

ORIGINAL RESEARCH ARTICLE

Technique sensitivity hampers outcomes in periodontal regeneration when performed by less experienced operators: A retrospective analysis

Supplementary File

Table S1. Minimally invasive flap inter-groups' sub-analysis

Group	Outcome		
	Mean change (%)	<i>p</i> -value	Power
Tooth loss			
MPPF (<i>n</i> =12, 30.0%)	16.67	0.973	0.05
PPF (<i>n</i> =7, 17.5%)	20.0	0.973	0.05
SPPF (<i>n</i> =21, 52.5%)	20.0	0.973	0.05
Clinical attachment level			
MPPF (<i>n</i> =12, 30.0%)	2.0	0.118	0.56
PPF (<i>n</i> =7, 17.5%)	-1.6	0.118	0.56
SPPF (<i>n</i> =21, 52.5%)	0.2	0.118	0.56
Probing depth			
MPPF (<i>n</i> =12, 30.0%)	1.42	0.8458	0.09
PPF (<i>n</i> =7, 17.5%)	1.6	0.8458	0.09
SPPF (<i>n</i> =21, 52.5%)	1.87	0.8458	0.09
Bleeding on probing			
MPPF (<i>n</i> =12, 30.0%)	27.27	0.673	0.05
PPF (<i>n</i> =7, 17.5%)	0.0	0.673	0.05
SPPF (<i>n</i> =21, 52.5%)	22.22	0.673	0.05

Abbreviations: MPPF: Modified papilla preservation flap; PPF: Papilla preservation flap; SPPF: Simplified papilla flap.

Table S2. Homogeneity of the groups at the patient's level and the tooth's level

Level	<i>p</i> -value
Patient	
Sex	0.632
Age	0.816
Diabetes mellitus	0.145
Smoking	0.575
Number of cigarettes	0.253
Periodontal staging	0.889
Periodontal grading	0.351
Follow-up visits	0.369
Tooth	
Tooth type	<0.001***
Tooth location in the arch	0.003**
Number of walls	0.044*
Defect depth	0.987
Defect width	0.085
Resident	0.421
The use of membrane	0.008**
The use of bone graft	0.531
Bone graft type	0.743
The use of biologics	0.837
The use of antibiotics	0.039*
Initial tooth mobility	0.212
Initial BOP	0.805
Initial PD	0.169
Initial CAL	0.060
Initial furcation degree	0.029*
Initial KT width	0.011*
Number of furcation	<0.001***
Number of maintenance/ year	0.226

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Abbreviations: BOP: Bleeding on Probing; CAL: Clinical attachment level; KT: Keratinized tissue; PD: Probing depth.

Table S3. Clinical attachment level gain (T0–T1) by independent factors and covariates

Factors	β	95% CI	p-value
Group			
CF	0		
MIF	-1.58	-2.88–-0.27	0.018*
Gender			
Male	0		
Female	-0.14	-1.26–0.98	0.807
Age	-0.01	-0.05–0.03	0.593
Diabetes			
No	0		
Yes	1.12	-0.99–3.22	0.300
Smoking			0.278
No	0		
Former	-0.27	-1.85–1.32	0.743
Current	-0.91	-2.04–0.22	0.113
No. of cigarettes			
<10	0		
>10	0.15	-1.32–1.63	0.838
Stage			0.049*
2	0		
3	2.48	-0.04–4.92	0.046*
4	3.30	-0.65–5.95	0.015*
Grade			0.288
A	0		
B	0.40	-0.98–1.77	0.575
C	-0.63	-2.10–0.85	0.406
Position			0.597
Anterior	0		
Premolar	0.00	-1.81–1.81	1.000
Molar	-0.57	-2.27–1.12	0.507

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Table S3. (Continued)

Factors	β	95% CI	p-value
Arch			
Maxilla	0		
Mandible	-0.14	-1.26–0.98	0.814
No. of walls			0.059
1	0		
2	-0.97	-2.89–0.95	0.322
3	-2.25	-4.21–0.28	0.025*
Defect depth	-0.32	-0.50–0.14	0.001**
Defect width	-0.51	-1.18–0.17	0.141
Resident level			0.381
R1	0		
R2	-0.80	-2.23–0.62	0.269
R3	-1.04	-2.58–0.50	0.185
Antibiotics			
No	0		
Yes	-1.17	-2.28–0.07	0.038*
Mobility			0.162
0	0		
1	0.58	-0.69–1.85	0.368
≥2	0.77	-0.02–1.56	0.056
No. of furcation			
0	0		
≥1	-0.58	-1.58–0.42	0.254
Follow-up	-0.01	-0.02–0.02	0.771
No. of maintenance/year	0.27	-0.21–0.75	0.263
Clinical attachment level T0	0.73	0.54–0.91	<0.001***

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T0 refers to the 1st time point. Abbreviations: CF: Conventional flap; CI: Confidence interval; MIF: Minimally invasive flap.

Table S4. Bleeding on probing at T1 by independent factors and covariates

Factor	OR	95% CI	p-value
Group			
CF	1		
MIF	3.27	1.41–7.62	0.006**
Gender			
Male	1		
Female	1.14	0.51–2.57	0.745
Age	0.99	0.96–1.02	0.529
Diabetes			
No	1		
Yes	0.73	0.19–2.80	0.648
Smoking			0.644
No	1		
Former	0.58	0.16–2.10	0.409
Current	1.14	0.42–3.07	0.794
No. of cigarettes			
<10	1		
>10	2.93	0.70–12.3	0.141
Stage			0.092
2	1		
3	0.26	0.03–2.45	0.241
4	0.04	0.00–0.76	0.033*
Grade			0.811
A	1		
B	0.70	0.23–2.10	0.526
C	0.82	0.27–2.53	0.727
Position			0.866
Anterior	1		
Premolar	0.96	0.21–4.38	0.962
Molar	0.78	0.22–2.75	0.698

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Table S4. (Continued)

Factor	OR	95% CI	p-value
Arch			
Maxilla	1		
Mandible	0.74	0.34–1.60	0.444
No. of walls			0.851
1	1		
2	1.36	0.34–5.45	0.667
3	1.30	0.37–4.57	0.679
Defect depth	1.07	0.87–1.31	0.542
Defect width	1.20	0.81–1.78	0.361
Resident level			0.693
R1	1		
R2	0.69	0.20–2.41	0.565
R3	0.58	0.17–2.02	0.392
Antibiotics			
No	1		
Yes	5.34	2.01–14.2	0.001**
Mobility			0.440
0	1		
1	1.91	0.71–5.16	0.200
≥2	1.15	0.16–8.39	0.892
No. of furcation			
0	1		
≥1	2.38	1.00–5.64	0.049*
Follow-up	0.99	0.98–1.01	0.455
No. of maintenance/ year	1.11	0.79–1.58	0.546
Bleeding on probing T0			
No	1		
Yes	1.70	0.67–4.33	0.269

Notes: * $p < 0.05$; ** $p < 0.01$. T0 refers to the 1st time point. Abbreviations: CF: Conventional flap; CI: Confidence interval; MIF: Minimally invasive flap; OR: Odds ratio.

Table S5. Bleeding on probing at T1 by independent factors and covariates

Factor	OR	95% CI	<i>p</i> -value
Group			
CF	1		
MIF	4.06	1.02–16.2	0.047*
Stage			
2	1		0.166
3	0.37	0.04–3.02	0.350
4	0.06	0.00–1.26	0.069
Position			
Anterior	1		0.676
Premolar	0.59	0.11–3.17	0.591
Molar	0.57	0.15–2.19	0.412
Arch			
Maxilla	1		
Mandible	0.88	0.34–2.26	0.789
No. of walls			
1	1		0.457
2	0.38	0.07–2.02	0.256
3	0.59	0.14–2.47	0.472
Pericardium	1.13	0.13–9.70	0.912
Antibiotics			
No	1		
Yes	2.89	0.78–10.8	0.114
No. of furcation			
0	1		
≥1	4.84	1.27–18.4	0.021*
Keratinized tissue T0			
No	1		
Yes	1.47	0.45–4.84	0.526

Notes: * $p < 0.05$. T0 refers to the 1st time point.

Abbreviations: CF: Conventional flap; CI: Confidence interval;

MIF: Minimally invasive flap; OR: Odds ratio.

Table S6. Recession at T1 by independent factors and covariates

Factor	β	95% CI	<i>p</i> -value
Group			
CF	0		
MIF	0.56	-0.11-1.23	0.101
Gender			
Male	0		
Female	0.05	-0.67-0.76	0.900
Age	0.03	0.00-0.05	0.020*
Diabetes			
No	0		
Yes	0.56	-0.53-1.65	0.315
Smoking			0.284
No	0		
Former	0.21	-0.67-1.09	0.638
Current	0.64	-0.15-1.44	0.113
No. of cigarettes			
<10	0		
>10	0.62	-0.38-1.62	0.226
Stage			0.929
2	0		
3	-0.15	-1.25-0.95	0.786
4	0.11	-1.89-2.11	0.916
Grade			0.524
A	0		
B	-0.18	-1.37-1.02	0.769
C	0.24	-1.01-1.84	0.708
Position			0.334
Anterior	0		
Premolar	0.07	-0.66-0.80	0.848
Molar	-0.46	-1.17-0.25	0.202
Arch			
Maxilla	0		
Mandible	-0.23	-0.89-0.43	0.498
No. of walls			0.549
1	0		
2	0.41	-0.40-1.21	0.321
3	-0.05	-0.80-0.70	0.899

(Cont'd...)

Table S6. (Continued)

Factor	β	95% CI	<i>p</i> -value
Defect depth	-0.07	-0.16-0.02	0.136
Defect width	0.08	-0.09-0.25	0.351
Resident level			0.683
R1	0		
R2	-0.32	-1.69-1.05	0.645
R3	-0.53	-1.91-0.84	0.448
Membrane			0.492
Collagen	0		
AMC	-0.02	-0.84-0.80	0.963
Pericardium	-0.59	-1.59-0.40	0.242
Bone graft type			0.429
Puros	0	6	
Auto	0.15	-0.63-0.92	0.702
Bio-Oss	0.10	-1.30-1.51	0.886
DFDBA	-0.45	-1.30-0.39	0.295
LifeNet	0.60	-0.33-1.53	0.203
Biologics			
No	0		
Yes	1.16	0.42-1.91	0.002**
Antibiotics			
No	0		
Yes	0.06	-0.73-0.85	0.886
Mobility			0.363
0	0		
1	0.27	-0.71-1.24	0.591
≥2	-0.60	-1.57-0.37	0.226
No. of furcation			
0	0		
≥1	-0.08	-0.81-0.66	0.834
Follow-up	0.01	0.00-0.02	0.060
No. of maintenance/ year	0.05	-0.27-0.38	0.772

Notes: **p*<0.05; ***p*<0.01. T1 refers to the 2nd time point. Abbreviations: ACM: Amnion-chorion membrane; CF: Conventional flap; CI: Confidence interval; DFDBA: Demineralized freeze-dried bone allograft; MIF: Minimally invasive flap.

Table S7. Recession at T1 by independent factors and covariates

Factor	β	95% CI	<i>p</i> -value
Group			
CF	0		
MIF	0.45	-0.48-1.38	0.345
Age	0.02	-0.01-0.05	0.110
Position			0.640
Anterior	0		
Premolar	0.15	-0.59-0.88	0.698
Molar	-0.28	-1.35-0.80	0.617
Arch			
Maxilla	0		
Mandible	0.02	-0.89-0.92	0.974
No. of walls			0.958
1	0		
2	-0.10	-0.80-0.59	0.770
3	-0.02	-0.67-0.62	0.941
Membrane			0.271
Collagen	0		
AMC	-0.45	-1.04-0.15	0.138
Pericardium	-0.39	-1.22-0.45	0.368
Biologics			
No	0		
Yes	1.32	0.75-1.89	< 0.001***
Antibiotics			
No	0		
Yes	-0.11	-1.07-0.85	0.820
No. of furcation			
0	0		
≥ 1	0.24	-0.93-1.40	0.689
Follow-up	0.01	0.00-0.02	0.157
Keratinized tissue T0			
No	0		
Yes	-0.27	-1.07-0.53	0.506

Notes: *** $p < 0.001$. T0 refers to the 1st time point.

Abbreviations: AMC: Amnion-chorion membrane; CF: Conventional flap; CI: Confidence interval; MIF: Minimally invasive flap.

Table S8. Probing depth reduction (T0–T1) by independent factors and covariates

Factor	β	95% CI	<i>p</i> -value
Group			
CF	0		
MIF	-0.53	-1.33–0.27	0.195
Gender			
Male	0		
Female	-0.03	-0.83–0.77	0.938
Age	-0.01	-0.04–0.01	0.314
Diabetes			
No	0		
Yes	-0.19	-1.62–1.24	0.796
Smoking			0.650
No	0		
Former	0.29	-0.91–1.49	0.637
Current	-0.31	-1.22–0.61	0.513
No. of cigarettes			
<10	0		
>10	0.08	-1.21–1.38	0.902
Stage			0.003**
2	0		
3	2.44	1.02–3.87	0.001**
4	2.70	0.93–4.47	0.003**
Grade			0.152
A	0		
B	1.02	-0.03–2.07	0.056
C	0.53	-0.52–1.58	0.325
Position			0.253
Anterior	0		
Premolar	-0.91	-2.43–0.62	0.242

(Cont'd...)

Table S8. (Continued)

Factor	β	95% CI	<i>p</i> -value
Molar	-1.14	-2.51–0.22	0.100
Arch			
Maxilla	0		
Mandible	0.05	-0.75–0.85	0.902
No. of walls			0.158
1	0		
2	-0.57	-1.90–0.76	0.398
3	-1.20	-2.50–0.11	0.072
Defect depth	-0.28	-0.43–0.12	0.001**
Defect width	-0.27	-0.50–0.04	0.020*
Resident level			0.836
R1	0		
R2	-0.06	-1.18–1.05	0.910
R3	-0.33	-1.61–0.94	0.607
Antibiotics			
No	0		
Yes	-0.73	-1.61–0.15	0.103
Mobility			0.433
0	0		
1	0.08	-0.78–0.95	0.852
≥2	1.13	-0.58–2.85	0.196
No. of furcation			
0	0		
≥1	-0.79	-1.68–0.11	0.084
Follow-up	0.00	-0.01–0.01	0.922
No. of maintenance/year	0.02	-0.31–0.35	0.904
Probing depth T0	0.65	0.43–0.88	<0.001***

Notes: **p*<0.05; ***p*<0.01; ****p*<0.001. T0 refers to the 1st time point. Abbreviations: CF: Conventional flap; CI: Confidence interval; MIF: Minimally invasive flap.