# BOSTOMR II Osteotome & Ridge Expander ~ Case selection ~

**Eiji Kato**
(Tokyo, Japan)

## Introduction

The classification concerning bone amount (width, height) and bone quality (hard, soft) is assumed to be the index of the initial fixation and the success rate prognosis, and the selection of surgical technique other than the drilling method of placement socket formation have been left to the discretion of the surgeon.

In the case of the enough bone amount and moderate bone quality (II~III type), even if the step drilling method that the standard pilot drill is made a radical starting point is used, the problem is few in the technique and prognosis.

However, in the case where bone amount (width, height) is insufficient, the mistake such as open window, dehiscence, depth and inclination are easy to cause at the bone formation. For the case who has 3mm or more cortical bone that bone quality is hard, the accident (nerve, blood vessel and sinus membrane damage) by formation shortage and drill slipping, the compression osteonecrosis and the dehiscence / recession by pressing are worried to occur after placement. For the case with the cancellous bone that bone quality is soft, the initial fixation shortage by the over formation and the trouble (nerve, blood vessel and sinus membrane damage) by the depth mistake are thought. This time, in order to evade these, the formation technique that uses BOSTOME II Oateotome and Ridge expander is shown.

## Instruments (Fig.1 and 2)

①Osteotome: Osteotome has the hemisphere concave in the point. It is used so that it is sinus floor elevation Osteotome technique (Socket lift) that puts greenstick fracture, bone graft material and autogeneous bone. The instrument is recommended no to be inserted directly in the maxillary sinus exceeding the depth of the existing bone because the maxillary sinus membrane is not damaged.

②Ridge Expander: Ridge expander has the convex shape the same as fixture in the point. According to the bone compression (Bone spreading) technique, the soft bone quality that is over-formed by drill is reformed. Ridge expander is used for initial fixation improvement, prevention of accident by drill control / depth mistake and split crest technique to the moderate stricture stiffening bone (knife edge bone). Bone ① and ② use rotation method by hand pressure and strike method.

③Contra head removable type expander (Rotation type ridge expander or BOS BONE SPREADER)

④Lateral stiffening bone cutting bur (Lindheman Drill etc)

⑤Piezo (Ultrasonic) bone cutting instrument

Fig.1 Osteotome

Curved type　　Straight type

Fig.2 Ridge expander

Curved type　　straight type

## 適応症例 （図3、4）

Fig.3

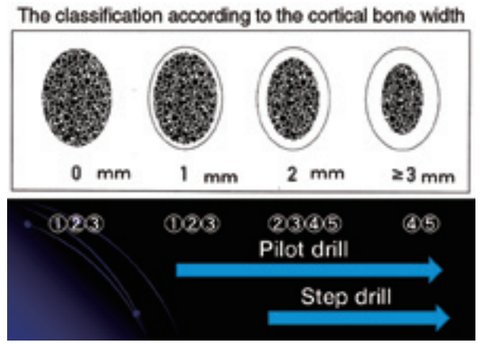
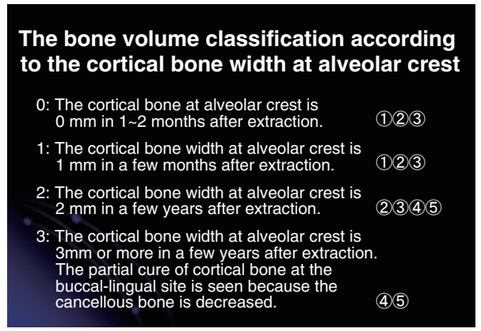



Fig.4




a. Bone width is enough and bone height approaches maxillary sinus floor (4~9mm).
b. Bone width is enough and bone quality is soft (posterior molar area in maxilla).
   The initial fixation is defective.
c. Bone width is enough and bone height approaches maxillary sinus floor.
   Bone quality is soft. The initial fixation is defective.
d. The bone width is enough. However, bone quality of formation socket is different due to extraction socket recovering or regenerated bone (transportation, GBR)
e. The bone width is narrow (less than 2 mm).
f. The bone width is narrow and bone height approaches maxillary sinus floor (4~9 mm).
g. The bone width is narrow. Extraction recovering bone or regenerated bone
h. The bone width is narrow and bone quality is hard (cortical). The low bone marrow (knife edge bone) is necessary to perform cortification and GBR as the 1st surgery. The simultaneous placement is dangerous.

### Case I (Fig.5~15) Osteotome technique (socket lift technique)

In clinic, Misch classified bone quality into 4 types of the hardness of oak, pine, balsa and styrene foam. Versolotti classified the cortical bone into 4 types according to its thickness. Also, he classified the cancellous bone into 3 types (L, M, H) according to the X-ray tones (ash, milk white, white). The classification is assumed to be the bone cutting selection standard. Based on this classification, the author also prepared the instrument in the consideration of bone width and bone quality by the CT image (Fig.3 and 4).

The Patient was 70-year Female. The surgical part was the left posterior molar area in maxilla. This time, the formation with the drill and the depth were decided in consideration of the above (Misch Type 4, Versolotti O-L: Instruments ②③). Also, bone width was wide; so 4.7 and 5.2 EX-HAC was selected. After examination of the bone quality, pilot formation and autogenous bone collection were performed simultaneously by 4.0 trephine bur (Fig.5). In this case, the bone 1~2 mm to the maxillary sinus floor was remained while noting the depth scale of the bur. The bone compression and bone quality were examined by using instruments ①②, and the 4.2 trail guide uses X-ray trial test (Fig.6). Then, bone graft material (HA or β-TCP particle), which has high X-ray density), was augmented into the formation socket fully (Fig.7, 8). The 1mm elevation of the sinus

Fig.5

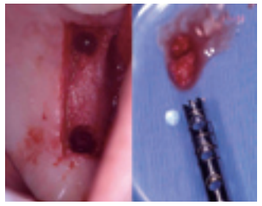


Fig.6

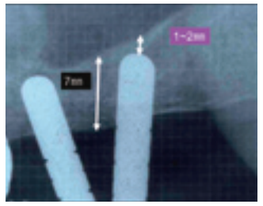



Fig.7


Fig.8

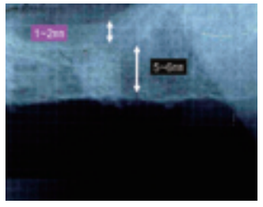



Fig.9

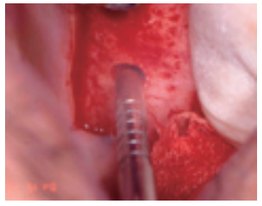


Fig.10

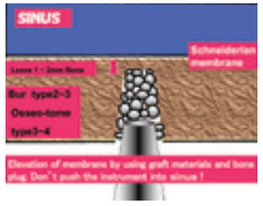



Fig. 5 autogeneous bone
Fig. 6 Trial guide. It remains 1~2 mm to the maxillary sinus floor.
Fig. 7 Bone graft material is augmented into the formation socket

membrane was possible by 1 cup of the 7mm formation socket. Using 3.3~3.9 mm elevated the sinus floor membrane Osteotome while it was rotated by hand pressure (Fig.10). When resistance felt it in greenstick fracture of remain bone of the sinus floor by hand pressure, power was added with strike technique gradually strongly. In the hand pressure technique and strike technique, the depth scale was noted due to the cause of the sinus floor membrane perforation. Instrument was never inserted exceeding the depth of the existing bone. The bone graft augmentation and Osteotome ① press-fitting repeated several times. The sinus floor membrane was elevated up to the selective fixture length (Fig. 11, 12). After elevation, the formation entrance diameter was expanded slowly by ridge expander ②③ up to the same as the fixture diameter or 1 size small diameter when bone quality is soft. Finally, the autogeneous bone was crashed and inserted into the most adjacent part to the fixture point. Then the implant is placed. Neither the postoperative infection nor the accident was admitted. Initial fixation value was more than 35N cm. Bone quality was Type III and bone volume was 7mm. So, impression taking was performed 4 months after surgery. In the case with the bone quality / bone volume shortage, sinus floor elevation and GBR, it should be waited 4~9 months for healing.

Fig.11


Fig.12

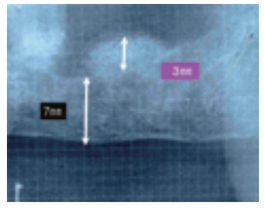



Fig.13

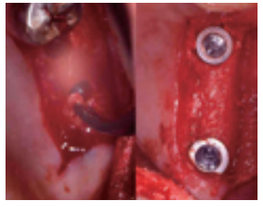


Fig.14

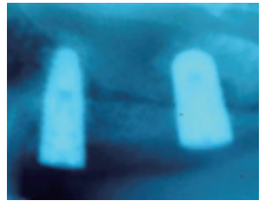


Fig.15

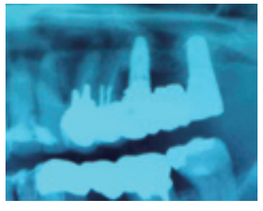


Fig. 12 after sinus floor elevation
Fig. 13 L: Autogenous bone augmentation
R: Fixture placement

Case II (Fig. 16~20) Split crest technique

The patient was 50-year female. Extraction at #30 and bone augmentation by split crest technique at #31 was performed gradually. The bone was cutting vertically up to 10 mm with piezo surgery. Then, the alveolar bone crest was expanded by ridge expander ② and rotation type bone spreader ③. This time, the alveolar bone crest expansion and socket preservation (β-TCP and collagen sponge) at #30 were performed simultaneously. The healing stability of the bone width was waited for 5 months. The bone was still soft partially at the implant placement surgery. 5.2 EX-HAC and 4.2 EX-HAC were placed with drill and instruments ②③.

Fig.16

Fig.17

Fig.18

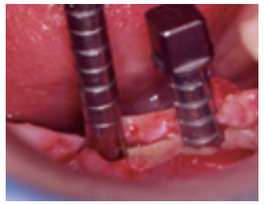


Fig.19

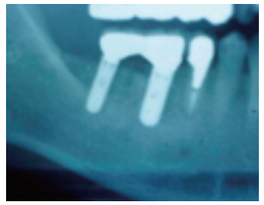


Fig.20

Fig. 16 L: before surgery
R: after surgery
Fig. 17 Split crest
Fig. 18 Ridge expander
Fig. 19 Final restoration

Lab technician: Yuuichi Yuuki

Case III (Fig.21~27) Socket preservation technique

The patient was 60-year female. She had left the root fracture at #12. The bone defect was expanded widely. Also, the bone defect area at # 13 and 14 was adjacent to the maxillary sinus. When #12 was extracted, the socket preservation (β-TCP, Calcium Sulfate, Collagen sponge) was performed for healing promotion of hard and soft tissue. The calcium sulfate and collagen disappeared on the X-ray in 1~2 weeks, and were substituted for the soft tissue. (The bottom β-TCP was remained.). After 5 months, β-TCP also disappeared on the X-ray. When the implant was placed, because the bone on the recovery road was soft, the bur was thrown easily in the usual technique. So, the instrument was used together. After pilot drill, the formation cavity entrance was expanded little by little with instruments ②③. Lateral formation was performed with Lihndeman drill ④ and Piezo diamond tip ⑤ to press against palatal medial side. This operation was repeated and 37-3 pieces HAC was placed. This time, 4.7 EX-HAC was placed simultaneously with Osteotome technique at #14. Also, the lateral bone augmentation (GBR) was performed at #13.

Fig.21
Socket debridement & preservation

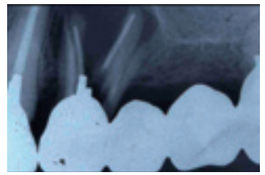


Fig.22

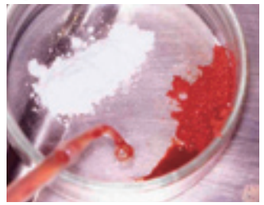


Fig.23

Fig.24

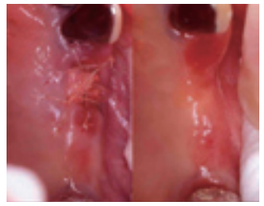


Fig.25

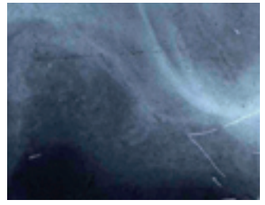


Fig.26

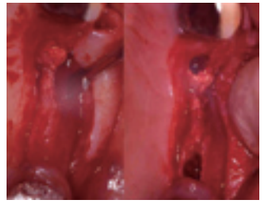


Fig.27

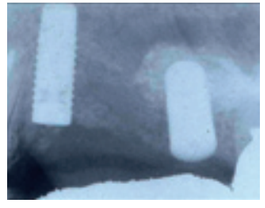


Fig. 23 Socket preservation
Fig. 24 L: Immediate after socket preservation
R: 2 months after socket preservation
Fig. 25 2 months after socket preservation
Fig. 26 5 months after socket preservation
Fig. 27 GBR, socket lift

Case IV (Fig28~32) Immediate placement after extraction

The patient was 30-year female. The immediate placement after extraction was performed due to root fracture at #8. In the esthetic case with the narrow bone width, the sterilization reamer was inserted into the submerged bone wall and it was assumed the index because the placement angle at the palatal bone wall was cleared. The implant placement and socket preservation were performed with instruments ②③, after installing starting point with instruments ④⑤, because the drill did not slip in the direction of the natural root point.

Fig.28

Fig.29

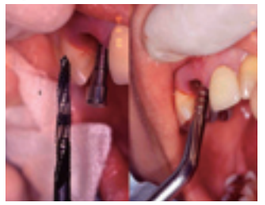


Fig.30

Fig.31

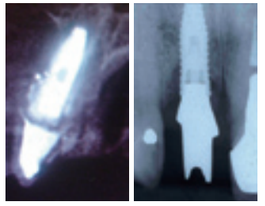


Fig.32

Fig. 29 L: lateral preparation
R: ridge expander

Lab technician: Akiyoshi Takaoka

As mentioned cases, it is considered that the problem is left for the technique, accident and prognosis only by the usual step drill technique. This case's improvement is tried by simultaneous using some instruments, and the excellent passage is obtained.

Though it is a personal opinion, it is great if this text becomes your little references.