

### Introduction

There are many techniques for sinus elevation in implant dentistry. For example, lateral windows technique, osteotome technique, hydraulic sinus condensing technique and hydrodynamic piezoelectric internal sinus elevation etc. In these techniques, hand instruments, rotary instruments or piezoelectric ultrasonic surgery devices are used.

Piezolift technique for sinus is an innovation of crestal sinus lift. In this technique, the piezoelectric ultrasonic scaling device and ultrasonic tips are utilized for sinus lift. It's for the first time that sinus elevation is manipulated by means of the piezoelectric ultrasonic scaling device and its tips. The piezoelectric ultrasonic scaling devices can be NSK Varios, woodpecker DTE, or Saletec Newtron with external saline supply.

The vibration of piezoelectric scaling unit is by far less than piezoelectric surgical unit. The weight of scaling handpiece is lighter and handier than the surgical one. Hence, dentists utilizing piezolift technique gain the best tactile sense and always know where they are. The initial osteotomy can be rather conservative due to the small tips. The osteotomy site is a small hole only 2mm in diameter, through which Schneider membranes are gently elevated by the hydraulic pressure from the ultrasonic tip.

Piezolift can be applied in almost any sinus elevation, which used to be lateral windows technique or osteotome technique. Even in very extreme case that remaining bone height is only 1mm or less, or the sloping, septum exists. Furthermore, the outcome of sinus elevation by piezolift is comparable with the result of lateral windows technique. (Fig 2~Fig 3)

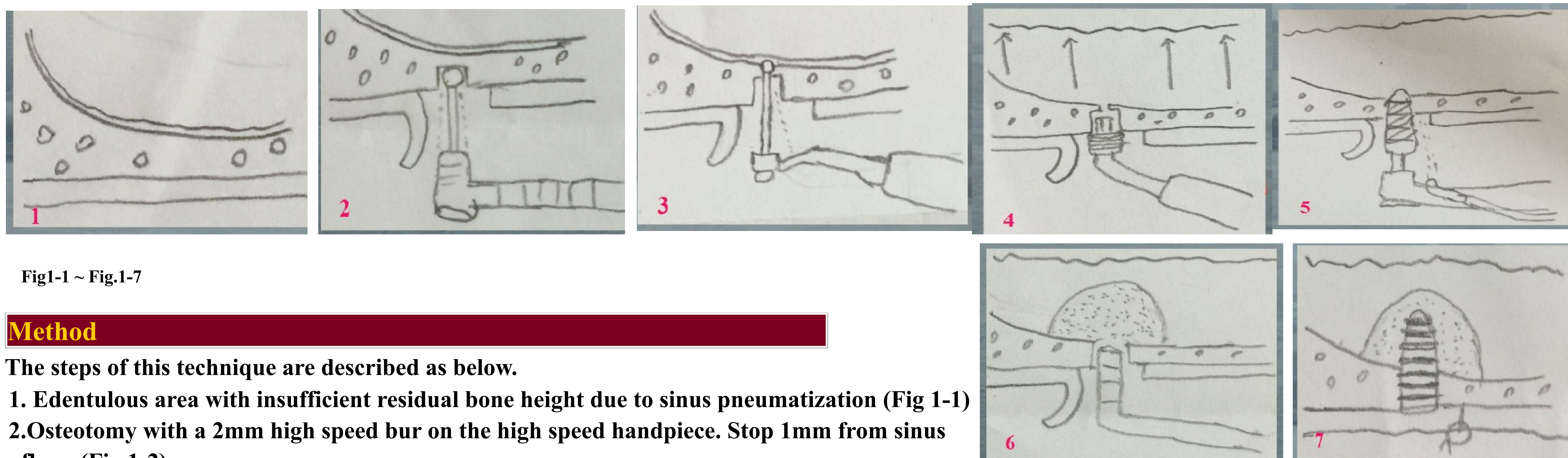


Fig1-1 ~ Fig.1-7

### Method

The steps of this technique are described as below.

1. Edentulous area with insufficient residual bone height due to sinus pneumatization (Fig 1-1)
2. Osteotomy with a 2mm high speed bur on the high speed handpiece. Stop 1mm from sinus floor. (Fig 1-2)

3. Penetration of sinus floor with a 1.5~1.6 mm bur on piezoelectric ultrasonic scaling device. (Fig 1-3)

The tip is NSK V30 temporarily. Customized tip is under development now.

4. Elevation of schneiderian membrane with hydraulic pressure from the ultrasonic tip. (Fig 1-4) The tip is NSK E11 or E12. Alternative is available now.

5. Osteotomy with implant drill. (Fig 1-5)

6. Augmentation with bone graft material (Fig 1-6)

7. Simultaneously implant placement if primary stability can be achieved. (Fig 1-7)

### Clinical Case (Fig.2 & Fig.3)

The tooth #16, #17 are missing for a long time and the remaining bone height above is under resorption to a degree from 2.8mm to 3 mm due to sinus pneumatization. Sinus elevation has to proceed before the regular implants can be placed over #16 and #17. According to sinus classification by Carl Misch, lateral windows technique will be chosen for sinus elevation because of the remaining bone height less than 5mm. Instead of lateral windows technique, piezolift technique is utilized for sinus elevation.

Piezolift proceeds as the above described steps. The schneiderian membrane is elevated as high as 13 mm and remain intact by hydraulic pressure of saline. The graft material is alloplast, Novabone Putty 2.5cc. The graft material extends from lateral wall to medial wall of sinus, which ensures the blood supply and osteoblast not only from schneiderian membrane but also from medial wall of sinus. The patient feels comfortable post operation and have minimal pain and swelling due to the minimal invasive nature of this technique.

The new bone generation can be observed in the CBCT image 4 months after sinus elevation. The implant over #16 is placed in one-stage surgery with excellent primary stability 4 months 20 days after sinus elevation. The implant is Dentsply Xive (D 4.5mm x L 11mm).

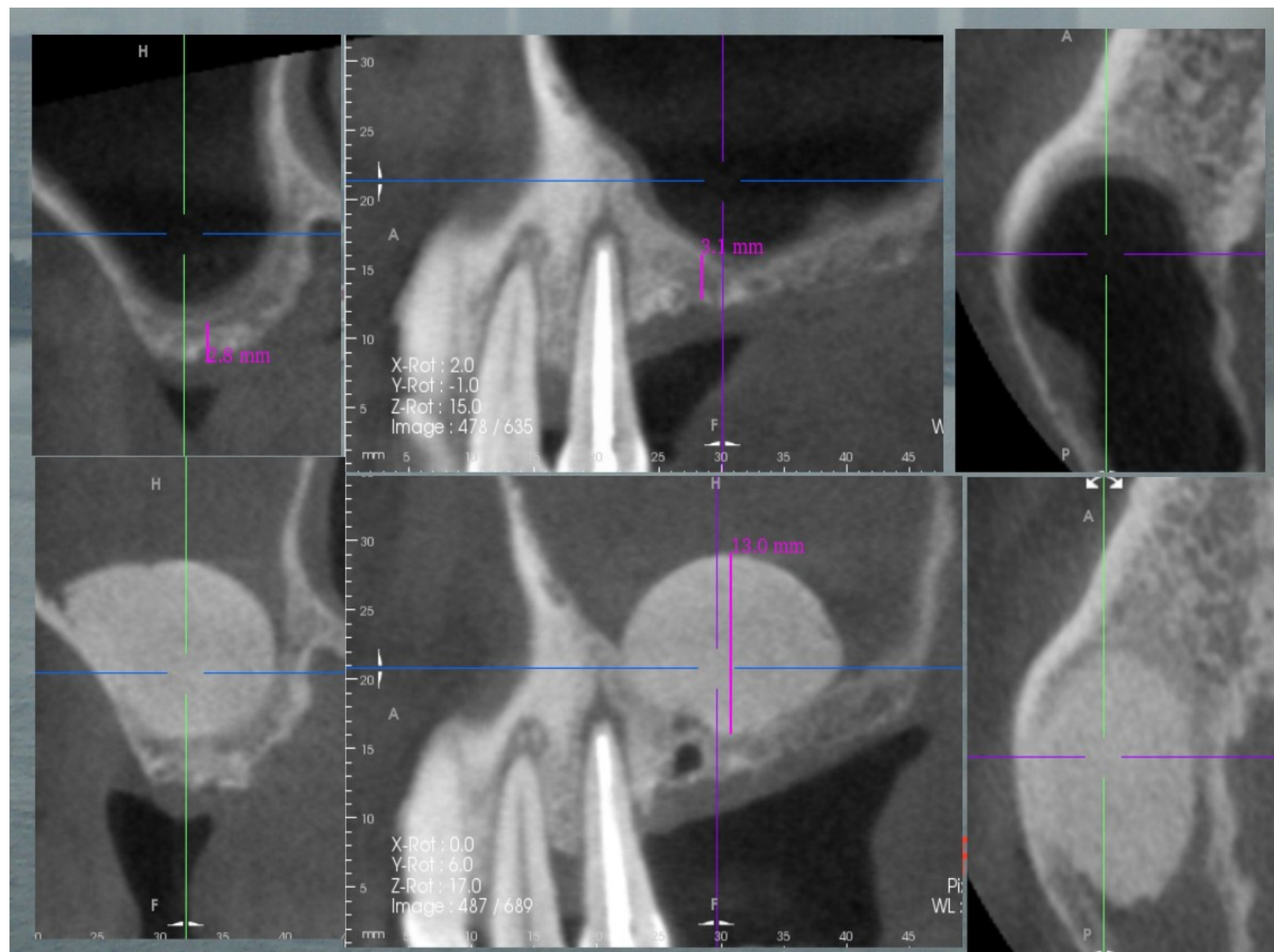


Fig 2 Piezolift over #16,#17 before(U) vs immediate after sinus elevation. Schneiderian membrane lifted more than 13mm in height, comparable with lateral windows technique.



Fig 3 New bone formation 4 months after piezolift. Implant placement in one-stage surgery with Excellent primary stability 4 months 20 days after sinus elevation.