

Supplementary Information

Long-lasting Renewable Antibacterial Porous Polymeric Coatings Enable Titanium Biomaterials to Prevent and Treat Peri-implant Infection

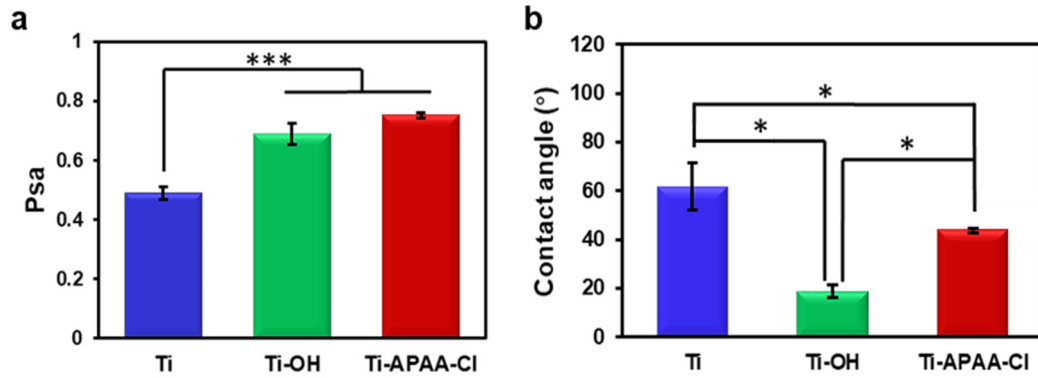
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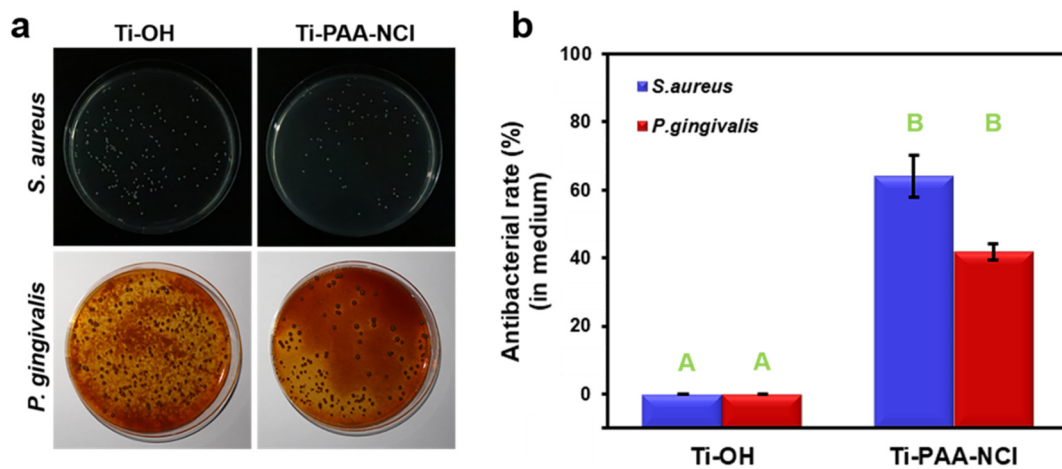
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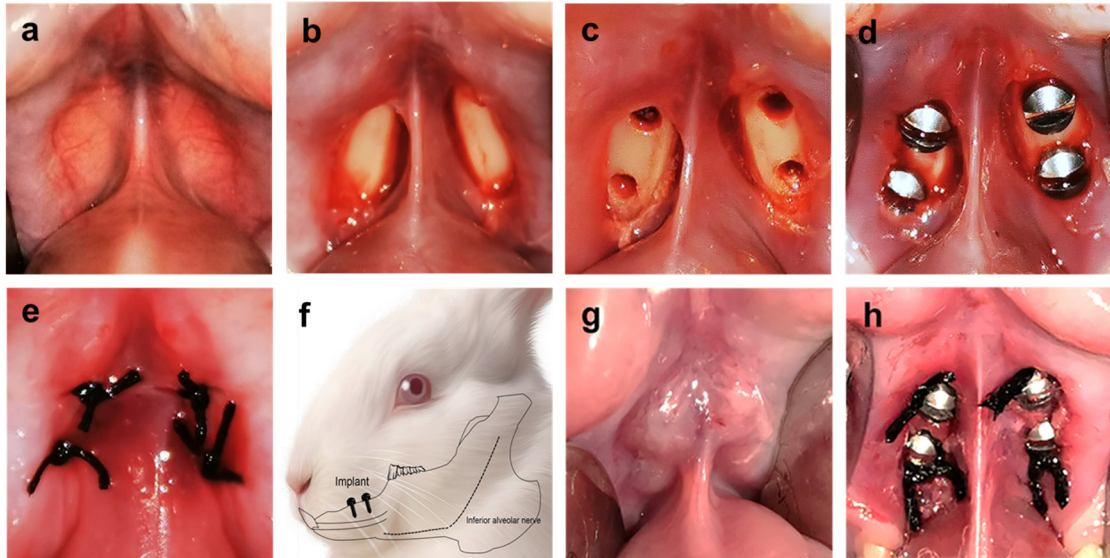
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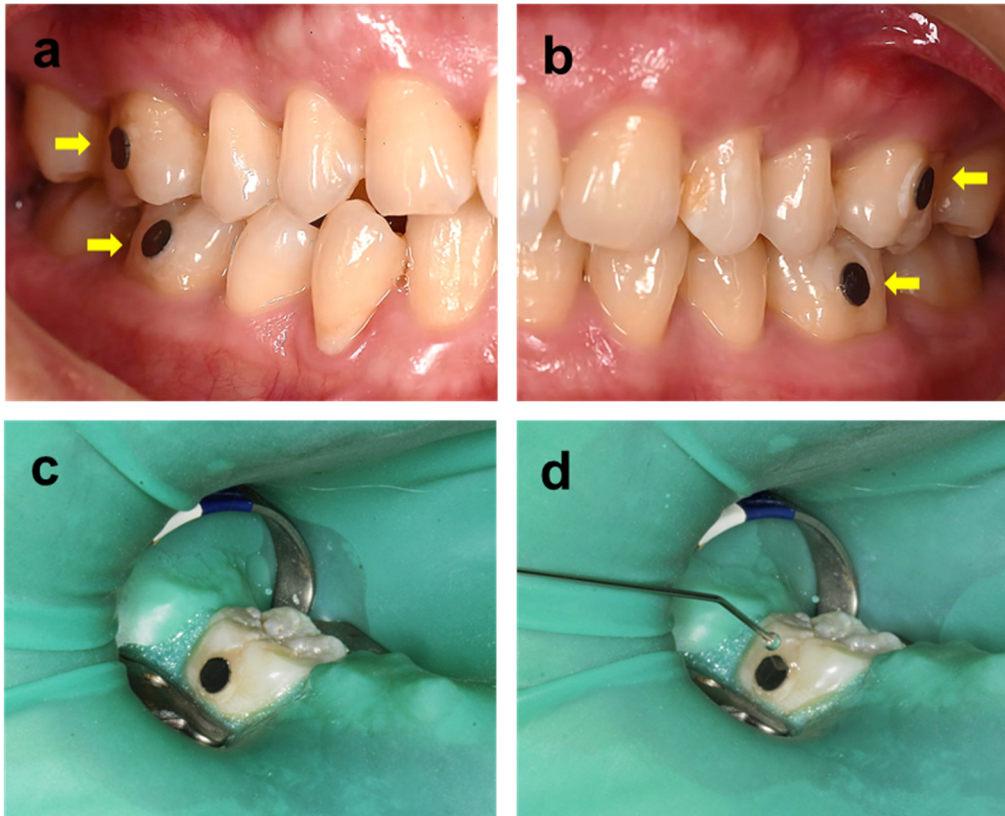
Supplementary Fig. 1 Roughness and water contact angle of Ti, Ti-OH and Ti-PAA-NCl. **a** Quantitative analysis of roughness ($n = 3$, $F = 61.626$ and $P < 0.001$ in one-way ANOVA, *** indicates $P < 0.001$ in Bonferroni test). **b** Quantitative analysis of water contact angle ($n = 3$; * indicates $P < 0.05$, Wilcoxon nonparametric test). All error bars = s.d.



Supplementary Fig. 2 **a** Images of bacterial colonies formed by *S. aureus* and *P. gingivalis* from culture medium treated with Ti-OH and Ti-PAA-NCl. **b** Antibacterial rates in medium against *S. aureus* and *P. gingivalis* treated with Ti-OH and Ti-PAA-NCl. Significant differences between Ti-OH and Ti-PAA-NCl are marked by different letters ($n = 3$; $P < 0.01$; Student's t test). Error bars = s.d.



Supplementary Fig. 3 Processes of *in vivo* animal experiment. a Rabbit's bilateral edentulous areas of mandible. b Incisions and exposures of implant sites. c Holes drilled for mini-implants. d Implantation of mini-implants. e Closing the incisions by suturing. f Schematic diagram of implantation positions. g Healing of implant sites after 4 weeks. h Silk ligatures placed around the neck of implants with ends left in oral cavity to introduce bacteria.



Supplementary Fig. 4 Processes of human intraoral experiment. a, b Bonding sites of tiny titanium disks (yellow arrows) on buccal surfaces of upper and lower first molars in volunteers' mouth. **c** Regional exposure of a tiny titanium disk with rubber dam and gum sealant for preparation of rechlorination. **d** Rechlorinating the coating by irrigating with NaOCl solution (5%, pH=7) for 15 min.

Supplementary Table 1 Inclusion criteria for patients with peri-implantitis

SN	Inclusion criteria
1	Obvious radiological evidence for vertical destruction of crestal bone
2	Vertical bone destruction associated with peri-implant pocket
3	Bleeding after gentle probing with blunt instrument
4	Tissues might or might not be swollen

Supplementary Table 2 Primer sequences used for RT-qPCR

Genes	Primers
OCN	Forward: 5'-GGACCATCTTTCTGCTCACTCTG-3'
	Reversed: 5'-TTCACCTACCTTATTGCCCTCCTG-3'
OPN	Forward: 5'-CTTTCACCTCCAATCGTCCCTAC-3'
	Reversed: 5'-CCTTAGACTCACCGCTCTTCAT-3'
RUNX2	Forward: 5'-AAGTGCGGTGCAAACCTTTCT-3'
	Reversed: 5'-TCTCGGTGGCTGGTAGTGA-3'
GAPDH	Forward: 5'-TCGGTGTGAACGGATTTGG-3'
	Reversed: 5'-TCTCCACTTTGCCACTGCA-3'