

Accuracy of digital guided surgery and Implant placement in partially edentulous region using One-guide system : A case report.

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Introduction

Digital analysis procedures have become more predictable with the advancement of implant placement along with various alveolar bone environments and digital-guided surgery become more useful choice. This case reports the predictability of implant placement procedure using one-guided system from the patient's partially edentulous region.

Digital Analysis & Method

56 years-old patient missing teeth(#24,25,26,37) planned for implant placement had panorama & CBCT taken.

In general periodontal condition was not good, so overall periodontal treatment was performed first. And the cast and CT data containing intraoral information of the patient were used for digital analysis(fig.1).

[Maxillary alveolar bone analysis]

Digital scan revealed that there is insufficient bone on the buccolingual side of tooth #24(4.0x8.5mm).

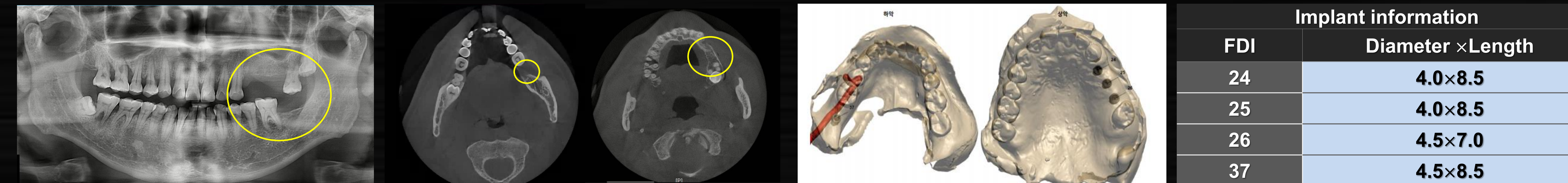
And it can be seen that the sinus floor of #26(4.5x7.0mm) is lacked 1-2mm of vertical bone(fig.2).

[Mandiblar alveolar bone analysis]

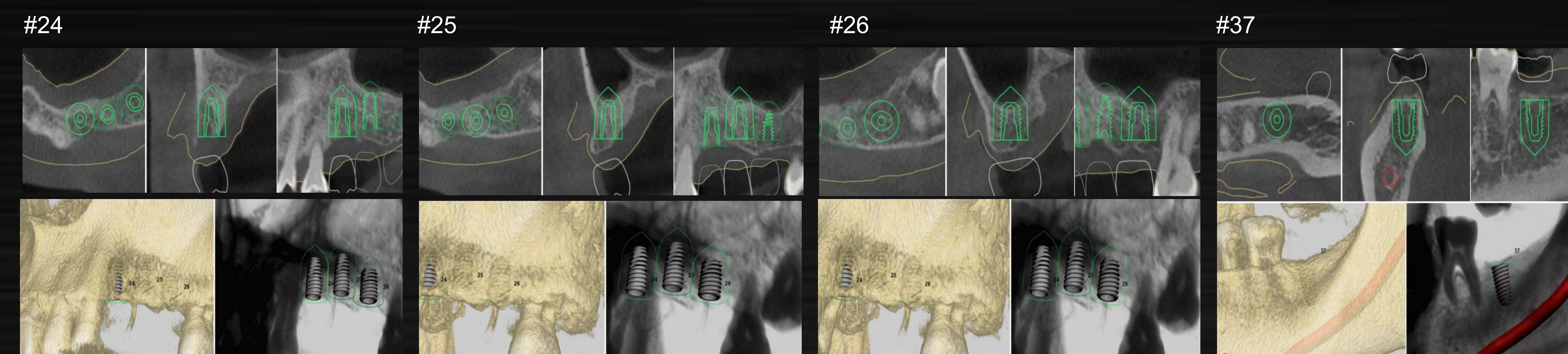
By setting a safe zone from the important structures(IAN) of mandible, It is possible to accurately determine the safe distance from the inferior alveolar nerve before surgery(fig.2).

[Revision by the digital program](fig.3)

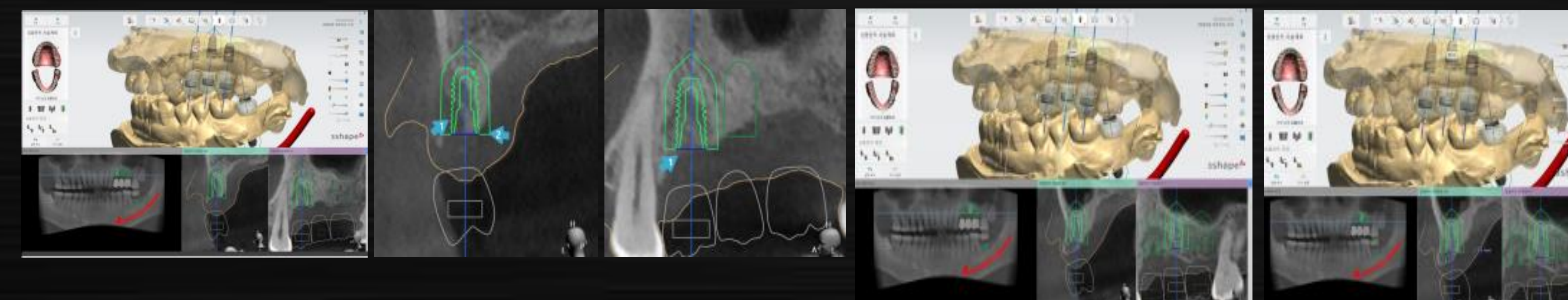
- 1) #25,26 fixture : positioning more longer implant(10mm) based on clinical research.
- 2) #26 : move to palatal side (1~1.5mm)
- 3) No size changes were made except for the implant position.



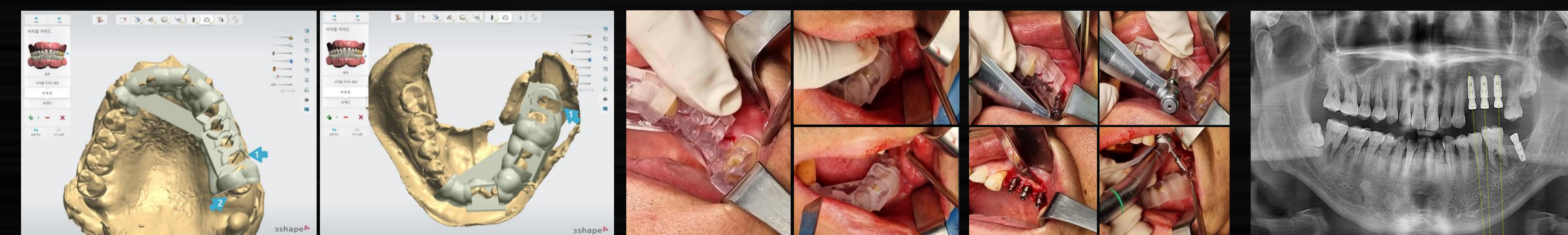
| Fig.1 Patient's radiographic information



| Fig.2 Digital analysis of implant position and anatomical structure



| Fig.3 Progress of revision



| Fig.4 One guide system device fabrication | Fig.5 Clinical application

Clinical Adjustment using one-guide device

Checking device suitability prior to surgery. Open type makes it easier to set the posterior path, but the drill may be moved to the side. The initial drilling and twist drilling could be done reliably. In actual clinical practice, the length of the implant used in the maxilla was determined to be 1.5mm longer than plan without bone graft. After placement using the device, it can be confirmed that the implant is placed in parallel.(fig.4,5)

Results

Surgical reproducibility is achieved from the virtual planning in terms of the accuracy. Deviation at the level of implant entry was 1~1.5mm. The angular deviation of #24 was of 2.11 degrees in radiographic post-op view.

Unlike the existing digital plan, in actual clinical practice, the length of the implant was expanded by 1~2mm. But there was no clinically significant problems occurred.

It was confirmed that the implant was positioned at a clinically desirable location and spacing even if there was a slight error.

Discussion

- One-guide device is accurate and useful for positioning the initial drilling.
- The implant path and intervals were more constant. But, it is difficult to check whether the drill is pushed sideways while drilling.
- Implant surgery accuracy using one-guide system is within the acceptable range in most of the clinical situations. However, a safe distance of at least 2mm is recommended.
- A wide variety of factors may contribute to deviations in the implant real position or size. Such factors include mouth opening, guide sterilization, errors during model scanning and CT scanning, as well as the offset.