

Study on Periodontal Pathogen Adhesion and Cytotoxicity of Different Materials for Implant Prosthesis Screw Access Hole.

Hsin-Ying Lu, Jason Hou, Yukihiro Tamura, Yuta Takahashi, Shinji Kuroda, Hidemi Nakata.

Introduction:

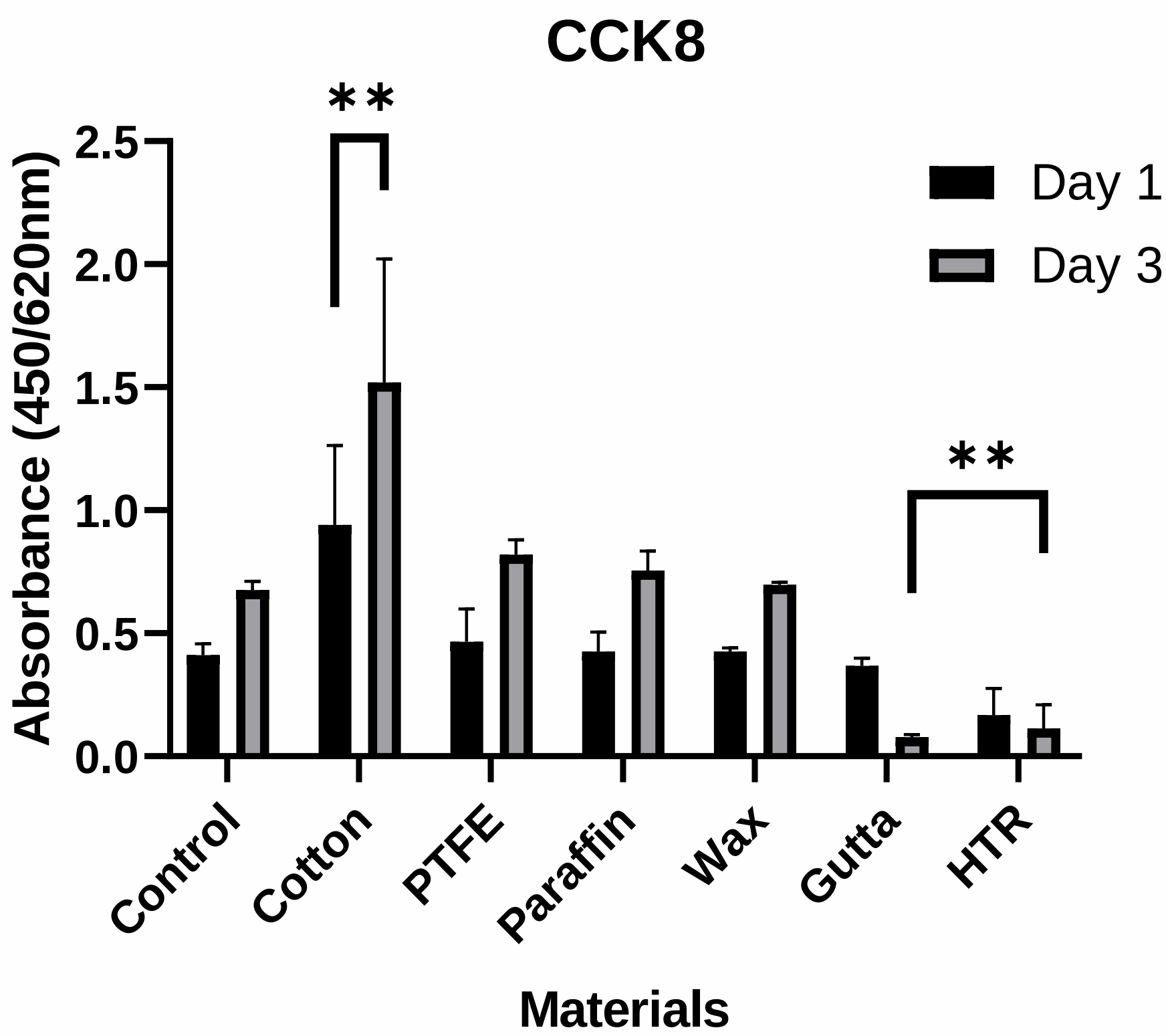
In two-piece dental implant systems, progressive colonization of periodontopathogen bacteria has been found in the space between implant components associated with peri-implant bone loss. Cotton has been the most widely used material for the sealing of the screw access hole because of its easy access, manipulation, and retrieval. However, it is also a reservoir for bacteria. The purpose of this study is to undertake an evaluation of the cytotoxicity and bacterial adhesion of potential materials for the screw access hole.

Materials and Methods:

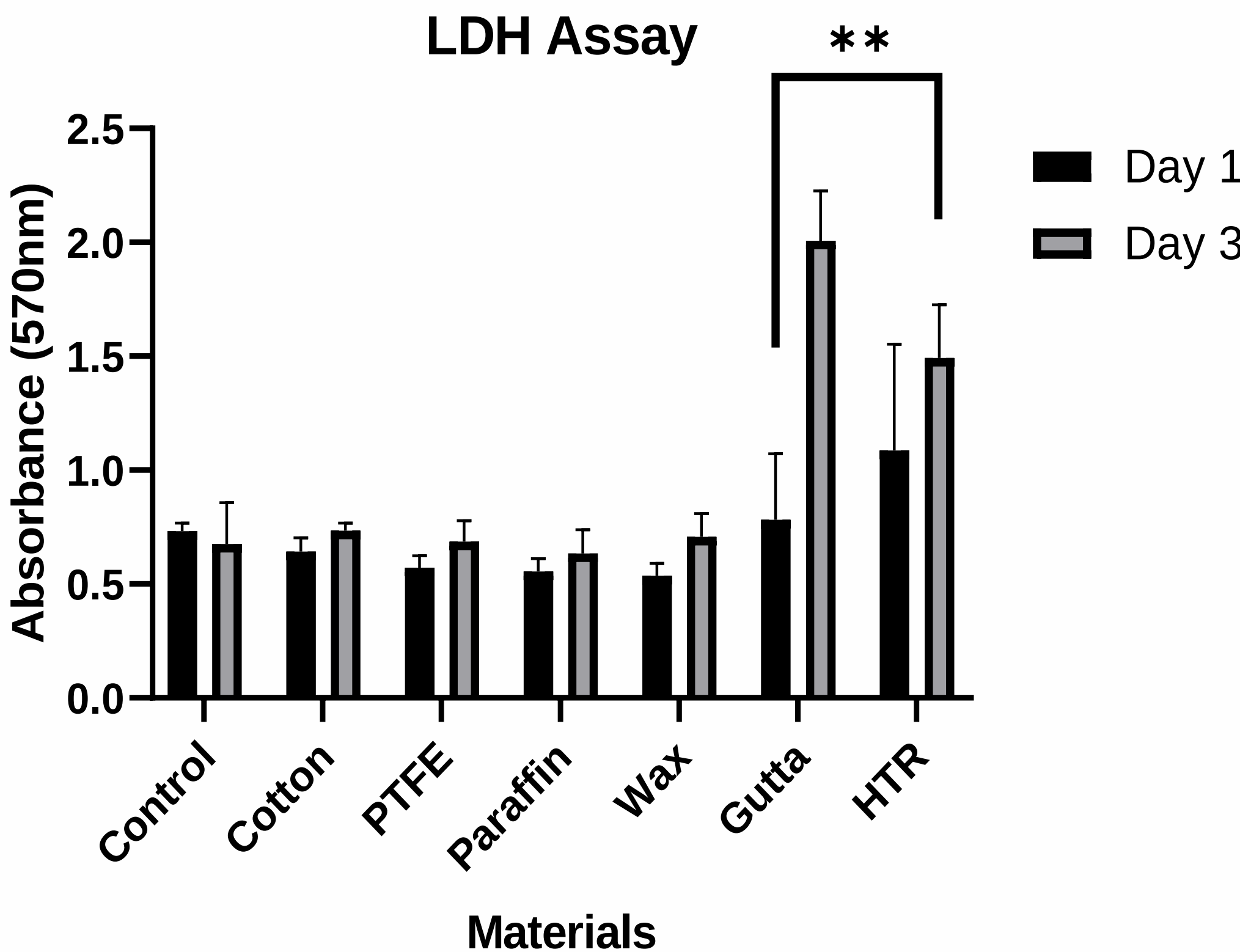
Cotton, Polytetrafluoroethylene (PTFE) Tape, Paraffin plastic film, Wax, Gutta Percha and Hydraulic temporary restorative (HTR) were the materials used for this study. An implant-abutment screw access hole was used to standardize the size of the materials. The materials were tested with Mouse gingival epithelial cells (GE-1) for the proliferation rate and cytotoxicity using Proliferation assay and LDH assay, respectively. *Porphyromonas gingivalis* was used for the analyzation of the pathogen adhesion to the materials.

Results:

1. The Proliferation assay results of PTFE, Paraffin film, and Wax showed no levels of toxicity compared to Cotton. There was a significant difference ($P<0.01$) for HTR and Gutta Percha indicating the lowest proliferation rate of the GE-1 cells compared to any other materials.



2. In consistency to the Proliferation assay, LDH assay of HTR and Gutta Percha was significant higher ($P<0.01$) in comparison to Cotton. Gutta Percha continued to show high levels of toxicity as the time period progressed from 24 hours to 72 hours.



3. Colony forming units per milliliter (CFU/mL) were counted to indicate the concentration of *Porphyromonas gingivalis* adhered onto each material. Cotton (control) showed a significantly higher concentration mean value of 4.4×10^5 CFU/mL. PTFE, Paraffin film and Wax indicated with a significantly lower CFU/mL count of 520, 42, and 180 CFU/mL, respectively.

	Bacterial Density (CFU/mL)					
Samples	Cotton	PTFE	Paraffin	Wax	HTR	Gutta Percha
1	541000	200	100	100	12200	2500
2	520000	1000	0	400	200	100
3	468000	0	10	0	1700	1000
4	254000	1000	0	100	700	300
5	457000	400	100	300	100	2000

Conclusion:

PTFE, Paraffin film, and Wax were significantly lower compared to Cotton, HTR and Gutta Percha in bacterial density, with Paraffin film being the best. Additionally, no levels of toxicity were present to the GE-1 cells. The potential use of PTFE, Paraffin film, and wax should be further investigated in clinical studies.