



# ISW for Upper Central Incisor Impaction Traction: A Case Report

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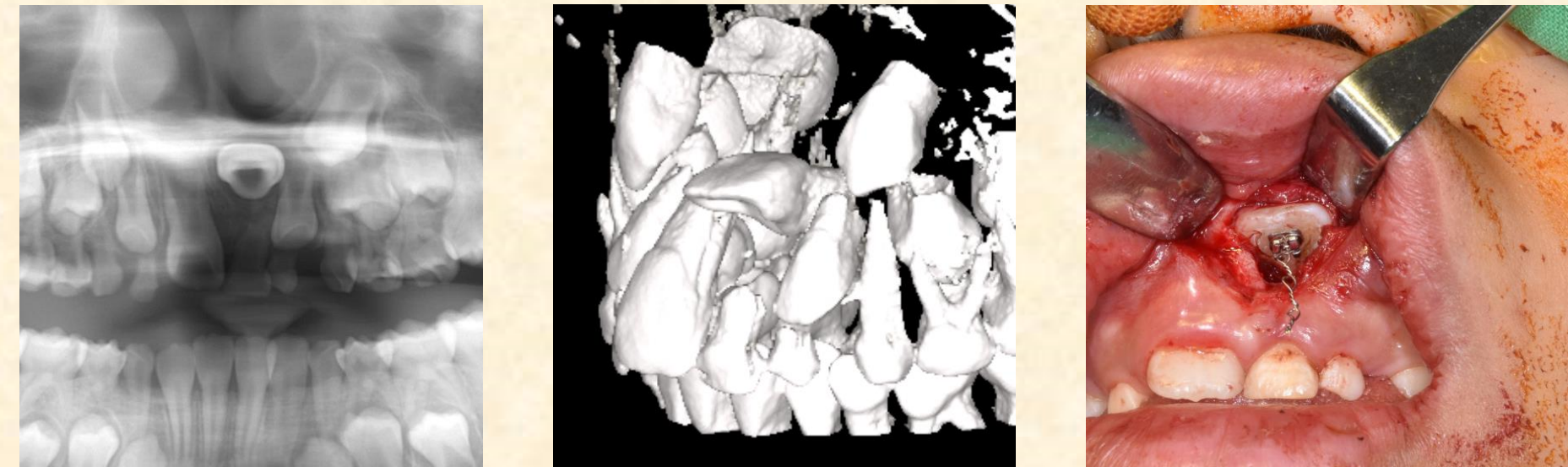


## Introduction

Comparing with other types of impactions, maxillary central incisor impaction is usually the earliest and easiest type to be noticed. The prevalence of maxillary central incisor impaction is below 0.2%, and bilateral impaction is far below unilateral impaction.

The etiologies of maxillary central incisor impaction include mechanical obstruction, trauma to deciduous tooth, tooth bud primary displacement and congenital/genetic problems. The most common situation of mechanical obstruction is supernumerary tooth. Minor traumas might lead to tooth intrusion, which raise the possibility of tooth dilaceration and cause tooth impaction. If the deciduous teeth are extracted earlier due to trauma, subsequently gingival fibrosis can also affect the eruption. Tooth bud displacement is mainly the reason of canine impaction. However, labial rotation of the incisor crown can also result in tooth dilaceration. Congenital or genetic problems can accompany with tooth obstruction or dilaceration.

We used Improved super-elastic Ti–Ni alloy wire (ISW, L & H Titan, Tomy International, Tokyo, Japan) as the main and only wire in this case. ISW is endowed with three superior abilities: super-elasticity, shape memory, and damping capacity. The wire can be engaged into the impaction tooth and can provide early dental torque control with ease, which is favorable in horizontal impaction case.



**Figure 1:**

Left: Pre-treatment panoramic radiograph.  
Middle: Pre-treatment cone-beam CT.  
Right: Surgical exposure under general anesthesia.



**Figure 2:**

Left: Orthodontic traction began one week after the surgery.  
Middle: At the second month, with step-bend and crimpable hook, we can adjust the traction direction.  
Right: At the fourth month, 0.016-inch x 0.022-inch ISW archwire was engaged into the bracket of impaction.



**Figure 3:**

Post-treatment intraoral radiograph and panoramic radiograph.

## Case report

A nine-year-old boy with a chief complaint of maxillary left central incisor delay eruption came for orthodontic evaluation with his family. Clinical examination revealed skeletal Class I relationship and convex profile appearance. Panoramic film and CBCT image showed maxillary left central incisor horizontal impaction (Figure 1).

We arranged surgical exposure under general anesthesia. Orthodontic traction was started one week after the surgery. First, we used ligature wire and crimpable hook for impaction traction. After two months, we adjust the traction force direction with step-bend. At the fourth month, 0.016-inch x 0.022-inch ISW archwire was engaged into the bracket of impaction tooth (Figure 2). After leveling and alignment, the active treatment was finished in 9 months. The impaction tooth was tractioned to proper position. Fixed retainer was bonded to four anterior teeth (Figure 3).

In central incisor impaction case, it might be difficult to decide when and how to traction. In most situation, when chronological age is about 8-9 years olds or the root is at least two-thirds of its eventual root, we can start the orthodontic treatment.

Surgery type can be another issue. In this case, the surgeon decided to perform surgical exposure. According to Kokich V.G., there are at least three ways to uncover the impaction tooth, including gingivectomy, apically positioned flap (APF), and the closed eruption technique. Gingivectomy and APF will influence the contour of gingiva. Many Taiwanese have thin gingiva phenotype, and the closed eruption might be more favorable in this case.

Maxillary central incisor impaction is the most noticeable type of impaction. Appropriate time to start treatment is essential. The use of the ISW can simplify the entire treatment and achieved a desirable result. The patient and his family were satisfied with the outcome.

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