

# **Endodontics**

**Cleaning and shaping**

**Chemical adjuncts, medicaments**



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# Major goal of endodontics

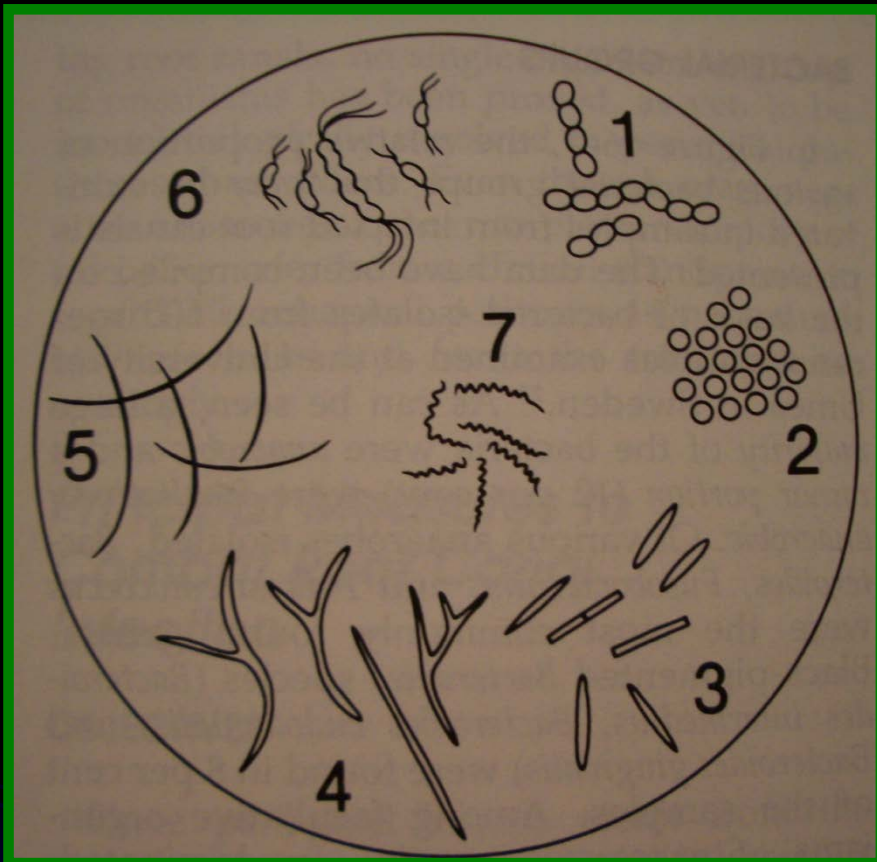
**Preserve the health of periapical tissues or heal them**

- **Root canal system**

**cleaning  
shaping**

- **Obturation**

**apical seal  
coronal seal  
lateral seal**



Forms of bacteria found in infected root canals. 1, *Streptococci*, e.g., gram-positive *S. sanguis*, *S. mutans*, and anaerobic peptostreptococci. 2, *Clusters of cocci*, e.g., anaerobic gram-negative *Veillonella* and gram-positive *Peptococcus* species. 3, *Small rod forms*, e.g., gram-negative *Eikenella* species, gram-positive anaerobic *Lactobacillus* species, and anaerobic gram-negative *Bacteroides*. 4, *Branched gram-positive rods*, e.g., anaerobic gram-positive *Actinomyces* and *Arachnia*, and unbranched gram-positive filamentous *Bifidobacterium* species. 5, *Fusiform rods*, e.g., anaerobic gram-negative *Fusobacterium* species. 6, *Curved motile rods*, e.g., anaerobic gram-negative vibrio forms, e.g., *Selenomonas* and *Campylobacter* species (showing flagella). 7, *Spirochetes*.

## Bacteria Isolated from Periodontal & Endodontic Infections

Organisms	Gingivitis	Adult Periodontis	Endodontic Infections
<i>Actinobacillus actinomycetemcomitans</i>	-	+	?
<i>Porphyromonas gingivalis</i>	-	+	+
<i>Prevotella intermedia</i>	+	+	+
<i>Bacteriodes forsythus</i>	-	+	+
<i>Capnocytophaga spp.</i>	+	-	+
<i>Eikenella corrodens</i>	-	+	+
<i>Eubacterium spp.</i>	-	+	+
<i>Fusobacterium spp.</i>	+	+	+
<i>Peptostreptococcus micros</i>	-	+	+
<i>Campylobacter rectus</i>	+	+	+
<i>Treponema denticolla</i>	+	+	+
Enteric rods/ pseudomonads	+	+	?
<i>Streptococcus spp.</i>	+	-	+
<i>Actinomyces spp.</i>	+	-	+

+ = Often isolated, - = Not often isolated

Adapted from Debelian et al., (1994) *Endod. Dent. Traumatol.* 10:57-65



90% obligat *anaerob*

*Prevotella*

*Porphyromonas*

*Fusobakterium*

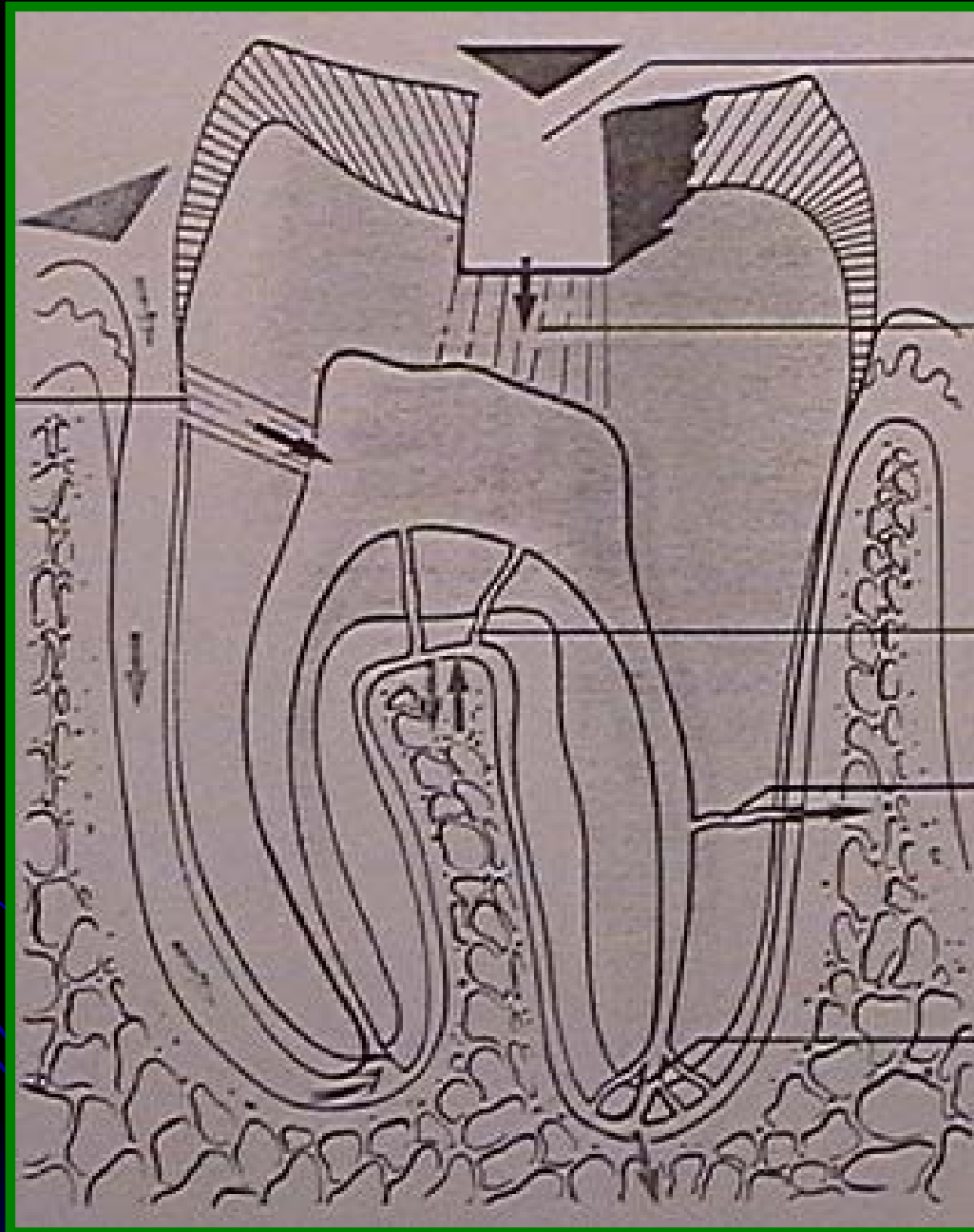
*Peptostreptococcus*



# BAKTERIENSTÄMME UND SPEZIES

(nach Dahlén und Haapasalo 1998)

GRAMNEGATIVE KOKKEN	GRAMNEGATIVE STÄBCHEN	GRAMPOSITIVE KOKKEN	GRAMPOSITIVE STÄBCHEN
<b><u>ANAEROBE BAKTERIEN</u></b>			
Veillonella	Prevotella (buccae, dentalis) Porphyromonas (gingivalis, endodontalis) Fusobacterium Campylobacter Bacteroides Selenomonas	Peptostreptococcus (magnus)	Eubacterium Propionibacterium (acnes) Actinomyces (israelii, viscosus, naeslundii) Lactobacillus Clostridium
<b><u>FAKULTATIVE UND AEROBE BAKTERIEN</u></b>			
Neisseria	Actinobacillus Haemophilus Enterobacter Eschericha Pseudomonas Proteus Klebsiella	Streptococcus Enterococcus Staphylococcus	Corynebacterium Bacillus



# Cleaning and shaping

## Root canal treatment

**Chemo - mechanical cleaning and shaping before the obturation**

**Obturation: three dimensional hermetic filling of the entire root canal space**



# Cleaning and shaping

**What will be removed from the root canal?**

# Cleaning and shaping

## Chemo-mechanical preparation:

- **organic remnants (bacteria, bacterial by-products, necrotic tissue, organic debris, vital tissue, salivary by-products, hemorrhage ...)**
- **anorganic remnants**
- **smear-layer**
- **disinfection**
- **lubricants**

# Cleaning and shaping

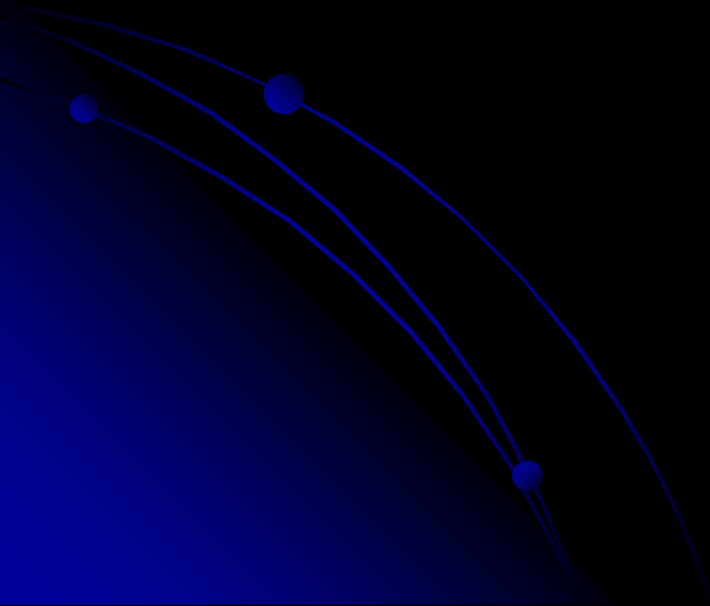
## Chemo-mechanical preparation:

- **debridement**
- **continuously shaped conical form / adequate taper**
- **apical preparation – apical stop / seat**



**Microorganisms**

# Anatomic problems



# Anatomic problems

denticulus



V. Stachniss

denticulus

Zs. Tóth

# Anatomic problems

## Three-dimensional imaging using microcomputed tomography for studying tooth macromorphology

G. Plotino, N. M. Grande, R. Pecci, R. Bedini, C. H. Pameijer, F. Somma

J Am Dent Assoc, Vol 137, No 11, 1555-1561.

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# Anatomic problems

**MicroCT** (microcomputed tomographic imaging)

**A.** bucco-lingual **B.** mesio-distal view

Plotino et al.: J A DA 137:1555-1561. 2006

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# Anatomic problems

- A. buccalis
- B. lingualis
- C. mesialis
- D. distalis view

# Irrigation

**Major function of the irrigants**

**to flush debris from the canal**

**Additional properties can aid**

**in cleaning and shaping**

# Irrigation

## Properties of the ideal solution:

- ❖ **tissue/ debris solvent**
- ❖ **low toxicity**
- ❖ **low surface tension**
- ❖ **lubricant**
- ❖ **sterilization/disinfection**
- ❖ **removal of smear layer**

# Irrigation

1 - 5.25 % NaOCl ---- 2.6 %

(min 20-30')

2 %

**Chlorhexidin**

2 - 3 %

**Neomagnol (chloramin)**

**Distilled water**

# Lubricants

**Glycerin**

**Soap**

**Commercial preparations of EDTA**

# Irrigation

## Dentin softener:

- **Chelators**

**17 % EDTA** (ethylene-diamine-tetraacetic acid)

**10 % citric acid**

- **Decalcifiers**      **Do not use!!!**

strong inorganic acids ( $\text{HCl}$ ,  $\text{H}_2\text{SO}_4$ ) for  
histologic preparation

concentrated organic acids (30-50% citric)

# Irrigation

**NaviTip**

# Irrigation

**EndoVac**



# Irrigation

**EndoVac**

# Irrigation

**EndoVac**

# Irrigation

**EndoVac**



# Intracanal medicaments

- **phenolic derivates**  
(eugenol, cresol, thymol)
- **aldehydes**
- **formocresol**
- **halides** (NaOCl)
- **steroids**
- **Ca(OH)<sub>2</sub>**
- **antibiotics**
- **combinations**

# Intracanal medicaments

## Phenolic derivates

~~~~~ 66 %

• **Ca(OH)<sub>2</sub>**

~~~~~ 97 %

# Intracanal medicaments



high pH (12.2)

bactericidal action

inhibition of bacterial proliferation

# The use of antibiotics

- **intracanal medicament**
  - local effect: - **allergenicity**
  - **resistance**
- **per os = oral administration**
  - systemic effect



# Per os use of antibiotics

## Before treatments with **bacteraemia**

- **Scaling**
- **Extraction, sculption**
- **Rootcanal treatment + additional surgery (curettage, resectio)**
- **Intraligamental injection**
- **Treatments with bleeding of the gingiva (surgery)**

(Magyar Belorv. Arch. 1995. )

# Per os use of antibiotics

## Non penicillin-allergic patient:

1 h before treatment

2 g Amoxicillin p.o.

50 mg/kg Amoxicillin p.o.

## Penicillin-allergic patient:

1 h before treatment

600 mg Dalacin C p.o.

20 mg/kg Dalacin C p.o.

# Antibiotic prophylaxis of high-risk patient

## Always

- Heart valves damaged by rheumatic fever
- Bacterial endocarditis
- Congenital cardiac malformations
- Surgically constructed systemic - pulmonary shunt
- Idiopathic hypertrophic subaortic stenosis
- Mitral valve prolapse with insufficiency

# Antibiotic prophylaxis of high-risk patient

After consultation their physician

- Immunosuppressive therapy
- Therapy on cytotoxic drugs
- Receiving irradiation for cancer
- Prosthetic joint implants or systemic infection

Careful history ---- consultation

## INFECTION CONTROL

(HIV, Hepatitis B, disinfection, sterilization)

**Thank you for your attention!**

