Poster Number

BASIC RESEARCH

Comparative study of immediate and staged applications of BMP-2 at the damaged socket in dogs.

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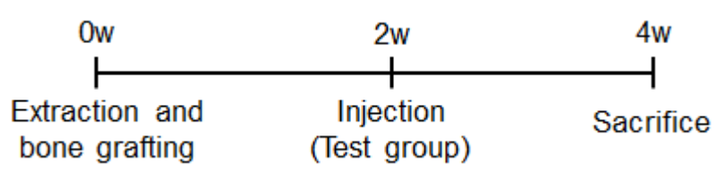
Abstract

Aim: This study evaluate bone formation patterns between two different application methods, either immediate or staged application of BMP-2 at the damaged socket.

Materials and Methods: The distal roots of fourth premolars were bilaterally extracted and buccal bone defect was surgically created. Bone graft material soaked with BMP-2 solution was immediately applied for control group. For test group, BMP-2 solution was injected at the grafted site at 2 weeks after.

Results: The mean NBA was significantly greater in the control group than in the test group (10.8 ± 7.05 mm^2 and 6.34 ± 3.14 mm^2, respectively; p=0.043). In other parameters, the test group showed greater values than the control; however, they were not statistically significant.

Conclusions: New bone formation in immediate application of BMP-2 was superior to staged application in 4 weeks of healing period.



Background and Aim

Several studies attempted to enhance implant therapy by reducing the treatment time and deducting the number of interventions. Hence, the timing of implant placement is considered an important factor to achieve the success of the implant approaching on the early implant placement (Buser,2008).

Bone morphogenetic protein-2 plays an important role in the regulation of bone remodelling, however, several clinical complications have been reported in numerous studies.

Therefore, we hypothesized that the staged application of BMP-2 would efficiently enhanced osteogenic potential and less clinical complication.

Methods and Materials

Five male beagle dogs aged 12 months were selected in this study.

The distal root of fourth mandibular premolars were bilaterally extracted. Subsequently, bone defect (9x3mm) was performed on extracted site. Collagenated biphasic calcium phosphate (CBCP) soaked with 100μl of BMP-2 solution (dose=25 μg) was immediately applied at the surgical site for control group. For test group, CBCP soaked with saline was grafted at the extracted site and same dose of BMP-2, was injected gradually by 1ml syringe after 2 weeks. Another 2 weeks of healing was allowed.

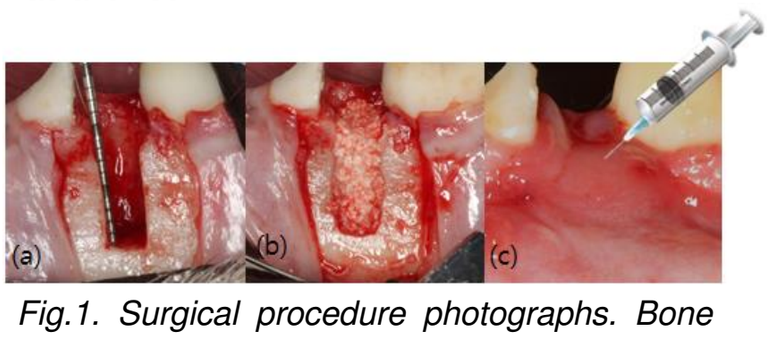


Fig.1. Surgical procedure photographs. Bone defect (a), bone graft (b) and BMP-2 injection after 2 weeks (c).

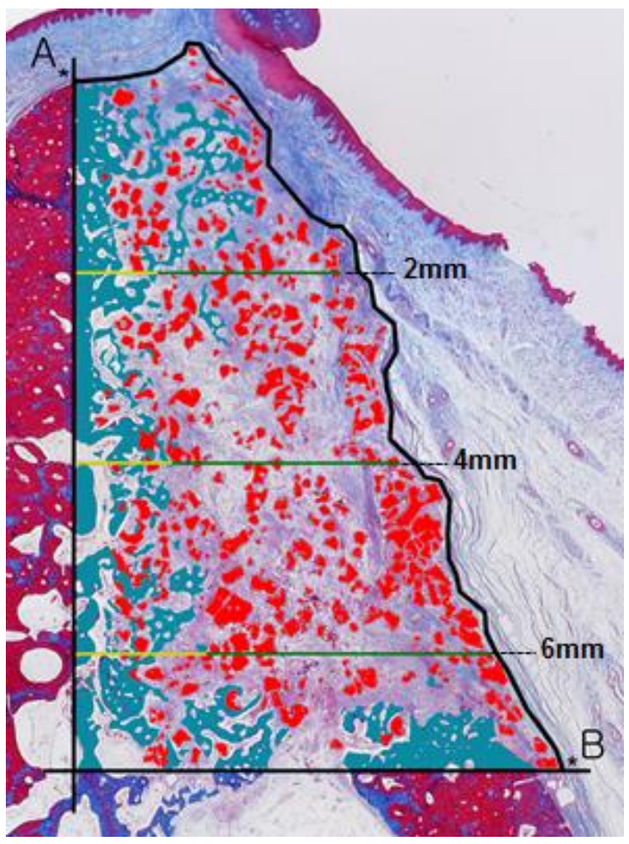


Fig.2. The ROI was drawn from two points (A, crest of lingual plate point; B, basal bone point). Within the ROI, horizontal ridge width at 2, 4 and 6 mm below the point A was determined; and two area measurements were obtained: new bone (red), bone graft material (green).

Results

Clinically, no outstanding difference was showed between two groups in terms of swelling and complications.

Histologic healing pattern was similar in two groups.

Table 1. Histomorphometric measurements

	Soaking (C)	Injection (T)
Total area	32.12 ± 8.14	32.60 ± 11.33
New bone area	10.8 ± 7.05*	6.34 ± 3.14*
Bone graft area	4.1 ± 0.7	5.32 ± 7.35
2mm	2.62 ± 0.98	3.32±1
4mm	3.21 ± 0.86	3.7±1.26
6mm	4.48 ± 0.45	4.22 ± 0.98

(*) : Significantly different ($p<0.05$)

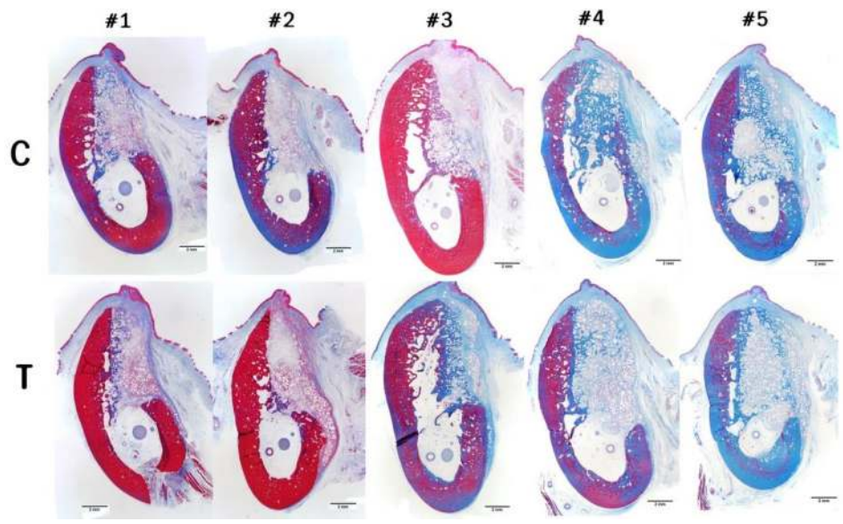


Fig.3. Histologic healing pattern of each control (C) and test (T) group

Conclusion

The damaged buccal wall did not completely restored by ridge preservation procedure in 4 weeks of healing period. Regarding the timing of BMP-2 application, immediate application has demonstrated more new bone formation than staged application. Further studies are needed to observe healing pattern in longer period and different concentrations.

References

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