



Stony Brook
School of Dental Medicine



Wettability of Hyaluronic Acid on Various Implant Disk Surfaces

Georgios E. Romanos^{1*}, Edona Mehmeti¹, Nina Anderson²

¹Dept. of Periodontics and Endodontics and ²Dept. of Oral Biology and Pathology,

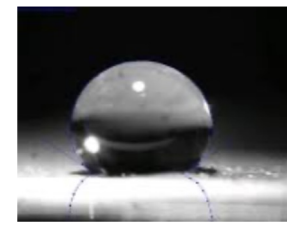
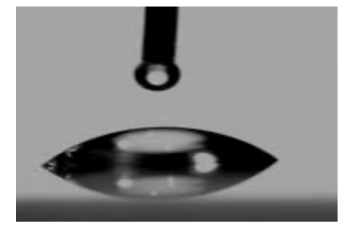
School of Dental Medicine, Stony Brook University, Stony Brook, NY

.....

Introduction

Hyaluronic acid (HA), also known as hyaluronan, is a **naturally produced linear glycosaminoglycan (GAG)** present throughout the human body. **Hyaluronic acid** as a biological material can be used in dental applications to **regenerate soft tissues**, work as a physical barrier between soft and hard tissues, assist in wound healing and regenerate hard tissues. **Chemically modified** combination of cross-linked and non-cross-linked versions of hyaluronic acid from a non-animal source (hyaDENT BG) **has been introduced in the market**. Use of **hyaluronic acid after periodontal surgeries** has been studied to support wound healing mechanisms especially in root coverage surgical procedures.

Objectives: This in vitro study aims to investigate **the impact of hyaluronic acid (HA) on the wettability** of four types of **implant surfaces**.



Methods

Four groups of implant surfaces in form of disks:

- Pure titanium (machined & SLA), Titanium Alloy, Zirconia
- Three different liquids: Saline, bovine serum albumin, hyaluronic acid serum
- Laboratory pipette, Contact Angle Goniometer (Ossila, Sheffield, UK)

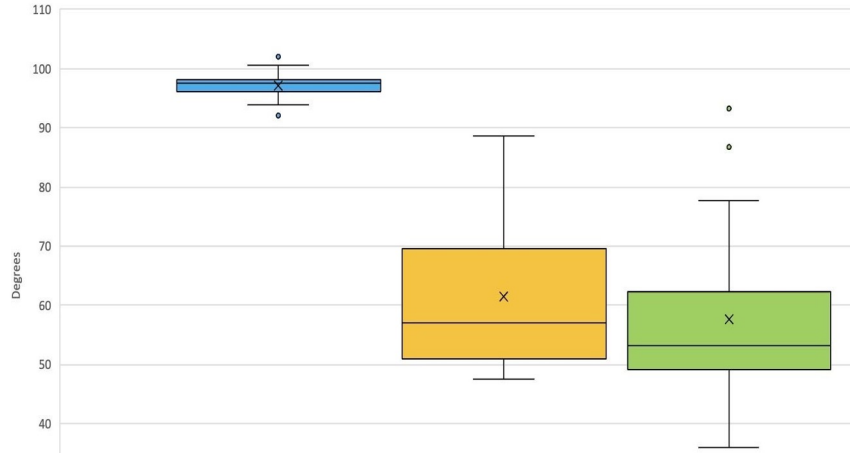


- The implant surface disks were cleaned and sterilized prior to testing to remove any contaminants that could affect wettability measurements.
- Wettability was assessed by measuring the contact angle formed between a droplet of liquid and the implant surface. For each test, a pipette was used to dispense exactly 10 μ l of the testing liquid onto the center of the implant surface disk.
- Each group (n=20) underwent wettability testing with each of the three liquids.
- A one-way analysis of variance (ANOVA) was performed to determine if there were statistically significant differences in the wettability (measured through contact angles) among the different liquids on each implant surface type. The significance level was set at $p < 0.05$.

Results for Pure Titanium/SLA

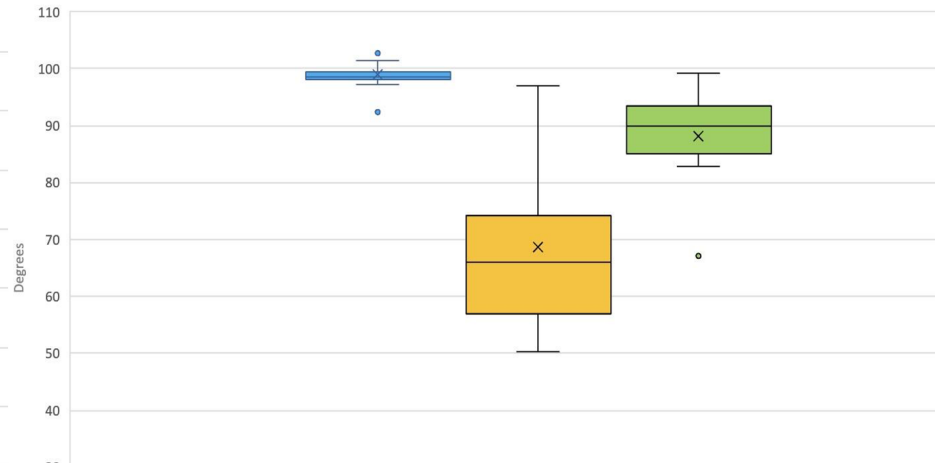
Pure Titanium Wettability

Saline BSA HA



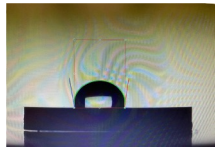
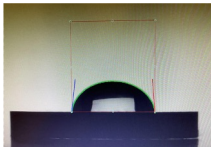
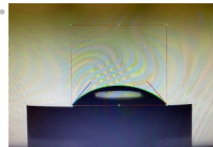
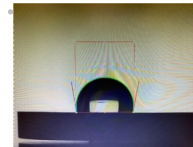
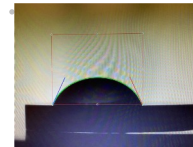
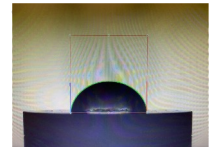
SLA Wettability

Saline BSA HA



The mean values for pure titanium were 97.2 ± 2.35 , 61.4 ± 12.20 , and 57.6 ± 14.31 for saline, BSA, and HA, respectively.

The mean values for titanium SLA were 98.9 ± 2.22 , 68.6 ± 13.41 , and 88.2 ± 8.28 for saline, BSA, and HA, respectively.



Results for Titanium Alloy/Zirconia

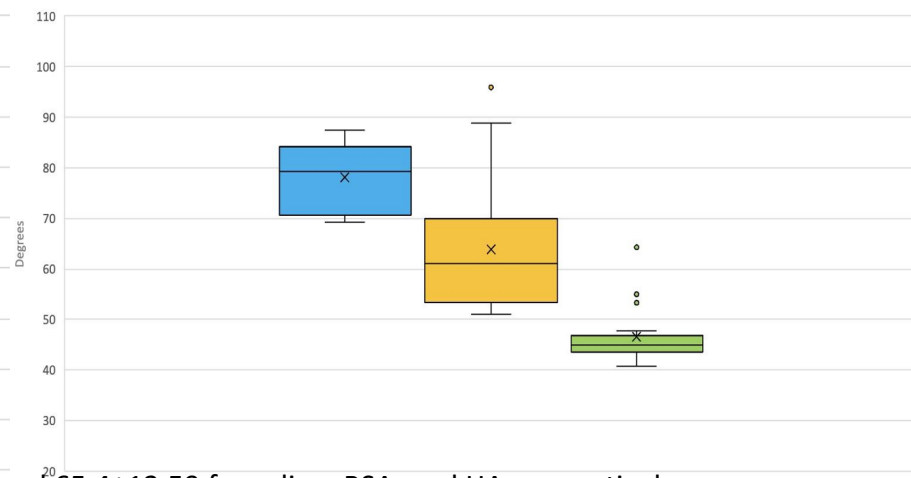
Titanium Alloy Wettability

Saline BSA HA



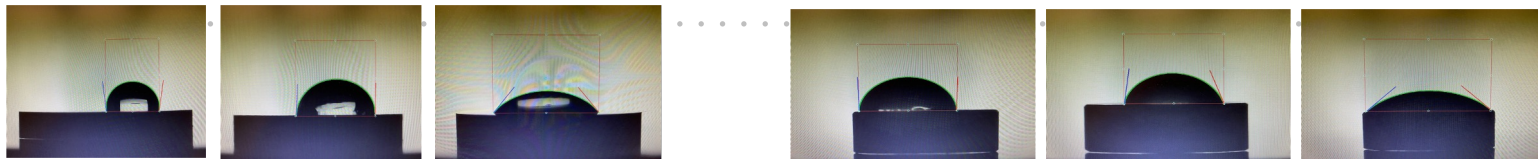
Zirconia Wettability

Saline BSA HA



The mean values for titanium alloy were 97.4 ± 2.27 , 88.9 ± 8.67 , and 65.4 ± 12.59 for saline, BSA, and HA, respectively.

Similarly, the mean values for zirconia were 78 ± 6.42 , 63.9 ± 12.28 , and 46.4 ± 5.36 for saline, BSA, and HA, respectively.





Conclusion

Within the limits of this study, **implant surfaces had greater hydrophilicity when exposed to hyaluronic acid.**

Statistical evidence confirms HA's superior effect on wettability across all tested implant types.
