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Title: Pilot In Vitro Study to Assess Cleaning Ability and Effects of Different Decontamination Methods on Implant Surfaces

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Author Questionnaire

1. We have marked your project as author-provided footage, meaning you film the video yourself and provide JoVE with the footage to edit. JoVE will not send the videographer. Please confirm that this is correct.

√ Correct

2. Interview statements: Which interview statement filming option is the most appropriate for your group? **Please select one**.

☒ Interview Statements are read by JoVE's voiceover talent.

3. Proposed interview filming date: Please indicate the proposed date that your group will **self-film** interviews: **12/11/2025**

Current Protocol Length

Number of Steps: 03
Number of Shots: 08

Introduction

NOTE to VO producer: Please generate the VO for interview answers

INTRODUCTION:

1.1. The scope of this study is to compare the cleaning efficacy and the surface effects of three commonly used mechanical decontamination methods for implant surfaces in-vitro.

1.1.1. B. roll: 2.2.1

CONCLUSION:

1.2. This study shows that titanium brushes clean implants most effectively with minimal damage, while titanium curettes and chitosan brushes cause more alteration and leave contamination.

1.2.1. B. roll: 2.2.4

1.3. These findings highlight the limitations of existing methods and the need for combined or improved decontamination strategies.

1.3.1. B. roll: 2.3.2

1.4. Future research will focus on understanding methods to fully decontaminate implant surfaces without causing damage by combining mechanical tools with chemical or electrolytic techniques.

1.4.1. B. roll: 3.4.1

Protocol

2. Cleaning the Implants and Photographing

Demonstrators: Gizem Ince Kuka, Hatice Selin Gungormek

2.1. To begin, prepare a custom-made acrylic splint to **[1]** position the camera with angulations of 30 degrees for the upper view and 60 degrees for the lower view relative to the implant long axis to assess the coronal and apical threads in a standardized manner **[2]**.

2.1.1. LAB MEDIA: Acrylic preparation 00:00–00:45

2.1.2. LAB MEDIA: Preparation of stent 00:00-00:20

2.2. Position the implant and apply three different decontamination methods separately **[1]** to the exposed buccal and oral surfaces per implant, commonly used in the treatment of peri-implantitis **[2]**. Perform each method for 2 minutes by a single operator to eliminate bias **[3]** and control the instrumentation time with a stopwatch **[4]**.

2.2.1. LAB MEDIA: Application of ChB

2.2.2. LAB MEDIA: Application of TiC 00:00–00:10

2.2.3. LAB MEDIA: Application of ChB2 00:00–00:15

2.2.4. LAB MEDIA: TiB application.mov 00:00–00:11

2.3. Place the camera 15 centimeters away from the implant surface **[1]**. Take standardized photographs at a frontal view of 0 degrees from the longitudinal implant axis at the buccal and oral surfaces of each implant before and after decontamination **[2-TXT]**.

2.3.1. LAB MEDIA: Photographing 0:00-00:05

2.3.2. LAB MEDIA: Photographing.mov 00:05–00:12 **TXT: Verify the alignment of the camera using a calibration ruler**

Results

3. Results

3.1. None of the treated surfaces showed complete removal of ink stain following decontamination **[1]**. Residual ink percentages varied depending on the device used and the angulation of the photographs **[2]**.

3.1.1. LAB MEDIA: Figure 3. *Video editor: Highlight the images on the right in A, B and C*.

3.1.2. LAB MEDIA: Figure 4.

3.2. At the buccal and oral frontal views, TiB *(T-I-B)* resulted in the lowest residual stain percentage at 75.98 percent **[1]**, followed by TiC *(T-I-C)* at 80.31 percent **[2]** and ChB *(C-H-B)* at 90.34 percent **[3]**.

3.2.1. LAB MEDIA: Table 1. *Video editor: Highlight the row for "TiB" under "Buccal + Oral Frontal" view showing 75.98%.*

3.2.2. LAB MEDIA: Table 1. *Video editor: Highlight the row for "TiC" under "Buccal + Oral Frontal" view showing 80.31%.*

3.2.3. LAB MEDIA: Table 1. *Video editor: Highlight the row for "ChB" under "Buccal + Oral Frontal" view showing 90.34%.*

3.3. At 60-degree views, all groups showed high levels of residual staining, indicating reduced cleaning efficacy in deeper implant regions **[1]**.

3.3.1. LAB MEDIA: Table 1. *Video editor: Highlight the row "Buccal and oral 60°" row*

3.4. Scanning electron microscopy examination showed that all treatment techniques modified the implant surface **[1]**, in contrast to the negative control which retained the original uniformly rough topography **[2]**.

3.4.1. LAB MEDIA: Figure 5. *Video editor: Highlight panels for A, B, and C* .

3.4.2. LAB MEDIA: Figure 5. *Video editor: Highlight panel D* .

3.5. Among the treatments, TiB caused minimal surface alterations **[1]**, while TiC and ChB induced extensive surface changes and irregularities **[2]**.

3.5.1. LAB MEDIA: Figure 6. *Video editor: Highlight panel C* .

3.5.2. LAB MEDIA: Figure 6. *Video editor: Highlight panels A and B*.

3.6. Horizontal scratches were particularly prominent on implants treated with TiC **[1]**.

3.6.1. LAB MEDIA: Figure 6. *Video editor: Zoom in on panel A and point to visible horizontal scratch lines*.

- **Decontamination**

Pronunciation link: https://www.merriam-webster.com/dictionary/decontamination merriam-webster.com+1
IPA: /ˌdiː.kənˌtæm.əˈneɪ.ʃən/
Phonetic spelling: dee-kuhn-ta-muh-NAY-shuhn

- **In-vitro**

Pronunciation link: https://www.merriam-webster.com/dictionary/in%20vitro merriam-webster.com+1
IPA: /ɪn ˈvɪtroʊ/
Phonetic spelling: in VEE-troh

- **Implant**

Pronunciation link: https://www.merriam-webster.com/dictionary/implant merriam-webster.com
IPA: /ɪmˈplænt/
Phonetic spelling: im-PLANT

- **Acrylic** (as in custom-made acrylic splint)

Pronunciation link: https://www.merriam-webster.com/dictionary/acrylic merriam-webster.com
IPA: /əˈkrɪlɪk/
Phonetic spelling: uh-KRIL-ik

- **Buccal**

Pronunciation link: https://www.merriam-webster.com/dictionary/buccal merriam-webster.com
IPA: /ˈbʌkəl/
Phonetic spelling: BUCK-uhl

- **Peri-implantitis**

Pronunciation link: https://www.howtopronounce.com/peri-implantitis howtopronounce.com+1
IPA: /ˌpɛriˌɪmˌplænˈtaɪtɪs/
Phonetic spelling: pair-ee-im-PLAN-tye-tis

- **Scanning (as in scanning electron microscopy)**

Pronunciation link: https://www.merriam-webster.com/dictionary/scanning merriam-webster.com

IPA: /ˈskænɪŋ/
Phonetic spelling: SKAN-ing

- **Microscopy**

Pronunciation link: https://www.merriam-webster.com/dictionary/microscopy merriam-webster.com
IPA: /mɪˈkrɒskəpi/ (American: /mɪˈkrɑːskəpi/)
Phonetic spelling: mi-KRAH-skuh-pee

- **Topography** (as in surface topography)

Pronunciation link: https://www.merriam-webster.com/dictionary/topography merriam-webster.com
IPA: /təˈpɑːgrəfi/
Phonetic spelling: tuh-PAH-gruh-fee

- **Calibration** (as in calibration ruler)

Pronunciation link: https://www.merriam-webster.com/dictionary/calibration merriam-webster.com
IPA: /ˌkælɪˈbreɪʃən/
Phonetic spelling: kal-ih-BRAY-shuhn

- **Residual** (as in residual stain)

Pronunciation link: https://www.merriam-webster.com/dictionary/residual merriam-webster.com
IPA: /rɪˈzɪdʒ.u.əl/ (or /rɪˈzɪdʒuəl/)
Phonetic spelling: ri-ZID-joo-uhl

- **Irregularities**

Pronunciation link: https://www.merriam-webster.com/dictionary/irregularities merriam-webster.com
IPA: /ɪˌrɛg.jəˈlærɪtiz/
Phonetic spelling: ih-REG-yuh-LAIR-ih-teez

- **Stopwatch**

Pronunciation link: https://www.merriam-webster.com/dictionary/stopwatch merriam-webster.com
IPA: /ˈstɑpˌwɑtʃ/
Phonetic spelling: STOP-watch

- **Calibration** (included above, but relevant again)

(already given)