

# Cavity preparation basic rules

L. Roubalíková

# Preparation of dental caries (cavity preparation)

- Instrumental treatment that removes dental caries
- The rest of the tooth must be restorable with filling materials
- The rest of the tooth as well as the filling must be resistant against occlusal forces
- The risk of secondary caries must be minimized

# Basic rules

Access to the cavity

Preparation of cavity borders and extention  
for prevention

Retention of the filling

Resistance of the restored tooth

Excavation of carious dentin

Finishing of the walls

Final control

# Basic rules

Access to the cavity

Preparation through the hard dental tissues

Removing of the undermined enamel

Separation of teeth

Separation or removing of gingiva

# Basic rules

Preparation of cavity borders and **extention**  
**for prevention**

Depends on

*Dental material*

*Oral hygiene*

***Precautions of secondary caries***

# Basic rules

Retention of the filling

Precautions of its lost

*Macromechanical retention*

*Micromechanical retention*

*Chemical retention*

# Basic rules

Resistance of the restored tooth

Against occlusal and other forces

Depends on

- *Material*
- *Individual occlusal forces*

# Basic rules

Excavation of carious dentin

Necessary (risk of recurrent caries)

*Ball shaped (spheric) bur - slow speed (3000 rpm)*

*or*

*Excavator*



# Basic rules

Finishing of the walls

Depends on the kind of material

- *Bevel or without bevel*
- *Fine diamond bur*

# Basic rules

Final control

Direct or indirect view

Good illumination

Magnification

# Preparation

- Hand

Excavator, cleaver

- Power driven

Burs, diamonds

# Chisel – for enamel Cleaver



# Chisel for enamel



# Excavator



# Instruments for cavity preparation

Power driven (powered) instruments for cutting

- Rotary instruments

Comon design characteristics



# Cutting instruments - burs

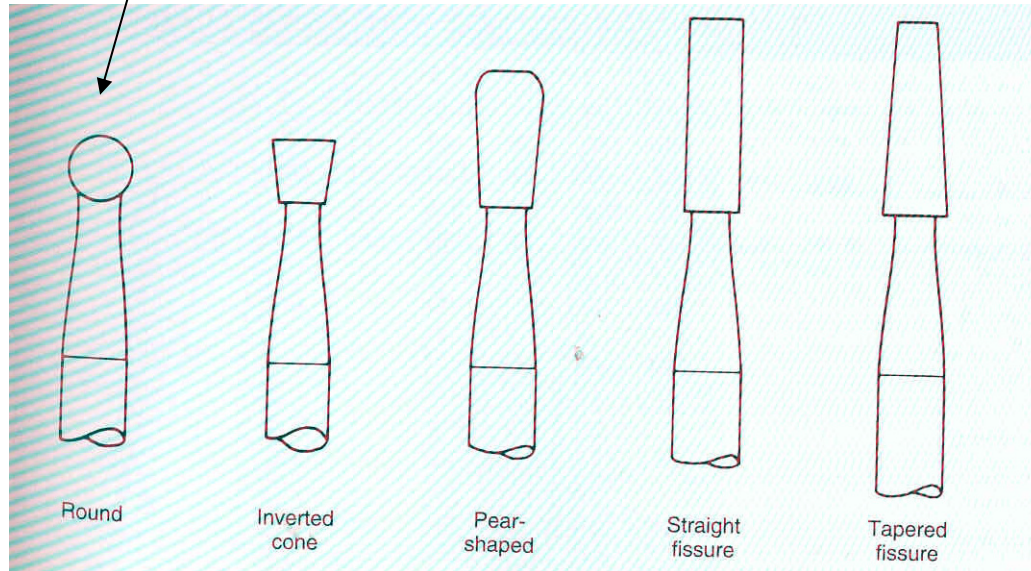
Steel

Tungsten carbide



# Cutting instruments – burs head shapes

Round (ball shaped)

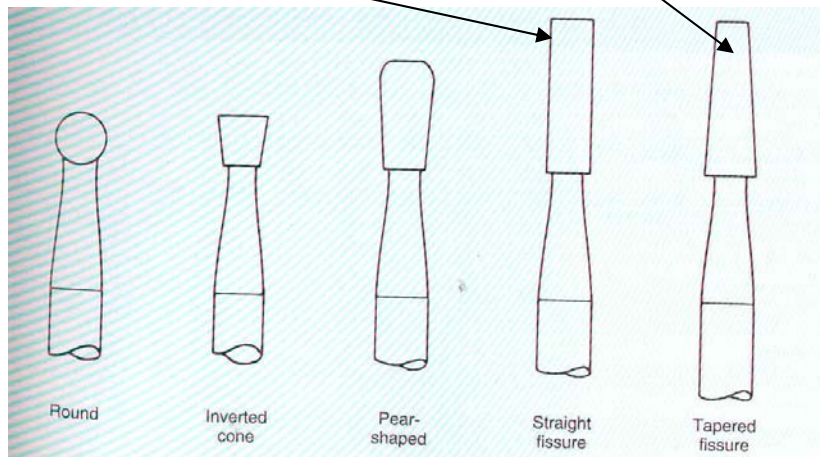


# Cutting instruments – burs head shapes

Fissure with flat end

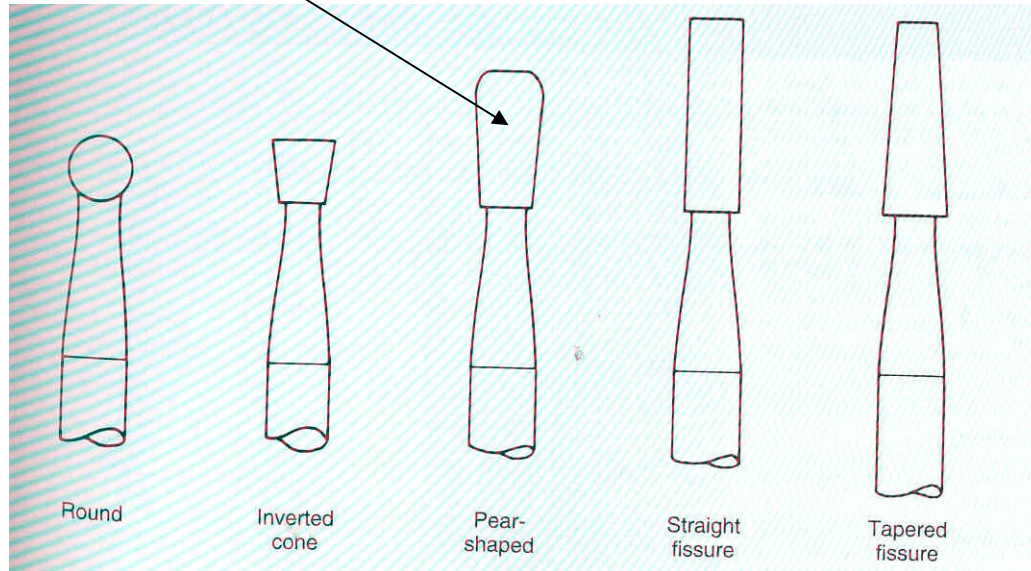
Fissure with pointed end

Straight or tapered form



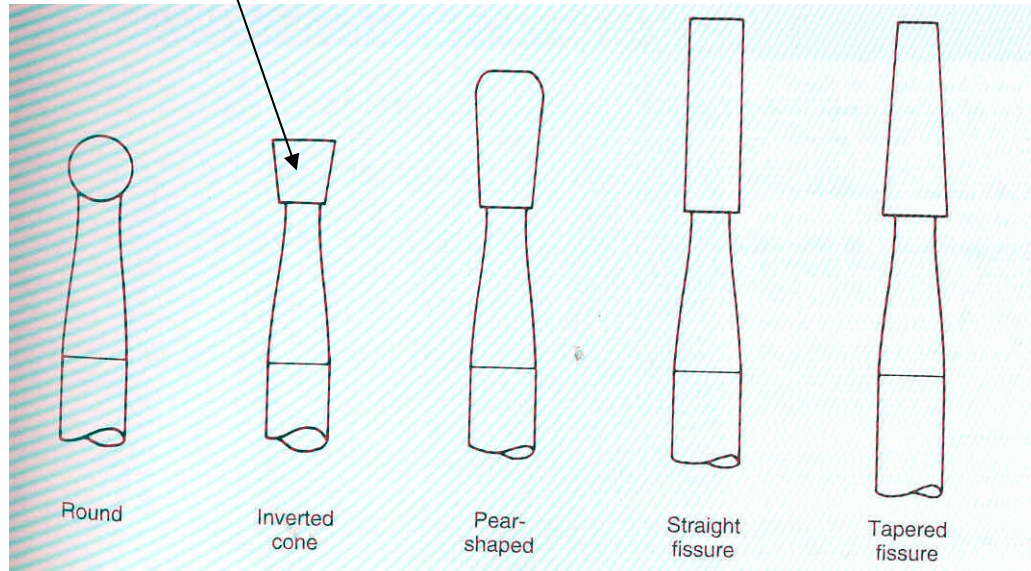
# Cutting instruments – burs head shapes

Pear



# Cutting instruments – burs head shapes

Inverted conus



# Cutting instruments – diamonds

Extra coarse – black

Coarse – green

Standard – blue or without any marker

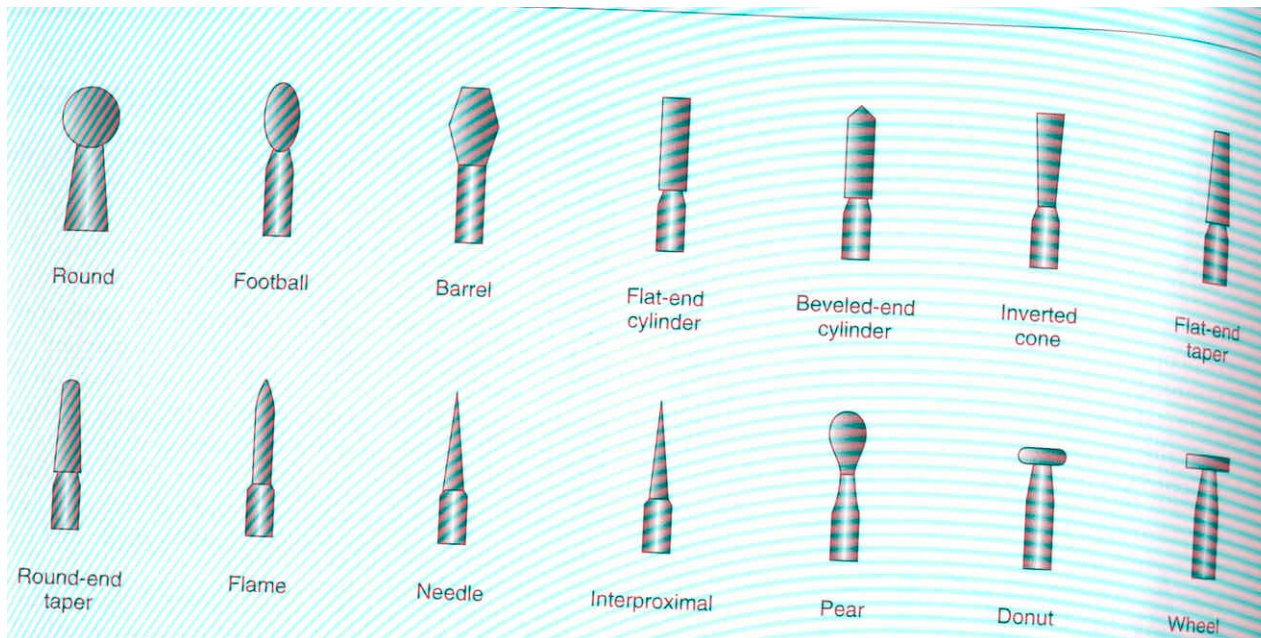
Fine - red

Extra fine - yellow

Ultrafine - white

# Cutting instruments – diamonds head shape

- Ball, pear, cylinder,taper,flame, torpedo, lens and others.....



# Hazards with cutting instruments

Pulpal precautions

Soft tissue precautions

Eye precautions

Ear precautions

Inhalation precautions

# Filling materials

- Temporary
- Definitive, permanent



# Temporary filling materials

- Zinkoxidsulphate cement and one component derivatives
- Zinkoxidphosphate cement
- Zinkoxideugenol cement
- Polymer based materials
- Guttapercha

# Permanent filling materials

Amalgam

Composites

Glasionomers

# Amalgam

*L. Roubalíková*

# Amalgam

Metal-like restorative material composed of silver-tin-copper alloy and mercury.

# Types of amalgam restorative materials

## Low – Copper Amalgam (5% or less copper)

Composition – wt%

Silver	63 - 70 %
Tin	26 – 28 %
Copper	2 - 5%
Zinc	0 - 2%

# Types of amalgam restorative materials

## High – Copper Amalgam (13% - 30%)

### copper

Composition – wt%

Silver	40 - 70 %
Tin	26 – 30 %
Copper	2 - 30%
Zinc	0 - 2%

# Particles of the alloy

- ✓ Irregularly shaped (filings - lathe cut)
- ✓ Microspheres
- ✓ Combination of the two.

# Particles shape

## High – Copper Amalgam

Microspheres of the same composition  
(unicompositional)

Mixture of irregular and spherical particles of  
different or the same composition (admixed)



# Production of irregular particles

Metal ingredients heated, protected from oxidation, melted and poured into a mold to form an ingot.

Phases of the alloy:



# Production of irregular particles

cooled slowly

Ingot heated at 400°C (6 – 8 hours)  
(homogeneous distribution of Ag<sub>3</sub>Sn)

Ingot cut on the lathe, particles passed through a fine sieve  
and ball milled to form the proper particle size.

Aging of particles (60 - 100°C, 6 – 8 hours)

*Particle size: 60 – 120 μm in length*

*10 – 70 μm in width*

*10 – 35 μm in thickness*

# Production of irregular particles

Molten alloy is spraying into water under high pressure



*Irregularly shaped high-copper particles*

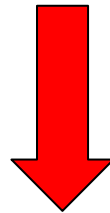
# Production of spherical particles

Molten alloy is spraying under high pressure of inert gas through a fine crack in a crucible into a large chamber

*Diameter of the spheres: 2 – 43 $\mu$ m*

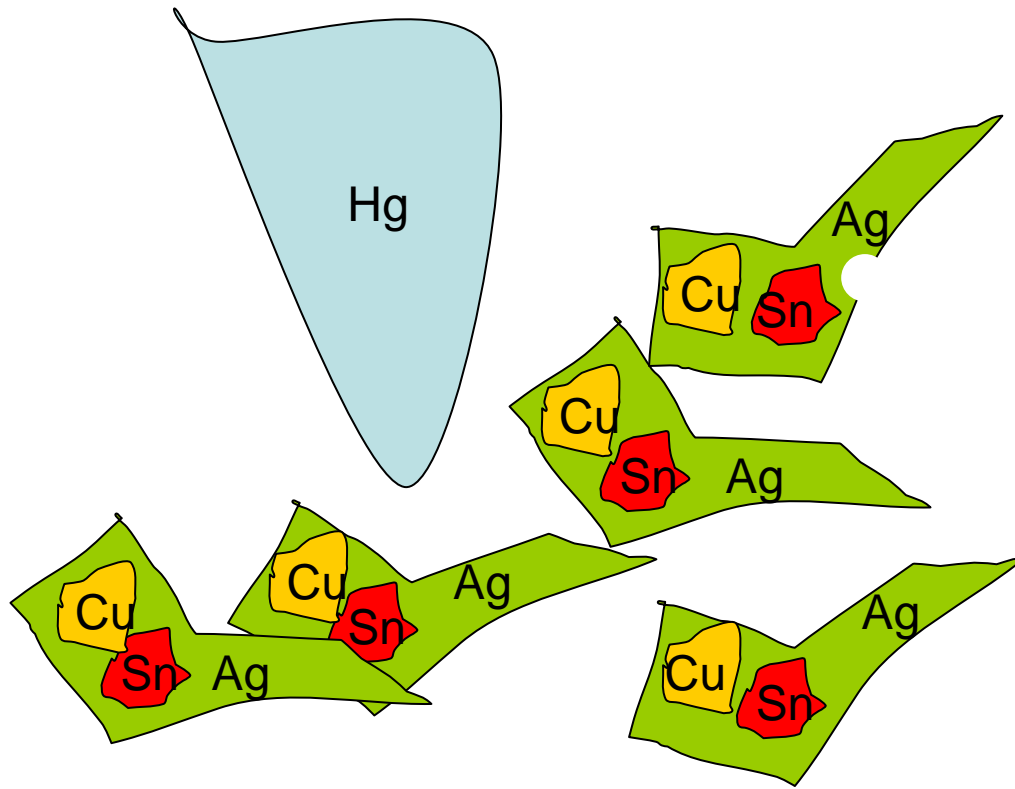
# Amalgamation processes

alloy is mixed with pure mercury

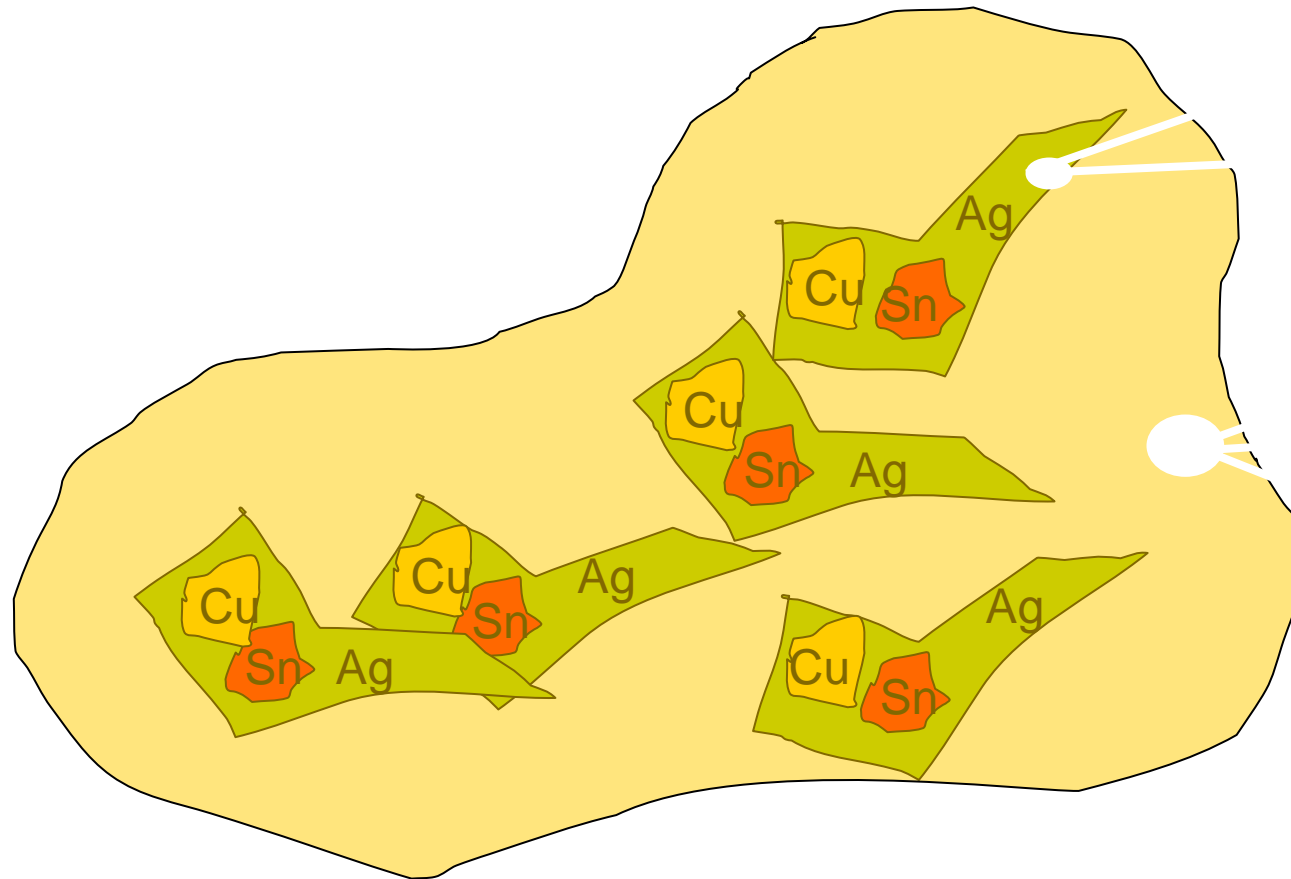


Trituration

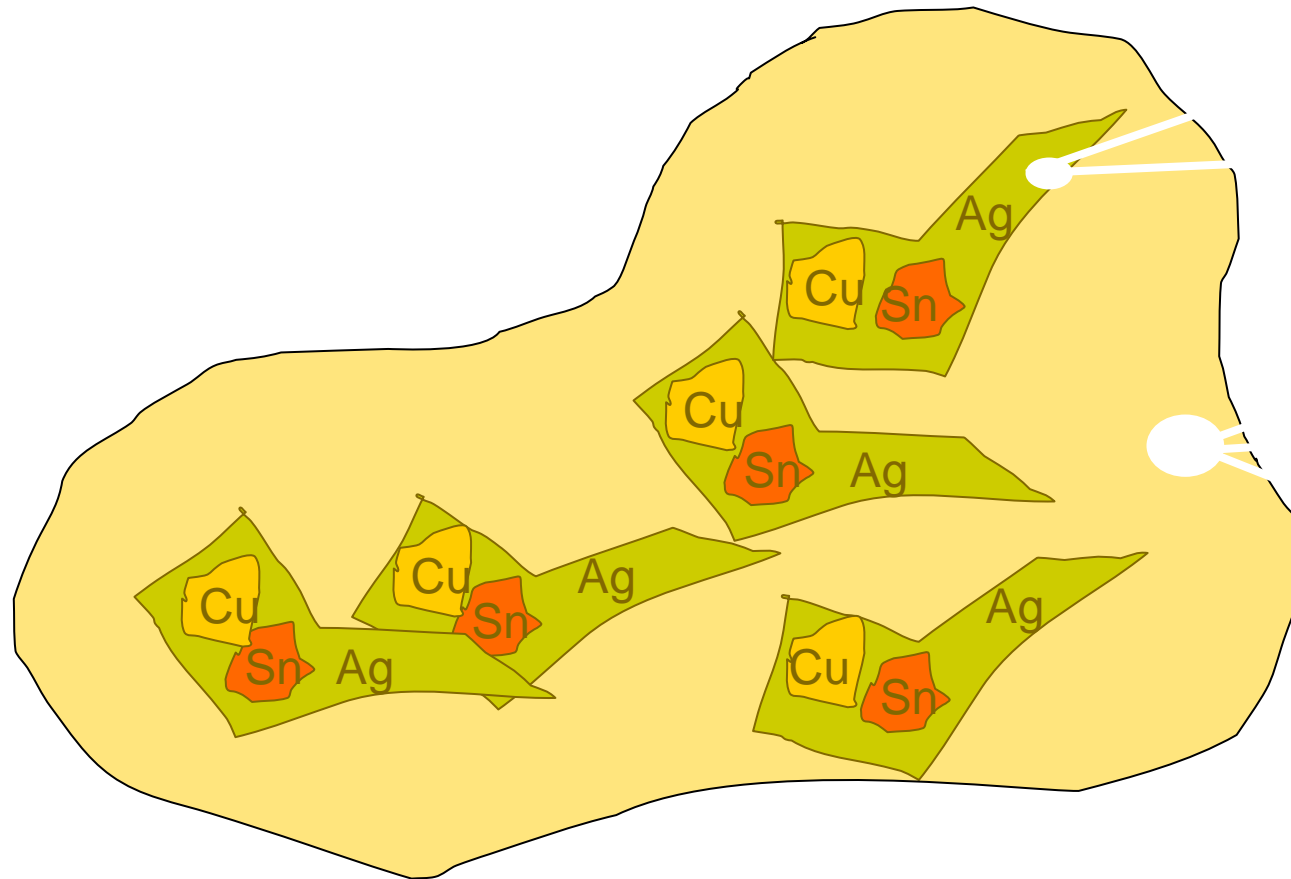
# Amalgamation processes



# Amalgamation processes



# Amalgamation processes





# Amalgam - properties

# Amalgam

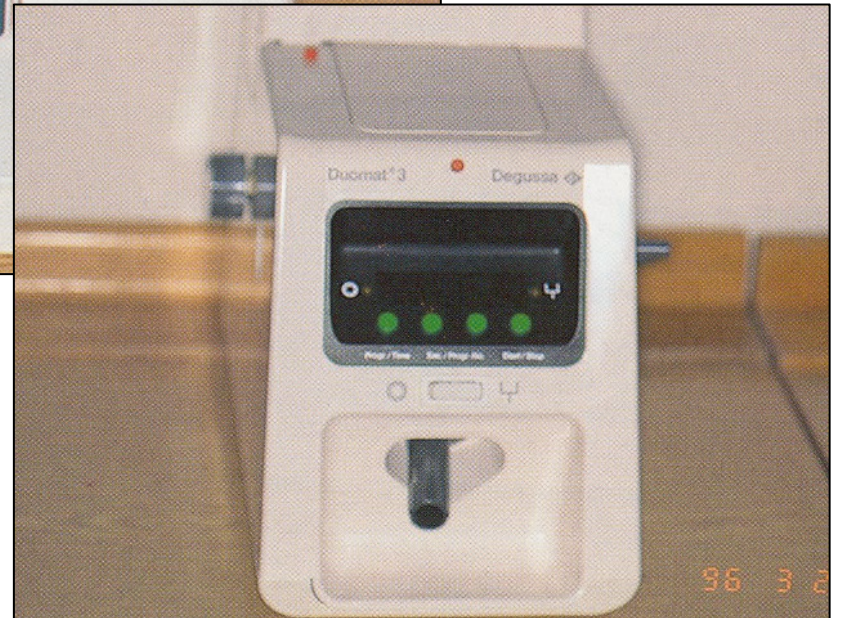
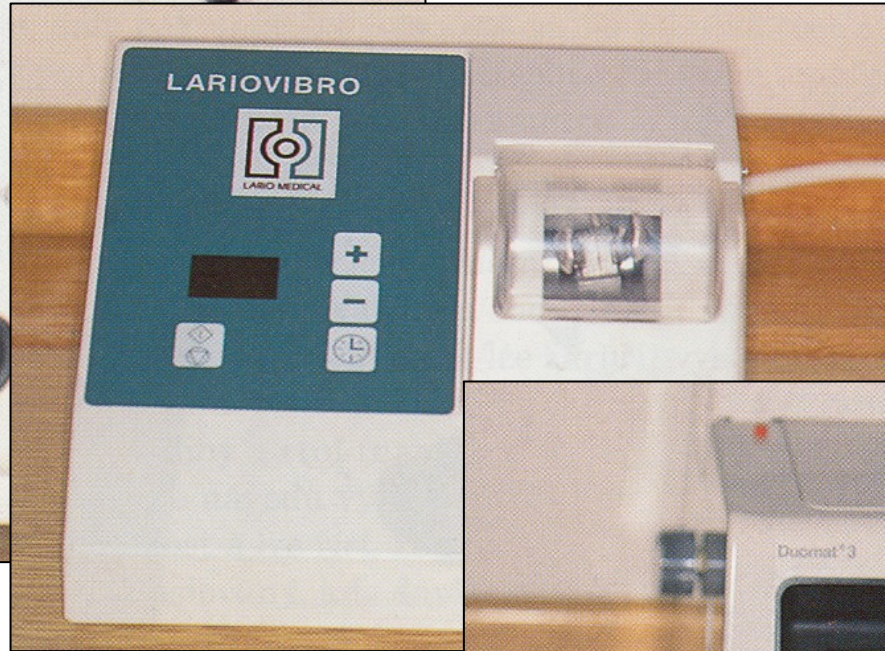
- **Wear and pressure resistance (2mm thickness at least)**
- **Easy handling**
- **Thermal and electrical conductivity**
- **Corrosion**
- **Bad aesthetics**

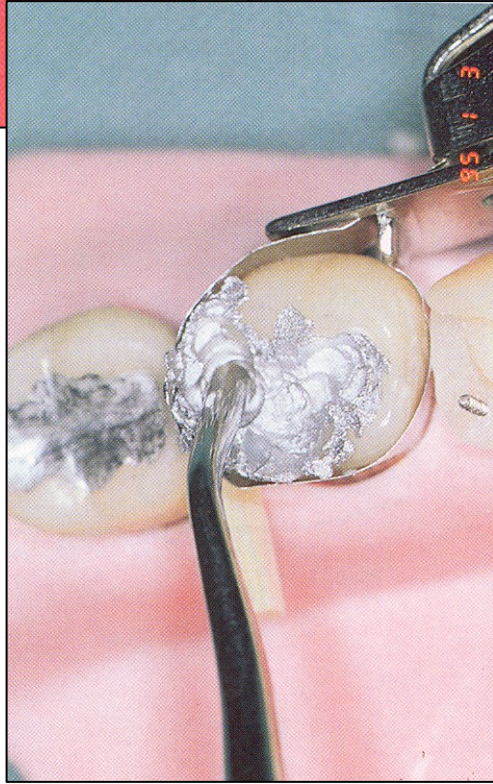
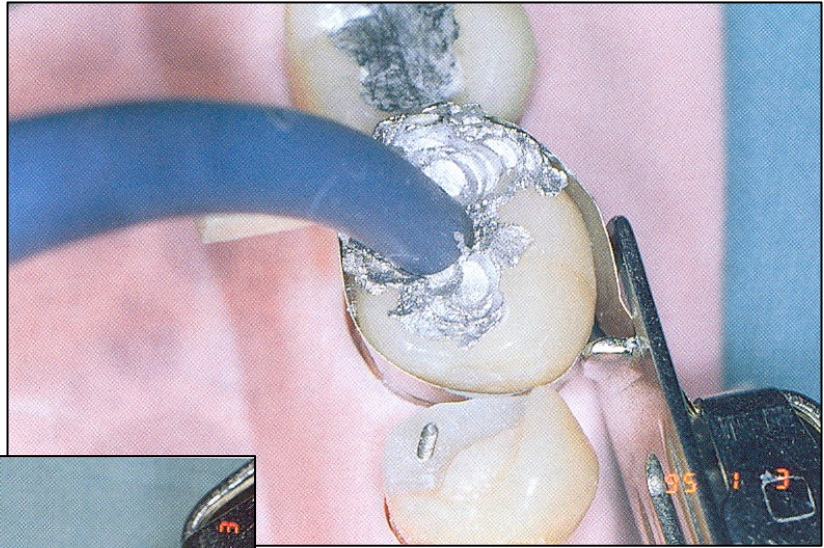
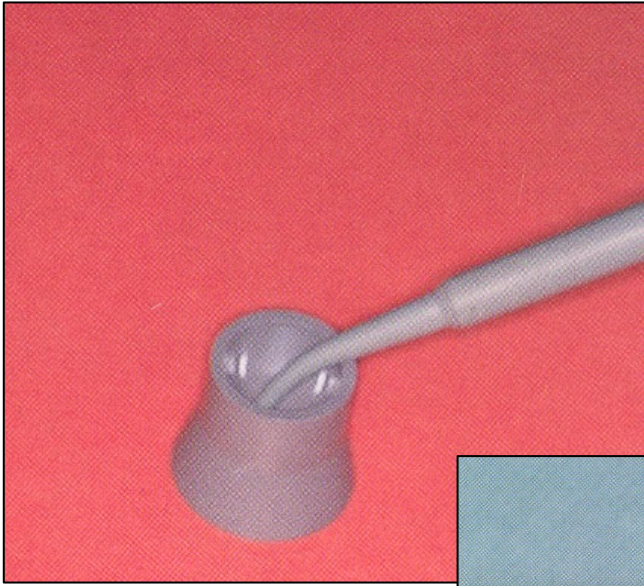
# Trituration

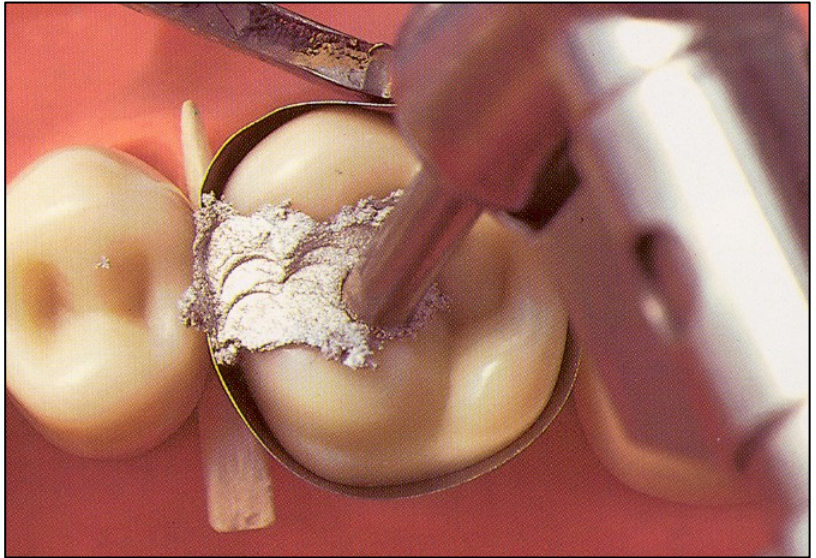
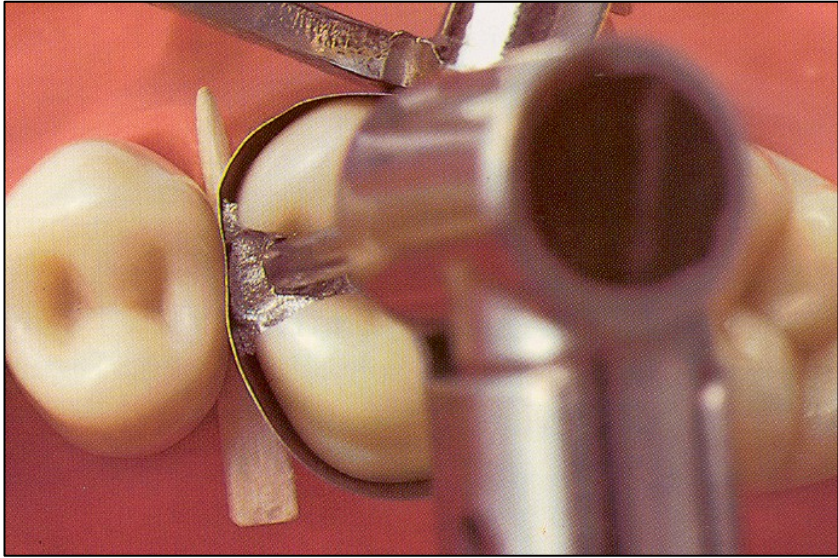
- **Hand mixing (obsolete)**
- **Power driven trituration**

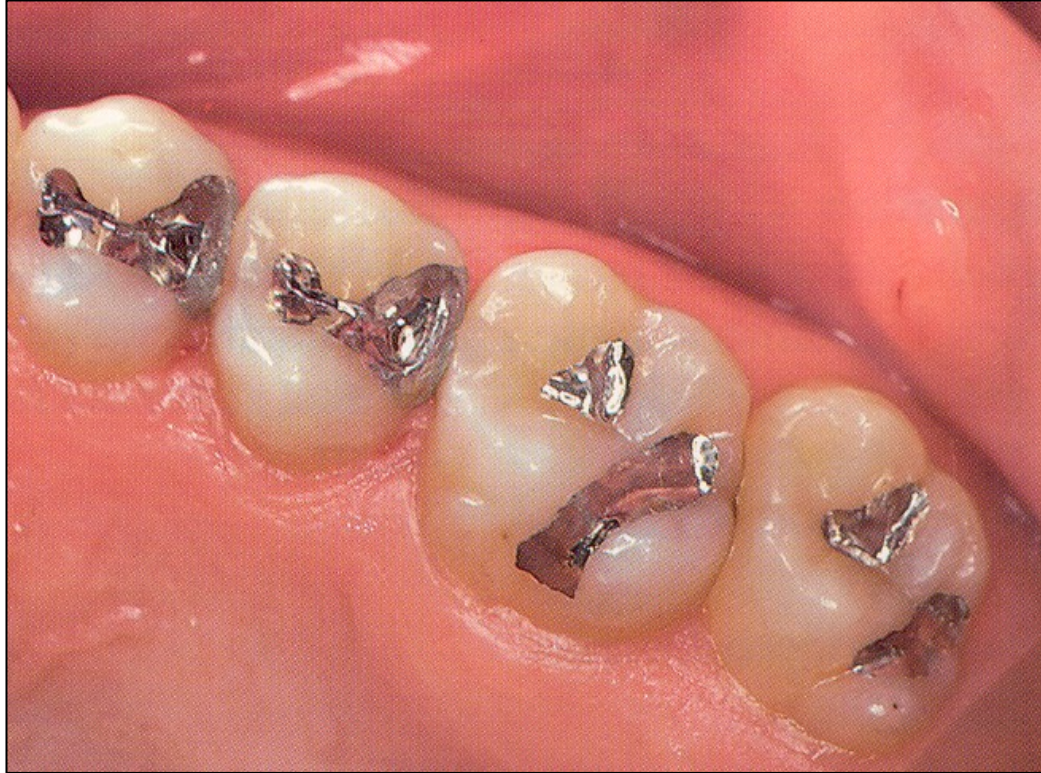


*Amalgamators*









# Instruments

➤ **Preparation instruments**

➤ **Filling instruments**

➤ **Carvers**

➤ **Burnishers**

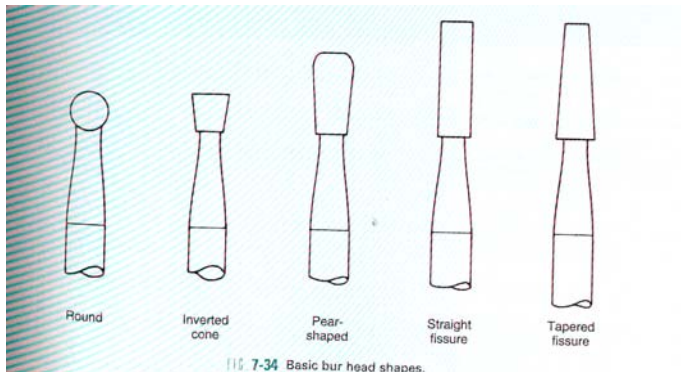


# Instruments

## Preparation instruments - power driven

Burs

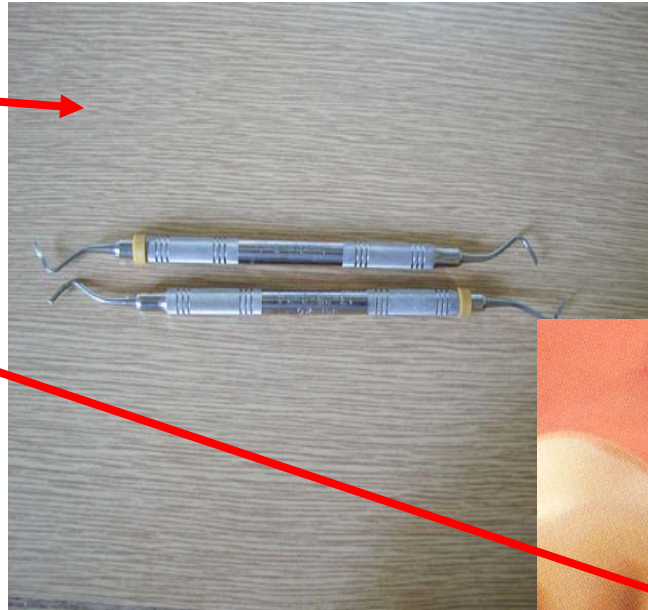
Diamonds



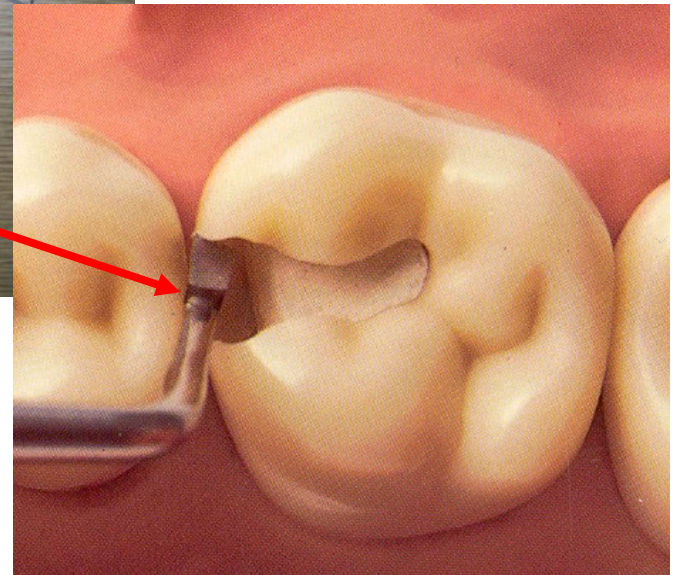
# Instruments

## ➤ Preparation instruments - hand

**Chisel**

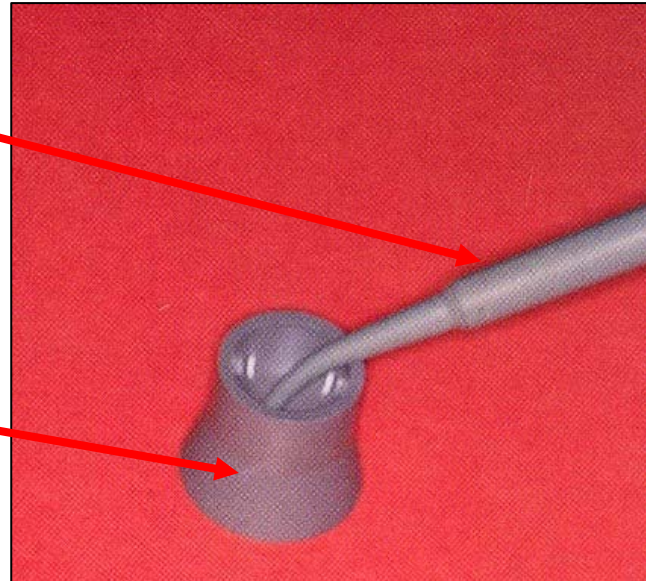


**Excavator**



**Amalgam gun**

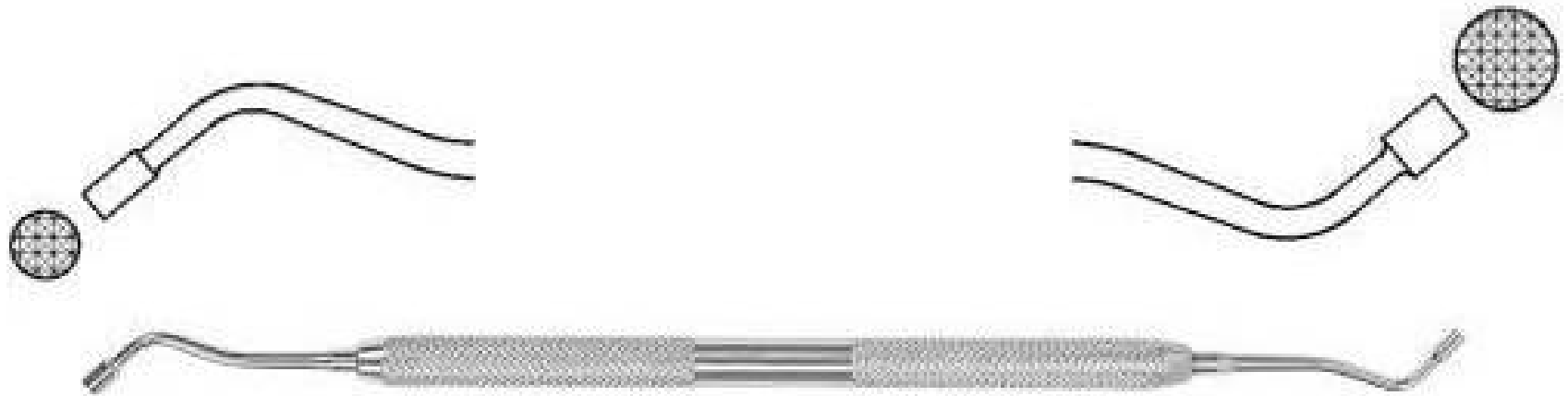
**Crucible**



Amalgam carrier



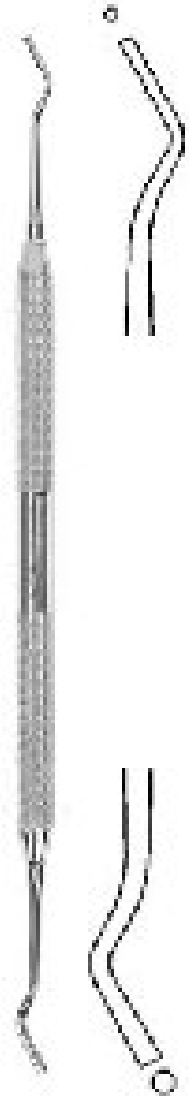
# Amalgam carrier



# Instruments

- **Filling instruments condensers and spatulas**

Condensor -  
stamen



# Condensor –stamen



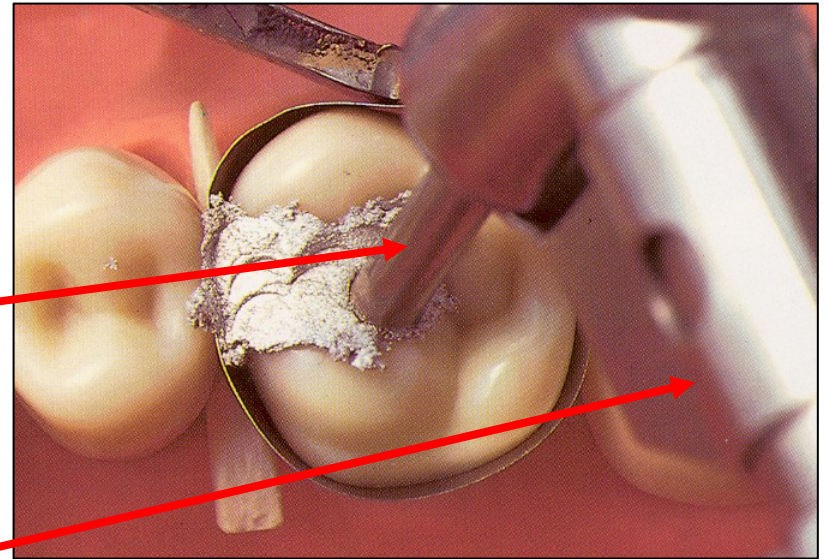


# Condensor and burnisher - spatula combined



**Power driven  
condensor  
- stamen**

**Special  
handpiece**



# Burnisher - spatula

## Angular- trough edge trough face



# Burnisher – spatula, angular three face



# Instruments

## ➤ **Burnishers**

Ball condensor – used as a  
burnisher at most

