



Suggested mesiodistal distance for multiple implant placement based on the natural tooth crown dimension

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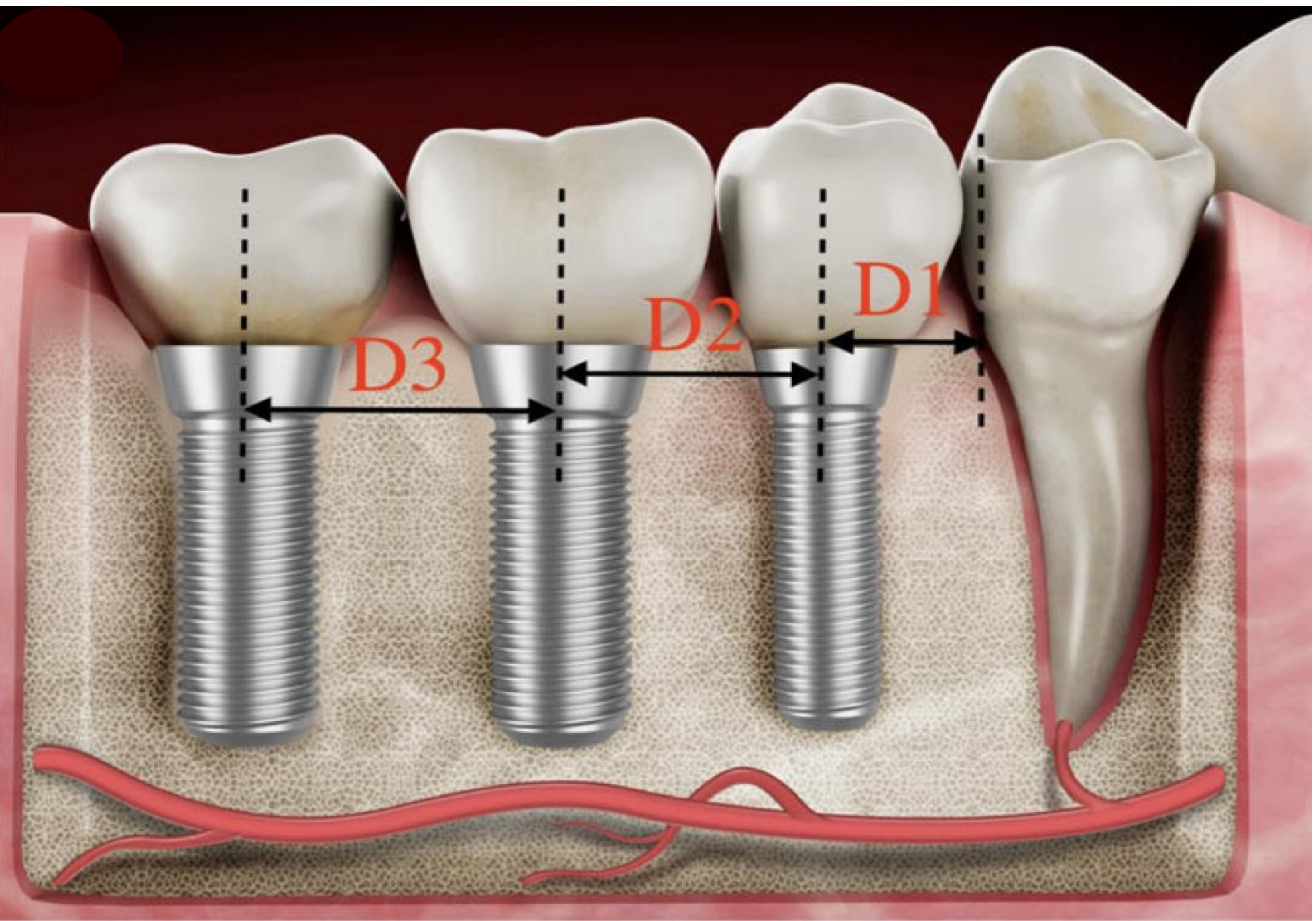


BACKGROUND

The mesiodistal distance in implant placement is crucial for achieving optimal prosthetic outcomes and a healthy soft tissue profile. In posterior edentulous cases, factors influencing the appropriate size and spacing of dental implants can be multifactorial.

AIM

This study aims to establish a mesiodistal algorithm for free-end posterior implant placements, providing a measurable criterion to predict implant prognosis based on mesiodistal spacing.

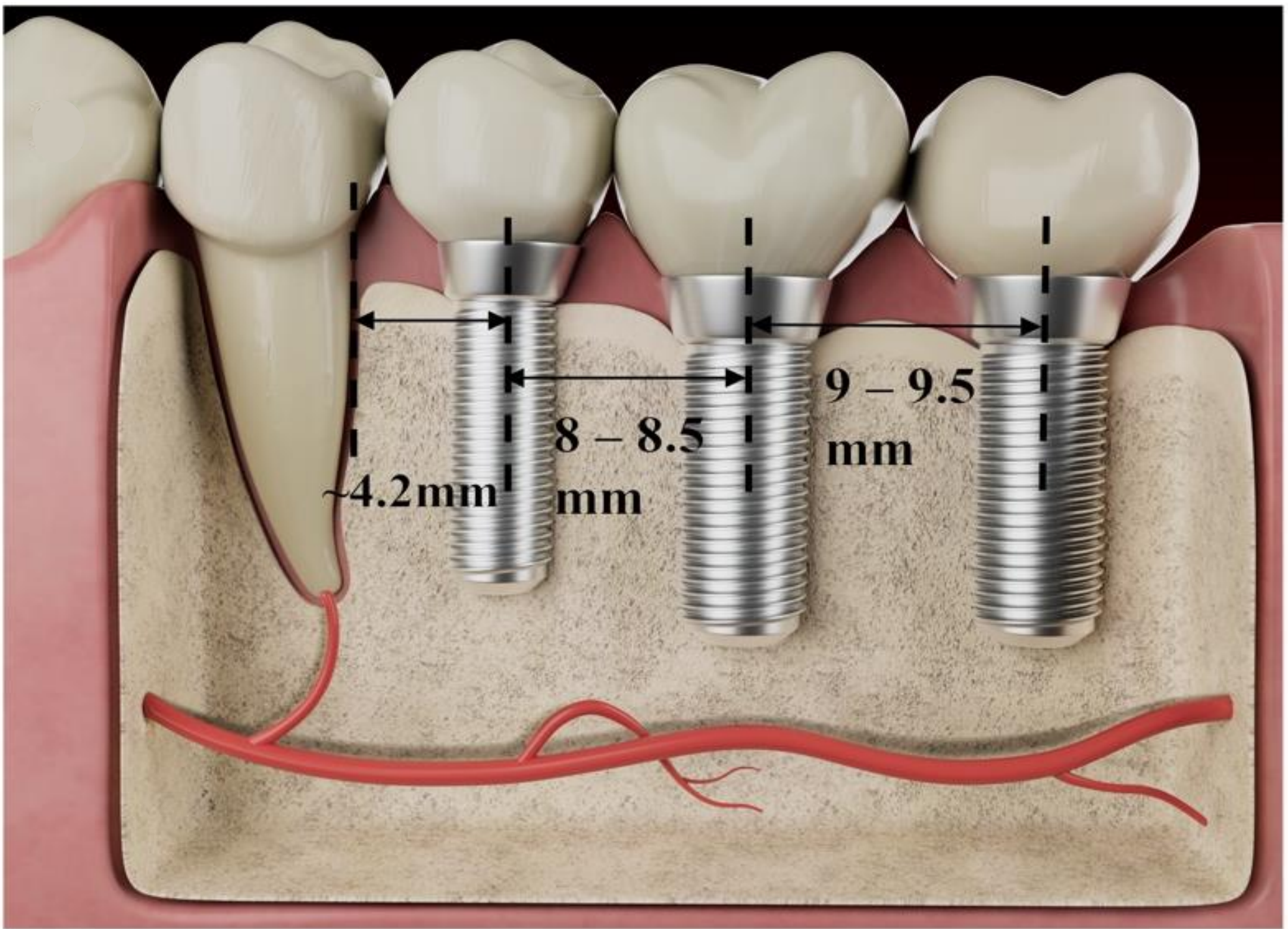


101 patients' implants
digital crown design &
measurement

Developed mesiodistal
algorithm

	Implant-natural teeth			Implant-implant		
	Maxilla	Mandible	p Value	Maxilla	Mandible	p Value
First premolars	4.3 ± 0.3	4.2 ± 0.2	ns			
Second premolars	4.2 ± 0.2	4.2 ± 0.2	ns	7.0 ± 0.2	7.1 ± 0.3	ns
First molars	5.4 ± 0.2	5.5 ± 0.3	ns	8.4 ± 0.3	8.5 ± 0.2	ns
Second molars	5.4 ± 0.2	5.4 ± 0.2	ns	9.3 ± 0.3	9.6 ± 0.2	***

[1]

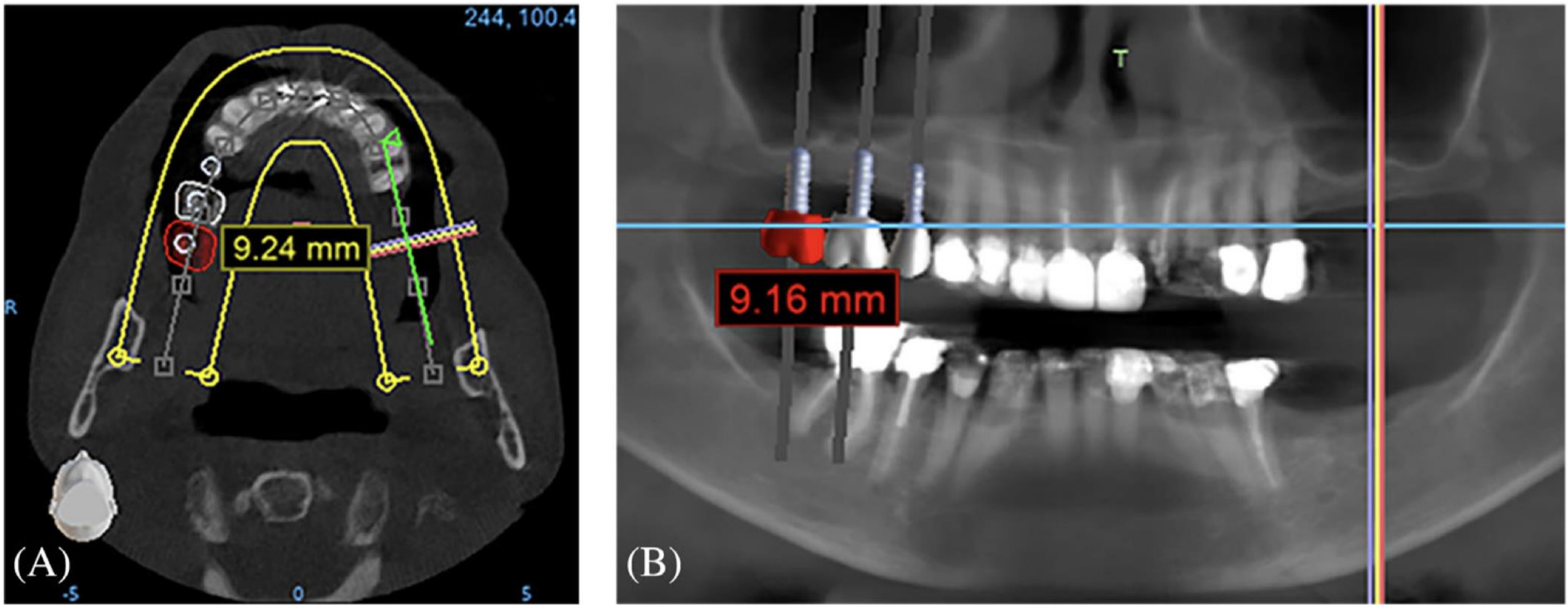


102 patients' implants
grouped according to
algorithm

Analyzing MBL and
covariates

INTRODUCTION

- Selected 101 cases of posterior free-end edentulous arches. Developed a mesiodistal algorithm through digital design.



- Analyzed 102 additional cases using calibrated X-rays for spacing and bone marginal bone loss (MBL) evaluation.
- Implants were grouped into experimental and control groups based on whether they adhered to the algorithm.
- Conducted logistic regression analyses to assess MBL, adjusting for covariates and analyzing inter-group comparison to examine the impact of smoking habits.



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Method

Inclusion:

- Partially edentulous patients with posterior implants and at least one year of follow-up after loading.

Data collection:

- Demographic Information: Age, gender, and smoking habits were documented.
- Implant Data: Number and positions of implants.
- Implant details: brand, length, diameter, neck design, abutment type, and crown type.

Statistical analysis:

- chi-square tests, t-tests , logistic multivariate regression analysis

Results

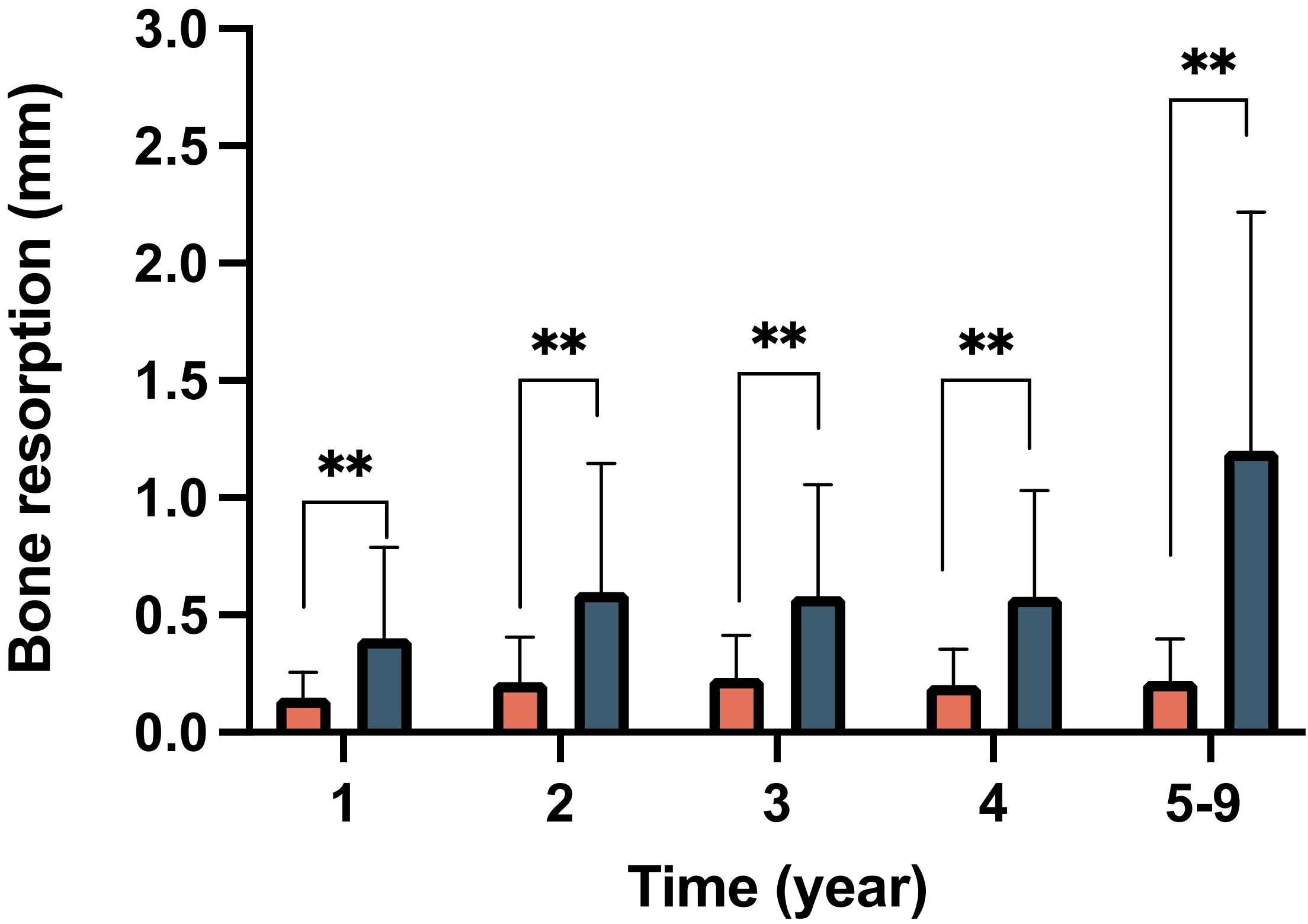
Peri-implant bone loss (mm) of different follow-up interval

Time	n	Experiment	Control	MD	95%CI	p
1-year	83	0.15 ± 0.11	0.40 ± 0.39	-0.19	(-0.33, -0.06)	0.006**
2-year	71	0.21 ± 0.19	0.60 ± 0.55	-0.39	(-0.66, -0.12)	0.005**
3-year	61	0.23 ± 0.18	0.58 ± 0.48	-0.43	(-0.68, -0.18)	0.001**
4-year	41	0.20 ± 0.15	0.58 ± 0.45	-0.30	(-0.52, -0.04)	0.009**
5-9 year	44	0.22 ± 0.18	1.25 ± 1.19	-1.26	(-1.94, -0.58)	0.001**

Inter-group comparisons of smoking habits (smokers VS non-smokers)

Time	Experimental group			Control group		
	MBL (smoker)	MBL (non-smoker)	p	MBL (smoker)	MBL (non-smoker)	p
1-year	0.203 ± 0.114	0.144 ± 0.105	0.166	0.279 ± 0.129	0.430 ± 0.423	0.273
2-year	0.131 ± 0.063	0.226 ± 0.203	0.601	0.350 ± 0.275	0.636 ± 0.604	0.089
3-year	0.131	0.235 ± 0.185	0.830	0.521 ± 0.447	0.596 ± 0.485	0.654
4-year	/	0.202 ± 0.152	/	0.597 ± 0.528	0.575 ± 0.435	0.581
5-9 year	0.218 ± 0.009	0.227 ± 0.188	0.454	0.723 ± 0.306	1.418 ± 1.315	0.614

Experiment
Control



Conclusion

Within the limitations of this retrospective study, it can be concluded that implants placed accordance with the mesiodistal algorithm of 4–4.6 mm (implant to adjacent canine tooth), 7– 7.4mm, 8–8.5mm, and 9–9.5 mm are conducive to bone level preservation. The impact of inter-implant distance on MBL was found to be greater than that of smoking habits.