



B70 A Comparison and Analysis of New Impression Casting Mediums to Dental Stone and Plaster of Paris

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Learning Overview: After attending this presentation, attendees will have a better understanding of the qualities and positive attributes of new impression casting media compared to Dental Stone and Plaster of Paris. This study evaluated QuikCrete, Epoxy Resin, Caulking, Insta-Foam, and Silicone Rubber in comparison to the gold standard presented by Dental Stone and Plaster of Paris.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by exploring the possibility that there are better casting materials available today. This will improve the quality of three-dimensional footprint impressions and ultimately improve the making of probative match decisions (or exclusions) based on impression evidence.

This study theorized that there currently are five new casting media that would be comparable or even superior to Dental Stone and Plaster of Paris. Each footprint impression was made in a confined path in a container with a soil substrate. A male volunteer weighing 185 pounds, made a typical walking motion in the soil to create shoeprint impressions. The first objective was to examine each material's ability to retain specific tread details from the worn shoe. Two specific details were selected from the shoe and each material was evaluated on its ability to retain those details. The second objective was to evaluate each material's preparation time, ease of use, and overall drying or casting time. The third objective was to analyze each material on nine points based on the following characteristics: a material that can reproduce very fine detail, have the viscosity to flow evenly throughout the impression and not be absorbed, cleaned without loss of detail, reasonable in cost, easily obtainable, easy to mix and use, set in a reasonable amount of time, not require special equipment or procedures, and not have a limited shelf-life (Bodziak, 2000).

The first objective concluded that only Dental Stone and Plaster of Paris were able to retain the finer details of the shoeprint impression, while the other materials retained only the simplest features. The second objective resulted in all materials having the same ease of use, a difference in preparation time by a margin of minutes, with drying time reflecting the greatest difference. The results from the third objective indicated that Dental Stone and Plaster of Paris met the established nine-point criteria. Insta-Foam finished with seven out of nine attributes. QuikCrete and Caulking both possessed six out of nine attributes. On the low end both Silicone Rubber and Epoxy Resin obtained three out of the nine attributes. The low scores for Silicone Rubber and Epoxy Resin were caused by the materials intercalation with the soil, making it impossible to separate the impression without severely ablating or destroying the impression.

Overall, this study revealed no definitive advantage of the other media compared to Dental Stone or Plaster of Paris. Although each material did have certain positive attributes that will need to be investigated further, they were still found lacking in overall performance. This study concluded that Dental Stone and Plaster of Paris remain the epitome of three-dimensional casting media used. These findings can be used to select the most appropriate casting mediums for impression evidence.

Casting Media, 3D Shoe Impressions, Dental Stone-Plaster of Paris