

Enhancing Precision in Full Arch Prosthesis Fabrication: Evaluating the Performance of Implant Analogues as Reverse Scanbody Alternatives



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Introduction | Extra oral impression techniques have emerged as a viable method for digitally capturing implant positions in fully edentulous patients. This innovative approach, known as the "**reverse scanbody protocol**", effectively replicates the conventional impression-pouring technique traditionally employed in analog workflows. Reverse scanbodies are attached to the provisional prosthesis, and an extra oral scan is performed, offering implant position data for a digital master cast.

Objective | Evaluate the effectiveness of using **implant analogues as reverse scanbodies** in the fabrication of structures for implant full-arch prosthesis. The focus of the assessment is the analysis of the distance deviation between implants, aiming to provide insights into the accuracy of this approach for implant full-arch prosthesis.

Material and Methods |

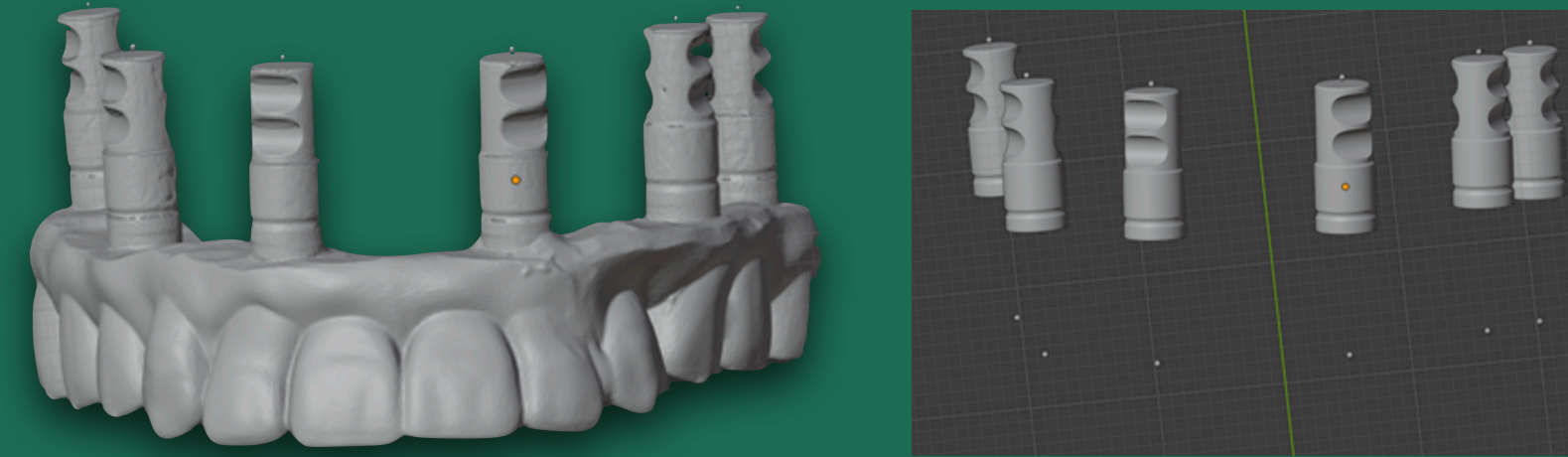
A temporary full-arch prosthesis supported by **six implants** was used for this study. Two distinct types of multi-unit (MU) analogs and the internal part of the MU cylinders were utilized. Two IOS were employed for the test groups - (**Trios 3 and Trios 4**) and a bench scanner (**E4**) was included as a control group. Each experimental condition were scanned 10 times. STL files were aligned on software Blender and the **linear distance deviation between implants #3 and #14** were measured using a Python script.

The trueness data were obtained, and **statistical analysis** was conducted. The data were found to be not normally distributed. Kruskal-Wallis test were conducted, followed by Bonferroni correction for multiple comparisons.

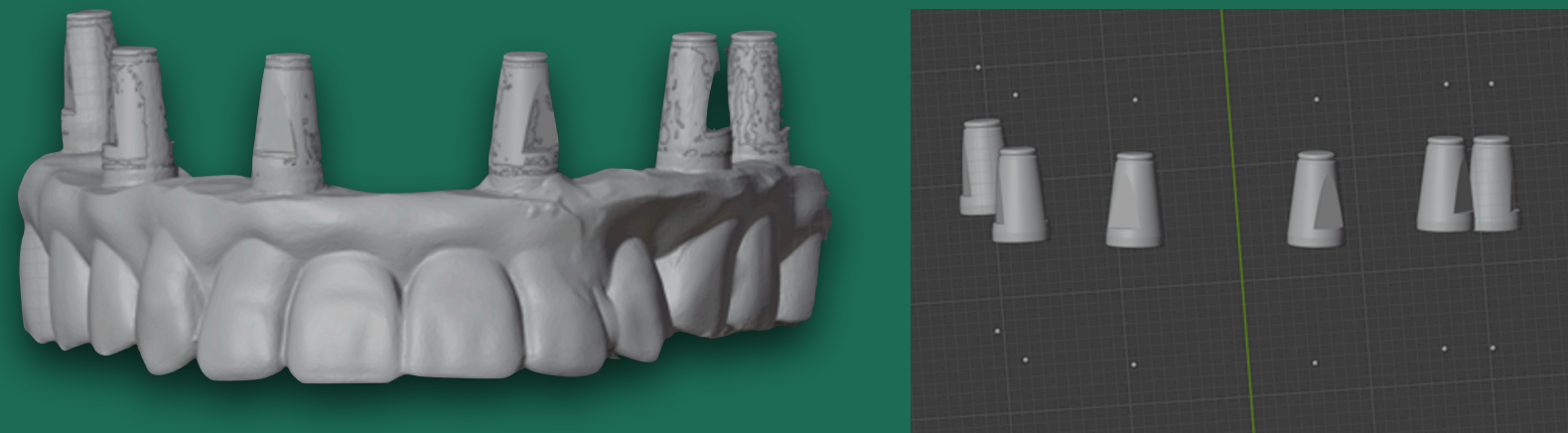
The confidence interval was set at 95%.

Groups | (n=10)

SB1 | S.I.N. ANMA - regular size



SB2 | S.I.N. ADNMA - reduced size



SB3 | MCU - internal part of the multi-unit abutment cylinder



Intra Oral Scanners | TEST

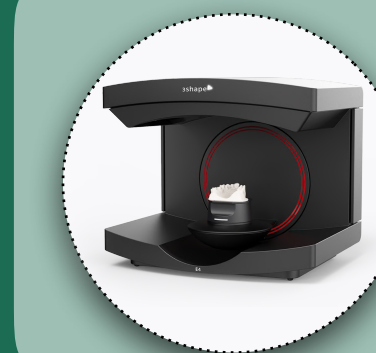


TRIOS 3 |
3SHAPE



TRIOS 4 |
3SHAPE

Bench Scanner | CONTROL

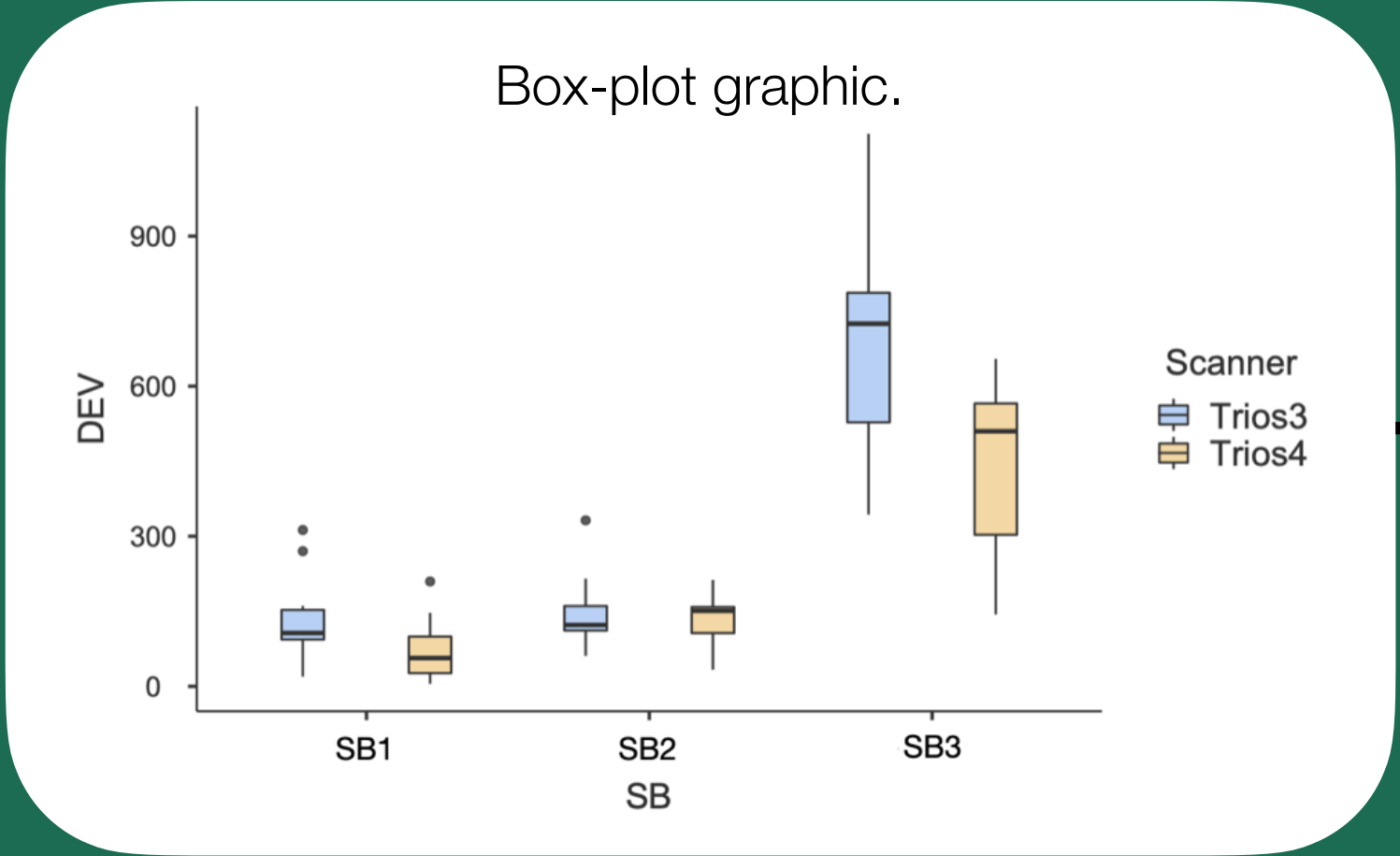


E4 | 3SHAPE

Results | The SB1 group showed the lowest median values of **linear distance deviation between implants #3 and #14** in both scanners. No differences were found across scanners within the SB1 group ($p=0.131$) neither SB2 ($p=0.940$) but SB3 showed significant difference ($p=0.19$). Differences were found across SB's within the IOS. The SB3 was significantly different from the SB1 ($p= 0.000$) and SB2 ($p=0.001$).

	SB1 (S.I.N. ANMA)	SB2 (S.I.N. ANMA)	SB3 (MCU)
TRIOS 3	107 (19 - 312)Aa	123 (60 - 332)Ab	725 (343 - 1104)Bb
TRIOS 4	56 (4.99 - 210)Aa	151 (33 - 213)Aa	510 (144 - 665)Ab

Lowercase letters mean differences between lines. Uppercase letters mean differences between columns ($p<0.05$).



Conclusion | The deviation observed in the SB1 group falls within the clinically acceptable trueness deviation range of 100 μm for a full arch. The SB1 group approached the limit of acceptability. The technique employed demonstrated satisfactory performance. However, it is essential to emphasize that further research and studies are warranted to develop a more comprehensive understanding of this approach.