



SECONDARY DISEASE OF CARIES IN PRIMARY DENTITION

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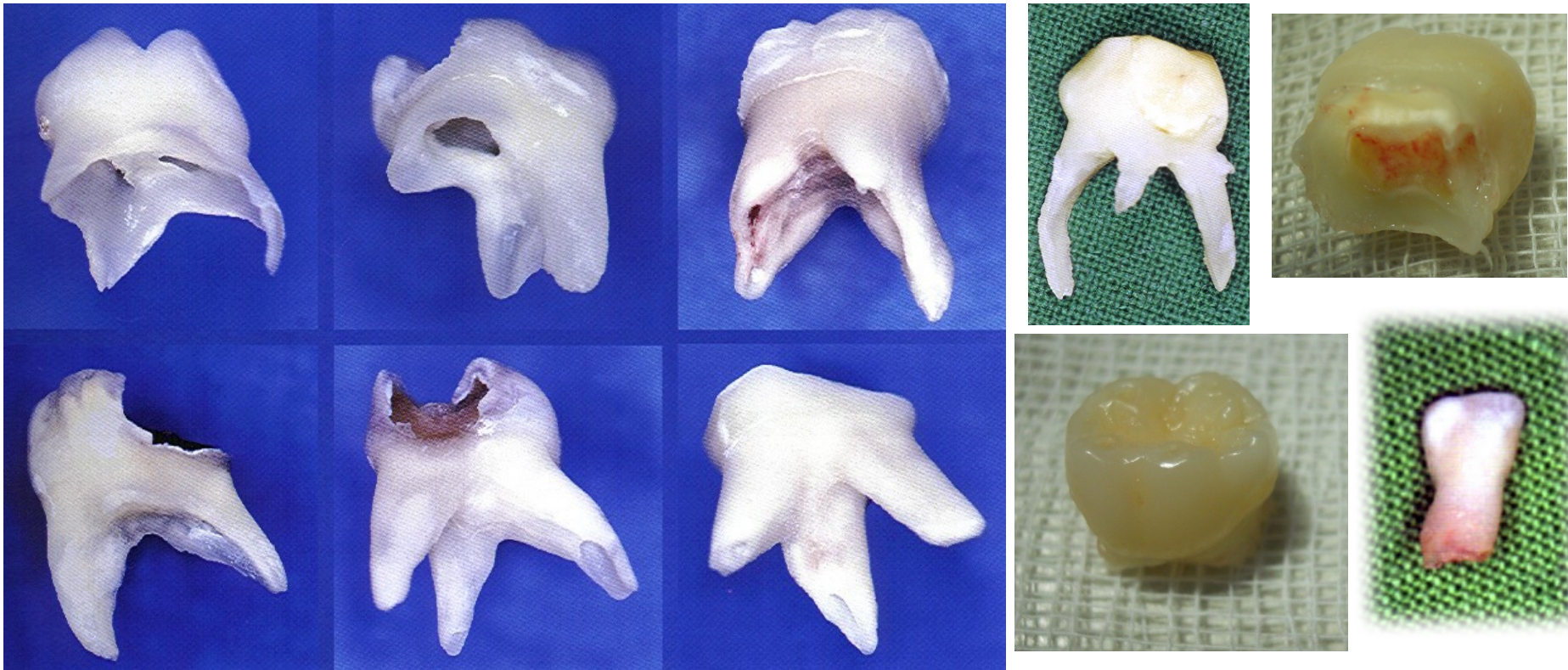
PULP THERAPY IN PRIMARY DENTITION

Favorising factors:

- reduced enamel-dentin thickness;
- variable mineralisation qualities of pre- and postnatal enamel;
- overdimensioned pulp chamber.

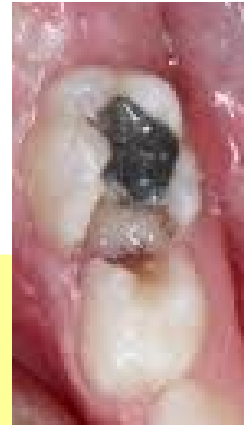
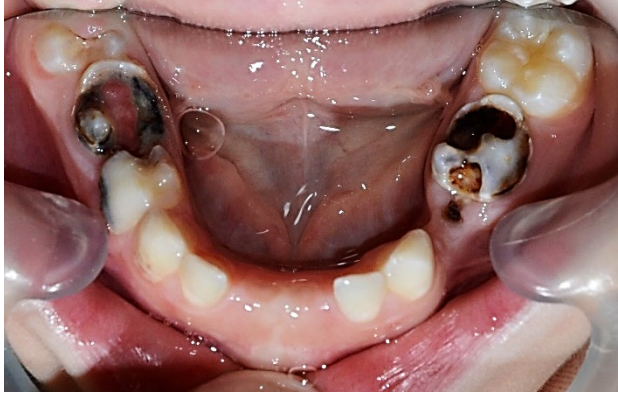


ROOT RESORPTION



- **Physiological and pathological root resorption in primary molars**

ETIOLOGY:



- **caries;**
- **secondary caries;**
- **unsuccessful therapy (fillings);**
- **trauma in primary front teeth.**



CLINICAL DISEASE FORMS

- **PULPITIS**
- **APICAL PERIODONTITIS
(PARODONTITIS, PERIOSTITIS)**
- **ASYMTOMATIC GANGRAENA**



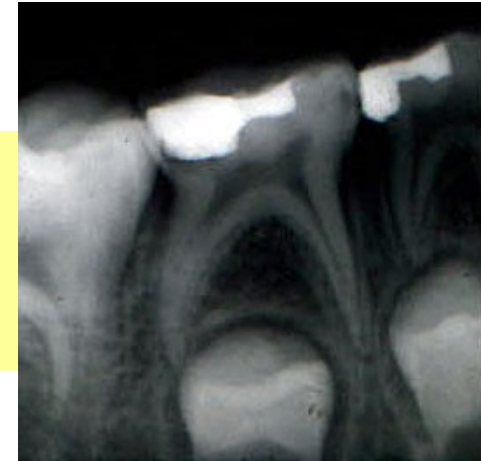
GENERAL SYMPTOMS OF INFLAMMATION

- **DOLOR** – pulpitis, periostitis;
- **CALOR** – microthermometer,
no diagnostical value;
- **RUBOR** – pulpitis: hyperemia localized on the
gingiva propria and fornix;
- **TUMOR** – intra- or extraoral swelling -
periostitis;
- **FUNCTIO LAESA** – all three disease forms.

DIAGNOSTIC PROCEDURES

• PULPITIS

- **FRONT TEETH:** - relative rare, periapical changes;
- **MOLARS:** diagnostical difficulties.



Fillings: Rtg- and clinical aspects.

TIME FACTOR

- The progression of pathological pulpal process from pulpitis to periostitis is faster in case of affected first primary molars, than in case of the second primary molars;
- Initiation and duration



DIAGNOSTIC PROCEDURES

• GANGRAENA – „asymptomatic G.”

- **FRONT TEETH:** - caries circularis - ECC;
- **MOLARS:** various therapeutical possibilities.

• Symptoms:



- pulp chamber is often penetrable;
- development of a sinus (fistula);
- persistence or initiation of pain;
- excessive mobility.



DIAGNOSTIC PROCEDURES

• PERIOSTITIS

- **intra- or extraoral swelling;**
- **radiolucency in the apical area;**
- **pain.**



Front teeth - therapy

DIAGNOSTIC PROCEDURES

• PERIOSTITIS

- excessive mobility;
- intra- or extraoral swelling;
- pain.



Molars

DIAGNOSTIC PROCEDURES

• PERIOSTITIS

- **punctum maximum of the swelling;**
- **evaluation of tooth condition,**
- **excessive mobility.**



54

Molars



75

DIAGNOSTIC PROCEDURES

• PERIOSTITIS

- temperature;
- prostration;
- lack of appetite.



54, 55



Molars

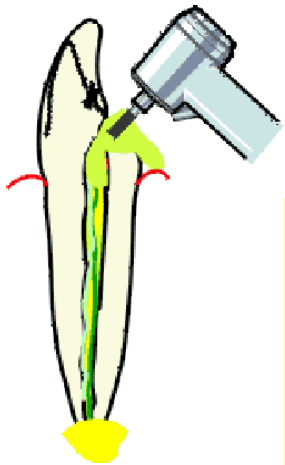


74, 75

RESOLUTION OF THE ACUTE PROCESS

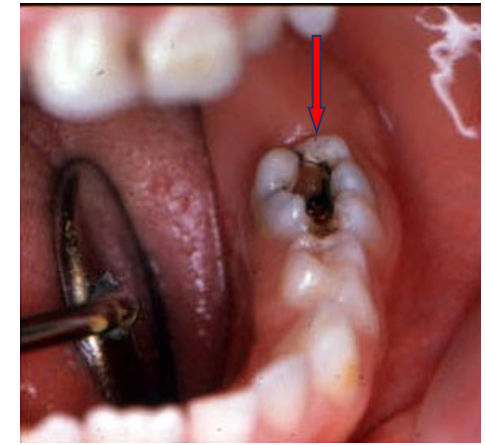
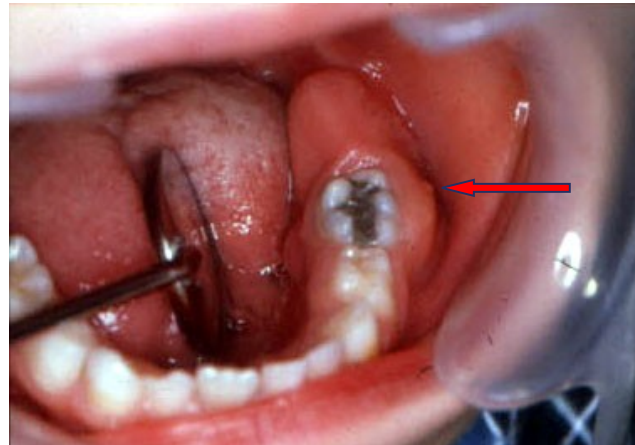
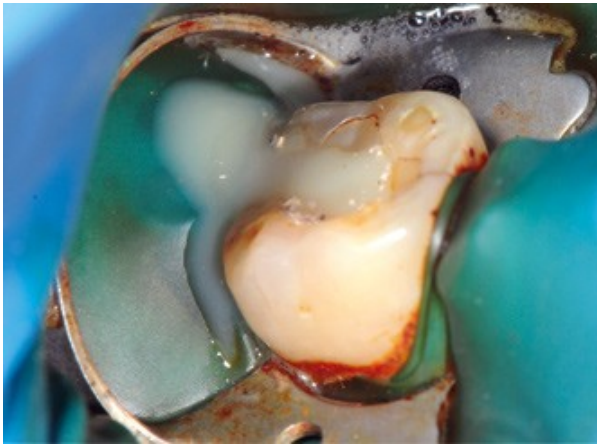


- **TREPHINATION AND DRAINAGE:**
 - periostitis → asympt. gangraena;
- **necessity of conservative therapy:**
 - persistence of the cariogenic environment;
 - masticatory problems;
 - repeated acute process ;
- **medication: antibiotherapy, antiinflammatory, antipyretic therapy, pain release;**
- **RTG??: so-called root canal filling, trauma, DD of swelling;**
- **monitorising, controll: 48 h.**



TREPHINATION

- penetration of pulp chamber should be rapid, effective and painless;
- access opening should be sufficiently large;
- purulent discharge: „pus bonum et laudabile” – no AB-therapy is necessary;
- opening from buccal – occlusal restoration;
- irrigation with sodium hypochlorite solution ;
- alimentary debris should not obliterate the access opening.



PULP THERAPY

- **Indirect pulp cap:** - thin, but 100% intact, cariesfree dentin;
- Ca(OH)_2 ;
- **Direct pulp cap:** **pulp necrosis!!** – low pulp reactivity.
- **Vital amputation, pulpotomy:** - preventive vital amputation: first primary molars, caries profunda .

PULP THERAPY

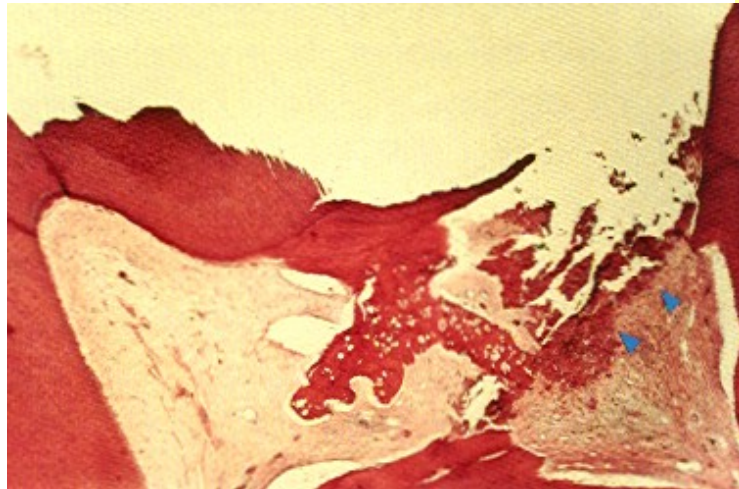
- **Partial pulpectomy, so-called high amputation:**
 - pulpitis incipiens;
 - pulpal hyperemia;
 - no possibility of hemorrhage control during pulpotomy.
- **Total pulpectomy:**
 - nonvital pulp;
 - degenerative pulpal changes with involved radicular tissues.

VITAL AMPUTATION (PULPOTOMY)

INDICATION

- vital primary teeth whose pulp have been exposed;
- coronal pulpitis.

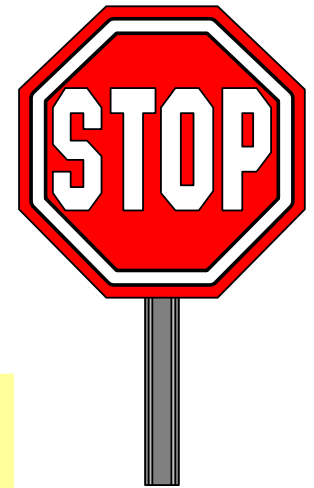
Chr. pulpitis after direct pulp cap using $\text{Ca}(\text{OH})_2$



VITAL AMPUTATION (PULPOTOMY)

CONTRAINDICATION

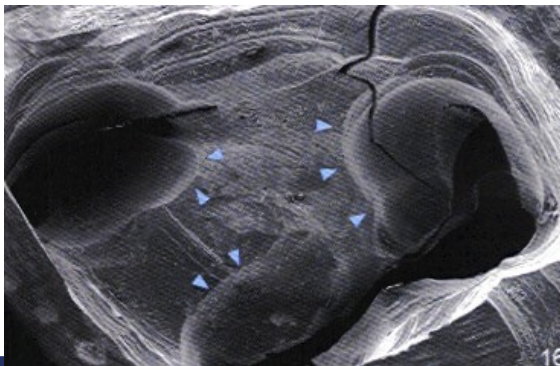
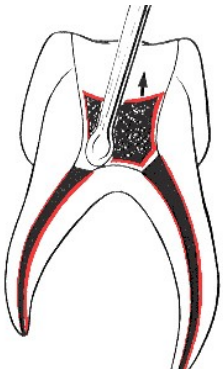
- **physiological root resorption more than 1/3-rd of the natural root length;**
- **pathological internal or external resorption;**
- **periapical and/or inter-radicular radiolucency;**
- **fistulas, sulcular drainage;**
- **spontaneous pain or putrescent odor;**
- **swelling, abnormal mobility.**



VITAL AMPUTATION (PULPOTOMY)

■ TECHNIQUE

- Lokal anesthesia;
- Isolation, rubber dam;
- Coronal pulp amputation: sterile spoon excavator, medium sized round bur.



Large round bur:

Pulpal floor perforation

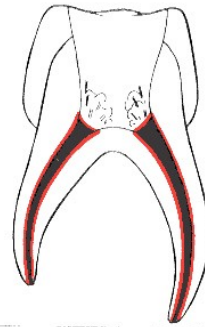
REM

VITAL AMPUTATION (PULPOTOMY)

TECHNIQUE

- **Fast hemostasis;**
- **Avoid coagulums.**

= Key of successful pulpotomy:



- no contact between vital pulp tissues and pulpotomy materials,
- favors inflammatory process, internal resorptions and pulp necrosis,
- no secondary dentin (dentin bridge) formation.

VITAL AMPUTATION (PULPOTOMY)

TECHNIQUE

- **Treatment medicaments for damaged primary pulps.**

= controvers discussion for many years:

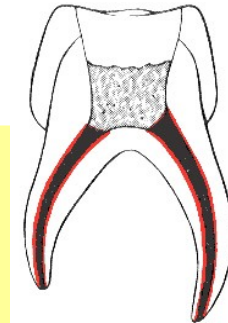


- **Calcium hydroxide $\text{Ca}(\text{OH})_2$;**
- **Iron sulphate $\text{Fe}_2(\text{SO}_4)_3$;**
- **Formocresol after Buckley (1904);**
- **Glutaraldehyde 2-5%.**

VITAL AMPUTATION (PULPOTOMY)

TECHNIQUE

- **Glassionomer cement-base;**
- **Final restoration:**



- composite or amalgam filling;
- stainless steel crown.





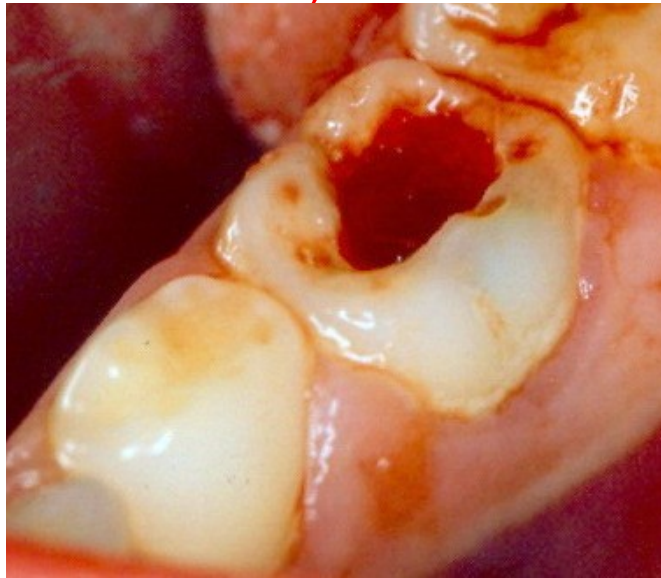
FORMOCRESOL BUCKLEY FORMULA

Technique 1930 SWEET

- **Formaldehyde 19%**
- **Cresol 35%**
- **Glycerine 15%**
- **Aqua dest. 31%**

1 : 5

PULPOTOMIY, FORMOKREZOL



From: SE-FOK Gyermekfogászati és Fogszabályozási Klinika

MINERAL TRIOXIDE AGGREGATE MTA

 1993 – lateral root perforation

 retrograde rootfilling,

 direct pulpcapping,

 bifurcal perforation,

 apexifikation.



pH = 12,5 ~ Ca(OH)₂

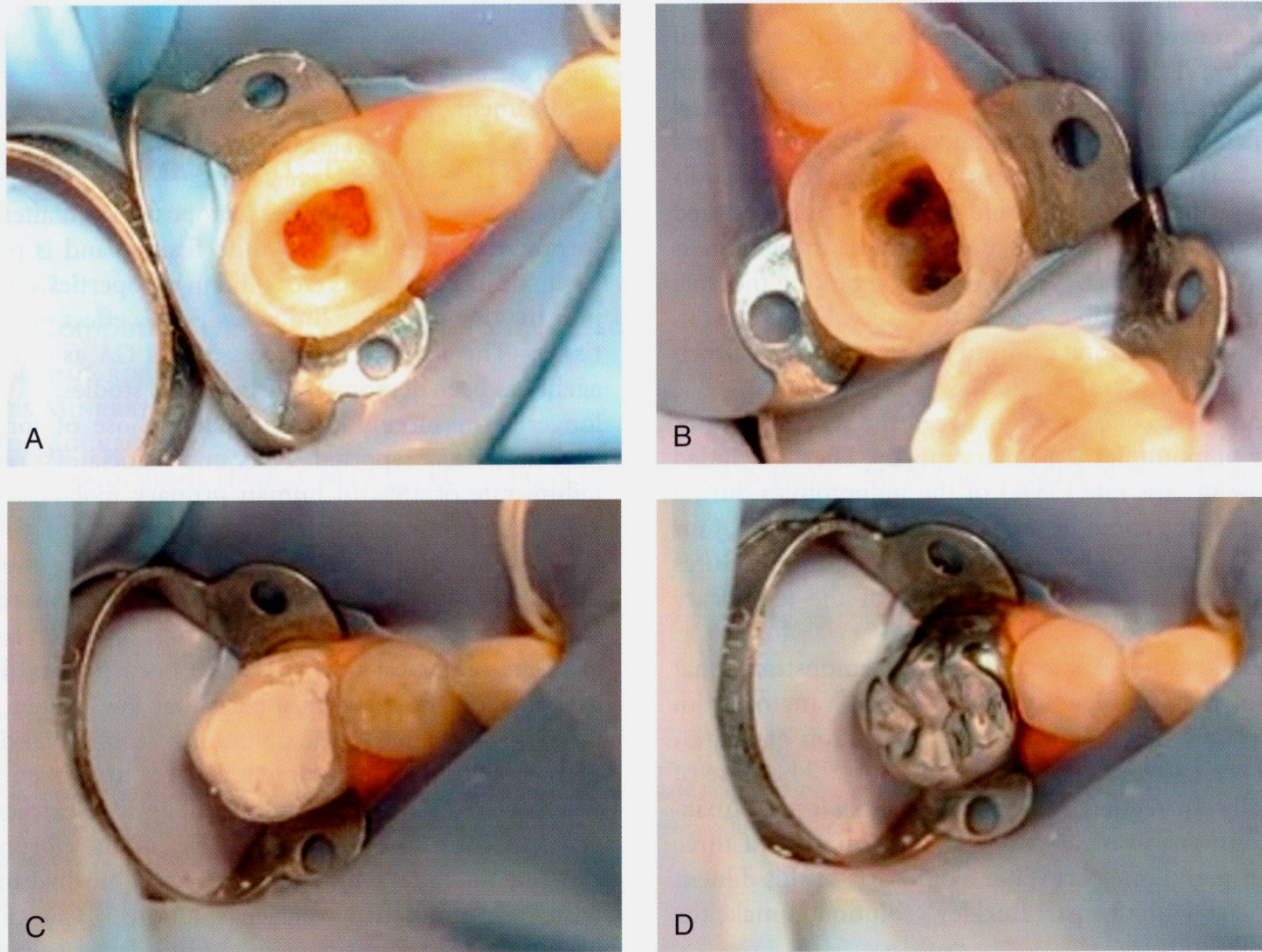
Torabinejad et al. - 1995

**WHITE
GREY**

MTA

- tricalcium-silicat
- dicalcium-silicat
- tricalcium-aluminat
- calciumsulfat-dihidrat
- bismutoxid
- tetracalcium-aluminoferrit

PULPOTOMIA, FORMOKREZOL



■ **FIGURE 22-5 Pulpotomy Technique Steps.** **A**, Pulp chamber after coronal pulp amputation; wide access opening prevents leaving tissue tags. **B**, After hemostasis and formocresol application, the tissue at the entrance of the canals shows dark color, a sign of tissue fixation. **C**, The pulps stumps are covered by a ZOE base. **D**, The tooth is restored with a stainless steel crown. (Courtesy Nathan Rosenfarb, DDS)

PULPOTOMIA, VAS-SZULFÁT



FeSO₄ - Pulpotomiya



ZOE



Crownrestoration

From: Gängler et al: Konservierende Zahnheilkunde und Parodontologie, 3. Aufl., Georg Thieme Verl. 2010.

BIODENTINE™

Septodont

 **2009 –Portlandcement**

 **retrograde rootcanal filling**

 **direct/indirect pulpcappig,**

 **bifurcal perforation,**

 **apexification,**

 **resorption,**

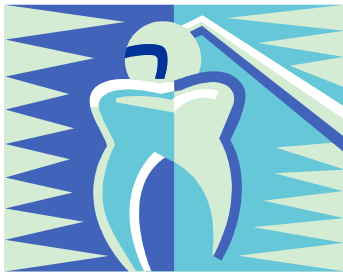
 **pulpotomy of primary teeth.**

Pulver:

- **dicalcium-silicat**
- **_tricalcium-silicat**
- **Oxid - filling**
- **calciumcarbonat**
- **zirkoniumoxyd: Rtg-opaque**
- **color: ferumoxyd**

Liquid:

- **calciumclorit – akcelerator**
- **watersoluble polymer**





PULPOTOMY - BIODENTINE™

Septodont

: Goupy L. Biodentine™: Neuartiger Dentinersatz für die konservierende Kinderzahnheilkunde. 2012.



- 55 approx. caries





PULPOTOMY - BIODENTINE™

Septodont

Goupy L. Biodentine™: Neuartiger Dentinersatz für die konservierende Kinderzahnheilkunde. 2012.

- Biodentine™ applic.
- X-ray: 1 month

Septodont



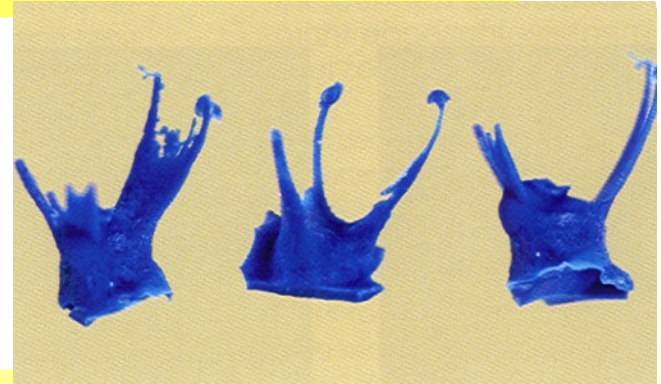
PULPOTOMY LASER

- ✂ 1960, 1985 SHOJI et al. Carbon dioxid lézer
- ✂ Nd:YAG, E:YAG, Ar-Laser, Ga-As
- ✂ Liu J, Chen IR, Chao SY.: *Laser pulpotomy of primary teeth.* J Pediatr Dent 21:128, 1999
- ✂ Elliot RD, Roberts MW, Burkes J, Phillips C.: *Evaluation of the carbon dioxid laser on vital human primary pulp tissue,* Pediatr Dent 21:327, 1999



PULPECTOMY ROOT CANAL THERAPY

INDICATIONS



- **Chronic inflammation and necrosis of root pulp.**

TECHNICAL PROBLEMS:

- **access, debridement and filling of the mostly narrow, curved root canals;**
- **the child's cooperative ability.**

PULPECTOMY ROOT CANAL THERAPY

CONTRAINDICATIONS

- **resorption of natural root length more than 1/3;**
- **severe internal and external resorptions;**
- **severe periapical or interradicular inflammatory process with bone loss near the permanent germ.**

**Chronic inflammatory process
with severe bone loss**



PULPECTOMY ROOT CANAL THERAPY

TREATMENT PROCEDURES



**Coronal pulp
amputation**

Enlargement

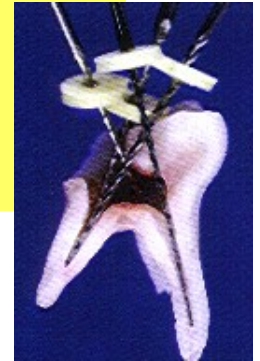


**Debridement and
filing**



PULPECTOMY ROOT CANAL THERAPY

TREATMENT PROCEDURES



- **Endodontic files are adjusted to stop 2 mm short of the radiographic apex;**
- **files and reamers max. ISO-35;**
- **irrigation: 0,5% sodium hypochlorite .**



**Apical damage by
overinstrumenting**

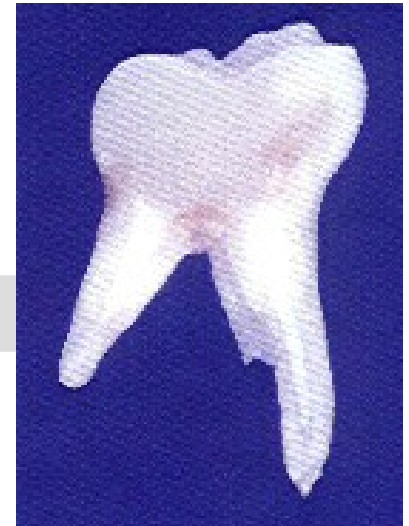
PULPECTOMY ROOT CANAL THERAPY

TREATMENT PROCEDURES



**Resorbable
root canal filling**

Final restoration



PULPECTOMY ROOT CANAL THERAPY



ROOT CANAL FILLING MATERIAL

- **resorbable – primary root resorption;**
- **radioopacity;**
- **not water solubable;**
- **wall coating;**
- **physiologically tolerable;**
- **the disinfection qualities should not
damaging the permanent germ.**



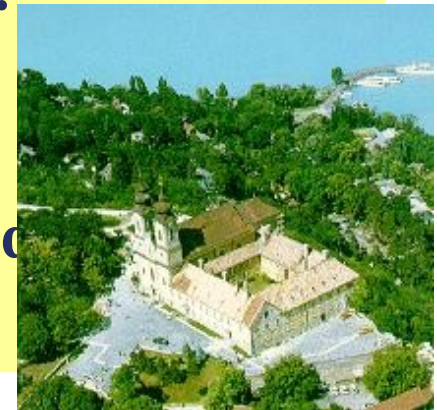
PULPECTOMIE ROOTCANAL THERAPIE

ROOT CANAL FILLING MATERIAL

- zinc oxid and eugenol;
- iodoform;
- calcium hydroxide;
- mixtures:

ex.: „mixture from TIHANY” :

- klion (metronidazole),
- colophony,
- barium sulphate – powder and
- alcohol - liquid.



ROOT CANAL FILLING MATERIAL



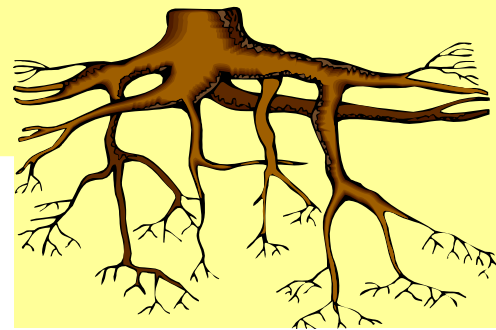
From: Fuks AB: Pulp therapy in the primary dentition. In: Casamassimo et al. Pediatric dentistry.

PULPECTOMIE ROOTCANAL THERAPIE

ROOT CANAL FILLING MATERIAL

• **Contraindication:**

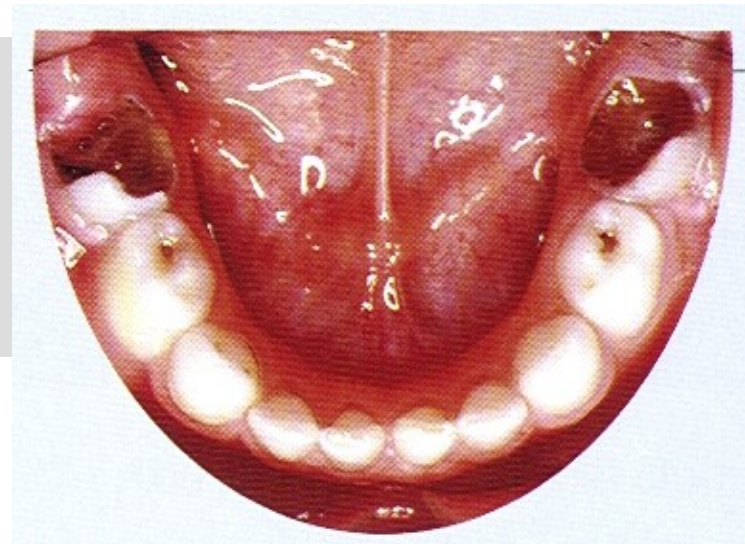
- guttapercha-;
- silver-;
- ceramic points.



PULPECTOMIE ROOTCANAL THERAPIE

TREATMENT PROCEDURES

**55, 65 –
asymptomatic
gangraena**

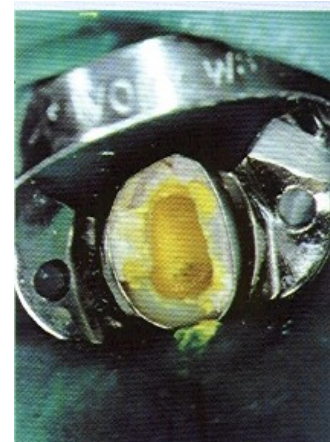
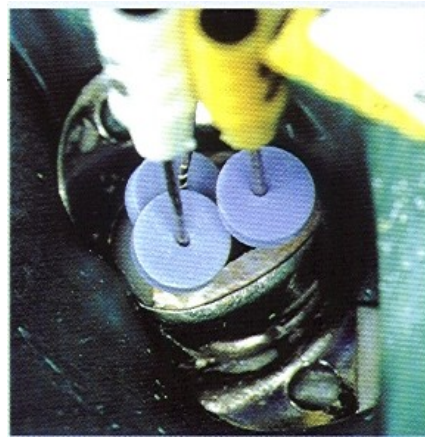


PULPECTOMY ROOT CANAL THERAPY

TREATMENT PROCEDURES



clinical steps



ROOT CANAL FILLING



- **A, B – acceptable root canal fillings;**
- **C – excess in the distal root canal.**

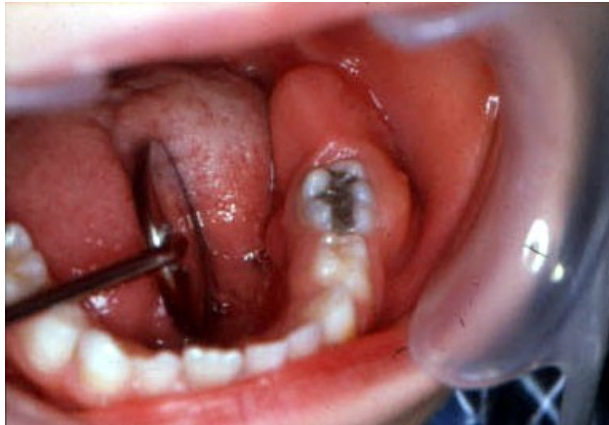
COMPROMISE SOLUTION

- **Resolution of the acut process only;**
- **Extraction;**
- **Amputation and so-called root canal filling.**



COMPROMISE SOLUTION

- Asymptomatic primary molars with necrotic pulp are left in place

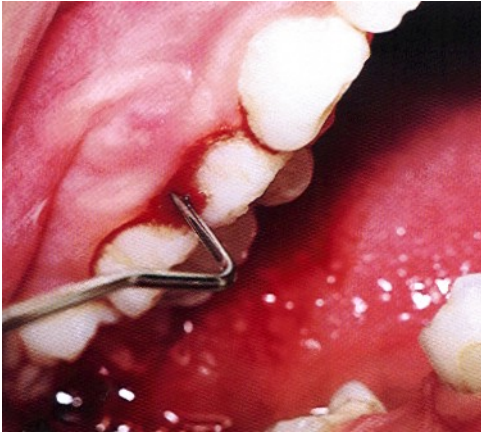


- **successful trephination;**
- **trephination can be effectuated from buccal direction;**
- **„pus bonum et laudabile”.**



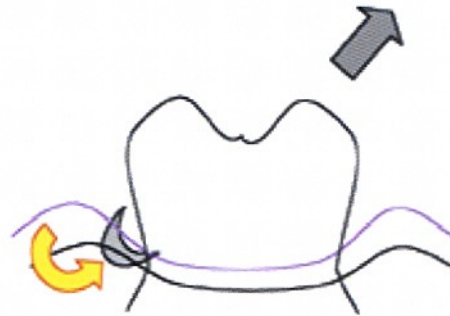
COMPROMISE SOLUTION

• EXTRACTION



Probe

Rootfracture!



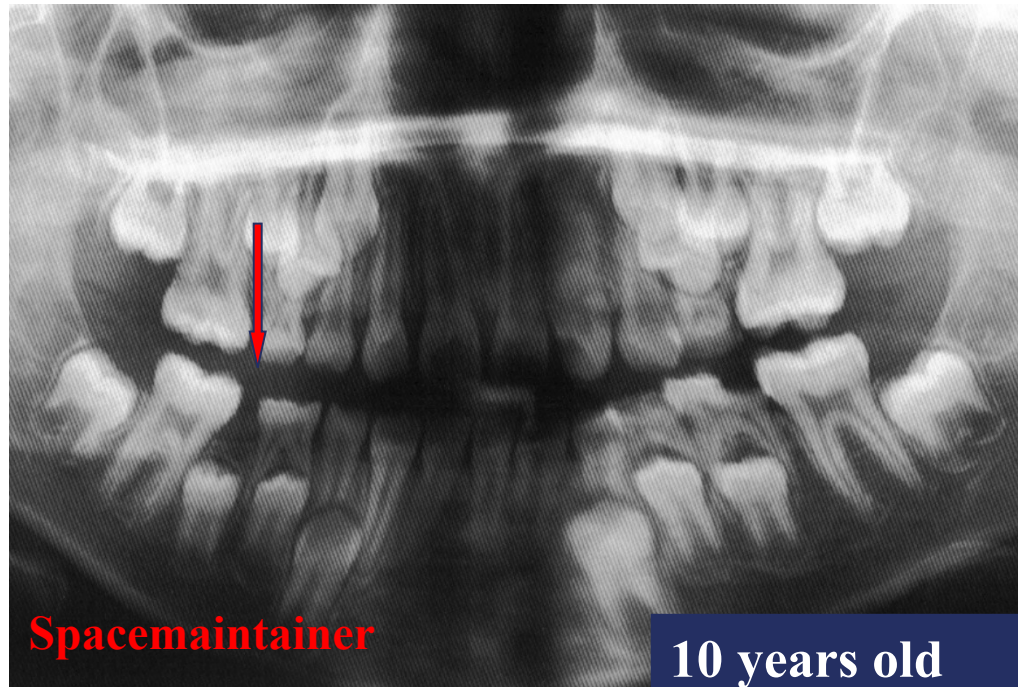
Slight rotation





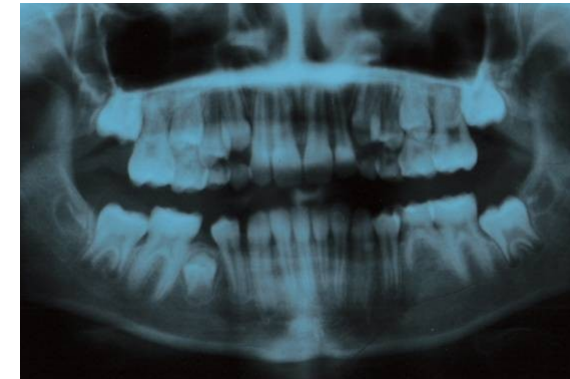
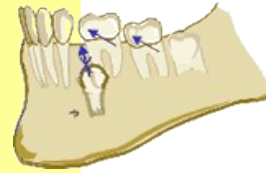
COMPROMISE SOLUTION

- Premature primary tooth extraction:
1-1,5 year before dentition of h. permanent



Consequences for permanent dentition

- **TURNER tooth** – periostitis, gangraene;
- space loss – premature primary tooth extraction;
- caries – cariogenic environment;
- permanent tooth germ: relativ rare, sequestration of the germ: so-called folliculitis exfoliativa



REFERENCES

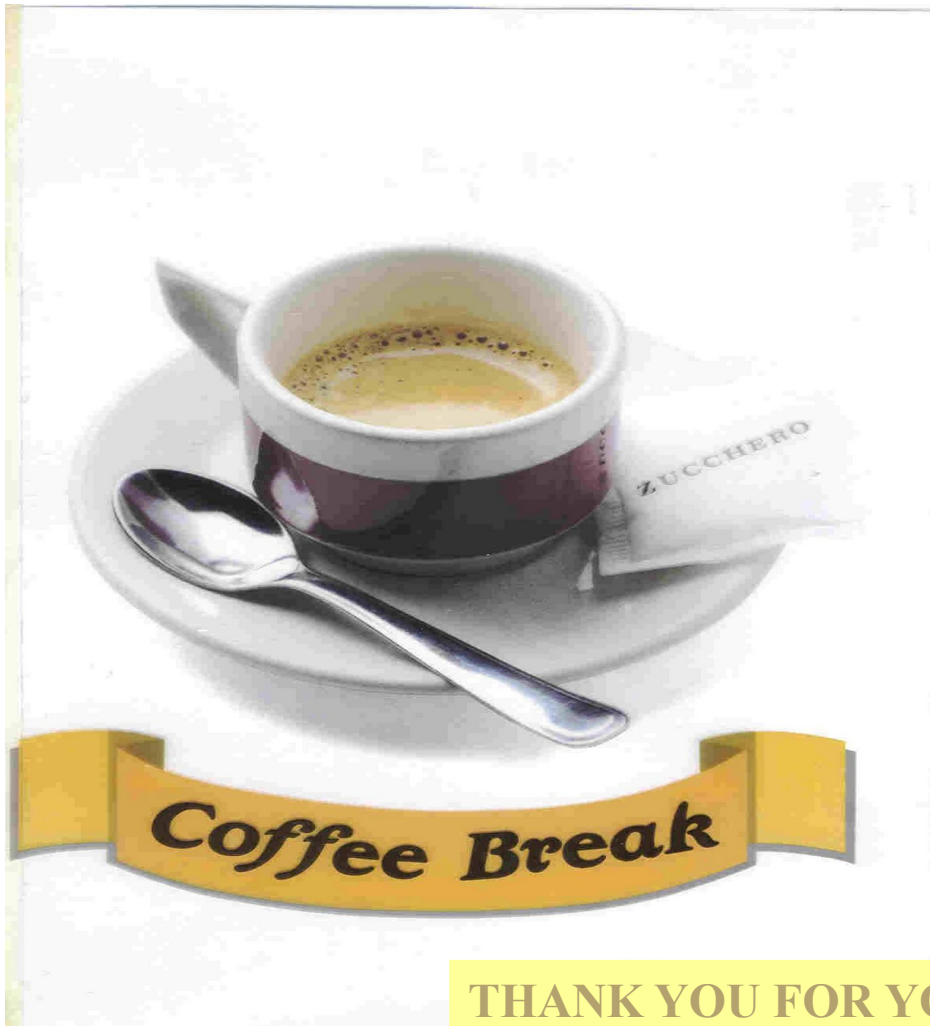


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DO YOU HAVE ANY QUESTIONS?



"Does the Tooth Fairy
recycle the teeth?"



THANK YOU FOR YOUR KIND ATTENTION

