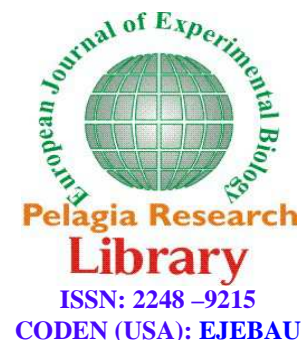




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European Journal of Experimental Biology, 2015, 5(12):1-5



### Impressions in fixed partial denture: A review update

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#### ABSTRACT

*Impression is defined as a negative likeness or copy in reverse of the surface of an object; or an imprint of the teeth and adjacent structures for use in dentistry. A good quality impression is only obtained when we have a thorough knowledge of materials, their properties, and techniques for their best manipulation. This article is a update of studies done by various dignities through time and their conclusions .*

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#### INTRODUCTION

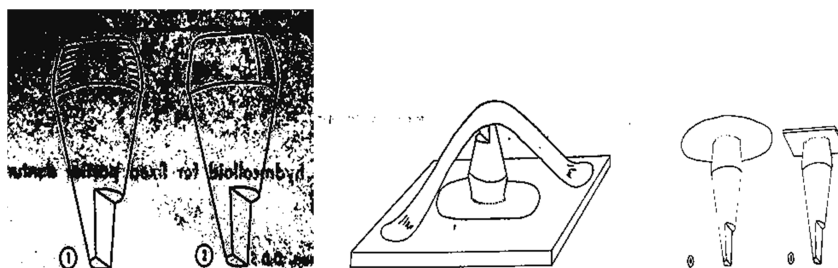
An impression is an imprint or negative likeness. Well-fitting indirect restorations can only be made if there are accurate models of the oral tissues available, made from high quality impressions. A good quality impression is only obtained when we have a thorough knowledge of materials, their properties, and techniques for their best manipulation. A Medline indexed search was conducted along with a manual search for articles on basal Osseo integrated implants and the articles were selected

#### REVIEW

Hudson (1958) described the clinical use of rubber impression materials . A combination of light and heavier bodied materials may be used in a disposable stock tray or a custom made acrylic resin tray for making impressions for fixed partial dentures. The special syringe is used to inject the light bodied material into the prepared cavities or about the crown preparation.

A LaForgia <sup>1</sup>(1965) described an impression technique using vacuum adapted temporary splints

Zuckerman<sup>2</sup> (1974) described a Technique of making impression.



Culbreath JC.<sup>3</sup> (1975) described A technique for making impressions for cast restorations. It can be used for a single preparation or for multiple preparations in a single arch. The most unique feature of the technique is that the tray is formed over the prepared teeth, either directly or indirectly

Dahl BL, Dymbe B, Valderhaug J<sup>4</sup>.(1985)Four hydrocolloid impression systems for fixed prosthodontics and one conventional alginate were tested for bonding properties between the syringe and the tray materials of the systems. Their dimensional stability was tested also after the impressions were kept in a humidor for 1, 3, and 24 hours before casts were poured.

Findings showed that there was a true bond between the syringe and the tray materials for all combinations. The precision tests gave a mean percent difference between the master model and the cast of less than 0.15 for all material combinations at both the 1- and 3-hours observations.

Marshak BL, Cardash HS, Ben-Ur Z.<sup>5</sup> (1987) After impression-making procedures, remnants of Xantopren impression material were found in the gingival crevices in eight of 125 patients. In three of the eight patients, remnants were only discovered subsequent to a systematic exploration with a fine curette.

Although eight of 125 is not a statistically significant number, it would be nonetheless prudent to consider a routine curettage of abutment sulci after impression-making. This procedure is even more strongly recommended when a defect be detected in the crevicular region of the impression. Impressions should remain in the mouth until full setting and maximum tear strength is reached. Strict adherence to the manufacturers' instructions is necessary

Lin CC, Ziebert GJ, Donegan SJ, Dhuru VB<sup>6</sup>. (1988) The accuracy of 12 impression materials of six different types were studied by using complete-arch FPD impressions. A one-piece casting was constructed by connecting the four individual castings made for the four abutment teeth. The master prosthesis was seated on the stone casts produced from the impressions. The marginal adaptation on the four abutments was then evaluated with a travelling microscope. The individual marginal adaptation of the four castings on the abutments was also examined after sectioning the four joints. They concluded that

1. The polyethers produced the most accurate complete-arch replicas. The second most accurate were the vinyl polysiloxanes, followed by the polysulfides and the irreversible-reversible hydrocolloids. The least accurate were the reversible hydrocolloids and the irreversible hydrocolloids.
2. The polyether impression materials exhibited the most consistent accuracy for a master cast to fabricate a complete-arch FPD.

Gordon GE, Johnson GH, Drennon DG<sup>7</sup>. (1990) study evaluated the accuracy of reproduction of stone casts made from impressions using different tray and impression materials. The tray materials used were an acrylic resin, a thermoplastic, and a plastic. The impression materials used were an additional silicone, a polyether, and a polysulfide. Impressions were made of a stainless steel master die that simulated crown preparations for a fixed partial denture and an acrylic resin model with cross-arch and anteroposterior landmarks in stainless steel that typify clinical intra-arch distances. Impressions were poured at 1 hour with a type IV dental stone. Results indicated that custom-made trays of acrylic resin and the thermoplastic material performed similarly regarding die accuracy and produced clinically acceptable casts. The stock plastic tray consistently produced casts with greater dimensional change than the two custom trays.

Dounis GS, Ziebert GJ, Dounis KS<sup>8</sup> (1991) This study compared the marginal fit of complete-arch fixed prostheses under simulated clinical conditions. Prostheses were made on casts constructed from three commonly used impression materials; polyether, polyvinyl siloxane (medium-viscosity and putty-wash), and reversible hydrocolloid. They concluded that, the polyether and both addition silicone impression materials were significantly more accurate than the reversible hydrocolloid in both situations. All of the single castings were clinically acceptable, but the luted restorations made from reversible hydrocolloids were not.

Hung SH, Purk JH, Tira DE, Eick JD<sup>9</sup> (1992) study compared the accuracy of one-step putty wash with two-step putty wash impression techniques. Five addition silicone impression materials-Mirror 3 (MR), Mirror 3 Extrude (ME), Express (E), Permagem (P), and Absolute(A)--were tested. Accuracy of the materials was assessed by measuring six dimensions on stone dies poured from impressions of the master model. They concluded that Accuracy of addition silicone impression material is affected more by material than technique. Accuracy of the putty wash one-step impression technique was not different from the putty wash two-step impression technique except at one of the six dimensions where one-step was more accurate than two-step. Mirror 3 putty wash two-step impression presented less distortion than Mirror 3 Extrude putty wash one-step or two-step impression.

Eriksson A, Ockert-Eriksson G, Lockowandt P, Linden LA.<sup>10</sup> (1996)The aims of their research were:

1) to determine if the compatibility between irreversible hydrocolloids (alginates) and type IV gypsums (die stones) is affected by different treatments of the impressions before pouring, and The results showed that dentists and dental technicians need to know how each specific irreversible hydrocolloid should be treated and also with which type IV gypsum it is compatible. This research also indicated that an irreversible hydrocolloid impression should not come into contact with any liquid within the first 15 min.

Lepe X, Johnson GH<sup>11</sup> (1997)study evaluated the materials after simulating overnight disinfection.

They concluded that, Accuracy of both impression materials was adversely affected with 18 hours of immersion disinfection. Long-term (18 hours) immersion disinfection will affect the fit of fixed partial prostheses.

Eriksson A, et al <sup>12</sup>(1998) The aim was to study their ability to reproduce six differently shaped abutments of a full arch stainless steel master model correctly, by measuring: 1) the accuracy of irreversible hydrocolloid impressions with different storage periods of 15 min, 2 h, 24 h and 95 h, reversible hydrocolloid stored 15 min and 2 h, and Type III addition silicones stored 24 h when the syringe-tray technique was used; and 2) whether mixing technique or tray design had any influence of the accuracy of irreversible hydrocolloid impressions

Randall RC <sup>13</sup>et al (1998) The aim of this study was to document the teaching of impression materials and techniques for crown and bridgework in the undergraduate curriculum in UK dental schools .Addition-cured silicones were found to predominate; 71% of schools taught and used clinically a one-stage, full arch impression technique involving stock trays, and 57% of schools a full-arch custom tray technique. Routine disinfection of impressions was taught and practiced in 43% of schools

Winstanley RB.<sup>14</sup> 1999 The quality of impressions for crown and bridge work in seven countries were compared with the results found in the United Kingdom in a previous study. The results showed that metal impression trays were used more frequently, and flexible plastic trays less frequently, in the countries visited than in the United Kingdom.

Nissan J et al 2000<sup>15</sup>. This study assessed the accuracy of 3 putty-wash impression techniques using the same impression material (polyvinyl siloxane) in a laboratory model.

The 3 putty-wash impression techniques used were

- (1) 1-step (putty and wash impression materials used simultaneously);
- (2) 2-step with 2-mm relief (putty first as a preliminary impression to create 2-mm wash space with prefabricated copings. In the second step, the wash stage was carried out); and
- (3) 2-step technique with a polyethylene spacer (plastic spacer used with the putty impression first and then the wash stage).

Omar R et al (2003)<sup>16</sup> This study compared the accuracy of stone models obtained from two-stage, pre-spaced putty/wash impressions under conditions in which known volumes of wash material were introduced during the second stage of the impression:

Group I, a quantity of wash material corresponding to the space provided;

Group II, double the quantity of wash material as the space provided;

Group III, double the quantity of wash material, but with V-shaped vents in the putty for escape of excess material. Percentage deviations of the vertical dimensions of stone dies with respect to the master model were significantly different between Groups I and II (the latter being shorter). For horizontal dimensions, differences were less consistent, although the deviations for Groups I and II and Groups II and III, with respect to the master model, were significantly different from each other for two of the three dimensions measured (Group II inter-abutment distances were generally larger) It was concluded that putty recoil, resulting from compression by excess wash material, plays a significant role in the under sizing of working dies, although the level of clinical relevance is less clear.

Eriksson A, Ockert-Eriksson G, Eriksson O, Linden LA.<sup>17</sup>(2004) The aim of this study was to estimate whether the survival ratios after 20 years of fixed prosthodontics made of alginate impressions was higher, equivalent or lower, compared to the survival ratios, shown in studies, where different impression materials were used. Concluded that, fixed prosthodontics made according to the syringe-tray alginate impression method may have the same success rates after 20 years compared to that of fixed prosthodontics presented in previous longitudinal clinical studies where other impression materials

Samet N,<sup>18</sup> et al 2005 This study evaluated the quality of impressions sent to commercial laboratories for the fabrication of fixed partial dentures (FPD) by describing the frequency of clinically detectable errors and by analyzing correlations between the various factors involved. The impression technique and material used, tray type, and number of prepared units were recorded for each impression. Data relating to errors and faults, including defects in material polymerization, retention to tray, tissue contact by tray, crucial areas beyond tray borders, heavy-bodied material exposure through the wash material (for double-step impressions), inadequate union of materials, retraction cords embedded in impressions, and air bubbles, voids, or tears along the margin were also documented. And concluded that impressions made with polyethers had the most detectable errors, followed by condensation-type silicones.

Nissan J<sup>19</sup> et al 2006 This article presented several impression techniques using PVS and recommends the one that provides the most accurate impression, utilizing the superior qualities of the PVS. The one step impression technique where no control of wash bulk and thickness exists, is considered to be the least accurate impression method with measured discrepancies as large as 7 times the original inter preparation distance and 40 times the original cross arch dimensions. Furthermore, the direct contact between the less refined putty material and the tooth preparation, as well as the high prevalence of air bubble entrapment, seriously compromises restoration longevity. The two stage impression technique has proved to produce the most accurate and reliable impressions due to complete control of the wash bulk and thickness entailed. The ideal wash bulk thickness should range between 1 to 2.5 mm all around the abutment tooth in order to minimize distortion of its subsequent die. The easiest and most clinically applicable method to achieve the desired space around the preparations is by loading the Putty material with the temporary crowns in place, followed by their removal at the second stage and occupation of the created space by the wash.

## COCLUSION

Since the field of impressions is so vast, still the inventions are being made and studies are being carried out for producing an ideal material and an ideal technique for making the job of the dentist and technician easy.

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