Supplementary file

1. Title

Effect of surface treatment on bonding strengths of hard and soft reline materials to 3D-printed denture base resin

2. Journal

Odontology

3. Authors

Hidemasa Shimpo, Mitsuki Masumoto, Shinji Sato, Chikahiro Ohkubo

4.Corresponding author

Name: Hidemasa Shimpo

Institution: Department of Oral Rehabilitation and Prosthodontics, School of Dental Medicine, Tsurumi University

Email: shinpo-hidemasa@tsurumi-u.ac.jp

Supplementary Table1: Tensile bond strength of HR

Values are presented as mean ± SD in MPa (n = 20 per group). Within each column, surface treatments that share at least one lowercase letter in brackets do not differ significantly. The pairwise comparisons used Welch's t-tests with Holm adjustment across all 96 surface-treatment comparisons in Supplementary Tables 1–4. The letters apply only to comparisons within the same column. TC0 = without thermal cycling, TC5000 = with thermal cycling, HC = conventional heat-polymerized denture base resin, 3DP = 3D-printed denture base resin, HR = hard reline material, AC1 and AC2 = acrylic-based soft reline materials, SI = silicone-based soft reline material

	TC0		TC5000	
	HC	3DP	HC	3DP
untreated	13.587 ± 3.479 [c]	4.884 ± 1.422 [c]	8.417 ± 3.675 [b]	2.954 ± 1.407 [b]
sandblasting	14.141 ± 3.775 [bc]	8.140 ± 2.840 [b]	9.609 ± 3.284 [ab]	7.903 ± 2.029 [a]
priming	21.786 ± 4.296 [a]	4.652 ± 2.170 [c]	14.514 ± 5.306 [a]	6.862 ± 2.806 [a]
4-META	18.613 ± 4.280 [ab]	12.522 ± 3.436 [a]	14.424 ± 5.100 [a]	9.415 ± 4.147 [a]
Welch F	18.412	33.366	9.985	36.809
Denominator df	42.068	40.045	41.481	39.865

Supplementary Table2: Tensile bond strength of AC1

Values are presented as mean ± SD in MPa (n = 20 per group). Within each column, surface treatments that share at least one lowercase letter in brackets do not differ significantly.

	TC0		TC5000	
	HC	3DP	HC	3DP
untreated	0.838 ± 0.207 [b]	0.345 ± 0.142 [c]	0.967 ± 0.467 [b]	0.396 ± 0.221 [c]
sandblasting	0.959 ± 0.212 [b]	0.796 ± 0.193 [b]	1.015 ± 0.444 [b]	0.848 ± 0.282 [b]
priming	1.483 ± 0.371 [a]	0.388 ± 0.192 [c]	1.219 ± 0.454 [ab]	0.528 ± 0.365 [bc]
4-META	1.536 ± 0.515 [a]	1.290 ± 0.250 [a]	1.776 ± 0.625 [a]	1.406 ± 0.411 [a]
Welch F	22.057	84.125	8.148	34.218
Denominator df	40.512	41.442	41.964	41.125

Supplementary Table3: Tensile bond strength of AC2

Values are presented as mean ± SD in MPa (n = 20 per group). Within each column, surface treatments that share at least one lowercase letter in brackets do not differ significantly.

	TC0		TC5000	
	HC	3DP	HC	3DP
untreated	0.830 ± 0.074 [b]	0.698 ± 0.187 [b]	0.551 ± 0.250 [c]	0.672 ± 0.311 [bc]
sandblasting	1.109 ± 0.173 [a]	1.074 ± 0.193 [a]	0.843 ± 0.366 [bc]	1.072 ± 0.459 [ab]
priming	1.068 ± 0.346 [ab]	0.711 ± 0.203 [b]	1.108 ± 0.432 [ab]	0.450 ± 0.284 [c]
4-META	1.115 ± 0.409 [ab]	1.346 ± 0.413 [a]	1.344 ± 0.494 [a]	1.343 ± 0.380 [a]
Welch F	18.202	25.218	17.612	26.333
Denominator df	35.815	41.391	40.776	41.676

Supplementary Table4: Tensile bond strength of SI

Values are presented as mean ± SD in MPa (n = 20 per group). Within each column, surface treatments that share at least one lowercase letter in brackets do not differ significantly.

	TC0		TC5000	
	HC	3DP	HC	3DP
untreated	0.530 ± 0.225 [a]	0.297 ± 0.117 [a]	0.150 ± 0.087 [a]	0.168 ± 0.075 [a]
sandblasting	0.301 ± 0.097 [b]	0.330 ± 0.122 [a]	0.135 ± 0.065 [a]	0.143 ± 0.086 [a]
priming	0.317 ± 0.124 [b]	0.255 ± 0.090 [a]	0.170 ± 0.086 [a]	0.134 ± 0.063 [a]
4-META	0.547 ± 0.210 [a]	0.285 ± 0.083 [a]	0.159 ± 0.088 [a]	0.190 ± 0.083 [a]
Welch F	11.916	1.693	0.786	2.111
Denominator df	40.273	41.742	41.854	41.895

Supplementary Table5: Comparisons among reline materials bonded to HC

Values are presented as mean ± SD in MPa (n = 20 per group). Within each row, reline materials that share at least one lowercase letter in brackets do not differ significantly. The pairwise comparisons used Welch's t-tests with Holm adjustment across all 96 reline-material comparisons in Supplementary Tables 5 and 6. The letters apply only to comparisons within the same row

		HR	AC1	AC2	SI	Welch F	Denominator df
TC0	untreated	13.587 ± 3.479 [a]	0.838 ± 0.207 [b]	0.830 ± 0.074 [b]	0.530 ± 0.225 [c]	97.157	35.532
	sandblasting	14.141 ± 3.775 [a]	0.959 ± 0.212 [b]	1.109 ± 0.173 [b]	0.301 ± 0.097 [c]	216.538	38.132
	priming	21.786 ± 4.296 [a]	1.483 ± 0.371 [b]	1.068 ± 0.346 [c]	0.317 ± 0.124 [d]	234.350	35.592
	4-META	18.613 ± 4.280 [a]	1.536 ± 0.515 [b]	1.115 ± 0.409 [b]	0.547 ± 0.210 [c]	137.858	37.468
TC5000	untreated	8.417 ± 3.675 [a]	0.967 ± 0.467 [b]	0.551 ± 0.250 [c]	0.150 ± 0.087 [d]	63.691	34.408
	sandblasting	9.609 ± 3.284 [a]	1.015 ± 0.444 [b]	0.843 ± 0.366 [b]	0.135 ± 0.065 [c]	99.618	32.735
	priming	14.514 ± 5.306 [a]	1.219 ± 0.454 [b]	1.108 ± 0.432 [b]	0.170 ± 0.086 [c]	106.231	33.141
	4-META	14.424 ± 5.100 [a]	1.776 ± 0.625 [b]	1.344 ± 0.494 [b]	0.159 ± 0.088 [c]	125.550	32.693

Supplementary Table6: Comparisons among reline materials bonded to 3DP

Values are presented as mean ± SD in MPa (n = 20 per group). Within each row, reline materials that share at least one lowercase letter in brackets do not differ significantly

		HR	AC1	AC2	SI	Welch F	Denominator df
TC0	untreated	4.884 ± 1.422 [a]	0.345 ± 0.142 [c]	0.698 ± 0.187 [b]	0.297 ± 0.117 [c]	86.455	40.034
	sandblasting	8.140 ± 2.840 [a]	0.796 ± 0.193 [c]	1.074 ± 0.193 [b]	0.330 ± 0.122 [d]	122.210	39.467
	priming	4.652 ± 2.170 [a]	0.388 ± 0.192 [c]	0.711 ± 0.203 [b]	0.255 ± 0.090 [c]	53.081	37.419
	4-META	12.522 ± 3.436 [a]	1.290 ± 0.250 [b]	1.346 ± 0.413 [b]	0.285 ± 0.083 [c]	206.041	34.376
TC5000	untreated	2.954 ± 1.407 [a]	0.396 ± 0.221 [c]	0.672 ± 0.311 [b]	0.168 ± 0.075 [d]	45.045	34.708
	sandblasting	7.903 ± 2.029 [a]	0.848 ± 0.282 [b]	1.072 ± 0.459 [b]	0.143 ± 0.086 [c]	150.430	34.029
	priming	6.862 ± 2.806 [a]	0.528 ± 0.365 [b]	0.450 ± 0.284 [b]	0.134 ± 0.063 [c]	50.808	33.181
	4-META	9.415 ± 4.147 [a]	1.406 ± 0.411 [b]	1.343 ± 0.380 [b]	0.190 ± 0.083 [c]	137.066	33.382