

Impacted teeth: what should we know?

Editorial

In our orthodontic practice, we are confronted to many challenges, and one of them is tooth impaction. The impaction is an anomaly of dental eruption that could affect any permanent tooth and this impaction is to be considered pathological, when the natural eruptive force of the tooth has stopped.¹⁻³ and this occurs at the completion of the root development and the closure of the apex. Besides the third molars, the maxillary permanent canines are the most commonly impacted teeth with a reported prevalence of 0.9% to 3.3%.^{4,5} About two thirds of these impacted maxillary canines are located palatally whereas the rest are located labially or within the alveolus.² Less frequently observed is the impaction of the maxillary central incisors with an estimated prevalence ranking from 0.06% to 0.2%.¹ and it is usually diagnosed in the early mixed dentition stage.⁶⁻⁷ The other teeth can eventually be impacted but with a very lower prevalence.

The etiology of tooth impaction is usually related to either a lack of space for a natural eruption, a retained deciduous tooth, a diversion of the tooth bud, or an idiopathic failure of eruption for unknown origin.⁶ Other known factors are also an obstacle hindering eruption, cysts, or a trauma on the temporary dentition.⁵

An impacted tooth is first diagnosed on a panoramic X-ray, being the routinely radiological assessment and orthodontist does besides the lateral cephalometric X-ray. The panoramic could give us a first impression on the severity and on the position of the impacted tooth. Katsnelson,⁸ did a study to assess the reliability of the panoramic to determine the position of the impacted maxillary canine. He concluded that inclination of the canine is a good indicator of its position. When the canine is tipped and the angle between its axis and the true horizontal varies from 0 to 60degrees, the canine is usually palatally impacted, while it is labially impacted when the canine is more up righted and the angle is between 70 and 110degrees. Of course the use of the Cone Beam Computed Tomography (CBCT), with or even without 3D reconstruction, remains the best alternative to visualize with high precision all factors related to the impacted tooth.

Following the space opening phase using orthodontic fixed appliances, comes the surgical procedure. Three techniques are available to uncover an impacted canine: the excisional uncovering, the apically positioned flap and the closed eruption technique.^{6,9} For labially impacted canines that are close to the occlusal plane, the excisional uncovering is usually used when the canine is covered with an important amount of attached gingiva, while the apically positioned flap is used with lack of attached gingiva. For the high impacted canines, whether they are labially or palatally impacted, the closed eruption technics remains the surgery of choice. Regarding the palatally impacted canines that are close to the gingiva an excisional uncovering could be performed.

For the traction of the impacted canines many mechanical devises exist, such as the ballista spring or the spring auxiliary wire, as well as many efficient other devises that could be used with or without Temporary Anchorage Devises (TADs).

In order to achieve a successful traction of an impacted tooth most specifically of impacted canines, being the most frequent

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impacted teeth, we should assess the difficulty of the situation. Many authors,¹⁰⁻²⁰ tried to realize this challenge by evaluating the treatment options, while others studied the treatment duration and even done an audit of management techniques over a 27-year period.¹⁴ Some authors went further by analyzing the failure or success rate of these impacted teeth or even establishing a treatment difficulty index for unerupted maxillary canines.¹⁵⁻¹⁷ Those authors came to a conclusion that besides ankylosis, 3 major factors, related to the patient, are the key points to indicate the difficulty of the case and the risk of failure. Other factors are related to the orthodontist in the risk of failure, such as poor or bad diagnosis or none adapted mechanics. These factors are completely eliminated in the presence of specialists with perfect control of their mechanics. Therefore the points related to the patient are:

- a. Patient's age.
- b. Impacted tooth position.
- c. Patient's buccal hygiene and cooperation.

An 18 years old patient is considered by 60% of the authors,^{9,10} as being in the critical age where the case turns to difficult, while the other 40%,^{15,16} consider that 16 years is beginning of the critical age. We have to clarify that without a difficult tooth position age does not have a very important impact.

As for the tooth position we can start with the vertical height. When the canine cusp tip is at the cemento-enamel junction of the adjacent lateral, we have a good traction prognosis. When it is at the lower half of the lateral root we have a fair prognosis. When the canine cusp tip is at the upper half of the root of the adjacent lateral we consider having a poor traction prognosis, and when above the apical third of the adjacent incisor then we have a bad prognosis.

We do have also the canine angulation with the true vertical: When the canine has a tipped angulation less than 30 degrees, we then have a good traction prognosis, while between 30 and 45 degrees a poor prognosis and if more than 45 degrees we consider a bad traction prognosis.

Finally we have the horizontal position: When the canine overlaps half of the adjacent lateral we have a low difficulty, when it overlaps

the whole lateral we have a medium difficulty, and beyond that we have an important difficulty.

As a matter of fact the position of the canine is considered to be difficult when a combination of these three dimensions occurs, and the situation is more complicated when the difficulty is more important in each factor.

Finally, a poor oral hygiene and a bad patient's cooperation can complicate any normal treatment not to talk about complicated ones including impacted teeth.

Most authors.¹⁵⁻²⁰ recommend that when a patient has a difficult tooth position, the case is considered hard to treat, and will need lots of cooperation and skills to get through it to a satisfactory ending. When the patient presents a critical age combined to a difficult impacted tooth position, then the case is considered hard with high risk of failure. Finally when the patient has a critical age, combined to a difficult impacted tooth position, and to a bad oral hygiene and cooperation, the recommendations become to extract the impacted tooth in order to minimize the treatment duration and the treatment difficulty.

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Conflicts of interest

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