Slides from Dr. Peter Hermann: Introducing the FACULTY OF DENTISTRY
The book:

Dental Technology and Materials for Students

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Impression materials I

Impression: Sunrise (Soleil Levant) by Claude Monet
- Chairside Impression
  - negative likeness of the denture bearing tissues

- Laboratory Cast
  - positive likeness of the denture bearing tissues
Placing some soft, semi fluid material in the mouth and allowing the material to set...
Impression materials after setting

**Rigid**

- Non undercut areas
  - Plaster of Paris
  - Compound
  - Zinc-oxide eugenol paste
  - Wax

**Elastic**

- Undercut areas allowed
  - Alginate
  - Polysulphide
  - Polyether
  - Silicone
Impressions trays

Stock tray
- prefabricated
- range of sizes and shapes,
- metal or plastic,
- perforated or nonperforated
- primary impressions preliminary or anatomic

Special tray
- constructed onto the primary cast
- spaced trays
- close fitting trays
- aluminium filled shellac
- acrylic resins
- secondary impressions
Basic properties of impression materials

- **Fluid**
  obtained by - mixing the components
  - heating
  → until it exhibits plastic flow

- **Setting period**
  changing from fluid to solid

- **Set**
  end form of the material
Certain properties

I. Consistency of the fluid material

- high viscosity
  heavy bodied, putty
- regular viscosity
  intermediate flow
- low viscosity
  light bodied
- very low viscosity
  light bodied
Certain properties

II. Setting characteristics of the material

- **Initial setting time**
  - beginning of the setting process
  - for manipulating the material (working time)
  - the impression material should be inserted

- **Final setting time**
  - the material is completely set, it can be removed from the mouth
Certain properties

III. Properties of the set material

- **Dimensional stability** (shape and size changing)
  a) more than 0,2% in six hours $\rightarrow$ dimensionally unstable
     alginates - shrinkage!
  b) less than 0,2% in six hours $\rightarrow$ dimensionally stable

- **Elastic recovery**
Impression materials: required properties

- Non toxic
- Accurate
- Easy to handle
- Easy to manipulate
- Consistency
- Setting time
- Elasticity
- Dimensionstability
- Wettability
- Thixotropic
- Economy
- Disinfection
- Flavour
Impression materials after setting

**Elastic**

These materials can be stretched and bent to a fairly large degree without suffering any deformation. These are used for recording the patient's mouth where undercuts are present. Usually used for partial dentures, overdentures, implants and crown and bridge work.

The elastic impression materials can be divided into two groups: the hydrocolloids and the synthetic elastomers.

- **Hydrocolloid:**
  - Alginate

- **Synthetic elastomers:**
  - Polysulphide
  - Polyether
  - Silicone

**Rigid**

Non undercut areas
- Impression Plaster
- Compound
- Zinc-oxide eugenol paste
- Wax
Hydrocolloides

- A colloid is a state of matter in which individual particles of one substance, are uniformly distributed in a dispersion medium of another substance. When the dispersion medium is water it is termed a hydrocolloid.
- Fluid: when the solute particles present are dispersed throughout the liquid, this is called a sol.
- Particles attached to each other, forming a loose network: the colloid becomes viscous and jelly like, and is called a gel.
- Ability to change reversibly from the sol state to the gel state.

- A sol can be converted into a gel in one of two ways:
  1. Reduction in temperature, reversible because sol is formed again on heating (e.g., agar).
  2. Chemical reaction which is irreversible (e.g., alginates). A gel can lose (syneresis which results in shrinkage) or take up (imbibition which results in expansion) water or other fluids.
- Hydrocolloids are placed in the mouth in the sol state when it can record sufficient detail, then removed when it has reached the gel state.
Alginate

### Composition

- Sodium or potassium alginate: 20%
- Salts of alginic acid, prepared from various species of seaweed
- Fillers: diatomaceous earth: 44%
  - Gives body to the impression
- CaSO₄ · 2 H₂O: 15%
- Sodium tripolyphosphate: 8%
  - Retardant
- Modifiers: magnesium oxide, sodium fluoride: 11%
  - Good setting, good surface
- **Mixing**

  Powder : Water = 1 : 3 in a flexible bowl with a curved, rigid spatula

  - Container of powder should be shaken before use to get an even distribution of constituents. Powder and water should be measured to manufactures instructions. Water at room temperature should be used, this gives a reasonable working time of a couple of minutes.
  - On mixing the powder with water a sol is formed, a chemical reaction takes place and a gel is formed.
  - dimensionally unstable
    syneresis (H2O loss from the surface)
    shrinkage → impression should be cast in 15 minutes, or stored in hygrofor
  - do not adhere to the impression tray – adhesives, or perforated trays
  - pH changes during setting - chromatic alginates
**PROPERTIES**
- Good surface detail
- Reaction is faster at higher temperatures
- Elastic enough to be drawn over the undercuts, but tears over the deep undercuts
- Not dimensionally stable on storing due to evaporation
- Non toxic and non irritant
- Setting time can depend on technique
- Alginate powder is unstable on storage in presence of moisture or in warm temperatures

**ADVANTAGES**
1. Non toxic and non irritant
2. Good surface detail
3. Ease of use and mix
4. Cheap and good shelf life
5. Setting time can be controlled with temperature of water used

**DISADVANTAGES**
1. Poor dimensional stability
2. Incompatibility with some dental stones
3. Setting time very dependent on operator handling
4. Messy to work with
Thank You for Your Attention!