

## PROBLEMS ENCOUNTERED WITH ORTHODONTIC MOVEMENT OF IMPACTED MAXILLARY CANINES (Laporan Kasus)

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Chandra Wigati: Problems Encountered with Orthodontic Movement of Impacted Maxillary Canines. Jurnal Kedokteran Gigi Universitas Indonesia. 2003; 10 (Edisi khusus): 743-747

### Abstract

Maxillary permanent canines are impacted in about 2% of orthodontic patients, second only in frequency of impaction to third molars. Bringing an impacted canine into the arch creates a set of problems, primarily because it is usually a long way from the line of occlusion. Four cases of impacted maxillary canines are presented to show some of the problems encountered during orthodontic traction of these teeth. The cases were treated using a preadjusted edgewise appliances. Careful judgement are needed to treat impacted maxillary canines successfully, and to minimize discouraging side effects that often occurs during the procedure.

Key Words: Impacted maxillary canines, edgewise appliances

### Introduction

Bringing an impacted maxillary canine into the arch is one of the most challenging tasks traction of an impacted canine, that requires very careful judgement. During the orthodontic the orthodontist should be careful to avoid the harmful sequel of devitalization, external root resorption of the lateral incisors, unwanted reactive forces of the neighboring teeth, distortion of the arch form, lateral or anterior open bite, etc.

Often a critical decision has to be made whether to extract the first premolar and make room for the impacted canine or to extract the canine and leave the first premolar as a substitute, thus giving a compromise orthodontic result.

Four cases of orthodontic treatment for impacted maxillary canines are presented, problems and unwanted side effects that happened during the treatment are shown. The three first cases are presented to show the difficulties in treating impacted maxillary canines, where as the last case shows that the treatment for impacted canine can be simple if the position of the canine is reasonably good and the anchorage is carefully controlled during the treatment.

### Literature studies

Maxillary canines have the longest period of development, the deepest area of development, and the most difficult path of

eruption of all teeth. Their normal age of emergence is between 11 & 12 years. Other than the third molars, the maxillary canines are the most likely to remain unerupted. They are also the teeth that most commonly require surgical exposure and orthodontic guidance during eruption. The frequency of maxillary canine impaction is significantly higher than that of the mandibular canine.<sup>1</sup>

As the maxillary canine has the longest path of eruption; any bony obstruction, insufficient bone development, crowding or resistance of the neighboring teeth may deflect the canine from its normal path.<sup>2</sup>

Although impacted canine might cause no untoward effects, but it can cause: migration of the neighboring teeth, loss of arch length, internal dentigerous cyst formation, external root resorption, and referred pain.<sup>1</sup>

Extraction of the impacted canines is generally contra indicated, the option to extract the canines should be considered for: ankylosed teeth that cannot be transplanted, canines undergoing external or internal root resorption, teeth with severe root dilacerations, canines lodged between the roots of the central and lateral incisors with a risk of jeopardizing these teeth during orthodontic treatment, teeth with pathologic changes, and when the occlusion is acceptable and the first premolar substitutes for the canine in otherwise functional occlusion with good alignment.<sup>1</sup>

### Case report

Case I : A 21 year-old female sought orthodontic treatment because of an impacted maxillary right canine. She had a class I occlusion with a mild crowding, the midline shifted to the right. The profile was slightly convex. Radiographic examination showed that an odontoma obstructed the eruption of the canine, its inclination was good.

0.018-in preadjusted appliances were placed, and a trans palatal arch (TPA) was used as an anchorage. The impacted canine was surgically exposed and the odontoma removed. All the second premolars were removed, and the maxillary

right first premolar was retracted to make space for the impacted canine, a traction was applied to pull the canine after the space was available. After sometime, the impacted canine did not show any noticeable movement, the gold chain was accidentally lost, so the patient was sent to the oral surgeon to have the canine uncovered again. During the surgery it was found that remnants of the odontoma were still present. Four months after the bracket on the impacted canine was rebonded and the odontoma were totally removed, the canine could be successfully pulled.

Case II : A 12 year-old girl presented with a class II malocclusion, a moderate crowding and an impacted maxillary left canine. No midline deviation and her profile was convex. The crown of the impacted canine tipped mesially between the root of the maxillary left central and lateral incisors.

The four first premolars were extracted, with the maxillary left first premolar extracted after the impacted canine was proved ankylosed. 0.018-in preadjusted appliances were placed on both arches. After all the teeth except the impacted tooth were well aligned, the impacted canine was surgically uncovered and pulled distally.

The impacted canine was picked up with an 0.016 NiTi, and all the teeth were tied to the archwire. It was noted that while the impacted canine was being extruded, a lateral open bite developed. One year after, the impacted canine was successfully aligned, a finishing 0.017 x 0.025 TMA wire was placed on the maxillary arch.

Case III : A 15 year-old boy presented with a class I malocclusion, bimaxillair protrusion and moderate crowding. His chief complaint was the absence of maxillary right canine. His profile was slightly convex. The maxillary midline was deviated to the right, and the space for the impacted canine was occupied by the distally inclined right lateral incisor. The impacted canine was almost horizontally positioned, with its root above the root apex of the right second premolar and the crown above the root apex of the right lateral incisor.

Treatment was initiated on the

maxillary arch. Five months after the 0.018-in preadjusted appliances were placed, the impacted canine was surgically exposed, and pulled to the occlusion. After the canine showed some movement, the maxillary right first premolar was extracted. During the treatment the patient informed that he would move soon, so the extraction of the other teeth were postponed. An 0.017 x 0.025 SS with hook and power chains were used to pull the canine, but a lateral open bite developed. The open bite was resolved by using flexible wire, the impacted canine was by passed. An open bite developed again when an 0.016 NiTi was used to pick up the canine, so a NiTi overlay on an 0.016 SS main archwire was used to pick up the canine. As the open bite persisted, the wire was changed to an .016 x .022 NiTi, and the maxillary second molars were banded. At this stage the patient could not continue the treatment.

Case IV : A 12 year old girl came for orthodontic treatment with the chief complain of impaired facial esthetics due to the unerupted right maxillary canine. Her profile was slightly convex. Clinical examination showed a good relation of maxillary and mandibular arch and a mild crowding. The root formation of the impacted canine was complete, the position was good, and odontoma obstructed its eruption.

As the patient's main concern was only the impacted canine, it was determined that a non extraction approach would be the best choice. The odontoma was removed and the impacted canine uncovered. Interproximal stripping was done to make space for the canine and to relieve crowding. TPA was used as an anchorage. 0.018-in preadjusted edgewise appliances were placed on the maxillary arch, an 0.016 Ni Ti was used to start aligning the teeth, the impacted canine was bypassed. Two months later, an 0.016 SS with a circle pointed downward below the impacted canine was placed and power chains were used to pull it. the force was kept very light. After one month an 0.016 NiTi was used to pick up the impacted canine, the right first premolar and right lateral incisor were bypassed, and the central incisors

were tied as one unit. Four months later an 0.016x 0.022 TMA was placed when leveling had been achieved in the maxillary arch. Toward the end of finalizing the maxillary arch, the mandibular arch was bonded to achieve inter arch finishing.

## **Discussion**

Many techniques and appliance designs have been proposed to bring an impacted canine into its proper position in the arch. The key factors are : Application of a light, continuous force to move the canine. Initial vertical eruption of the canine, away from the roots of the adjacent teeth. Minimization of the side effects.<sup>1</sup>

When trying to orthodontically erupt an impacted canine, the problem of the canine being ankylosed may not be ignored. As the patients get older, the impacted teeth tend to become ankylosed. If a tooth has been extracted with the expectation of bringing an impacted canine into the arch and later it was found that the impacted canine would not move, then it can be a disaster.<sup>4,5</sup>

The impacted canine would not move if there was an obstruction, as shown in case I, the canine moved only after the odontoma was removed completely.

Without adequate anchorage, a lateral open bite often developed when the impacted canine was picked up, as shown in case II and III. It seemed because the canine had a big size and a long root, it served as an anchorage, so while it was extruded, the neighboring teeth were intruded. A lateral open bite still developed in case III even when a full size rectangular wire and elastic chains were used to pull the impacted canine distally. When elastic chains are used to deliver the single erupting force to the canine from a rigid base arch wire, the forces must be kept light because of the high load deflection rate. The maximum force level of the traction on the maxillary canines should be kept below 2 oz.<sup>1</sup> A head gear, a TPA should be used, or the second maxillary molars banded to add anchorage in these cases. If an open

bite still occurred, the opposite arch could be used as an anchorage to pull the impacted maxillary canine.

In case IV the treatment procedure was not complicated, because the position of the impacted canine was favorable, the anchorage preparation was good, and the patient was young.

## Conclusion

Accurate identification of the location of the impacted canines, correct surgical exposure and removal all the obstruction are necessary in the successful treatment of impacted canines.

To move the canine and not the other teeth, a good anchorage control has to be prepared. TPA, head gear, full size rectangular wire, overlay on rigid main arch wire, and using the opposite arch as an anchorage are some ways to add anchorage. Active traction is better delayed until the main arch wire is rigid enough, to maintain arch form and anchorage.

The greater the displacement of the impacted canine and the greater the surgical trauma, the poorer the prognosis. Not all the unerupted canines can be salvaged, if the position of the impacted canine is unfavorable and the first premolar is in a good position, then it is better to extract the canine.

Experiences of the orthodontist and a good team work between the orthodontist and the oral surgeon are also important factors. An informed consent has to be made to prevent the orthodontist from an uncomfortable situation when the impacted canine failed to be placed in its correct location and the first premolar has been extracted.

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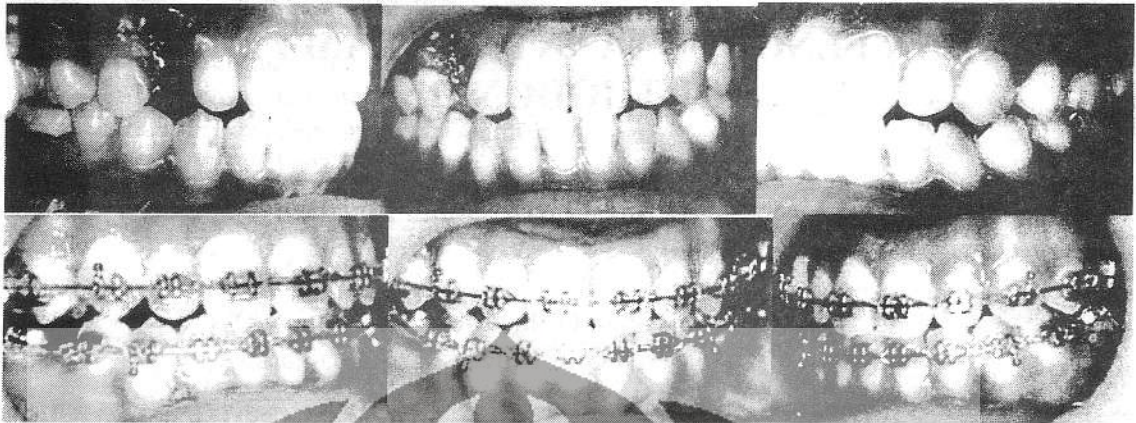


Fig. 1. Case I : Pretreatment and 12 months after treatment intraoral photographs



Fig. 2. Case II : Pretreatment and post treatment dental casts

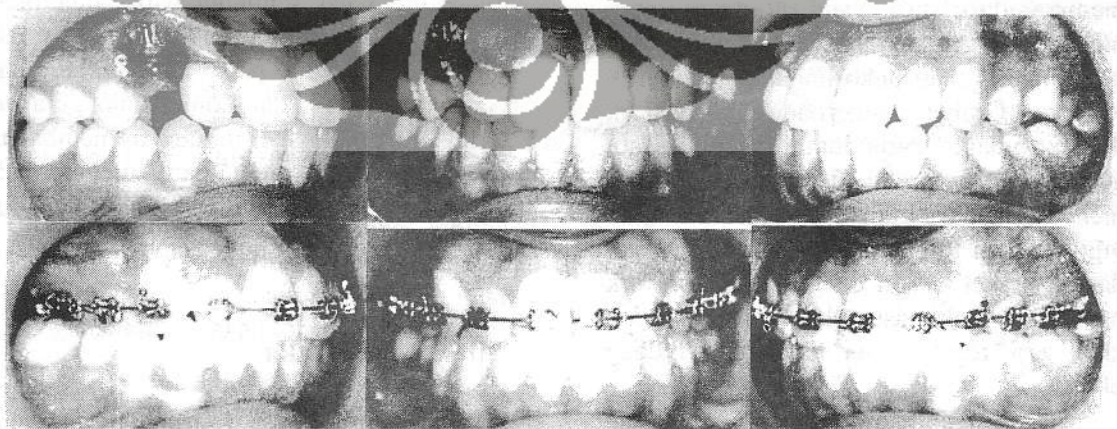


Fig. 3. Case IV : Pretreatment and 7 months after treatment intraoral photographs