



Effect of Reline Material on Dimensional Accuracy of Digital Denture Conversion to Implant Supported Fixed Complete Denture at Different Time Intervals

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INTRODUCTION

Conversion of conventional dentures to implant supported fixed complete dentures (ISFCD) is discussed extensively in the literature. Same day conversions using acrylic resin is common, but no studies exist that measure the amount of distortion that occurs from the conversion process due to resin shrinkage. The potential deformation may be significant, resulting in a misfit of the prosthesis to the immediately loaded implants with significant negative consequences.

Passive fit is achieved when implant components and their prosthetic attachments are fully connected without any strain after fastening all screws.¹ To achieve passivity in a conversion prosthesis, distortion must be minimized to reduce any misfit between implant and corresponding abutment.² A common material used during the conversion process is acrylic resin. Heat, light, and auto polymerizing acrylic resins are known to undergo 6-9% volumetric shrinkage and linear shrinkage of 0.5% upon polymerization.³⁻⁵

If polymerization shrinkage of reline material causes significant distortion of the conversion prosthesis, perhaps an alteration in the materials and methods used should be considered. However, if distortion of the conversion prosthesis is within tolerance thresholds documented in the literature, 150 um of linear deviation⁶ and 0.4° of angular deviation⁷, then use of the conversion prosthesis to create the master cast for fabrication of the definitive prosthesis may be acceptable, resulting in fewer appointments and reduced costs.⁸

METHODS

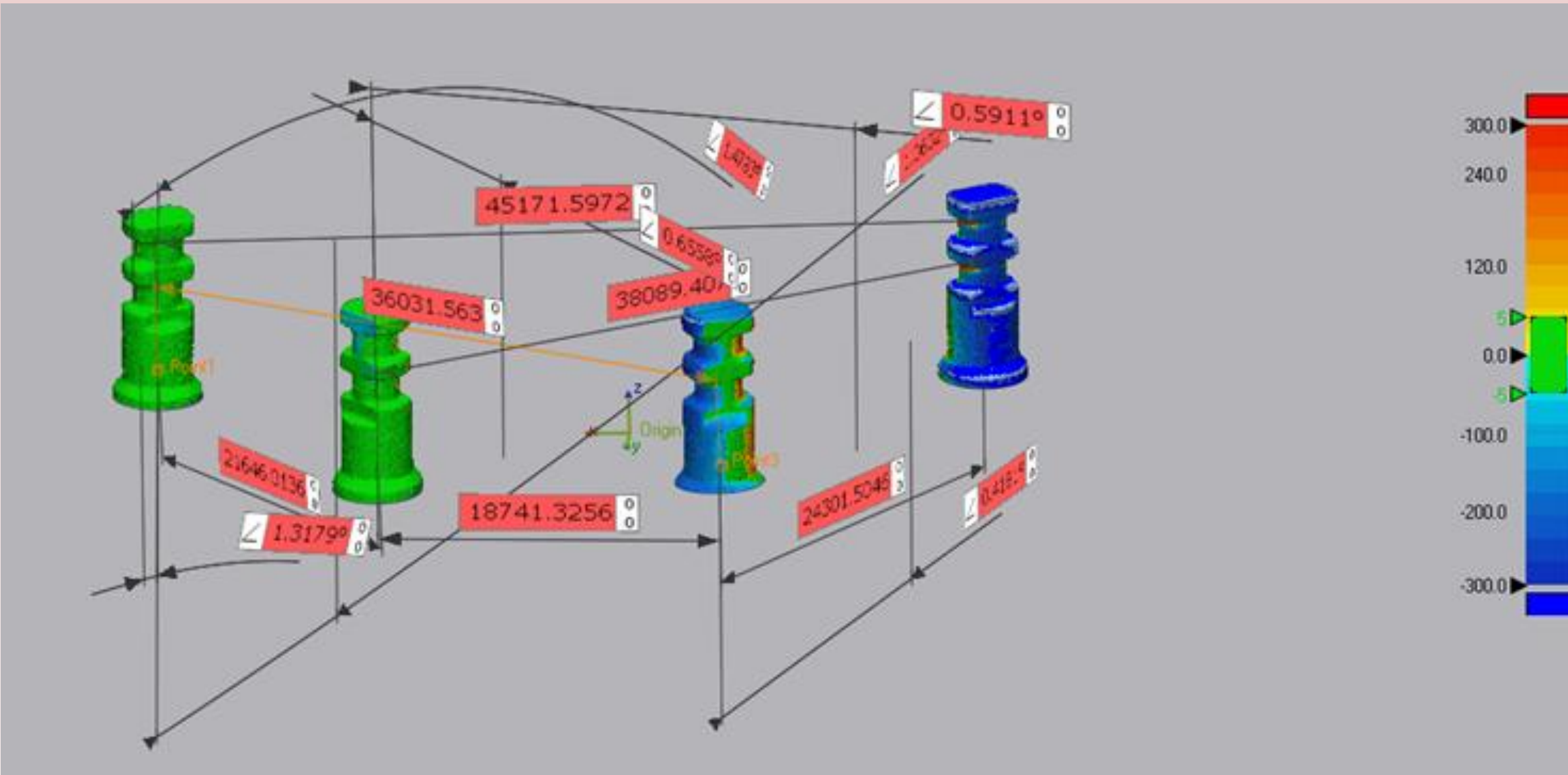
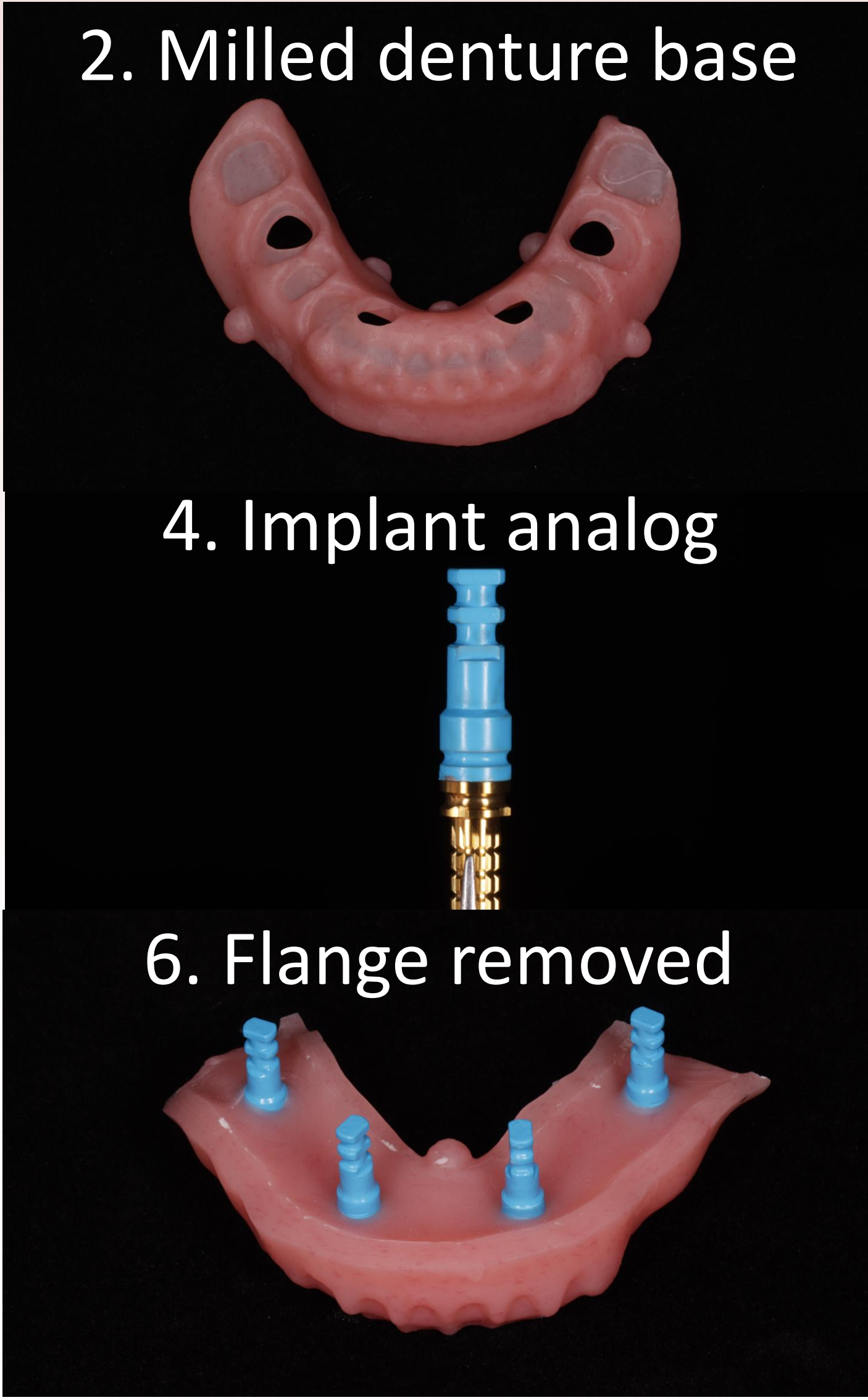
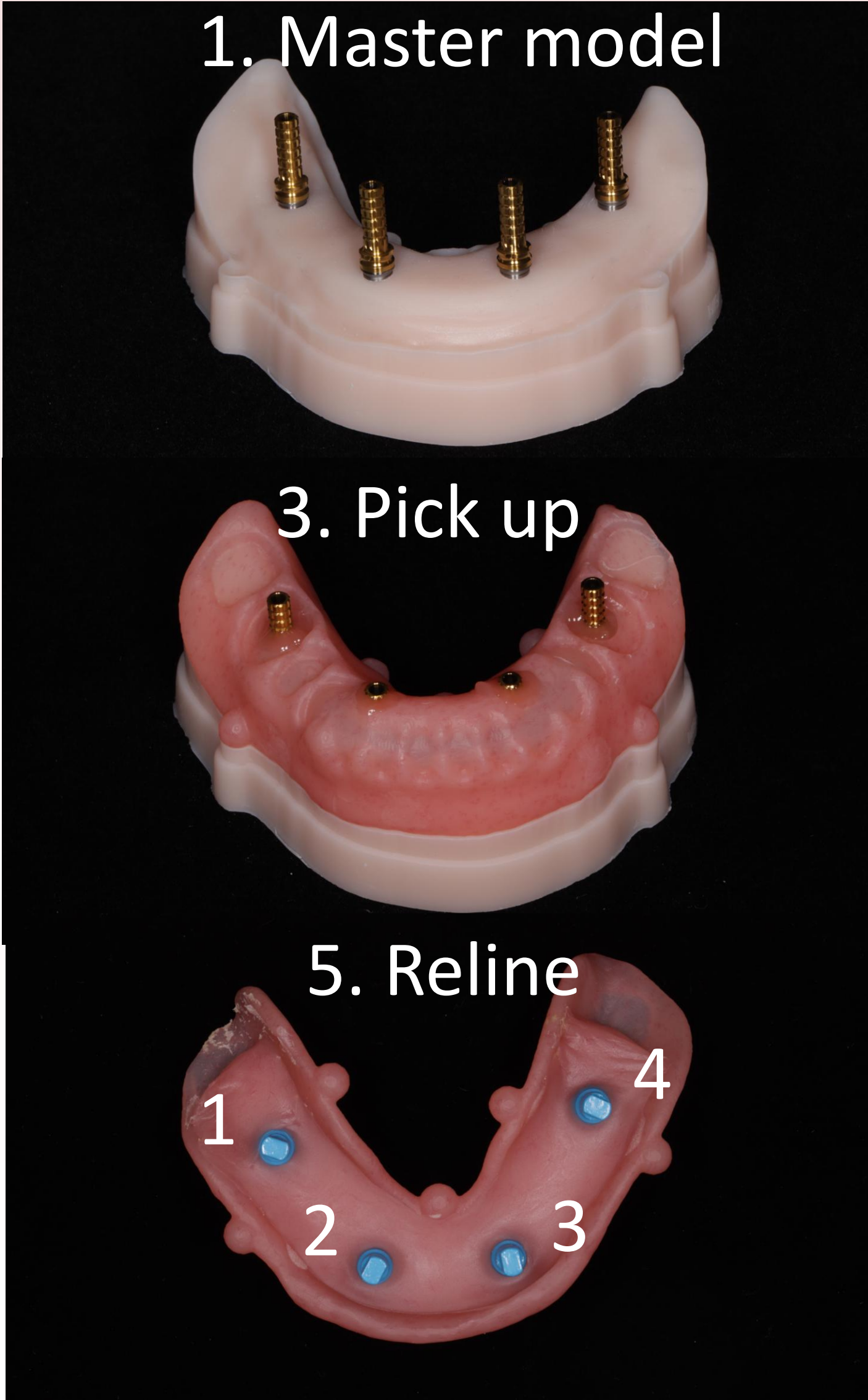


Figure 1. Best fit matching following alignment with implant #1 at T0. Linear and angular deviations are depicted as well.

		Initial Set	1 Hr	24 Hr	Flangeless
Angular Deviations					
Pro Base	Mean(SD)	0.56(0.37)	0.59(0.44)	0.61(0.44)	0.38(0.30)
	Median	0.51	0.48	0.51	0.33
	Min-Max	0.01-1.32	0.01-1.50	0.00-1.48	0.03-1.43
Ufi Gel	Mean(SD)	0.28(0.21)	0.28(0.21)	0.29(0.22)	0.28(0.19)
	Median	0.21	0.26	0.24	0.24
	Min-Max	0.00-0.81	0.00-0.77	0.01-0.90	0.02-0.92
Linear Deviations					
Pro Base	Mean(SD)	112.54(60.93)	93.85(73.87)	94.74(73.00)	76.04(41.72)
	Median	91.82	77.38	77.26	41.72
	Min-Max	20.13-254.21	0.11-360.17	1.81-362.00	1.56-360.61
Ufi Gel	Mean(SD)	82.66(47.29)	49.70(62.44)	71.20(64.71)	69.14(61.89)
	Median	80.47	49.64	51.21	42.54
	Min-Max	8.34-217.92	3.06-246.61	0.36-248.52	0.66-245.04

Table 1. Descriptive statistics for angular and linear deviations according to resin type and time.

DISCUSSION

The results of this study suggest the dimensional change associated with denture conversion to ISFCD may be well within the clinical thresholds of linear and angular deviation to achieve passive full arch implant supported restorations. The greater predictability and lower deviation of Ufi Gel®hard C compared to ProBase®Cold suggests the material choice may prove more influential in the dimensional accuracy and stability of the converted prosthesis than time or method of conversion. There was a general trend of more linear than angular deviations. The greatest angular deviations occurred between cross arch implants. The least amount of angular deviation occurred between ipsilateral adjacent implants. ProBase®Cold displayed a clear trend for significant distortion over time while ProBase®Cold did not. This suggests that while the conversion prosthesis may not be suitable to be used for full arch implant supported prosthesis master cast fabrication, it may be used for ipsilateral ISFDP master cast fabrication. Material choice appears to have a significant impact on conversion prosthesis dimensional stability. This has significant implications including reduced costs, less chair time, and fewer resources.

Future studies may evaluate the stress put on surrounding periodontium and prosthetic components due to the dimensional change associated with prosthesis conversion.

CONCLUSION

The following conclusions may be made:

- The dimensional change associated with denture conversion to ISFCD is within the clinically acceptable threshold for both ProBase®Cold and Ufi Gel®hard C.
- Ufi Gel®hard C produced significantly less dimensional change.

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