

Review Article

History of Impressions, Impression Materials and Impression Techniques in Complete Dentures

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Abstract:

A dental impression is a negative imprint of hard (teeth) and soft tissues in the mouth from which a positive reproduction (or cast) can be formed. Impression materials are designed to be liquid or semi-solid when first mixed and placed in the tray, and then quickly set to a solid (usually a few minutes depending upon the material), leaving an imprint of the structures in the mouth. No doubt we know many new materials and techniques to make impressions but we should definitely know the pioneers who wear the crown of inventions and innovations.

Key words: Impression, Materials, Complete dentures, Prosthesis.

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Introduction

- Dental prostheses are undoubtedly among the earliest forms of dental treatment, the oldest existing denture being one of the lower six anterior teeth bound together with gold wire and attached by same means to adjacent teeth. It was by Etruscans in about 300 B.C.
- The earliest practice of the prosthetic arts was among the ancient Phoenicians circa 500 B.C. Hammarabi, ruler of all lower Mesopotamia (1760 B.C.), established a state controlled economy in which fees charged by physicians were set. His low code contained two paragraphs dealing with teeth:
 - "If a person knocks out the teeth of an equal, his teeth shall be knocked out."
 - "If he knocks out the tooth of a freed slave, he shall pay one third of a mine."
- Teeth were knocked out as a form of punishment among these early people (Egyptians and Chinese)
- But the specialty Prosthodontics came into existence in 1918 (Egyptians and Chinese.) Nicolas Dubois De Chemant Patents Porcelain Teeth.
- James Snell Invents the first reclining dental chair.

Complete Denture Impression Materials: Stark, 1975¹

Before the middle of the 18th century there was no method for producing an impression of the alveolar ridges. Ridges were painted with dye and a block of ivory or bone was pressed on the ridge. Areas of contact were scraped away.

- 1756 beeswax was the first material used in making impressions.
- 1840 Charles de Loude first references to impression trays.

- 1847 Desirabode referred to an impression tray.
- 1842 Montgomery discovered gutta percha.
- 1848 Gutta percha introduced as an impression material, high working temp and stiffness made it difficult to achieve satisfactory results.
- 1844 Plaster of Paris first used as an impression material.
- 1862 Franklin first corrected impression, wax followed by a plaster wash.
- Until the early 1900s, wax or plaster were used directly.
- 1857 Modeling plastics developed by Charles Stens
- 1874 Modeling plastics developed by S. S. White
- 1900 Green brothers introduce a method for manipulating the modeling plastics. First to use the term "posterior dam" in describing the posterior palatal seal.
- S.G Supplee introduced the hot water heater for modeling plastics.
- 1915 Rupert Hall perfected the first moderate-heat modeling plastic for making individual impression trays. Used black modeling plastic for making a custom tray in which impression plaster was placed for the correction.
- 1925 Poller agar for dental impressions. Not ideal for edentulous impressions.
- Late 1920s first functional impression waxes developed. Waxes used before this time were paraffin and beeswax, were far from ideal as they were hard flowed too slowly, or were crumbly.
- 1930s Ward and Kelly first use of ZOE for impressions.
- 1939 Trapozzano early technique using ZOE.
- 1936 Alginate-type materials patent awarded.
- 1940s first alginate impression. Write and Denen - use for corrective wash procedures.
- 1938 Mucostatics. Pascal's law - tissues under a mucostatic impression act as a confined liquid.
- 1950s elastomeric impression materials introduced: polysulfide, silicone base
- 1955 Pearson reported on the polysulfide base materials. Elastomeric materials were intended for impressions for inlays, crowns, and FPDs.
- 1973 First moldable acrylic material. First practical research with the material in complete denture construction.
- 1961 Chase first described the moldable acrylic material used for tissue conditioning and for functional (dynamic) impressions for complete dentures.

Development of complete denture impression techniques: Zimmer I.D and Sherman, 1981²

- To document the frequency and historical development of knowledge associated with scientific advancement from 1845-1964 (clinical sciences, biology, psychology, and material science) as they relate to impression procedures in prosthodontics.
- Prior to 1600s CD replacements were not made, due to a lack of understanding of retention
- 1711 Matthias Gottfried Purma recorded the use of wax
- Phillip Pfaff, Proposes Using Softened Wax To Take Impressions Of The Teeth 1736. Claude Mouton, Makes A Gold Crown And Post To Be Retained In The Root Canal. He also Recommends Enameling the gold crown white to promote more pleasing aesthetic dentistry. Mouton also writes of the first claspto hold artificial teeth. (1746-1755)
- 1844 Plaster of Paris first used as impression material
- 1848 Gutta Percha introduced

1845-1899

- Concepts of atmospheric pressure, max extension of denture bearing area, equal dist of pressure, and adaptation of denture bearing tissues were stressed
- Secondary wash impression started, plaster within the primary impression
- Retention, stability, and comfort - anatomic considerations
- All impressions were of open mouth variety
- Impression trays developed (mostly Britannia metal), also non metal trays used

1900-1929

- Introduction of closed mouth impression technique
- Border molding to capture the anatomy of the tissues (oral/perioral muscles)
- Placement of a posterior palatal seal (anatomic and mechanical), most texts recorded the termination of the posterior palatal seal as the vibrating line
- Introduced the concept of esthetics in impression.

1930-1940

- Recognized the anatomy of denture bearing areas, and muscle physiology as related to impression procedures
- Emphasis on immediate denture techniques
- New materials-reversible hydrocolloids, ZOE
- Stressed the use of plaster for final impression procedures:
- Introduction of the concept of mucostatics

1950-1964

- Introduction of rubber base and silicones
- Appreciation for rationale of border molding and posterior palatal seal
- Used modeling compound (preliminary impressions)

- Used ZOE or plaster (secondary impressions)

Impression Techniques in Full Denture Prosthesis: Tuckfield W.J 1950^{3,4,5}

- 1782- First impressions known made of bees wax, gutta percha or plaster of Paris
- 1856- Charles Stent introduced compound 1910- Greene brothers defined requirements of an impression.
- Needs to extend over the total area that the expected denture is to cover.
- Should be taken at the pressure it is to be worn
- Should not impede muscular movement yet provide a valve-like seal.
- 1921- Trench introduced trays with tissue stops and compound rims to allow patients muscle trim the borders in the closed mouth method. A post-dam was added to the impression in wax.
- 1925- Stansbery and Pendleton felt the functional impressions over-compressed the tissues and resulted in ridge resorption. They each used methods of pressure release usually by perforating the trays.
- 1932- Neil cut the post-dam into the cast at the "ah" line. Open mouth impression technique was felt to enable a more controlled and uniform result. He along with Fournet and Tuller in 1936 felt a mechanical lock should be created in the "lateral throat form area" for the best retention of the mandibular denture.
- 1932- Fish felt the denture flange should be triangular in cross-section to allow the tongue and cheeks to hold down the denture. The patients would need minimal training of musculature to control the denture.
- Late 1930s- Introduction of zinc oxide-eugenol to replace plaster wash.

- 1939- Schlosser advocated covering the retromolar pad, the full extent of the external oblique ridge and forming the reverse curve on the lingual flange. He coined the term "functional test impression".
- 1944- Page proposed the mucostatic technique. Dykins felt that the denture should only cover the stress bearing area with a two mm flange on the lingual.

Some Important persons:^{7,8}

- Ambrose Pare (16th Century) - he was born in Paris. He was a Barber - Surgeon at 16 years of age and became a member of the College of Surgeons at age 37. He was the first to describe Palatal Obturators, and transplant techniques, etc. His instruments though crude could be used today
- Charles Goodyear (1840) - discovered vulcanite rubber. It was used for denture bases. This discovery led to false teeth for the millions. Dentures were called vulcanite dentures.
- In 1790 George Washington is elected President. At the time of his election, he had only one tooth, a lower left bicuspid. George Washington NEVER has wooden teeth. His dentures were manufactured from gold, hippopotamus tusk, elephant ivory and human teeth.
- Pierre Fauchard (18th Century - 1728) - Father of Scientific Dentistry
- He described partial dentures and full dentures in his text. He constructed dentures with springs and used human teeth.
- Philip Pfaff (18th Century) - German. He introduced plaster for pouring up models

Source of support: Nil

- E.J. Dunning (1844) - plaster of Paris impressions, first shown in America
- John Greenwood (1789) - dentures for George Washington were made by him

Conclusion

We have looked back in to history seeing how and when what began. It was the beginning, to which there is no end. Now we have many new materials and techniques. If people in the past could make beautifully carved prostheses with minimal resources, we privileged with advanced methods and techniques have the responsibility of mimicking the nature as far as possible and obviously this is not the end. May be the beginning.....

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