INTRODUCTION

Technological advances in removable prosthesis include enhanced materials as well as more efficient processes. The use of carded denture teeth with conventional processing involves skill and time from the laboratory technician. The fabrication of dentures via a milled monolithic material can save a technician’s time and inventory. The emergence of print technologies also saves time but currently has esthetic limitations.

As new processes become standard of care, it is critical to understand the properties of strength, modulus and bond of these materials.

OBJECTIVE

The purpose of this study was to examine the load bearing capability of denture teeth from four different denture production methods.

MATERIALS AND METHODS

Materials:

Table 1: Materials

<table>
<thead>
<tr>
<th>Group</th>
<th>Denture Teeth</th>
<th>Denture Base</th>
<th>Process</th>
<th>Manufacturer</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ivotion® Monolithic</td>
<td>Single Disc Milling</td>
<td>Ivoclar Vivadent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ivotion® Dent</td>
<td>Ivobase® Base</td>
<td>2 Disc Milling</td>
<td>Ivoclar Vivadent</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Blueline® Denture Teeth</td>
<td>Ivobase® High Impact</td>
<td>Conventional - Ivobase®</td>
<td>Ivoclar Vivadent</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>IPS® CAD Denture Teeth</td>
<td>Lucitone® Digital Print™</td>
<td>Carded Teeth/Print</td>
<td>Dentply Sirona</td>
<td></td>
</tr>
</tbody>
</table>

Methods:

Denture Process

Eight full arch lower dentures were processed from each method.

Group 1: Ivotion

Group 2: Ivotion Dent | Ivotion Base

Group 3: Blueline Denture Teeth | Ivobase High Impact

Group 4: IPS Denture Teeth | Lucitone Digital Print

Specimen Preparation

Teeth 21-23 (ADA Universal Tooth Numbering System) were cut from each arch to be loaded.

RESULTS

The mean failure loads (N) were analyzed using a one-way analysis of variance (ANOVA) and Tukey’s post hoc analysis to determine statistical difference between or within groups (p<0.05).

![Chart 1: Denture Tooth Debonding Values (N)](chart1.png)

*Means with different letters are statistically different (p<0.05)

![Failure Mode: Representative Sample](failuremode.png)

- The monolithic one-disc milled denture sample showed the highest load to failure to a printed denture base showing the lowest value.
- The printed dentures with carded teeth showed pure adhesive debonding in the adhesive while the other three groups showed mixed mode or cohesive failure.

CONCLUSION

Within the bounds of this study, the load to cause failure of teeth was statistically different for all four tested denture processing methods. The failure method also differed between the groups for each tested method.

REFERENCES