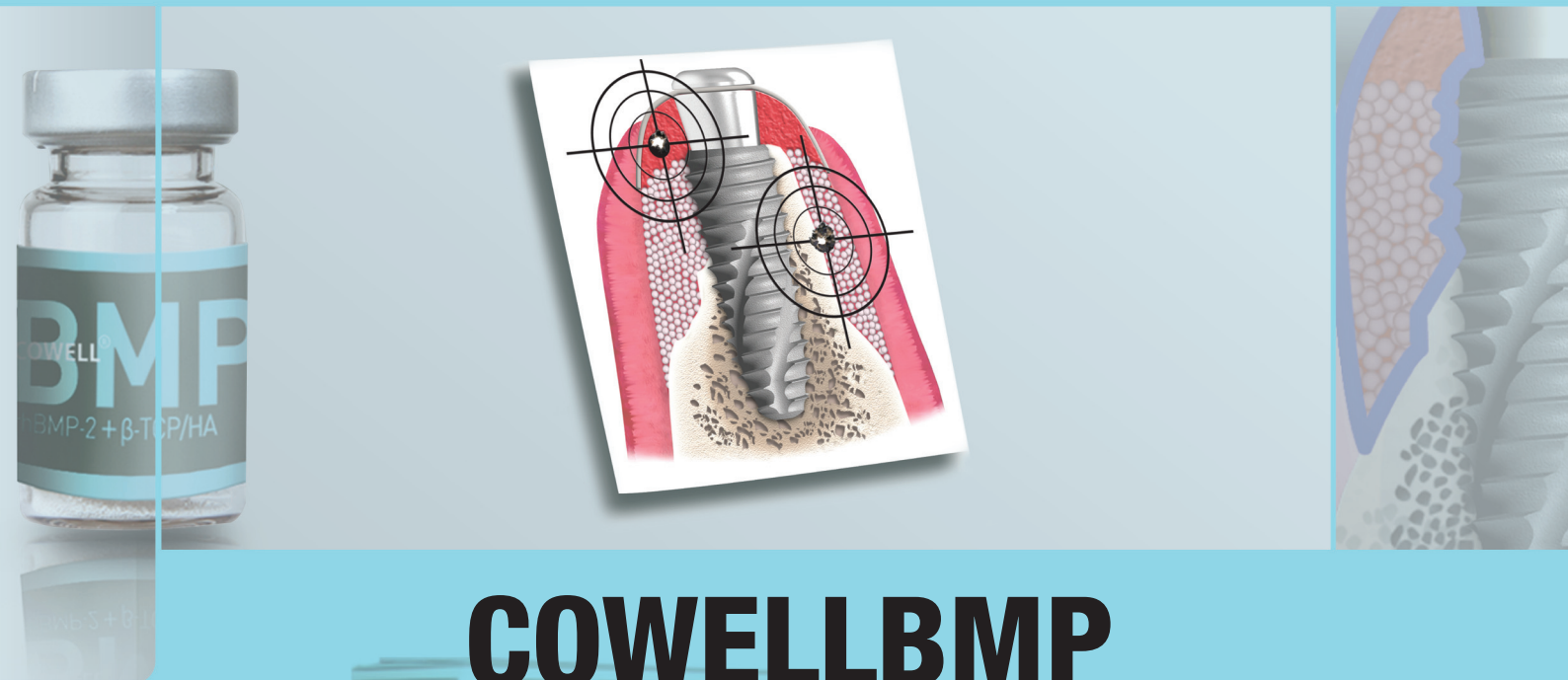


The pioneer in Korean dental implants is now working with the world !
www.cowellmedi.com



COWELLBMP

rhBMP-2 + β -TCP/HA



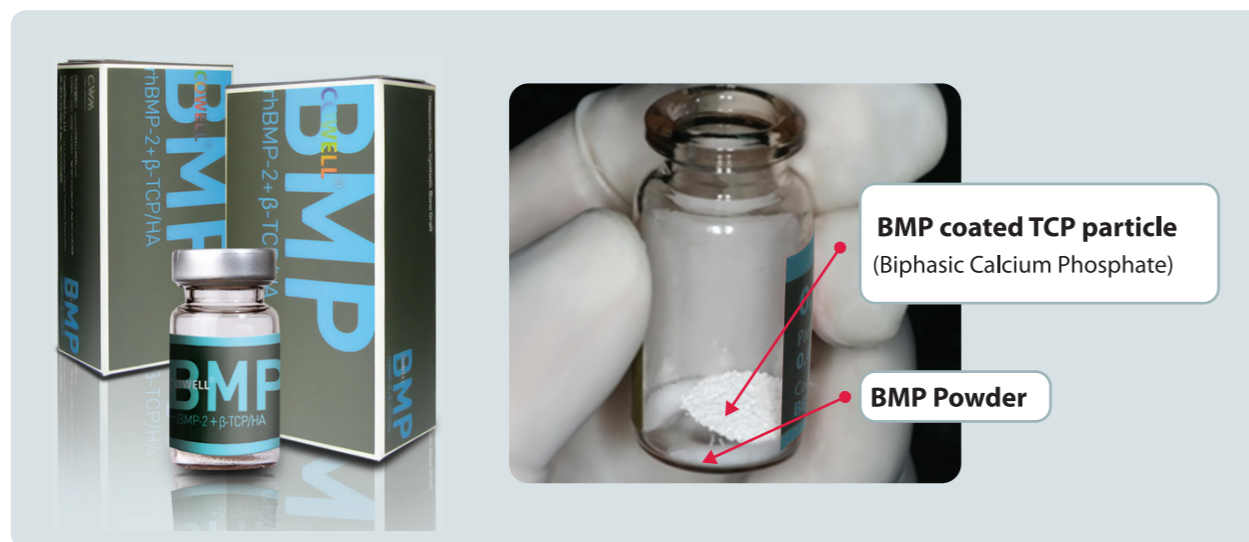
CWM
Cowellmedi Co., Ltd.

COWELLMEDI IMPLANT SYSTEM

COWELLBMP^{rhBMP-2 + β -TCP/HA}

1. Composition of CowellBMP

- > Bone graft material initially made in South Korea by freeze-drying recombinant human bone morphogenic protein type 2 (rhBMP-2) on the surface of β -TCP
- > Approved by KFDA in 2010
- > Launched as dental bone graft material in 2010
- > TCP/HA as a carrier allows maintenance of space

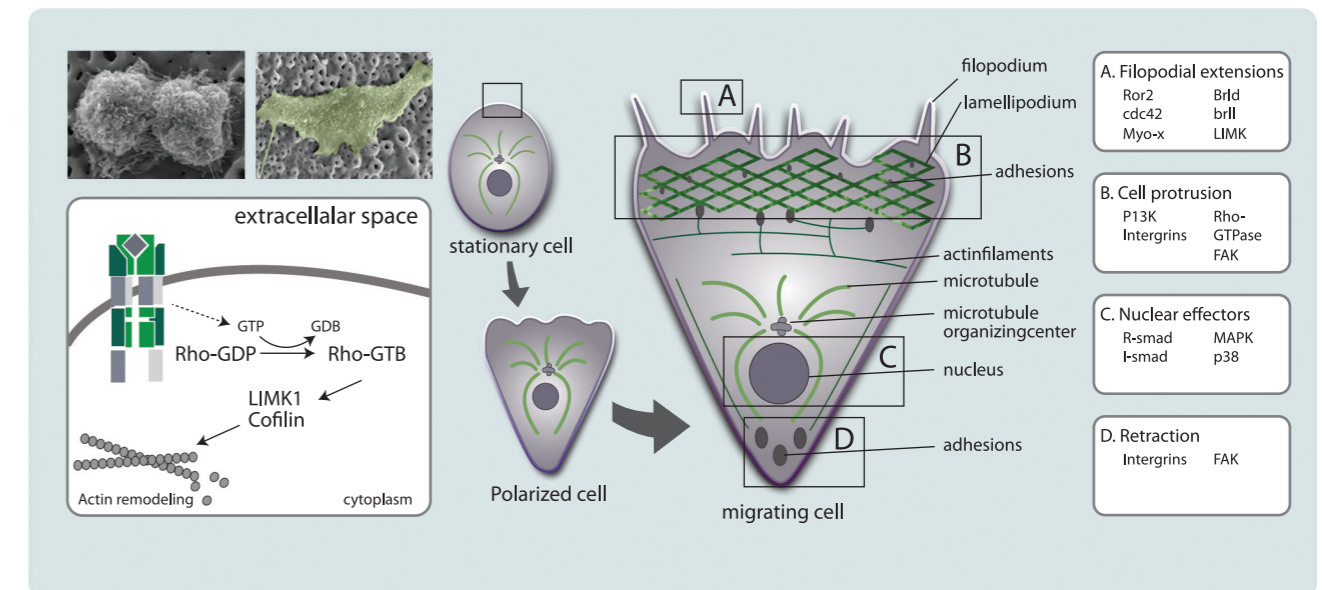


2. Features of CowellBMP

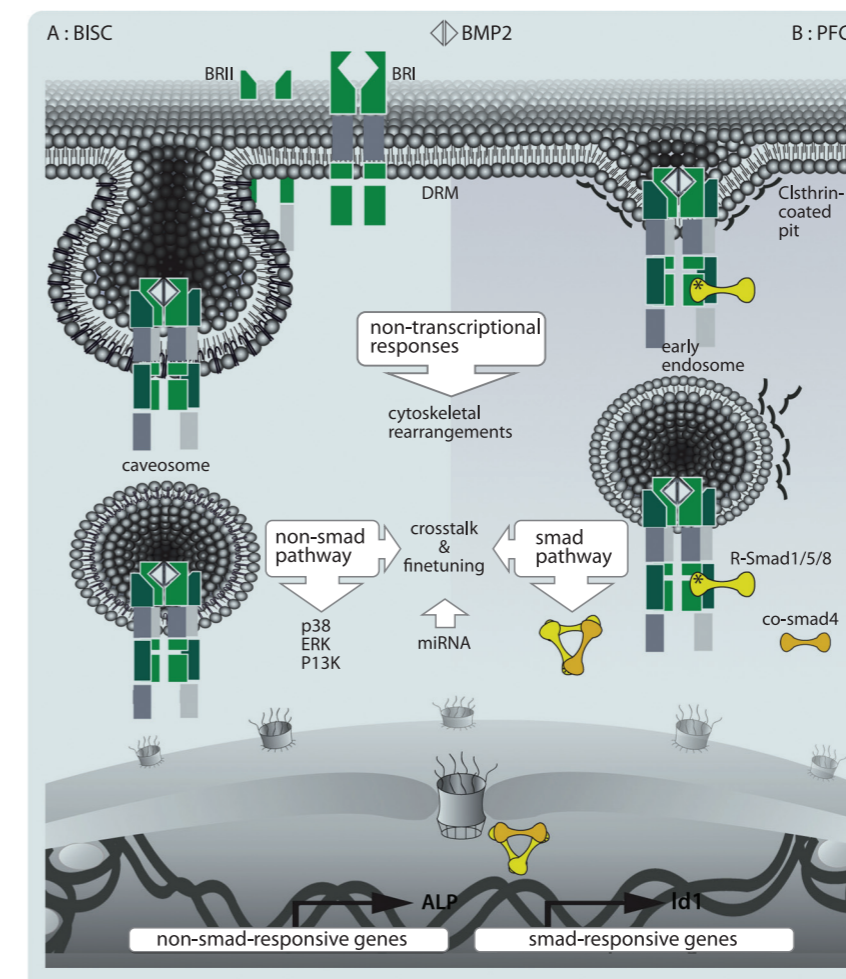
- > Primary closure for soft tissue regeneration is not required
- > Regenerates adherent gingiva
- > Simplifies challenging bone grafting and soft tissue regeneration
- > Acts directly on stem cells
- > Induces bone regeneration without infection in extraction socket
- > Contains 1 mg of bone morphogenic protein per 1g of the powder (1g of autologous bone contains 2ng of bone morphogenic protein)

3. Mechanism of Action of CowellBMP

Migration of Cells with lamellipodia



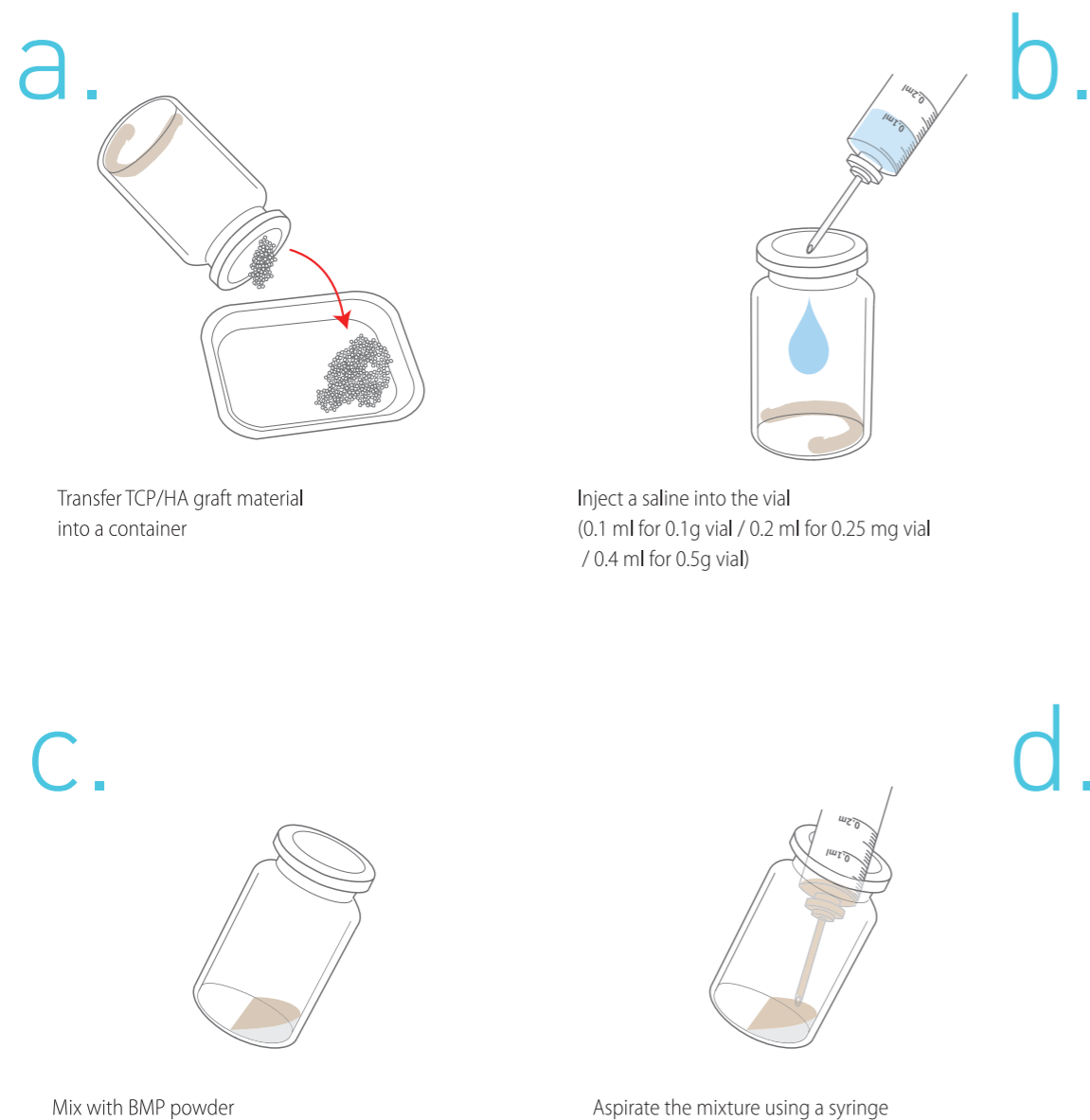
Cellular mechanisms



- > BMP-2 adheres to the membrane of stem cell and induces expression of genes of nucleus. Then, BMP-2 migrates to recipient site.
- > BMP-2 growth factor, Twist-2 transcriptional factor, and VEGF growth factor synthesize and secrete endogenous growth factor
- > Proliferation of osteoblast of osteocyte, and proliferation of fibroblast in dermis and keratinocyte of the skin
- > Twist-2 transcriptional factor induces tissue regeneration in osseous tissue and adherent gingival area

4. How to Use CowellBMP

Preparation for Bone Grafting: Preparing Graft Materials and BMP Solution

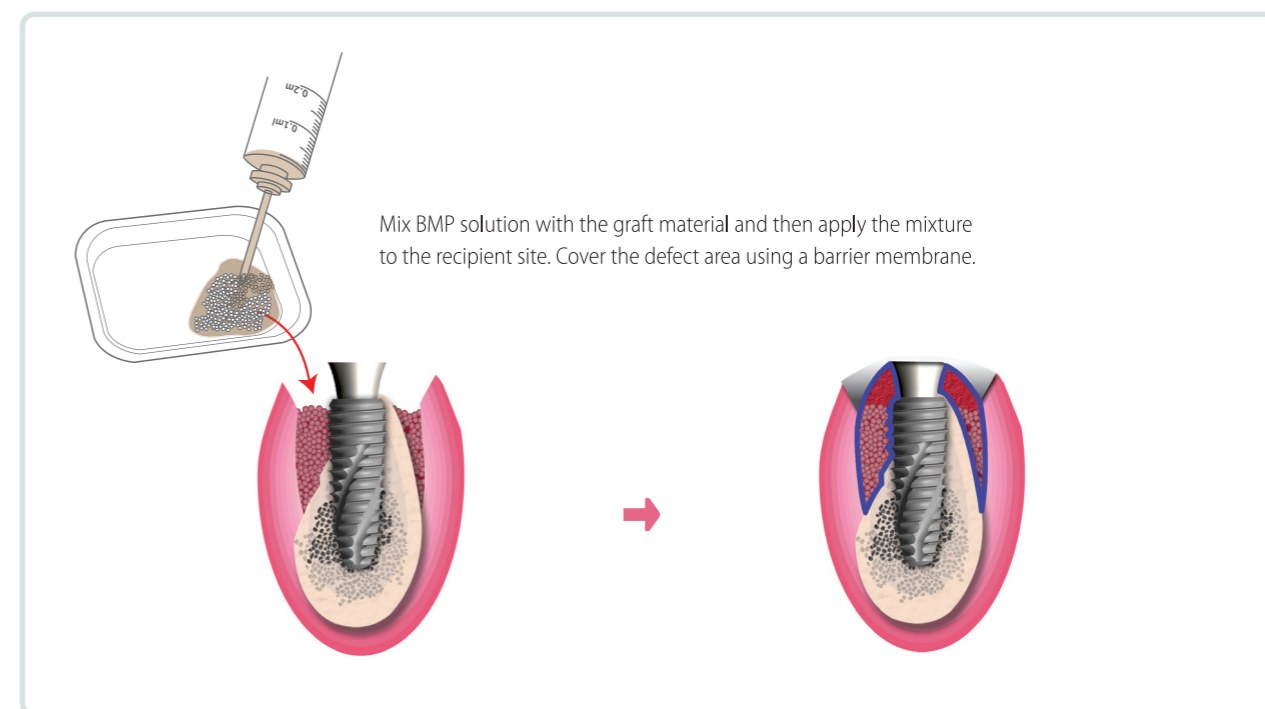


Dose and Granule Size of Cowell BMP

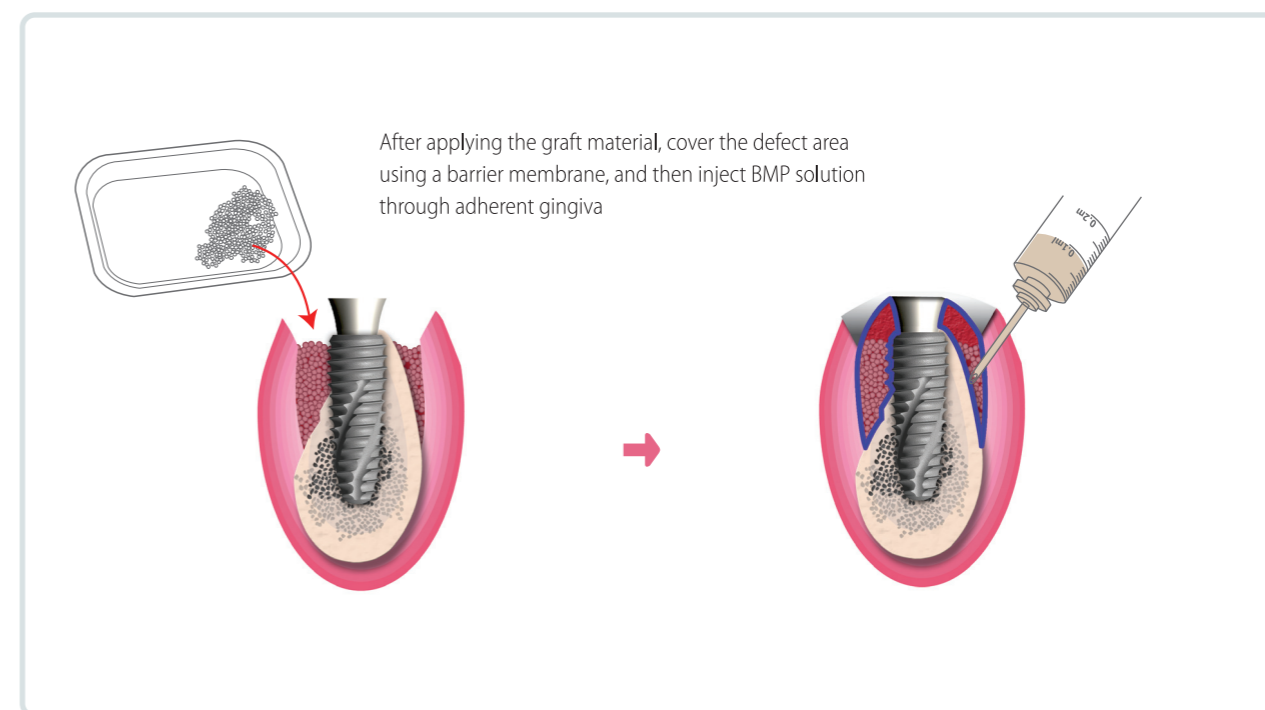
0.1g		0.25g		0.5g	
product code	particle size	product code	particle size	product code	particle size
BB1010	0.41~1.0mm	BB1025	0.41~1.0mm	BB1050	0.41~1.0mm

※ A vial of 0.1g can be used for less than one extraction socket, while 0.25g/0.5g can be used for maxillary sinus or for the wide bone defect area.

Bone Grafting Method 1 : Grafting BMP solution in combination with bone graft material



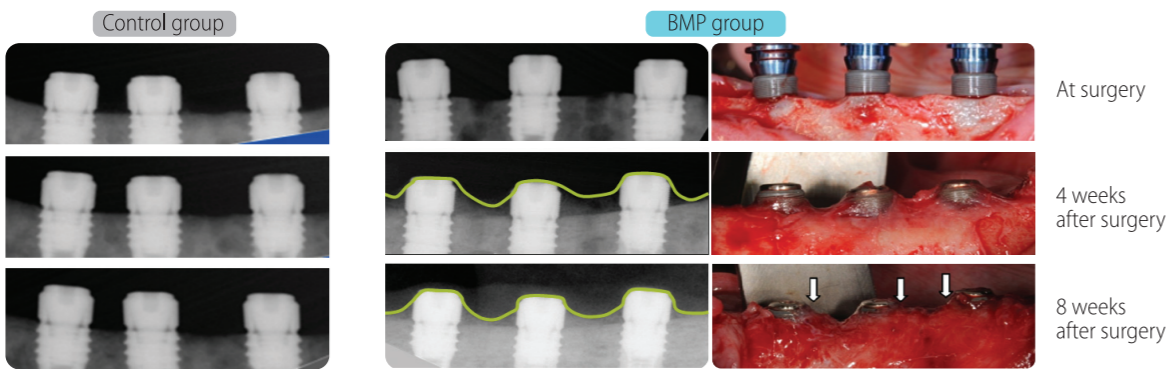
Bone Grafting Method 2 : BMP solution injection



※ Use one type of method or a combination of two methods.
When BOSS system is used, solution injection is recommended so that BMP can contact autogenous osseous tissue.

5. Study Result on CowellBMP

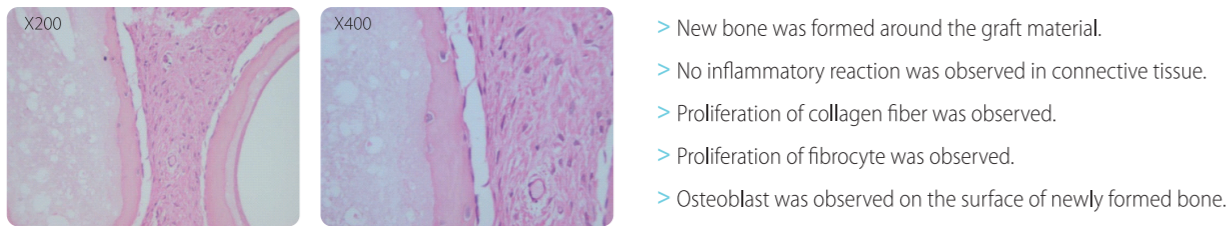
In vivo Study



Jung-Bo Huh, et al., Alveolar ridge augmentation using anodized implants coated with Escherichia coli-derived recombinant human bone morphogenetic protein 2 (Beagle dog)

- Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2011 -

Histologic Findings : Tissue specimen collected approximately four months after the maxillary sinus grafting (human)



6. Clinical Data of CowellBMP

- > Vertical height of surrounding bone was compared three months after grafting in extraction socket.
- > The study was conducted at Seoul National University Bundang Hospital, Yonsei University Dental Hospital, and Korea University Guro Hospital.

Group		Average	SD	95%CI	†P value
Height	Control	-1.087	1.413	(-1.565, -0.609)	0.0006**
	Experiment	-0.059	0.960	(-0.384, 0.266)	
Width at 75% ESL	Control	1.405	1.753	(0.812, 1.998)	0.346
	Experiment	1.863	2.310	(1.081, 2.644)	
Width at 50% ESL	Control	0.542	1.157	(0.15, 0.934)	0.016*
	Experiment	1.239	1.249	(0.816, 1.662)	
Width at 25% ESL	Control	0.006	1.149	(-0.383, 0.395)	<0.0001**
	Experiment	1.279	1.387	(0.81, 1.749)	

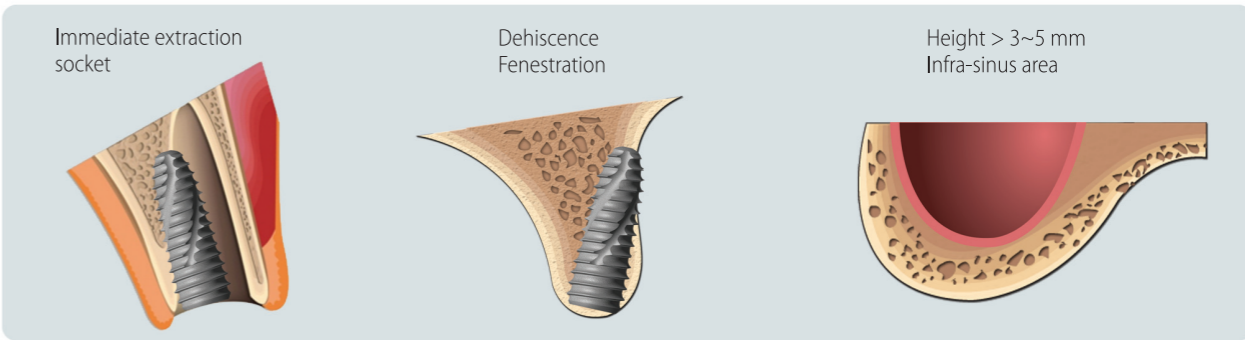
ESL : Extraction Socket Level *:P<.05, **:P<.01, †: Student t-test

Jung-Bo Huh, et al., Multicenter, randomized clinical trial on the efficacy and safety of Escherichia-coli-derived rhBMP-2 with β-Tricalcium phosphate and hydroxyapatite in human extraction sockets

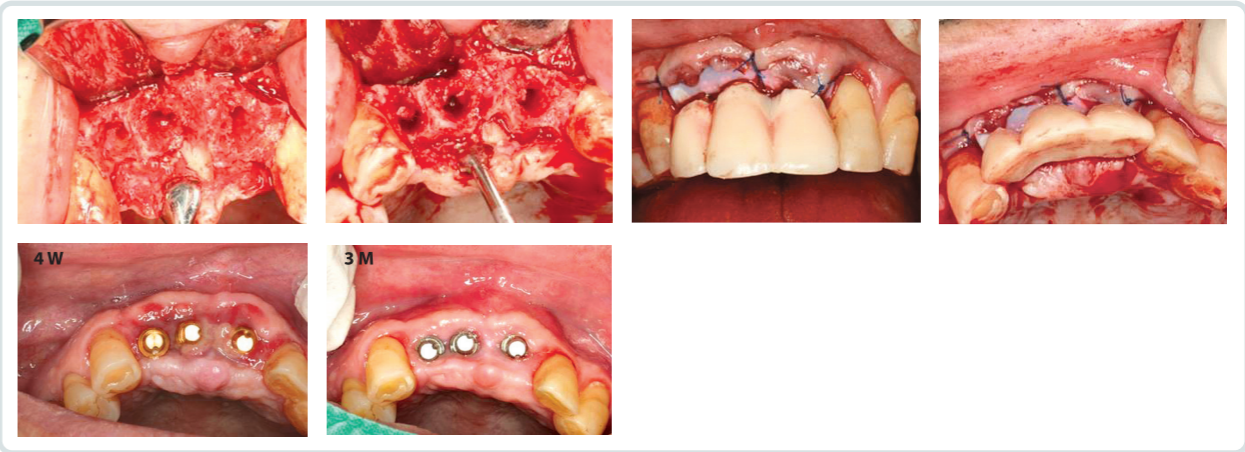
- J Adv Prosthodont 2011;4 -

7. Clinical Case of CowellBMP

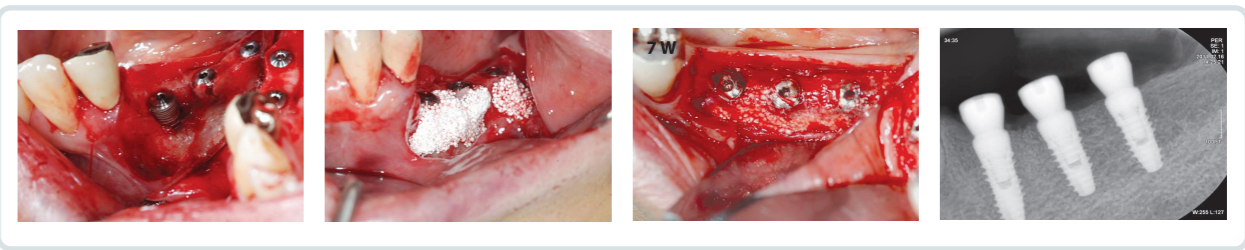
The CowellBMP reduced the treatment period for the bone regeneration performed simultaneously with the implant placement.



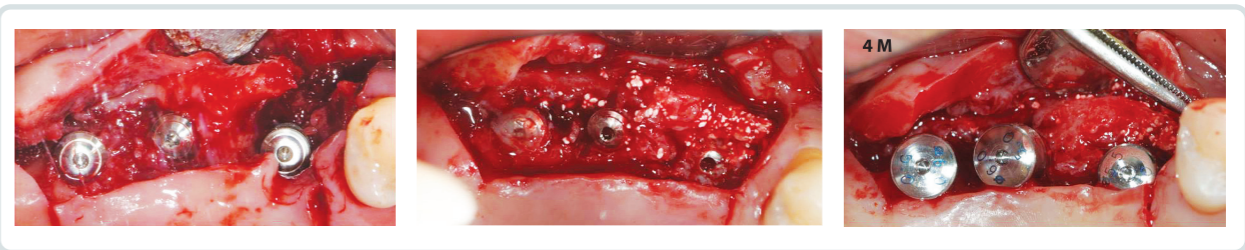
A. The implant is placed immediately after applying bone graft material in anterior tooth bridge using insertion torque of 25 Ncm or higher (* for single implant, fix with insertion torque of 35 Ncm or higher).



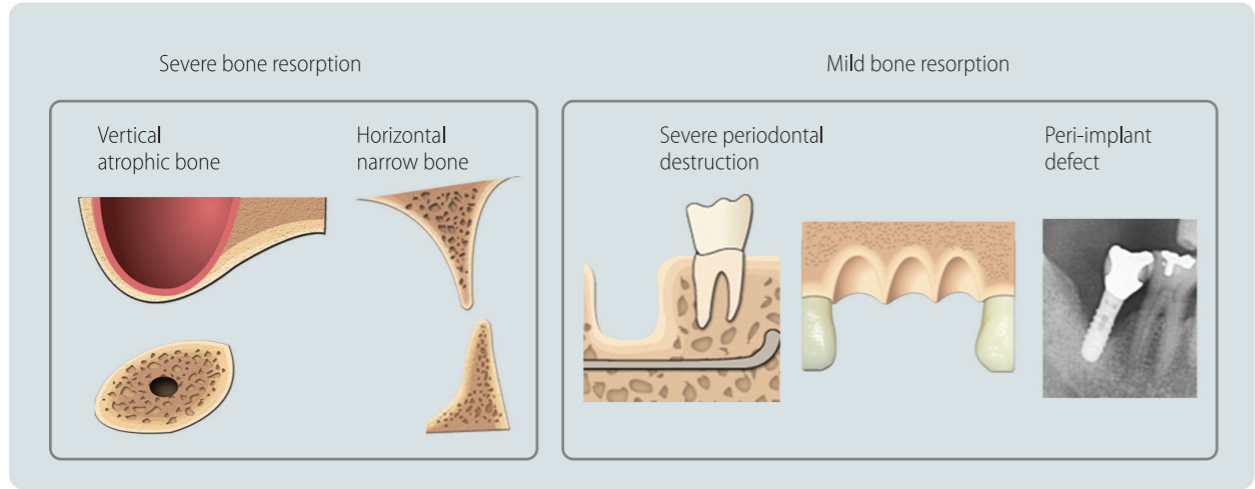
B. Seven-week early loading at insertion torque of 35 Ncm or higher in posterior tooth area



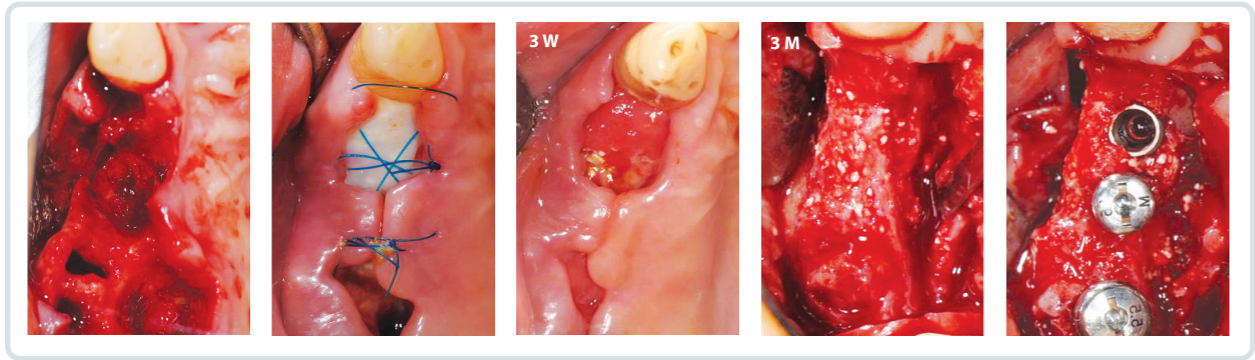
C. Conventional loading in maxillary sinus at four months when one or more lateral walls are lost



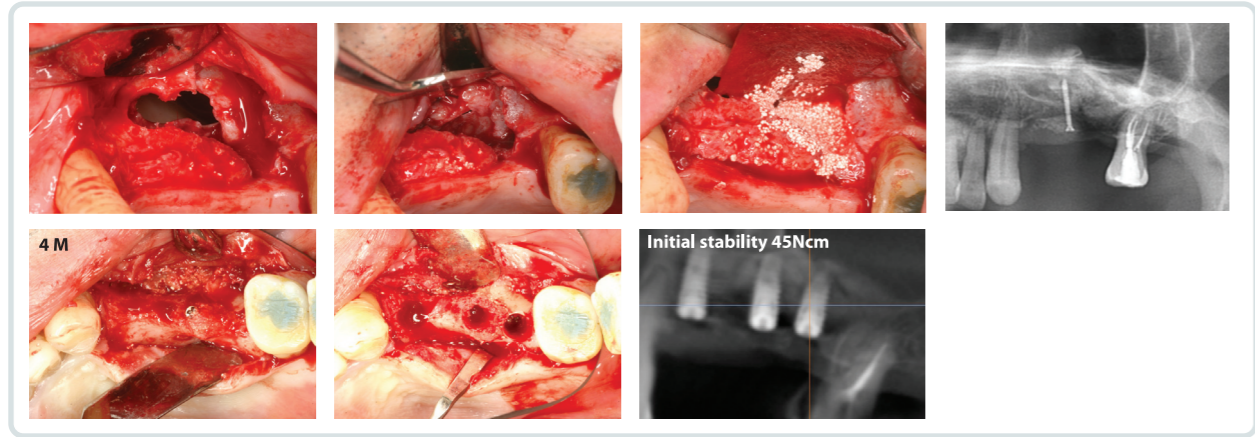
The effect of CowellBMP in the bone regeneration in an area where implant placement is impossible



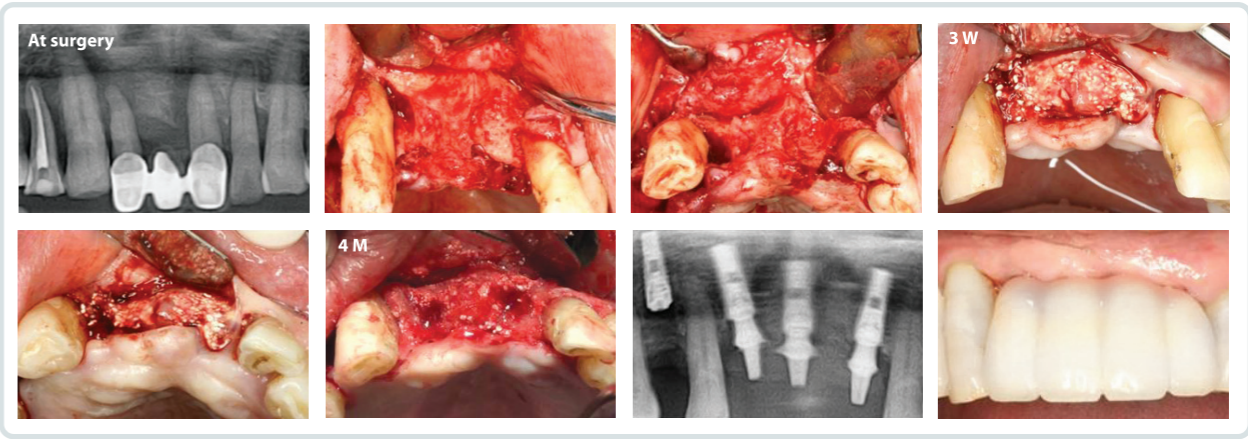
A. In areas where bone quality of surrounding bone is Type 2 or 3, implant is placed three to four months later after the grafting.
 (* For Types 1 and 4, five to six months after the grafting; for areas where vertical or horizontal bone resorption or serious atrophy exists, implant is placed six to eight months after the grafting.)



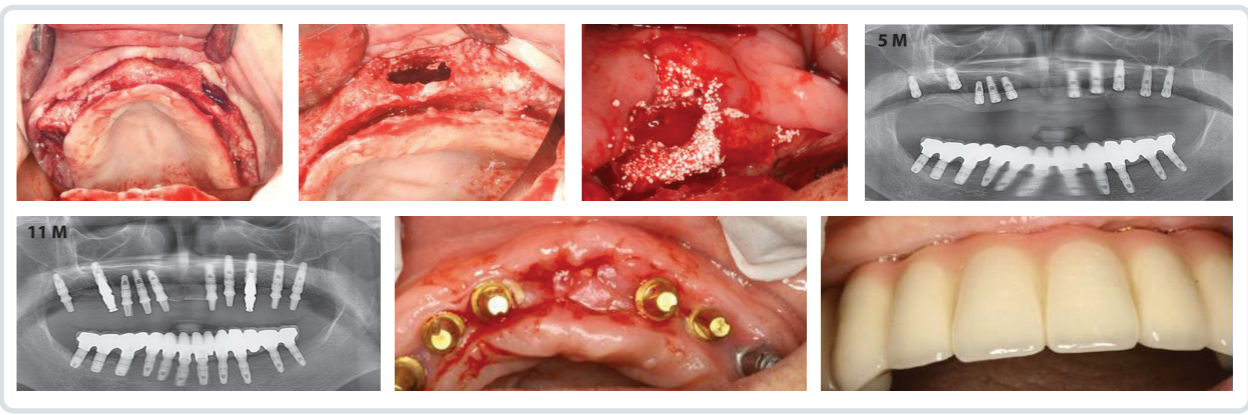
B. Implant is placed four months after the grafting in alveolar bone infected after the bone grafting in maxillary sinus.



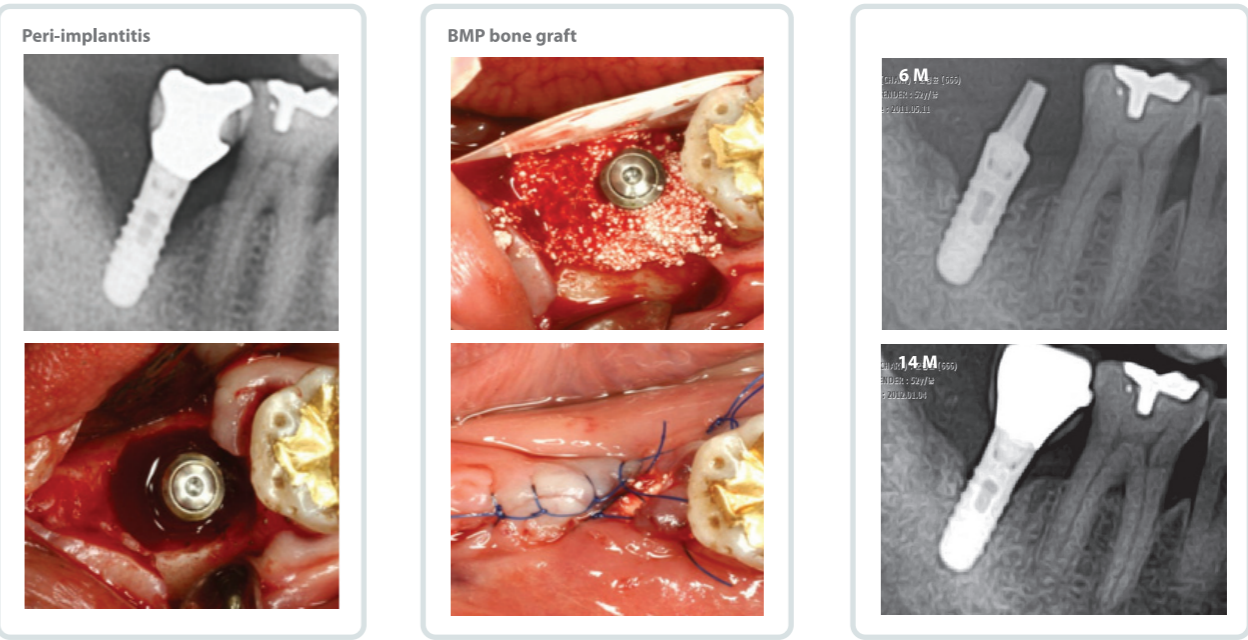
C. CowellBMP was grafted in the area where labial bone for three continuous teeth was completely lost due to chronic periodontitis, and 4 months later, implants were placed in the same area.



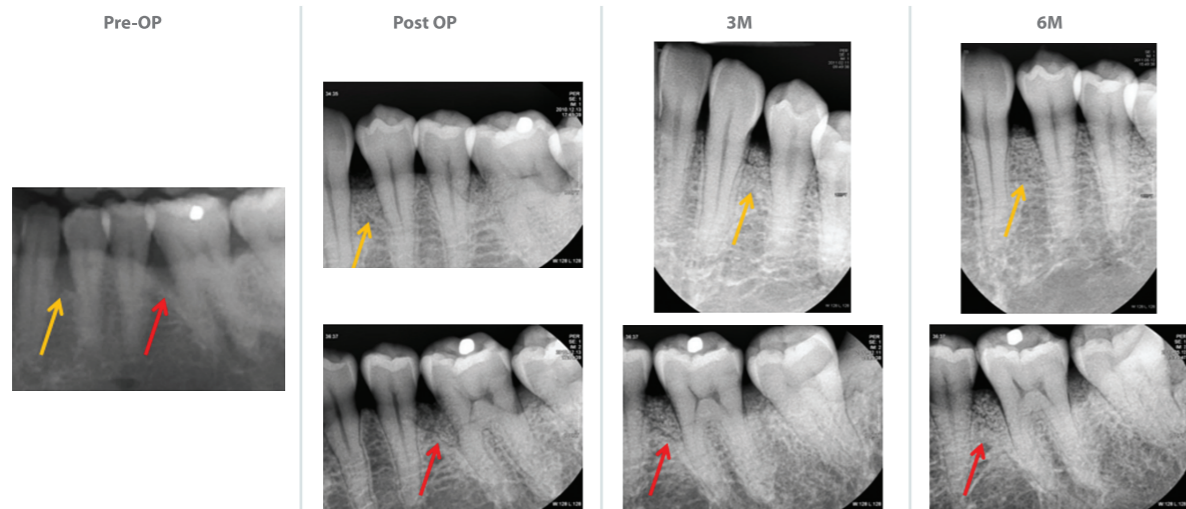
D. Implant was placed and loading is performed five months and six months after the grafting, respectively in maxillary sinus area with osteoporosis where bone quality of surrounding bone was Type 4.



Bone regeneration in periimplantitis



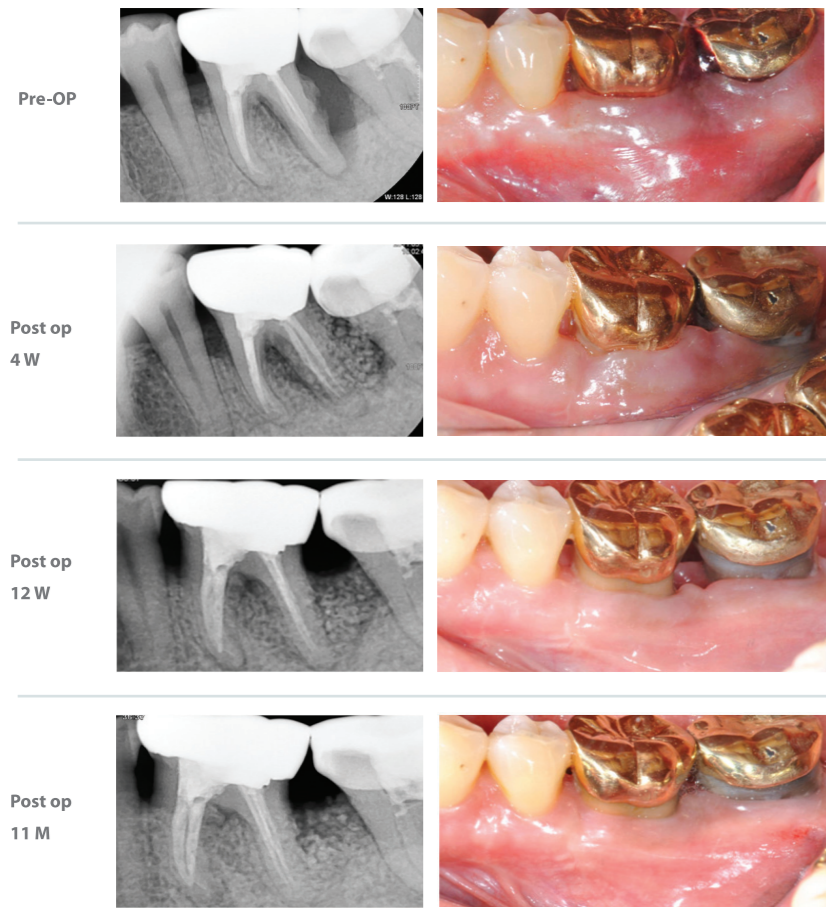
Periodontal regeneration



Clinical probing depth

	#34	#35	#36			#34	#35	#36	
Buccal	6	2	3	3	3	4	8	3	3
Lingual	6	3	2	3	3	3	7	3	3

	#34	#35	#36						
Buccal	2	2	3	3	2	2	3	3	
Lingual	2	3	2	3	3	3	2	3	3



Clinical probing depth

Buccal	3	4	10
Lingual	3	3	9

Buccal	3	3	5
Lingual	3	3	4

Buccal	3	3	5
Lingual	3	3	4

C o w e l l B M P & B O S S

Q & A

Q1. When using CowellBMP graft material, should barrier membrane be used?

Answer : Barrier membrane has an advantage of making the interface between the bone grafting material and the soft tissue distinctive. However, as BMP directly induces growth of osteoblast of osseous tissue as well as fibroblast of soft tissue, new periosteum is regenerated in the grafting site a week after the application of BMP. Thus, bone regeneration is possible without the use of barrier membrane.

Q2. Can CowellBMP be used in combination with other grafting materials?

Answer : When CowellBMP was used in combination with Bio-Oss, a good clinical outcome was observed. CowellBMP can be used in combination with other bone grafting materials. The maximum dose of other grafting material was five times the dose of CowellBMP when BMP solution was used with the graft site sutured. Studies reported that the effect of a combination of CowellBMP and other graft material was two times that of CowellBMP alone.

Q3. Can Cowell BMP be used in place of autograft?

Answer : CowellBMP's growth factor effectively induces bone regeneration through the stimulation of stem cell. Thus, it can be used instead of autograft. However, as CowellBMP does not contain stem cell, the use of CowellBMP in combination with autograft can achieve optimum outcome in wide defect area or areas that need block bone grafting.

Q4. Is there a risk of adverse reaction when CowellBMP is overused?

Answer : Orthopedic clinics in the U.S. reported postoperative edema and pain after administering BMP 50 mg or more. However, it was reported that below 50 mg, the pain was less than that with collection of autologous bone. In dentistry, a maximum of 5 mg is used and thus it is safe. If large amount of BMP is used in combination with collagen sponge as in the U.S., seroma may occur due to the condensation of protein in the center. As CowellBMP does not employ collagen sponge, it has no such risk.

Q5. Why is open sheet technique used in CowellBMP procedure?

Answer : In normal bone grafting procedure, the most important requirement for bone regeneration is that the defective area should be covered using surrounding gingiva and the covering should be maintained for several months. CowellBMP is capable of inducing soft tissue regeneration, and thus the defective area can be covered with newly formed gingiva within three weeks even if the soft tissue was not completely covered. Therefore, it is recommended that the defective area be covered with sheet to prevent the bone-grafting material from escaping. When acute inflammation is present, however, delayed bone grafting is recommended due to the risk of infection.