DIAGNOSIS, BASIC SYMPTOMS AND TREATMENT OF INFLAMMATORY DISEASES OF DENTAL PULP AND APICAL PERIODONTIUM

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DIAGNOSIS OF INFLAMMATORY DISEASES OF DENTAL PULP AND APICAL PERIODONTIUM

PATIENT EXAMINATION

• Anamnesis - medical history + dental history

• Extraoral and intraoral clinical examination:
  - visual examination
  - probing
  - palpation
  - percussion
  - supplementary tests – EPT, radiography

• Differential diagnosis

• Diagnosis – based on clinical manifestation + examination tests

• Treatment plan
ANAMNESIS:

MEDICAL HISTORY – a complete one:

• Contains patient’s vital signs

• Gives early warning of unsuspected general disease

• Defines risks to the health of the staff

• Identifies the risks of treatment to the patient

• Updated regularly, esp. in case of changes in the patient’s health status
MEDICAL HISTORY:

• MEDICAL HISTORY FORM:
  - the focus - on the pre-examination patient interview
  - helps in identifying **conditions that could alter, complicate / contraindicate proposed dental procedures:**
    - cardio-vascular diseases
    - diabetes mellitus
    - allergy
    - HIV and HBV infections
    - renal diseases ± dialysis
    - pregnancy
    - behavioral and psychiatric disorders
    - medication-related osteonecrosis of jaws (bisphosphonates), etc.
  - identifies a **need for medical consultation or referral** before initiating dental care
DENTAL HISTORY - contributes to the establishment of a diagnosis

- Chief complaint and present dental illness
  - determine patient’s chief complaint, or the problem that initiated patient’s visit
  - discuss all aspects of the current problem
    (onset, duration, symptoms, frequency and severity of pain, provoking and relieving factors)

- Information about past dental problems and treatment
- Frequency of dental care and perceptions of that care
- Encountered problems with previous dental care
- Identification of other problems (food impaction, inability to floss, etc.)
- Date and type of available radiographs
EXTRAORAL EXAMINATION of face, lips and neck:

- Facial asymmetry swellings outgrowth
  pigmentation signs of trauma previous treatment
- Lymph node examination
- Examination of temporomandibular joint
  (for sensitivity, noise, irregular movement)
- Extent of jaw opening
1. SOFT TISSUE EXAMINATION
(lips, cheeks, mucobuccal folds, palate, tongue, sublingual space, gingivae, tonsillar areas, pharyngeal areas)
- color changes
- localized swelling
- sinus tract

2. EXAMINATION OF DENTITION
- carious lesions
- discolorations
- restorations
- fractures
- loss of teeth
- abnormalities
- supernumerary / retained deciduous teeth
- crowns
CARIES DETECTION:

VISUAL EXAMINATION - criteria for:
- surface roughness
- cavitation
- chalky appearance
- opacification
- discoloration (*brown, gray, light-brown*)

TACTILE EXAMINATION – *explorer, mirror and light*
- detection of softened tooth structure
- the explorer sticks in presence of decay
- provokes or not pain

DYE-PENETRATION METHOD:
- Dyes: 0,1% solution of fucsin
  - 2 % water solution of methylene blue
  - iodine, etc
3. PERCUSSION
   • Applied gently with a mirror handle
   • Vertical and horizontal
   • Dull/sharp (clear) tone

4. PALPATION:
   a. Most effective - when made bilaterally at the same time
   b. Gives information about:
      - mucosal sensitivity
      - asymmetry
      - swelling and fluctuation in examined areas
5. PULPAL EVALUATION - DIAGNOSTIC TESTS

Thermal tests

- **Cold testing** *(usually performed first)* –
  - CO₂ snow, dichlorodifluoromethane, ice sticks
- **Application of heat** - *heated gutta-percha bar*

Electrical tests - diagnostic accuracy affected by:

- enamel thickness
- location of the point of contact with the probe tip
- dentin calcification
- interfering restorative materials
- the cross-sectional area of the probe tip
- patient’s level of anxiety
6. PERIODONTAL EVALUATION by:

- using periodontal probe
- recording of any bleeding on probing
- assessing the bone architecture (X-ray)

• Evaluation of oral hygiene level
• Assessment of attachment levels – *circumferential probing*
• Assessment of gingival tissue health
• Tooth mobility
• Alveolar bone topography
• Radiographic evaluation
7. RADIOGRAPHIC EXAMINATION - informative about:

- caries and existing restorations
- calcifications
- internal and external resorptions
- tooth and pulpal morphology
- root fractures
- the relationship of anatomic structures
- the architecture of the osseous tissues
- tracing sinus tracts
- periodontal defects
- evaluation of quality of previous endodontic treatment
Limitations of the radiographic method:

- with a little value in assessing pulpal status (vital/necrotic)
- two-dimensional images of three-dimensional structures
BASIC SYMPTOMS OF ACUTE PULPAL INFLAMMATION

CLOSED PULP CHAMBER!
BASIC SYMPTOMS OF ACUTE PULP INFLAMMATION
PAIN CHARACTERISTICS

1. Based on the type of exudate:
   - **Serous:**
     - provoked prolonged pain by cold + relieved by warm irritants
     - acute dentin reaction
     - acute, pulling spontaneous pain
   - **Purulent:**
     - provoked prolonged pain by warm + relieved by cold irritants
     - dull/missing dentin reaction
     - acute, throbbing spontaneous pain

2. Based on the extent of pulp engagement:
   - **Partial:**
     - the patient points out the involved tooth
     - short pain attack / longer remission
   - **Total:**
     - The patient cannot point out the tooth
     - dominating pain attacks / shorter remissions
     - painful percussion in case with pulpo-periodontitis

+ recurring + with constantly increasing intensity
BASIC SYMPTOMS OF CHRONIC PULPAL INFLAMMATION

Primary origin
Result of untreated acute pulpitis

Opened pulp chamber

Result of:
Weak, continuous irritation + Pronounced body defensive systems

Prolonged progress of clinical symptoms

Without distinct clinical manifestation
BASIC SYMPTOMS OF CHRONIC PULP INFLAMMATION
PAIN CHARACTERISTICS

• Provoked pain by mechanical (*hard food*), chemical irritants (*for proximal lesions*)
• Impaired masticatory function
• Exposed pulp tissue – *pulp ulcer, pulp polyp*
• Bleeding + pain at suction or chewing
• Mild pain
• Positive dentin reaction
• Percussion – painless/mild pain + normal distinct sound
FACTORS AFFECTING TREATMENT METHOD CHOICE:

- Tooth diagnosis
- Tooth condition – vital / necrotic
  intact / treated restoration / crown
- Patient’s general condition:
  - age
  - general health
  - psychological condition
  - medication
- Dentist’s skills
- Dentist’s knowledge about indications, contraindications and limitations of treatment methods

TREATMENT METHODS:

- Preservation of pulp + its vitality
- Removal of pulp:
  - Vital extirpation (pulpectomy)
  - Nonvital methods (mortal amputation / extirpation)
TREATMENT METHODS OF INFLAMMATORY DISEASES OF DENTAL PULP

ACUTE PULPITIS:
• Methods for preservation pulp vitality (indirect / direct pulp capping; pulpotomy) - in case of:
  partial serous pulpitis  pulp trauma  immature teeth
• Pulpectomy (vital / mortal extirpation) – in case of:
  total serous inflammation  purulent inflammations  traumatic pulp injury

CHRONIC PULPITIS:
• Methods for preservation pulp vitality – in case of:
  incipient chronic pulpitis  pulp polyp
• Pulpectomy (vital / mortal extirpation) – in case of:
  advanced chronic pulpitis  pulp polyp
METHODS FOR PRESERVATION OF PULP VITALITY

MINERAL TRIOXIDE AGGREGATE (MTA)

In 5 years
CRITICAL ANALYSIS OF NONVITAL METHODS:

- **Necrosis of dental pulp** – acquired with chemical methods (arsenic) or physical methods (electro-thermal coagulation)

- **Indications** – very limited:
  - allergy
  - hemophilia
  - lack of time in the practice

- **Application time** – from 24-48 hours to 1 week

- **Application technique**:
  - removal of carious tissue + pulp chamber trepanation
  - application of arsenic + cotton pellet + sealing with ZnO – eugenol product

- **Painkillers** – advisable for the next 2-3 hours

- **Complications**:
  - acute (chemical) periodontal inflammation
  - more appointments
  - ineffective devitalization
  - gingival necrosis
ACUTE SEROUS PERIODONTITIS – with 2 stages of development:

**Initial (toxic)** - *irritating hyperemia in the apical periodontium (from root canal toxins)*
- Feeling of pressure and tenderness in the tooth
- Pain relief after a prolonged pressure on the tooth
- Tenderness on vertical percussion

**Developed (exudative)** – *periapical serous inflammatory process*
- Spontaneous, constant dull pain – *the strength can decrease but never disappears*
- Localized pain, without irradiation
- The patient identifies the affected tooth
- Tooth is felt longer - *slight extrusion of tooth from the alveolus because of exudation*
- Regional lymph nodes – increased and painful
- Radiography – normal / slight widening of periodontal space apically
ACUTE PURULENT PERIODONTITIS – with 4 stages of development:

- into apical periodontium – *periodontal phase*
- into alveolar bone – *endostal phase*
- near periosteum – *subperiostal abscess*
- into surrounding soft tissues – *submucosal abscess (parulis)*
BASIC SYMPTOMS OF ACUTE INFLAMMATION OF APICAL PERIODONTIUM
ACUTE PURULENT PERIODONTITIS

- Increasingly intense, constant, spontaneous, throbbing pain
- Tooth is felt elongated - the patient appears with semi-opened mouth!
- Severe pain during mastication, even in slight contact with opposing teeth, lips and cheeks (esp. in case of a subperiostal abscess)
- Increased degree of mobility, even axially
- Irradiating pain but patient can point out the affected tooth
- Periapical erythema, swelling, fistulous tract / opening
- Sometimes facial asymmetry and trismus
- Impaired general condition
- Radiographic examination – normal / slight widening of periodontal space
BASIC SYMPTOMS OF CHRONIC INFLAMMATION OF APICAL PERIODONTIUM

- A slow chronic process:
  - asymptomatic
  - feeling of slight tenderness in the tooth upon vertical loading
  - discovered accidentally on X-ray – DD based on characteristic findings

PERIODONTITIS CHRONICA FIBROSA – radiography:

- Root surface (cementum) + lamina dura – preserved
- Periodontal ligament:
  - a widened periodontal space limited to the infected area near the apex
  - a fairly sharp transition affected / unaffected adjacent periodontal ligament (a “hood“)
  - hypercimentosis of the root (“drumstick” like) altering the tooth outline
  - hypercalcification (sclerosis) areas of bone – periapical radiodensity
PERIODONTITIS CHRONICA GRANULOMATOSA DIFFUSA – develops in 2 stages:

• **Prior fistulation:**
  - usually asymptomatic
  - occasionally patients experience:
    - minor pain during chewing hard food
    - dull pain / discomfort
    - instability
    - slight soreness
    - periapical soft tissue – hyperemia (livid color) + swelling

• **Fistulation (period of exacerbation):**
  - fistula + fistulous tract - lined by granulation tissue – nodular appearance
  - exudate (serous-hemorrhagic / purulent)
  - reduced pain
PERIODONTITIS CHRONICA GRANULOMATOSA DIFFUSA:

RADIOGRAPHY:

- A widened periodontal ligament space periapically
- Loss of apical lamina dura
- Periapical radiolucency - slight blurring of inflamed bone result of initial decalcification
- Area of disorganization – with a diffuse transition to normal bone

Tracing of a fistulous tract
PERIODONTITIS CHRONICA GRANULOMATOSA LOCALISATA:

- **Vary in size** - from a few millimeters to 1 cm or more
- **Separated from the surrounding bone** by a cleavage (division) plane – **covered by a capsule**
- Development of a **granuloma** (firmly attached to the root surface)
- Usually **asymptomatic**
- Occasionally patients experience:
  
  *minor pain during chewing hard food*  
  *dull pain / discomfort*  
  *negligible pain on pressure in periapical region*  
  *slight soreness (after strong bite)*

- **Periapical soft tissue** – hyperemia (livid color) ± cicatrix, thickened periosteum
- **Regional lymph nodes** - +/- increased + slight pain
PERIODONTITIS CHRONICA GRANULOMATOSA LOCALISATA:

RADIOGRAPHY:

- A widened periodontal ligament space periapically
- Loss of apical lamina dura
- Well circumscribed radiolucent lesion
- The area of disorganization – easily traced + separated from the surrounding normal bone
- Sometimes with external root resorption of cementum/cementum
TREATMENT OF CHRONIC INFLAMMATION OF APICAL PERIODONTIUM

ACUTE APICAL PERIODONTITIS – endodontic treatment:
- elimination of irritant/s from the root canal system
- root canal cleaning and shaping
- exudate drainage
- pain control

CHRONIC APICAL PERIODONTITIS – endodontic treatment:
- elimination of irritant/s from the root canal system
- root canal cleaning and shaping
- root canal medication

ASYMPTOMATIC – single-visit endodontic treatment
SYMPTOMATIC – multiple-visit endodontic treatment
endodontic-surgical treatment