Endodontics II. questions

1. Pulpal diseases – symptoms, diferential diagnosis.
   Morphology and structural elements of dental pulp.
   Histopathologiocal and clinical classification of pulpal cindition.
   Clinical classification:
   Normal pulp (tissue resilient, usually exstirpation in one piece)
   Reversible pulpitis (hyperalgesia) – transistory pain, hyperreactive pulp, requires stimulus (structurally intact, increased vascularity)
   Irreversible pulpitis (painful pulpitis) – pain my be spontaneus and persists, persistent response to cold stimuli, later to heat stimuli (structurally intact bud engorged, areas of necrosis or abscess formation)
   Nonvital pulp, exsudative – variies, may be heat sensitive,prime finding in precussion sensitivity.
   Non vital pulp dehydrated – no response to vitality test, periapical translucency may be present.
   Differential diagnosis of potentionally reversible affected pulps:
   Differential diagnosis of potentionally reversible affected pulpitis:
   Probably reversible:
   Pain: momentary – dissipates readily after stimulus (e.g. cold) (A-∂ fiber stimulations)
   Stimulus: requieres external stimulus (cold, heat, sugar)
   History: Patient may have undergone recent dentzal procedures (e.g. root planning, cavity preparation), cervical erosion or abrasion may be present.
   Electric pulp test: may be premature response
   Percussion:Negative response unless problem related to occlusal sreess
   Lying down: Negative unless of minimally affected pulp tissue and short duration of pain
   Color: negative
   Radiograph: Probable cause (e.g. restoration and/or dental caries, periodontal pocket, cupping of alveolar crest. Periapex negative.
   Probably irreversible:

Pain: continuous – persists for minutes to hours after stimulus is removed, presence of internal (secondary) irritant (C fibre stimulation) Throbbing –may be present, due to arterial pulsation in area of increased intrapulpal pressure.(C- fibre stimulation)
Stimulus: Spontaneus pain, does not require external (primary) stimulus, dead on injured pulp tissue present in chambre or canal (internal or secondary irritant – secondary irritantperpetuates the inflammatory response, which increased regional intrapulpal pressure). Also intermittent spontaneus pain of short duration.
History: Patient may have had extensive restoration, pulp capping, deep caries, trauma etc.
Electric pulp test: may be premature, delayed or mixed response.
Percussion: May respond in advanced stage of pulpitis when concommitant acute apical periodontitis is present.
Lying down: pain, common finding because increase incephalic blood pressure increases already excessive intrapulpap pressure.
Color: may be present as result of tissue lysis and intrapulpap hemorrhage
Radiograph: Probable cause as for reversible (e.g. restoration and/or dental caries, periodontal pocket, cupping of alveolar crest. Periapex - may be slight widening of periodontal space)

2. Apical periodontitis – patology, clinical symptoms, possible complications
Histopathology of the periapex (cementum, periodontal ligament, alveolar bone)
Pulpoperiapical disease (periapical pathoses of pulpal origin):
Acute apical periodontitis (acute apical abscess. acute exacerbation of prior existing chronic lesion, suppurative apical periodontitis)
Condensing ostitis
Chronic apical periodontitis (periapical granuloma, apical cyst, suppurative apical periodontitis – chronic apical abscess)
Pain (characterization), Swelling and palpation, vitality test. Radiography
Treatment: consideration of local, regional and systemic factors.
Conservative: Emergency in acute ophases (decomporession, heavy local anaesthesia, good access – decomporession - drainage,WL, sterile cotton pellet, close, patient is reappointed in 2 – 5 days, RCT afterwards).
Possible commplications:Subperiostal, submicous abscess, inflammation in perimaxillar or perimandibular spaces.

3. Pulpitis, principles of therapy

Characterization, symptoms, consideration, emergency in acute poulpitis – local anaestheisa, exstirpation – pulpectomy, caklciumhydroxide between sessions,RCT af or RCT in one session.

4. Therapy of apical periodontitis
   Consideration, emergency, RCT.
5. Radiography in endodontics – i.o. radiography, princilpes, parallel technique, bissecting angle, orthoradial and axcentric projections, importance of follow up comparisons.
6. Working length of the root canal (definition, establishment: radiographically – estimation of location of apical constriction, odontometry, principles, description of apexlocators, morphology of apical area)
7. Dry operating field in endodontics – rubber dam
8. Access to the pulp chamber – instruments, description of the procedure
9. Hand instruments for the RCT, ISO norm
   (size of instruments, taper, material description of iinstruments)
10. Power driven instruments for root canal shaping (see lactures – materal – NiTi and its variations, taper, rotary, reciprocating, oscillating instruments,
11. Canal shaping using hand instrumentation (techniques: rotation, reaming action, filing .-curcumferential filing, balanced force. Methods: rotary – filing combined risk of apical transpúortation and stripping) step back, modified double flared.
12. Canal shaping - power driven root canal instrumentation – systems and basic rules (material, rotary instruments, reciprocating instruments, ocsillating instruments)
13. Reendodontic treatment

Indications (when and why), description of procedure, role of ultrasound.

14. Root canal irrigation
    (importance of irrigation, irrigants, activation – see lecture)
15. Root canal filling - materials (see lecture)
16. Root canal filling – cold techniques: single cone, lateral compaction – description, risks and benefots of both methods.
17. Root canal filling – warm techniques: warm lateral compaction, vertical compaction, injection, hybrid technique, Mc Sppaden compaction. Dexcriptions and benefits.
18. Calcium hydroxide in endodontology
19. Medicaments in endodontology. MTA

Anaestetics, antibiotics, corticoids, calcium hydroxide, necrotizing agents (based on paraphormaldehyde – these pastes contain paraphormaldehyde, anestetics, vehiculum, they must be placed on open pulp for 2 weeks, cover hermetically, there is a risk of necrosis of alveolar bone and soft tissues)), MTA see special list.

20. Endodontic surgery

    General indications – persistent periradicular pathology (more than 6 months the same or worse finding), siutuations when conservative treatment is not possible (e.g. long root canap pos, fragment of root canal instrument atc.).

    Surgery to retreat a failure or symptomatic case:

    Failure of an incompletely formed apex to close

    Persistent pain

    Acute exacerbation after root canal filling

    Lacko f apical mseal

    Unfilled portion of root canal

    Failures of unknown clinical reason.

    Contraindications:

    Situations when RCT can be successfull

    Systemic diseases contraindicating local anaesthesia, systemic diseases contraindicating surgical treatment.

    Procedures:

    Incision (abscess)

    Apicectomy

    Periradicular excochelation

    Hemiextraction

    Minimally invasive apical surgery (root canal shaping from the epex – magnification, ultrasound, apical seal with special materials or MTA)

In root canal therapy where an apical infection is persistent, an apicoectomy may be required. Flap[is raised over the tooth and the root tip is resected and a cavity created (3–4 mm) in the root tip removed. Retrograde application of MTA to the root tip cavity is completed.

MTA was originally developed for root-end filling. There were several different materials such as amalgam, reinforced zinc oxide eugenol cements (interim restorative material - IRM), super ethoxy benzonic acid [EBA], glass ionomer cement and composite resin for root-end filling after apicoectomy. MTA, a refined "Portland cement" - calcium alumino-silicate cement-, was found to have less cytotoxic and better results in biocompatibility and micro-leakage sealing ability, giving it more success over root-end filling materials. But MTA is not

acceptable as "ideal root-end filling material" because MTA has some drawbacks of toxic heavy metal presence, discoloration, difficult handling, short working time, long setting time, washout before setting and washout after set (calcium carbonate based MTA has solvent of carbonic acid).

For ideal Root-end filling, there are many new materials or improved materials developed.

1. Glass ionomer cement: It is based on alumino-silicate based bioceramic material. Most cytotoxicity is caused by polyacrylic acid. So current GIC as root-end filling material is reducing the cytotoxic acclerator's concentration. - calcium alumino-silicate - MTA (calcium alumino-silicate) + GIC (alumino-silicate), calcium reinforced glass ionomer cement is developed. It's a promising material.

2. Calcium phosphate cement (hydroxyapatite) bioceramic material: CPC has been studied since 1985 in the US. Bone grafting material, artificial bioceramic CPC is developed for Root-end filling or pilot material in root-end filling and root repair material.

3. Calcium silicate based material - bioceramic material: It was known as bioceramic sealers. But actual bioceramic aggregates are composed of pure medical graded calcium silicate based material.

4. Calcium aluminate bioceramic material - (alumina cement in minerals, calcium aluminate cements in bioceramics) Alumina is an initial fast setting element and high compressive strength. It has been used as dental products as luting agent. Calcium aluminate cement (bioceramic) has been developed for dental products and root-end filling material.

These newly developed root-end filling materials are based on bioceramic, chemically bonded ceramic, not by mineral (ceramic in nature) like MTA. Even if mineral shows higher biocompatibility, minerals have potential toxic heavy metals in material. Bioceramic or bioMaterial is used for medical and dental products. BioMaterials can reduce the issues on discoloration and toxic heavy metals' presence initially.

21. RCT – indications and contraindications

Systemic, regional and local factors. – see lectures.