

# Treatment of Impacted Cuspids

## The Hazard Lasso

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*A clinical report illustrating hazards of the long-used lasso technique that is now being replaced by bonding and other less invasive methods for accelerating and guiding the eruption of impacted cuspids.*

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Impaction of a permanent tooth is a reasonably common occurrence in children.<sup>1,2</sup> Excluding the third molar, the maxillary cuspid is the most frequently impacted tooth in the dentition.<sup>3</sup>

Several theories have been suggested to explain the reason why these teeth fail so frequently to erupt. Early loss of primary teeth, crowding of the successors, retained primary cuspids, dentigerous cyst, ankylosis and a myriad of other hereditary and environmental factors may cause a change in position and subsequent deviation from the normal path of eruption. It has also been suggested that the long eruption path from its high developmental origin under the floor of the orbit may contribute to the frequency of this deviation.<sup>3</sup>

The orthodontist faced with an impacted tooth must decide whether or not the tooth might be moved and then select a procedure to move it to the arch. A considerable range of surgical and orthodontic techniques

have been used with varying degrees of success in the management of these impacted teeth.<sup>4</sup> Most commonly the tooth is surgically exposed, followed by its orthodontic guidance into the dental arch.

Prior to the introduction of the acid-etch bonding techniques, a popular approach had been to lasso the cervical area of the impacted tooth with a circumferential ligature wire at the time of surgical exposure.<sup>5</sup> This often requires channeling and removal of a large portion of bone overlying the impacted crown.

Surgical skills and extreme caution are needed to avoid damaging the adjacent teeth, especially in those cases where the impacted crown lies in close proximity. Such ligature wires are snugly twisted by the surgeon to avoid slippage when force is applied to move the tooth into the dental arch.

A frequent complication of the ensuing orthodontic procedure is the inability to move the tooth due to ankylosis. Additionally, the movement of an impacted tooth involves risks of discoloration, devitalization, root resorption, loss of cervical bone and long clinical crown with lack of attached gingivae. The patient and/or parents should be fully aware of these risk factors.

Many impacted teeth, particularly maxillary cuspids, have been treated with the lasso wire technique over the years with minimal or no damage to the teeth or their supporting structures. However, of all of the previously enumerated factors the risk of external root resorption is especially related to the lasso wire technique. Therefore, the hazards of using this technique are discussed in the ensuing cases to alert and caution both orthodontists and oral surgeons.

#### CASE I

A 17-year-old male with an unerupted maxillary left permanent cuspid was referred for orthodontic consultation. His dental history included a surgical exposure of the impacted tooth three years earlier, with no orthodontic follow-up. Radiographic examination revealed an impacted cuspid with a lasso wire around the cervical area of the tooth (Fig. 1). The free end of the wire was not protruding through the palatal mucosa. Ankylosis was suspected, as the periodontal membrane could not be followed radiographically along the root. The alveolar lamina dura appeared to be obliterated. External resorption at the cervical region of the tooth was evident, apparently as a result of the lasso wire left in situ for a period of over three years.



Fig. 1 External root resorption under a lasso wire around the cervical area of an impacted maxillary left cuspid.

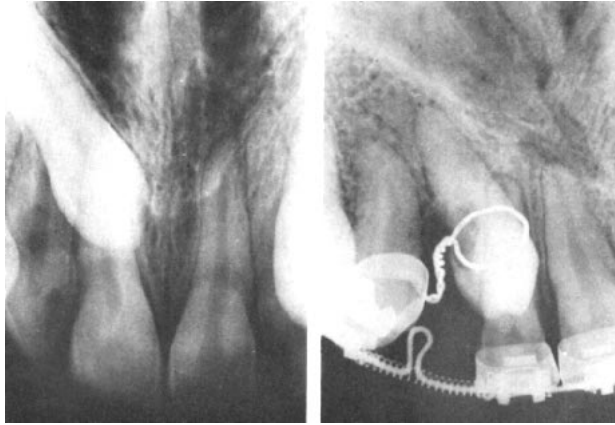


Fig. 2 An impacted maxillary right cuspid. Left: before treatment. Right: External root resorption under a lasso wire.

#### CASE II

An 18-year-old female with a Class I malocclusion presented with a retained maxillary right deciduous cuspid and inadequate space for the impacted successor (Fig. 2a). Orthodontic appliances were placed on all of her teeth and space for the impacted cuspid was opened with a coil spring. The impacted tooth was surgically exposed, ligated with a lasso wire and light force applied to pull the tooth through the palate. A follow-up radiograph showed resorption of the tooth in the area immediately under the lasso wire (Fig. 2b). The resorption appeared to progress inwardly toward the root canal.

#### CASE III

A 14-year-old female with a Class I relationship presented with a retained maxillary left deciduous cuspid and a mild lack of space for the permanent tooth. The patient's radiographs showed an impacted maxillary left cuspid with cystic degeneration of the follicle. (Fig. 3a).

The treatment plan called for removal of the deciduous tooth and surgical exposure of the impacted tooth, followed by orthodontic guidance into the dental arch. Because its crown was in close approximation with the root of the lateral incisor, an iatrogenic fracture of this root occurred during the surgical exposure and ligation of the circumferential wire around the impacted cuspid. (Fig. 3b). Orthodontic treatment was designed to move the impacted tooth very carefully and align it in the dental arch. No pain, discoloration or devitalization was detected on the fractured yet stable lateral incisor, and no resorption was detected in the cuspid at any stage during or after treatment (Fig. 3c). Upon completion of orthodontic treatment the patient was referred to her general dentist for follow-up care of the fractured lateral incisor.

#### DISCUSSION

It has been stated that any impacted tooth is liable to undergo re-



Fig. 3 An impacted left maxillary cuspid with enlarged follicle and retained deciduous precursor. Left: Before treatment. Center: Lasso wire in place, space opening; lateral incisor was fractured at the time of surgical exposure. Right: Cuspid in place.

sorption. This most commonly originates on the enamel surface, less often at the cemento-enamel junction, and rarely on the cementum.<sup>6</sup> Resorption occurs when the enamel epithelium around the crown is destroyed, bringing connective tissue into direct contact with the tooth enamel. The resorptive process appears to proceed initially in an irregular manner through the enamel and subsequently the dentin.<sup>7</sup> Incidence of coronal resorption in impacted cuspids was reported to be in the range of 8-14%. Local inflammatory processes have been suggested as another cause of this resorption.<sup>8,9</sup>

Unlike the coronal resorption found in embedded cuspids, the circumferential lasso wire technique used in their correction can result in external resorption at the cemento-enamel junction. One possible explanation is that the wire may have been twisted too tightly around the tooth, creating continuous pressure on the cementum. This, in turn, may cause

alteration in the cellular activity within this tissue. It seems possible that once started, this surface resorption will continue to advance inward, through the dentin and into the root canal. This may continue even after removal of the wire, and sometimes results in devitalization of the tooth (Cases I, II).

Most impacted cuspids and their often enlarged developmental follicles lie very close to the roots of the lateral incisors. This can place the periodontal attachment of those teeth at great risk, both from the unerupted tooth and from efforts to retrieve or remove it. The root fracture in the third case shown is an extreme case in point; many apparently successful cases can also suffer hidden damage that may not become apparent for many years.

Clinician and patient must both be fully aware of the many varied risks presented by these teeth. Careful management can do much to minimize them, but they cannot be eliminated.

Early intervention and conservative management are paramount. Surgical efforts should place a high priority on preservation of adjoining teeth and their periodontal attachment. Orthodontic efforts can now use less invasive methods than the lasso.

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