

Distal healing after extraction of impacted third mandibular molars in young adults



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Aims

This study analyzes the clinical and radiographic response of preoperative periodontal defects in the distal aspect of second mandibular molars (M2), following the extraction of impacted third mandibular molars (M3), in young adults

- estimate the prevalence of periodontal defects on the distal aspect of the M2
- characterize the types and the localization of those periodontal defects
- describe the periodontal healing through the post-operative assessments of 3, 6, 12 months

Materials and Methods

- **Prospective clinical study (12 months)**
- **22 young healthy patients (16-35 years; 21.03 ± 4.51 years); n = 37**

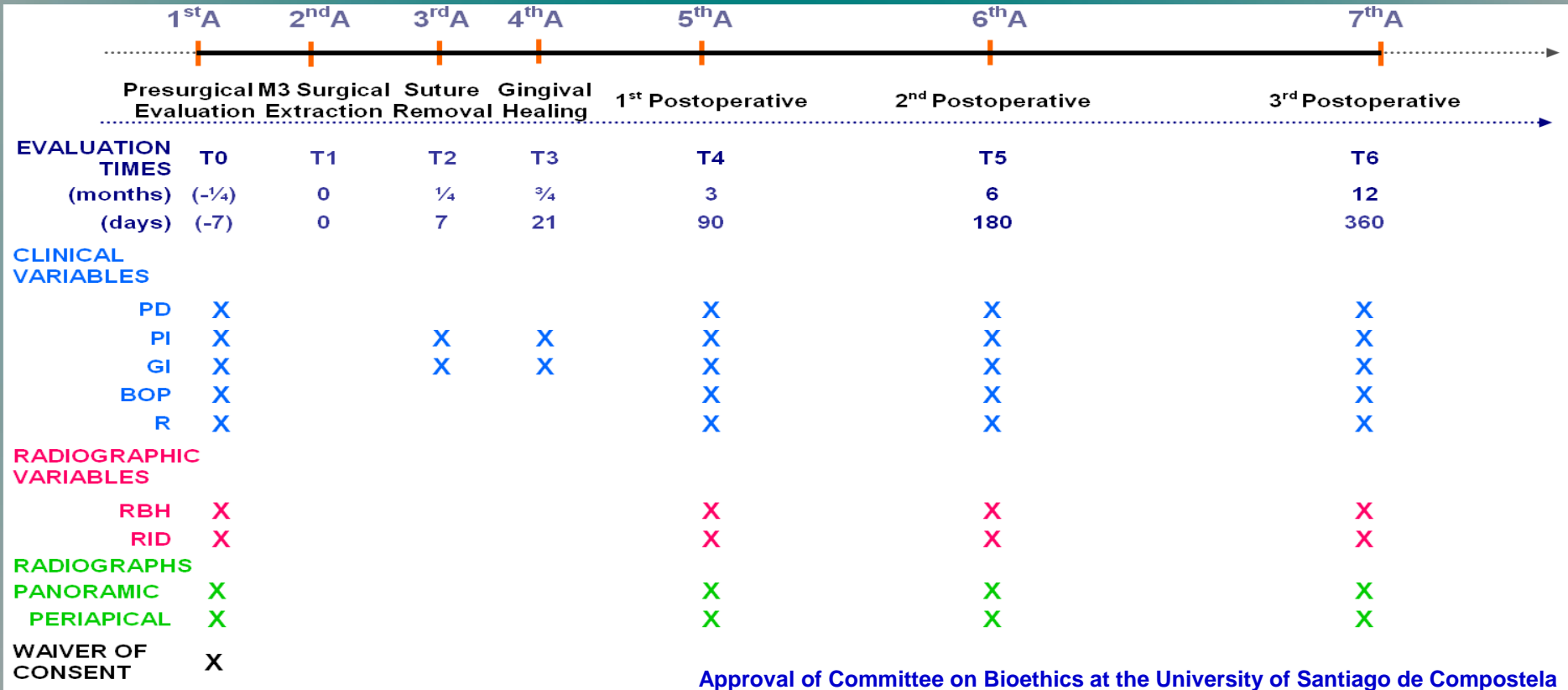
Inclusion criteria:

- Higher-risk periodontal, asymptomatic and impacted M3, completely covered by mucosa

Exclusion criteria:

- systemic or dental diseases
- medication (except oral contraceptives) or pre-treatment in the last 6 months
- smoking >10 cigarettes/day
- healing complications (at 21 days): absence of epithelialization, dehiscence and alveolitis

Materials and Methods



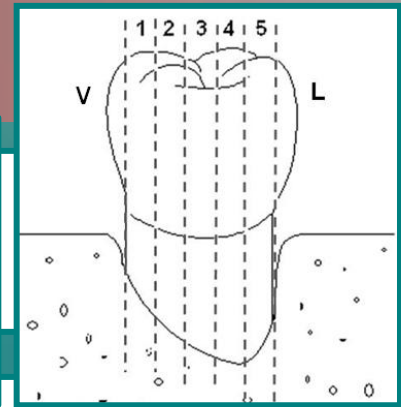
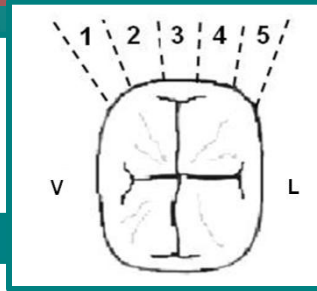
Approval of Committee on Bioethics at the University of Santiago de Compostela

Figure 1. Diagram protocol study; PD – Probing Depth; PI – Plaque Index; GI – Gingival Index; BOP – Bleeding on Probing; R – Recession; RBH – Radiographic Bone Height; RID – Radiographic Infrabony Defects; A – Assessment.

Materials and Methods

Probing Depth (PD)

- Selection of the deepest probing depth point



Radiographic Variables

- Paralleling radiographic technique with a modified device (Faria-Inocencio & Gallas-Torreira, 2011)

Radiographic Bone Height (RBH)

from RA - periodontal probe tip = bone longitude

Radiographic Infrabony Defect (RID)

from CEJ - periodontal probe tip

RID \leq 1mm weren't considered as true RID

RID \leq 3mm
 $4\text{mm} \leq$ RID \leq 5 mm
RID \geq 6mm

Bone Loss (BL)

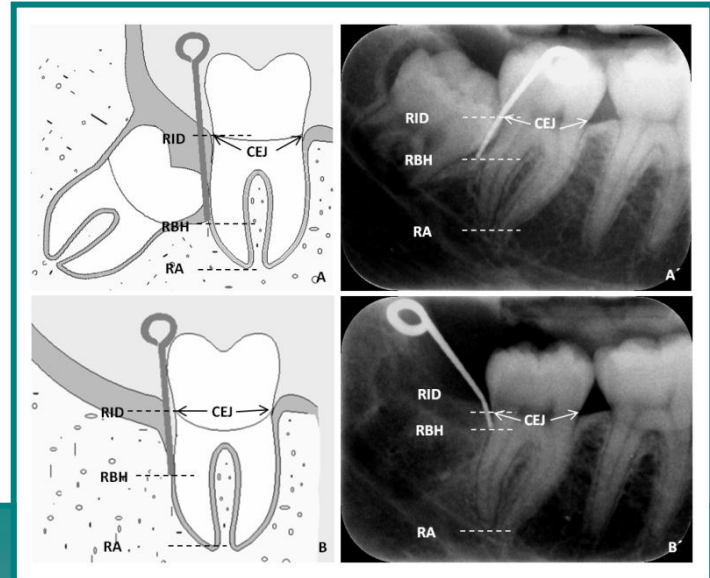
dividing distance RA - CEJ into thirds

Without BL: up to 1mm bellow CEJ

Slight: first $\frac{1}{3}$

Moderate: $\frac{2}{3}$

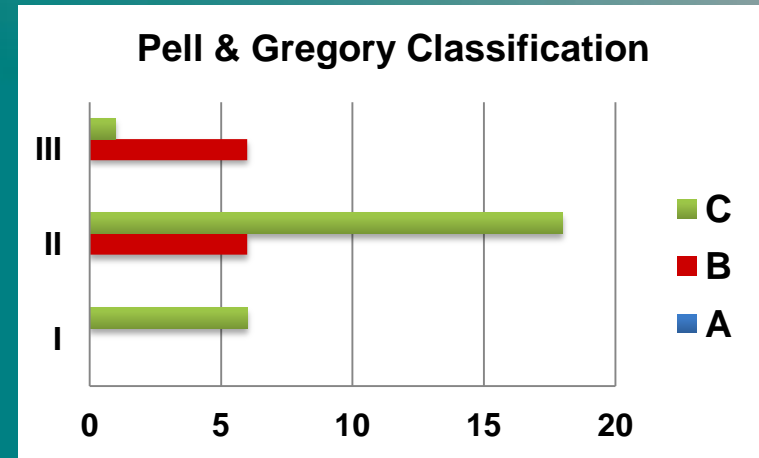
Severe: last $\frac{1}{3}$



Results

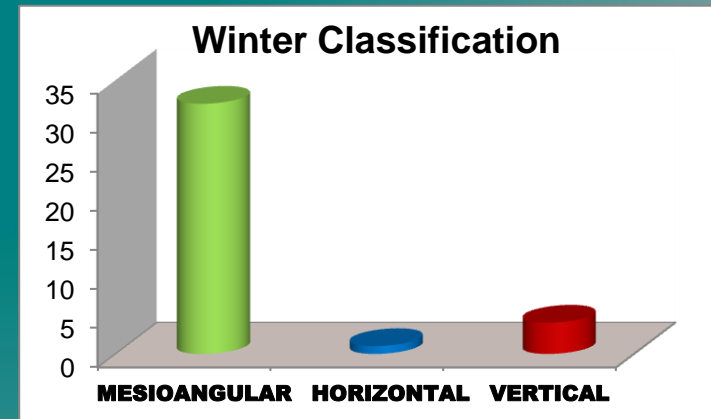
STUDY SAMPLE n = 37

PELL & GREGORY CLASIFICACION	A	B	C	TOTAL
I	—	—	6 16.2%	6 16.2%
II	—	6 16.2%	18 48.6%	24 64.9%
III	—	6 16.2%	1 2.8%	7 18.9%
TOTAL	—	12 32.4%	25 67.6%	37 100.0%



WINTER CLASSIFICATION		
HORIZONTAL	2	5.4%
VERTICAL	4	10.8%
MESIOVERSION	31	83.8%
DISTOVERSIÓN	—	—
TOTAL	37	100%

MEAN ANGULATION = 32.51 ± 12.44°



Results

Data over time:

Variables	Assessments (months)	Mean (mm)	s. d. (mm)	Differences between different assessments (mm)	s. d. (mm)	p value
PD	0	8.23	2.34	-3.88***	2.75	0.000
	3	4.35	1.81	-0.54*	1.58	0.043
	6	3.81	1.65	-0.04	1.59	0.308
	12	3.77	1.28	-4.46***	2.72	0.000
RID	0	4.54	1.87	-1.40***	2.00	0.000
	3	3.14	1.74	-0.56**	1.19	0.013
	6	2.59	1.85	-0.81***	1.20	0.000
	12	1.78	1.65	-2.76***	2.36	0.000
RBH	0	8.77	2.25	1.29**	2.01	0.002
	3	10.05	1.78	0.88***	1.09	0.000
	6	10.96	1.61	0.70**	1.48	0.003
	12	11.62	1.75	2.87***	2.68	0.000

Repeated Measures ANOVA Test (n=26): *p<0.05; **p<0.01; ***p<0.001

For all sites, at 12 months:

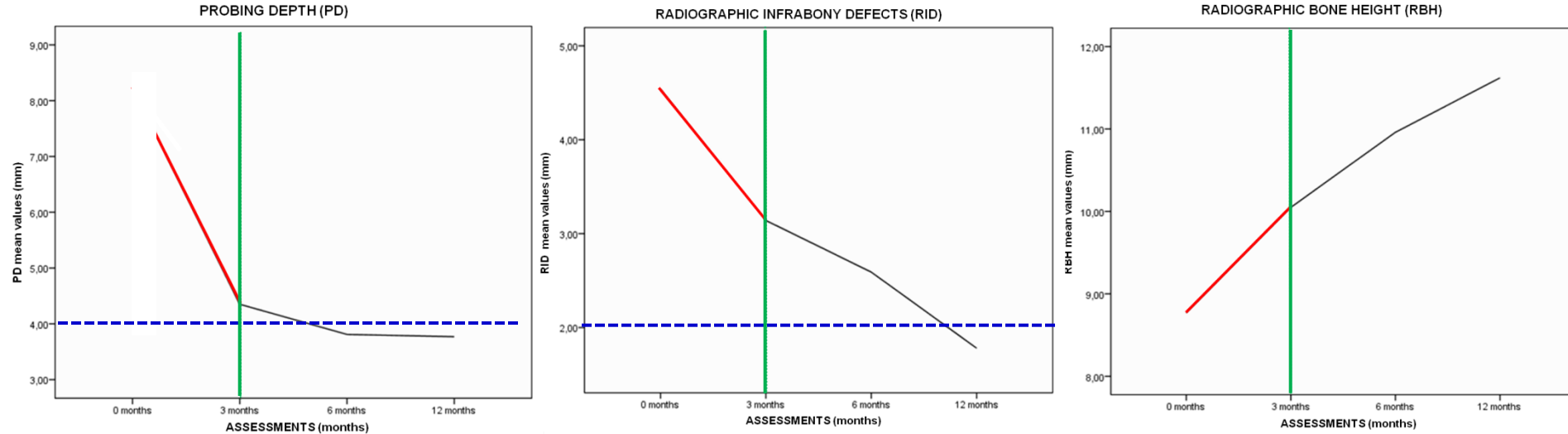
PD mean recovery: 4.46 ± 0.53 ($p < 0.001$) with PD changes ≥ 4 mm (clinically significant)

Bone mean recovery: 2.80 ± 2.36 mm ($p < 0.001$) with Osseous Changes ≥ 2 mm (clinically significant)

Cut-point of periodontal healing: 3 months

Results

Analyzing the data over time, for all continuous variables:




Periodontal healing is gradual along a 12-month evaluation

Final mean values considered to be healthy: PD < 4mm and RID < 2mm

Cut-point of periodontal healing: 3 months

Results

Analyzing PD by every deepest site, over time:

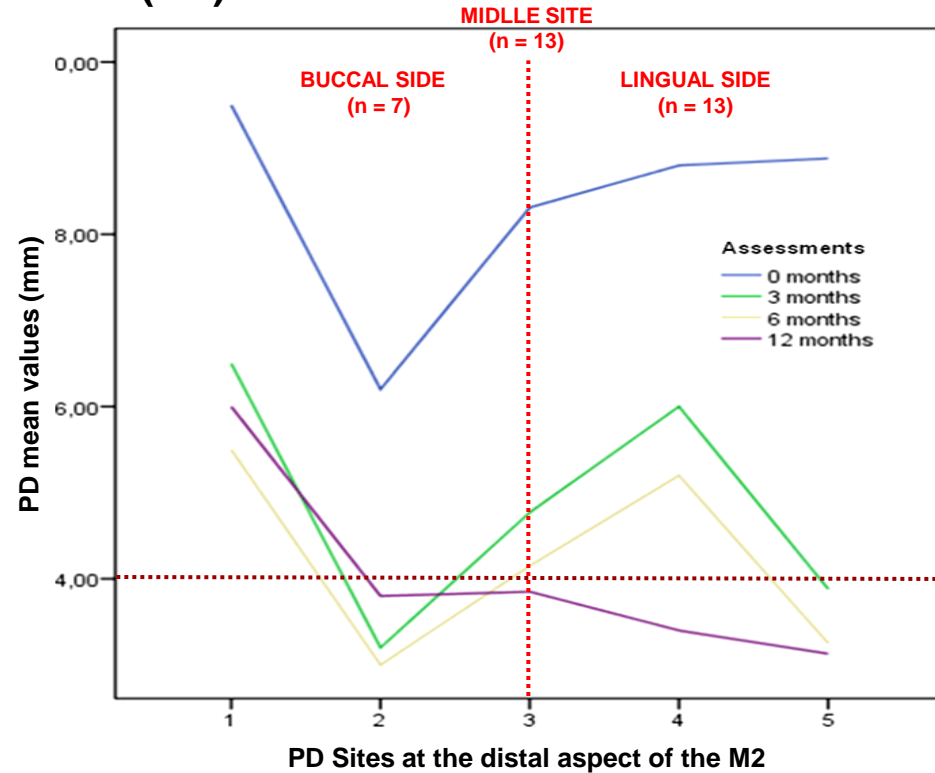
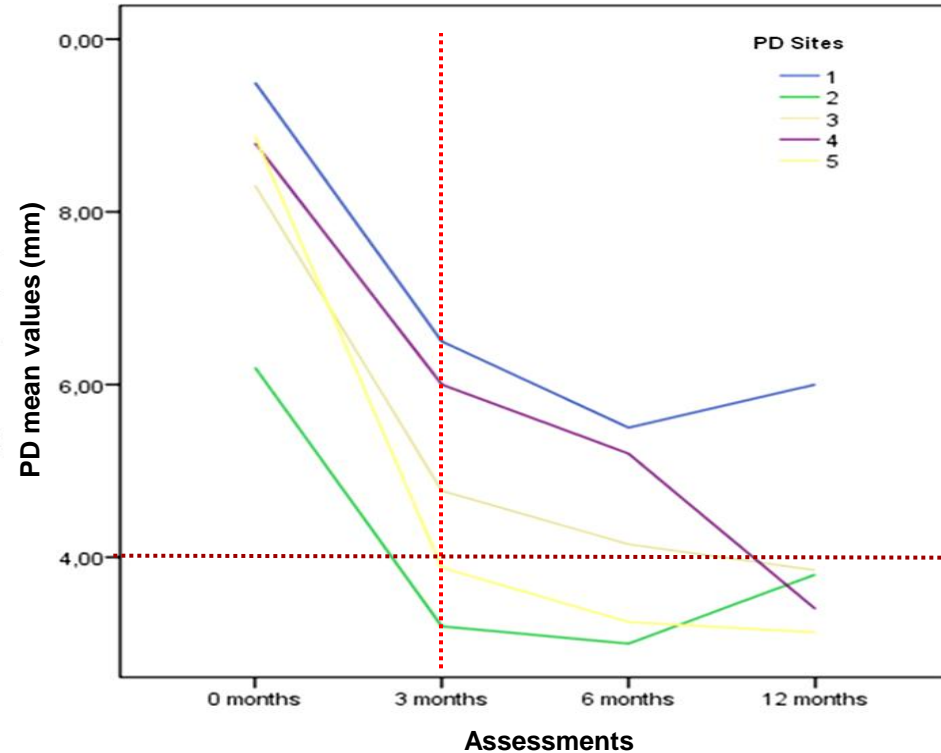
PROBING DEPTH SITES (DISTAL ASPECT M2)	Assessments (months)	PROBING DEPTH (PD)									STATISTICAL ANALYSIS DATA [†] (n=33)		
		DESCRIPTIVE DATA (n=37)									Differences between assessments (3m-0m; 6m-3m; 12m-6m; 12m-0m)		
		n	Min. (mm)	Max. (mm)	Mean (mm)	s. d. (mm)	n	Mean (mm)	s. d. (mm)	PD mean differences (mm)	s. d. (mm)	p-value	
1 st Buccal (B) 	0	3	7	10	8.67	1.53	2	9.50	0.71	-3.00	1.41	0.250	
	3	3	4	7	5.67	1.53	2	6.50	0.71	-1.00	1.41	0.500	
	6	3	5	6	5.67	0.58	2	5.50	0.71	0.50	2.12	0.500	
	12	2	4	8	6.00	2.83	2	6.00	2.83	-3.50	2.12	0.250	
2 nd Disto-Buccal (DB)	0	5	4	8	6.20	1.48	5	6.20	1.48	-3.00	2.12	0.063	
	3	5	1	6	3.20	1.92	5	3.20	1.92	-0.20	2.59	0.500	
	6	5	2	5	3.00	1.41	5	3.00	1.41	0.80	0.84	0.125	
	12	5	2	6	3.80	1.48	5	3.80	1.48	-2.40	2.30	0.063	
3 rd Middle (MD)	0	14	5	12	8.14	2.28	13	8.31	2.29	-3.54**	3.10	0.002	
	3	14	3	9	4.64	1.69	13	4.77	1.69	-0.62	1.66	0.126	
	6	14	2	10	4.21	2.01	13	4.15	2.08	-0.31	1.89	0.500	
	12	13	3	6	3.85	0.90	13	3.85	0.90	-4.46***	2.57	0.000	
4 th Disto-Lingual (DL)	0	5	7	11	8.80	1.64	5	8.80	1.64	-2.80*	2.39	0.05	
	3	5	4	10	6.00	2.55	5	6.00	2.55	-0.80	0.84	0.125	
	6	5	3	10	5.20	2.78	5	5.20	2.77	-1.80	2.95	0.125	
	12	5	3	5	3.40	0.89	5	3.40	0.89	-5.40*	2.30	0.031	
5 th Lingual (L)	0	10	5	12	9.30	2.36	8	8.88	2.42	-5.00**	2.27	0.004	
	3	10	3	6	3.70	1.16	8	3.88	1.25	-0.63	1.92	0.328	
	6	10	2	4	3.30	0.82	8	3.25	0.89	-0.13	1.13	0.500	
	12	8	1	5	3.13	1.25	8	3.13	1.25	-5.75**	2.49	0.004	

Results

Preoperative periodontal defects:

- **Type** - moderate to severe, deepest at lingual side
- **Localization** - as twice as frequent at the lingual side

PROBING DEPTH (PD)



Results

SITES (DISTAL ASPECT M2)	Assessments (months)	n	Radiographic Bone Height (RBH)						Radiographic Infrabony Defects (RID)					
			Mean (mm)	s. d. (mm)	Differences between assessments (3m-0m; 6m-3m; 12m-6m; 12m-0m)			Mean (mm)	s. d. (mm)	Differences between assessments (3m-0m; 6m-3m; 12m-6m; 12m-0m)				
					PD	mean differences (mm)	s. d. (mm)			p-value	PD	mean differences (mm)	s. d. (mm)	p-value
1 st Buccal (B)	0	2	10.51	0.52	-1.16	1.92	0.500	3.28	2.20	0.87	1.51	0.50		
	3	2	9.35	2.44	0.00	0.19	0.750	4.15	3.71	1.06	1.68	0.50		
	6	2	9.35	2.63	0.01	0.73	0.500	5.21	5.39	-0.80	0.20	0.25		
	12	2	9.37	3.36	-1.15	2.84	0.500	4.41	5.18	1.12	2.99	0.50		
2 nd Disto- Buccal (DB)	0	4	8.77	4.14	2.35	2.96	0.188	5.15	2.45	-2.59	2.52	0.063		
	3	4	11.12	1.52	0.71	0.17	0.063	2.57	0.75	-0.59	0.34	0.063		
	6	4	11.83	1.45	0.81	0.11	0.063	1.98	0.68	-0.66	0.38	0.063		
	12	4	12.64	1.36	3.87	3.18	0.063	1.32	0.30	-3.84	2.57	0.063		
3 rd Middle (MD)	0	9	9.73	1.99	0.80	1.36	0.102	3.75	1.96	-1.01*	1.37	0.020		
	3	9	10.53	1.69	1.30**	1.42	0.014	2.74	1.42	-0.99*	1.19	0.027		
	6	9	11.82	1.36	0.23	0.82	0.223	1.74	1.28	-0.18	0.84	0.150		
	12	9	12.05	1.37	2.32**	2.18	0.010	1.56	1.45	-2.19**	2.33	0.014		
4 th Disto- Lingual (DL)	0	4	7.52	1.70	0.45	1.67	0.438	5.09	1.59	-0.10	2.11	0.563		
	3	4	7.97	1.64	1.43	1.30	0.063	4.99	1.79	-1.48	1.06	0.063		
	6	4	9.40	1.11	2.82	2.13	0.063	3.51	1.34	-2.28	1.76	0.063		
	12	4	12.22	1.61	4.70	3.17	0.063	1.23	0.42	-3.86	1.46	0.063		
5 th Lingual (L)	0	7	7.74	1.07	2.49**	1.64	0.008	5.26	1.37	-2.61**	1.64	0.008		
	3	7	10.22	1.30	0.39	0.64	0.109	2.65	1.55	0.09	0.86	0.289		
	6	7	10.61	1.05	0.25	1.45	0.188	2.74	1.34	-0.85	1.20	0.063		
	12	7	10.86	1.61	3.12**	1.82	0.008	1.89	1.10	-3.37**	1.62	0.008		

Friedman and Wilcoxon Tests (n=26): *p<0.05; **p<0.01; ***p<0.001.

Conclusions

PERIODONTAL HEALING PATTERN:

- **Gradual improvement:** up to 12-months to values considered to be healthy.
- **Cut-point:** at 3 months.
- **Localization:** regardless of the deepest site in the distal aspect of M2, with a possible “danger zone” at buccal sites.

CLINICAL IMPLICATIONS

- M3 surgery does not have a negative effect on the preoperative compromised periodontal status of the adjacent M2.
- Young adults, with high-risk periodontal M3 impactions, may benefit from the early extraction, enhancing spontaneous periodontal healing.