

ORIGINAL RESEARCH

Efficacy of different impression materials in making duplicating dies

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ABSTRACT

Background: Dental impression materials are a group of dental materials which are used in the patient's mouth to make a negative replica of specific oral tissues. The present study was conducted to evaluate the efficacy of different impression materials in making duplicating dies. **Materials & Methods:** The present study comprised of two impression materials placed in group I (Panasil) and group II (Speedex) used for making duplicating dies. 10 successive impressions were then made, 5 for each of the impression material. Fabrication of the die was done. The marginal discrepancy was recorded with the use of the described measuring technique in mesial, distal, buccal and lingual side. **Results:** There was significant difference on buccal side in both groups while on lingual side in group I ($P < 0.05$). There was significant difference on mesial side in group I while on distal side in group II ($P < 0.05$). **Conclusion:** Panasil proved to be better in terms of accuracy in making duplicating dies as compared to Speedex.

Key words: Dies, Panasil, Speedex

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INTRODUCTION

The use of indirect techniques for the fabrication of prosthodontic restorations has become almost universal today due to their distinct advantages over direct ones. Indirect techniques involve the fabrication of the prostheses on dies that replicate the patient's prepared tooth/teeth.¹ The accuracy of the prostheses, therefore, to a large extent, dependent on the accuracy of the die. A number of issues like recurrent caries, gingival recession, loosening of prosthesis etc can, at least in part, be attributed to an ill-fitting prosthesis. The accuracy of a die is, in turn, dependent on the inherent mechanical properties of the die material, such as, transverse strength, abrasion resistance and fine detail reproduction.²

Dental impression materials are a group of dental materials which are used in the patient's mouth to make a negative replica of specific oral tissues, from which are obtained positive casts in dental gypsum products which are used in the fabrication of various dental prostheses outside the mouth. Dental impression making is the process of creating

a negative form of the teeth and oral tissues, into which gypsum or other die materials can be processed to create working analogues. The accuracy of a prosthesis fabricated using indirect techniques depends on a number of factors with one of the most critical ones being the transverse strength of the die material. The transverse strength is a measure of how well the material behaves when under multiple stresses.³ The present study was conducted to evaluate the efficacy of different impression materials in making duplicating dies.

MATERIALS & METHODS

The present study was conducted in the department of Prosthodontics. It comprised of two impression materials placed in group I (Panasil) and group II (Speedex) used for making duplicating dies. Ethical approval from institutional ethical committee was obtained prior hand.

In this study, on step impression technique was used for making the impression followed by pouring of dental stone. Stone casts were separated from the impression and were

stored for final setting. 10 successive impressions were then made, 5 for each of the impression material. Fabrication of the die was done. The marginal discrepancy was recorded with the use of the described measuring technique

in mesial, distal, buccal and lingual side. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Materials used in study

Groups	Group I	Group II
Materials	Panasil	Speedex

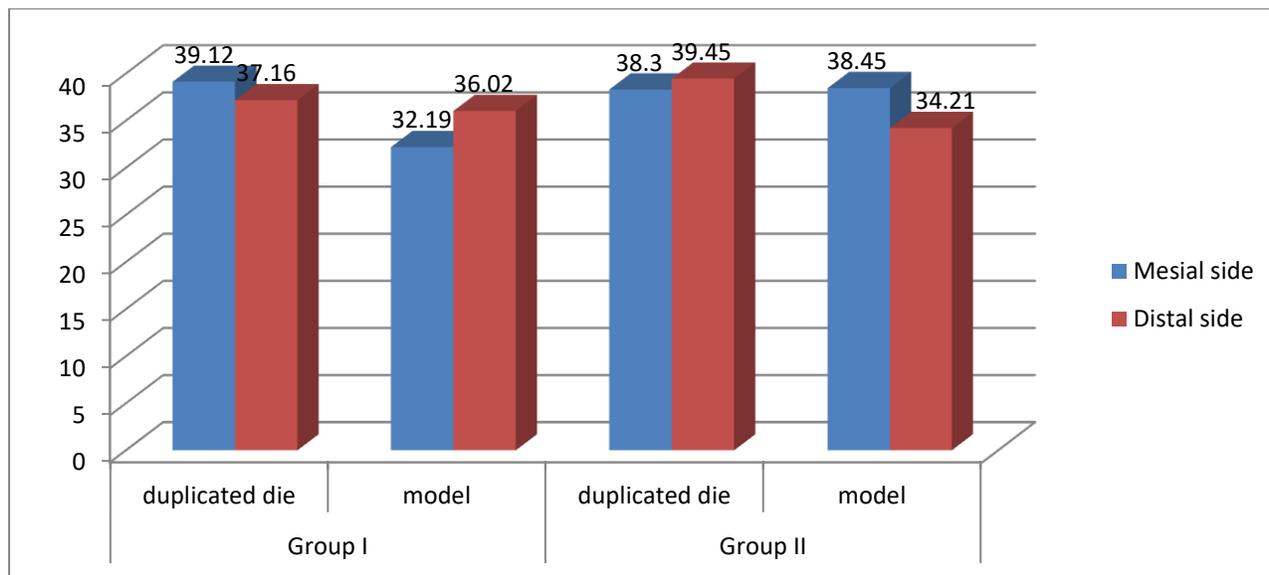
Table I shows that material used was panasil in group I and speedex in group II.

Table II Mean discrepancies in between duplicated die and model in both groups on buccal and lingual side

Groups	Material	Buccal side	P value	Lingual side	P value
Group I	duplicated die	34.11	0.01	35.12	0.51
	model	32.15		34.76	
Group II	duplicated die	37.34	0.02	36.31	0.01
	model	32.15		31.26	

Table II shows that there was significant difference on buccal side in both groups while on lingual side in group I (P < 0.05).

Graph I: Mean discrepancies in between duplicated die and model in both groups in mesial and lingual side



Graph I shows that there was significant difference on mesial side in group I while on distal side in group II (P < 0.05).

DISCUSSION

Marginal adaptation of a cast restoration can influence its durability due to lower accumulation of plaques in margins, enhancing structural properties (stability, resistance, low thickness of cement, and etc.), and higher esthetics.⁴ There are several factors which can affect the accuracy of definitive impression like quality of preparation (undercuts and tapering), impression technique, soft tissue management, and quality of wax pattern and casting. Several elastic impression material silicones are available for dental use: Synthetic elastomeric materials (polysulfide [PS], additional silicone [AS] and condensational silicone [CS], and polyether [PE]); and hydrocolloids. PE and silicones are accurate with high stability.

They can maintain their accuracy even 1-week or later, however, they are technique sensitive; for instance PE should be stored in <50% humidity.⁵ The present study was conducted to evaluate the efficacy of different impression materials in making duplicating dies.

In present study, material used was panasil in group I and speedex in group II. We found that there was significant difference on buccal side in both groups while on lingual side in group I ($P < 0.05$). There was significant difference on mesial side in group I while on distal side in group II ($P < 0.05$). Johnson et al⁶ planned the study to assess the efficacy and accuracy of addition and condensation silicon impression materials in making duplicate dies. On comparing the overall discrepancies, Speedex material showed significant overall discrepancy while non-significant discrepancy was observed in Panasil material.

Al-Zareet al⁷ compared three different impression materials (including: Additional silicone [AS] and condensational silicone [CS] and polyether [PE]) for duplicating master dies. Three master dies from an acrylic tooth model-with supragingival and shoulder finishing line was made by using PE: Impergum, CS: Speedex, and AS: Panasil separately. The Ni-Cr copings were prepared from master dies separately. The mean marginal difference of four walls from Impergum (38.56 μm) was the lowest than Speedex (38.92 μm) and Panasil (38.24 μm). The Impergum had the highest capability in making duplicate dies ($P > 0.05$).

Chen et al⁸ evaluated the effective factors on impressions accuracy during different storage times and proportion of inorganic fillers. They used three types of alginates, five commercial silicones, and two experimental silicones impression materials. They found greater accuracy and stability with AS materials.

Morgano SM et al⁹ evaluated the ability of five different impression techniques to make duplicate dies of two different types of tooth preparation. One mandibular second premolar Ivorine tooth was prepared for a complete crown and one for an onlay. A master impression was made of each tooth preparation with the use of five impression techniques for a total of 10 master impressions, and a master die was made from each of these impressions. Results indicated that none of the impression materials was capable of producing exact replicas. Polysulfide rubber performed significantly better than two materials for the production of duplicate dies with the complete crown preparation; and polyvinylsiloxane used with a putty-light body, single-stage technique produced mean marginal discrepancies that were significantly greater than the other four techniques when used for the onlay preparation.

CONCLUSION

Panasil proved to be better in terms of accuracy in making duplicating dies as compared to speedex.

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