necrotic ,1) cuz the pulp might be normal and u apply a filling a little bit high and allow the patient to bite >> premature contact >> tooth become very tender ( tenderness to biting) and you did the pulp test and its normal you have to check the occlusion or 2) history of trauma

# tender : painful to touch ..

# apical peredontitis could be extension to pulp inflammation

Sever irreversible pulpitis( sever pulpal inflammation ) > can lead to tenderness as well 3)

Inflammation reach periapical area >> preapical peredontitis

# radiographically : still very early stage of inflammation

You know that outer bone is cortical , inner is spongy or cancellous bone

And for inflammatory lesion to appear on x- rays clearly >>it needs to perforate one of the buccal bones so it takes time, and at early stages the buccal and lingual bone plates are intact , you don’t see any change .. so u see widening in preapical region

# chronic apical peredontitis :

Necrotic tooth and infection try to escape but body is fitting so it's a balance

Host dependence on one side and infection on the other side..

Long duration , usually is silent stage , u find it incidentally cuz the body keesp this infection under control >> if u tap the tooth no symptom but the patient may feel smth different it's not pain ,in the x- ray in the slide .. there is an immature tooth so u can see follicles there ..

So u do pulp test as negative response

# radiographically : radiolucent legion >> 99% the tooth is necrotic

It could result from deep filling by composite as in the slides

Irreversible pulpitis hurst for awhile then changes to necroses here the pain will disappear ,,that’s what happens when u put a deep filling

Any patient with irreversible pulpitis its much easier to treat him because u know there is no infection >> it's all about removing the pulp, but if he come back with radiolucent legion it's an infection ..so the protocol will be different..

# abscess

Production of puss which it could be acute >> get swelling which is intraoral or extra oral

This is because of very severe infection , so body increase its intensity, so again it's an inflammatory rxn by polymorfonuclear cells , complement sys , T- lymphocyte, B lymphocyte >> produce free radical stuff that destroy both bacteria and normal tissue..

It's very painful condition …

Abscess means there is necrosis

These patients need drainage of the abscess

You have to anesthetize around it, get scarpal plate ,stab all the way to the bone , puss comes out , pain is relieved ,,

They may have systemic side effects : fever

# remember that root canal treatment is control over the infection that would follow necrosis

# radiographically : radiolucent legion, few times u can find primary periapical abscess with no radiographic appearance…

Inflammatory rxn produced puss but very slowly( low scale), and it will find its way out, >> chronic apical abscess or chronic supportive peredontitis >creates sinus tract ( channel connecting area of infection which is the tip of the root to the outside ) and it could be intraoral or extra oral >> if it is an intra oral one >> u put your gutta-percha in it , take an x-ray pointing it to source of infection ,,

Not painful , patient has little descriptions: bubbles, that they open it by themselves

#radiographically : radiolucency

Easier to diagnose than acute apical abscess cuz isn't associated with bad pain with it and easily diagnosed by inserting gutta-percha, but the problem : exposure of this area to oral cavity so the bacterial flora in ur mouth is very complex and much difficult to control.

# to make diagnosis : we need to

 1) listen to patients complains (most important one cuz they know the problem well)

Taking an x- ray that shows u multiple problem to you but as a patient they are not making problem, don’t miss with sth that doesn’t make any problem to the patient , also you may work on problem but not related to his symptom so u have to listen to him to treat his symptom to make him happy, also their complains may give u a history of the legion …like if he complains about cold water >> describing pulpal pain

But if he said : I have swelling since yesterday and I can't bite >> abscess

People that are not good in describing their complains > ask them leading questions

2- medical history

3- clinical examinations

4- pulp test

5- radiographic examination

We have to combine all information we get because one of them is not enough ..

# basic chief complains : ask about pain , its location ( patient is capable to know where it is ) most of the time there is some sort of apical peridontitis , proprioception is common in periapical tissues as it is in priapical area.. the patient can tell the location ,but if it is in the pulp there is proprioseptive fibers but merely localized

Characteristic of pain : is it boring , throbbing, sharp , dull …

Onset : when it started

There is nonodontogenic reasons that can lead to toothache

Duration : last for seconds or …

If it trigeminal neuropathy >> toothache>> lasts for seconds

If the problem with TM joints it is a constant pain

Aggrevating factor and relating factor : like when patient says : when I drink cold water I feel the pain , or when he shaves his face he feels toothache ….or when he bites on the tooth ( you have to know whether this pain is due to biting only or if when he bites he feels the pain and when he opens his the pain is gone because the second is due to a crack and the pulp is normal

When he opens his mouth the crack is closed, pressure is on nerves >> pain

Frequency of pain :

Alarm clock headache = cluster headache >

EXAMINATIONS:

Extra oral examination:

Check symmetry to insure no swelling

Redness , lymph nodes, …..

If lymph nodes are palpable and tender>>infection

But if they are palpable but not tender >> it can be more dangerous >> lymphoma

Sinus tracts

TMJ >> check for tenderness>>muscles of mastication, deviation , clicking, normal opening

All above are extra oral examinations

Intraoral : check the soft tissues, gums cheeks , tongue, sublingual area, ulcers

Check the occlusion , if there is an occlusal interference >> painful

Tests within one minute >1) testing lower 6 by palpating with a finger buccaly and lingually

To check if there is swelling, and if bone is intact, tenderness by asking if there is pain

2) percussion: by examination with mirror and tap each teeth, by moderate force , otherwise it will hurt the patient ,, then use periodontal probe to measure the depth of the sulcus…

We measure the sulcus because of 2 reasons :

1) patient may have generalized bone loss peredontitis >probing depth is increased all over the mouth , sometime you probe and normal normal ,then suddenly a drop..>> deep and narrow pocket means either tooth is fractured and some of the bone around it is lost, or there is sinus tract and instead of draining inside or outside the oral cavity, it drains inside the sulcus

 Check mobility of the tooth (1,2,3 grades)

 Restorability >> some teeth are not restorable >>need to come out

 Pulp test >> heat or electric pulp test, in heat test you roll gutta-percha or green stick on the tooth surface make sure you isolate it !!!! because if it get stuck to tooth surface >> may cause injury

Electric pulp test : device that sends an electric current

We do pulp test to check whether pulp is vital or not , and reproduce patient symptoms

 I test him cuz I want to give him pain cuz it’s the only way to confirm from where the pain is coming from , or to relieve patient symptom …

Or used as base line record after trauma

Sometimes u loose sensation to all these pulp tests, so the best way to check vitality is to use electrical pulp test readings 40,30,20>>> nerve fibers become less in intact

In all these tests you should notice patients response,

No response = necroses or other things as well

Or it could be normal response… normal sensation

Or pain if it is quick sharp pain that mediates immediately >> reversible pulpitis associated with a delta fibers ( mylinated fibers), or delayed lingering pain >>

Pain is not filled from the first time , even by removing stimulus he still feel the pain

# radiographic examination :

Periapical radiograph : gets apex and tissues around it

Radiopaque >> looks white

Radiolucent >> looks black

Bite way x –rays : allow the patient to bite >> film is btw the teeth >> booth upper and lower crowns will appear not the roots >> help to show the carries that sometimes u can miss, or any overhanging restorations , level of bone

Panoramic radiograph : x – rays that is taken to the whole dentition , to see the full extent of radiolucent or radiopaque

Occlusal pins : put a pin and allow the patient to bite on it we don’t use it , either taken from the upper or lower side

The most recently is COM CT scan : you can see the tooth MD and in cross section ,PROBLEM WITH IT : radiation exposure is increased , and it is expensive also

So diagnosis : is the sum of all information together

Diagnoses should include :

1) diagnosis of the pulp and periapical tissues >> u can say there is normal pulp and acute peredontitis , necrotic pulp with chronic apical peredontitis, or necrotic pulp with apical abscess ….you should diagnose both

There is a slide shows a file in the pulp >> the Dr said that the patient comes with cold pain >> you should assume that there is no pulp there >> this tooth don’t respond to cold stimulation , while the adjacent tooth has a very deep filling that sets almost on the pulp , which the tooth that hurt

Maxillary sinus in x-rays appears radiolucent ( check the slides)