The precision, fit, and clinical success of indirect dental restorations depend on the accuracy of the final impression (Fig 1a-e). A final impression free of bubbles, voids, and tears is still considered one of the most challenging procedures in restorative dentistry. Vinyl polysiloxane impression materials (PVS) have favorable physical properties, accuracy, dimensional stability, and biocompatibility. Recently, new materials with improved material characteristics such as flow and wetting ability were developed (e.g., Affinis, Coltène/Whaledent, Altstätten, CH) and their advantages verified in laboratory studies. It is unknown, however, whether those properties will also lead to successful application in vivo.

This study evaluated the ability of a new PVS impression material to achieve satisfactory final impressions for indirect fixed restorations when used by inexperienced clinicians (3rd year dental students) as compared to a widely used PVS impression material. The Null-Hypothesis was tested: there is no difference between impression materials.

115 patients treated in the LSU School of Dentistry Junior Student Clinic for indirect fixed restorations in posterior (premolar/molar) teeth and meeting the inclusion criteria were randomly assigned to either one of two groups. In Group A (n=62), Affinis was used as the impression material (treatment group). The standard impression material in our clinics, a widely-used PVS impression material, was utilized in Group B (control, n=53). Preparations of the abutment teeth were made according to accepted universal guidelines for tooth preparation. Position of tooth, type of preparation, preparation finish line (Class I-V), and gingival bleeding score were recorded (Impression evaluation sheet, Fig 2). After application of a standardized cleaning and tissue-retraction protocol (“double cord technique”), a final impression was obtained with a one-step impression technique and a perforated metal tray. Manufacturers’ recommendations on working and polymerization times were followed strictly. Two calibrated examiners evaluated the first impression of the most distal abutment tooth at a magnification of x10 for acceptability (no voids or bubbles). Criteria for success/failure
1. no voids or bubbles – “acceptable impression”
2. voids or bubbles – “unacceptable impression”

Fisher-Freeman-Halton test was used to test for associations between material and type of preparation, preparation finish line, and gingival bleeding score. Logistic regression was used to determine the effect of material on success of the impression (acceptable/unacceptable). All statistical summaries and analyses were performed using SAS Version 8.1 (SAS Institute, Inc.). Contingency table analysis (Fisher-Freeman-Halton Test) was done using the FREQ procedure. Logistic regression was performed using the LOGISTIC procedure. All statistical tests were performed at the 0.05 significance level and p-values less than or equal to 0.050, after rounding to 3 decimal places, were considered statistically significant.

Power analysis revealed a sample size of 310 to detect a 10% difference. Since these calculations were solely based on estimations, interim analysis was performed 6 months after initiation of the study and it was agreed to halt the study if interim analysis finds statistical significance.

Within this study’s limitations, the new PVS impression material Affinis provided very significantly higher chances to obtain an acceptable impression than the control material.

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