Transnasal Endoscopic Approach to the Impacted Maxillary Canine

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Abstract: The inclusion of maxillary canines is a very common condition. The intraoral approach to the canine extraction can be buccal or palatal depending on the position of the tooth. However, in some cases, the proximity to the nasal floor or the side wall of the nose makes the transoral approach rather invasive. The aim of this article was to describe a novel transnasal endoscopically assisted approach for the extraction of high palatal/paranasal impacted canines.

Thirty-seven maxillary canines have been extracted in 29 patients. The surgical approaches were buccal in 5 cases, palatal in 24 cases, and transnasal endoscopically assisted in 8 cases.

Patients treated with the transnasal approach required the least amount of pain killers in the postoperative period, and the average of the operative time was shorter than that of the transoral extraction. In our opinion, the transnasal endoscopically assisted approach is a safe and effective procedure for the extraction of highly impacted maxillary canines located within 2 cm from the piriform aperture.

Key Words: Maxillary canine, endoscopic extraction, nasal teeth

Canines have the highest frequency of inclusion after the third molars. This condition is more common in the upper maxilla than in the mandible. The incidence of inclusion of the superior canines varies between 0.92% and 2.2%. In 85% of the cases, the inclusion is palatal, and in the remaining cases, it is vestibular (15%). The main reason of the high rate of inclusion of maxillary canines is their long and tortuous pattern of eruption; deviations and obstacles in the path of eruption can be determined by trauma, dysembryogenic alterations, neoplasms, infections, or malformations. In most cases, an orthodontic-surgical recovery of maxilary canines is possible; however, in certain cases, this conservative approach is not feasible because of an excessive inclination of the major axis of the tooth, and extraction is needed. Maxillary canine extraction is a standardized surgical procedure. The intraoral approach can be buccal or palatal depending on the position of the canine. However, in some cases, the proximity of the tooth to the nasal floor or the side wall of the nose makes the transoral approach rather invasive. Only 2 cases of complete canine eruption through the nasal floor have been described, whereas approximately 50 cases of supernumerary teeth eruption in the nasal cavities were reported (the so-called nasal teeth), the recommended technique for the extraction of nasal teeth is through an endoscopically assisted intranasal approach, which ensures optimal exposure and low postoperative morbidity. Should the transnasal approach be also suitable for the extraction of highly impacted canines not yet erupted in the nasal cavity? The aim of this article was to describe a novel transnasal approach endoscopically assisted for the extraction of highly palatal/paranasal impacted canines.

MATERIALS AND METHODS

From February 2008 to March 2013, a total of 63 consecutive patients with unilateral or bilateral (8 cases) maxillary canine inclusion were treated at our institution. Thirty-four patients underwent orthodontic surgically assisted recovery of the tooth, whereas 29 underwent surgical extraction. Thirty-seven maxillary canines have been extracted in 29 patients. The average age of the patients was 25.3 years (range, 13–72 y) with a male:female ratio of 1:6. All patients were preoperatively investigated with a computed tomographic (CT) scan (standard or cone beam) to establish the exact position of the impacted canines (Figs. 1–3). Indications for tooth extraction were as follows: excessive inclination or inversion of the major axis of the tooth, ankylosis, risk for damaging the roots of adjacent teeth, and follicular cystic degeneration. The surgical approaches were buccal in 5 cases, palatal in 24 cases, and transnasal endoscopically assisted in 8 cases. All the extractions performed with palatal intraoral were made under local anesthesia; all the transnasal extractions and the extractions performed through the palatal approach (10 cases) were performed under general anesthesia. The intubation was nasotracheal in 10 patients, whereas 8 patients underwent orotracheal intubation. Indication for the transnasal approach was dictated by the clinical experience of the surgeon and the proximity of the impacted tooth to the piriform aperture. Eight transnasal extractions were performed in 6 patients (bilateral in 2 patients). All canines treated through the transnasal approach were close to the piriform aperture not more than 2 cm with their most distal portion, regardless of the crown orientation. Operative time, hospitalization, and the use of pain killers during the postoperative course were collected. The patients underwent a regular postoperative follow-up. The heterogeneity of the groups, small sample size, and non-standardized protocol of tooth extraction did not allow statistical comparison between different surgical techniques.

Intranasal Surgical Approach

By retracting the nostril with a Killian speculum, an incision of approximately 15 mm along the floor of the nasal vestibule with a lateral relief incision was performed using a no. 15 blade scalpel (Fig. 4). The scalpel was always maintained in contact with the bone and following the contour of the piriform aperture. Using an Obwegeser periostoeum elevator, the perioistoeum of the lateral wall...
FIGURE 1. Computed cone beam scan in the sagittal projection showing the “inverted” canine.

FIGURE 2. Axial scan of CT cone beam showing a bilateral canine paranasal inclusion.

FIGURE 3. The same CT scan of Figure 2 in the coronal view.

FIGURE 4. Incision of approximately 15 mm along the floor of the nasal vestibule.

FIGURE 5. Endoscopic view of the canine after the removal of the bone surrounding the crown.

FIGURE 6. Endoscopic view of the postextraction cavity.

FIGURE 7. Transnasal extraction of the right canine through the nasal vestibule incision.

FIGURE 8. Transnasal extraction of the left canine in the same patient of Figure 7.
of the nose and that of the maxillary upright branch were dissected. With the aid of a 0-degree optical endoscope, the bone was drilled using a thin-stalk burr to create a bone window that can be extended from the nasal spine inferiorly to the ascending branch of the maxillary bone superiorly. Once the impacted tooth was identified, the bone surrounding the crown was drilled and the tooth was extracted using levers (Fig. 5). Sometimes, the inclination of the canine does not allow the extraction of the tooth in 1 piece, making necessary to perform odontotomy and extraction of the tooth in 2 or more fragments. With the aid of the endoscope, it is possible to inspect the extractive cavity and identify any remnants of the root (Fig. 6). When a residual follicular sac or granulation tissue is present, an accurate curettage must be carried out. Once dislocated, the tooth can be grabbed transnasally through a curve Klemmer or a Blakesley-type nasal forceps (Fig. 7 and 8). The intranasal incision was saturated with separate stitches of absorbable suture (4.0). A slight fatty gauze dressing was rolled up in the nasal vestibule and kept for approximately 5 hours to avoid bleeding.

RESULTS

The mean surgical times for each technique were as follow: 18 minutes (range, 12–35 min) for the vestibular approach, 27 minutes (range, 20–48 min) for the palatal approach, and 23 minutes (range, 18–30 min) for the transnasal approach.

Postoperative pain-control therapy was scheduled using paracetamol intravenously (1 gram) within 1 hour from the end of surgery, followed by subsequent administrations according to the request of the patient. The average amount of pain killer request by patients, expressed in vials of paracetamol taken within the first 24 hours, was 3.2 vials (range, 2–5) for patients treated with the vestibular approach, 2.8 (range, 1–4 ) with the palatal approach, and 1.3 (range, 1–3) with the transnasal approach. In the group of patients treated through the transnasal approach, 4 patients did not require additional pain killers, whereas 2 patients with bilateral inclusions requested, respectively, 1 and 2 vials of paracetamol in addition to the initial one. None of the patients had complaints of paresthesia of the premaxillary region or upper incisors. Conversely, 10 of 19 patients (6 cases bilateral) treated with the palatal approach complained of transient paresthesia of the premaxilla or upper incisors. All the patients treated under local anesthesia were discharged approximately an hour after the end of surgery, whereas the patients who underwent general anesthesia were discharged on the first postoperative day. The patients underwent a regular postoperative follow-up consisted of first control and stitches removal 10 days after the surgery, clinical control after a month, as well as clinical and radiographic monitoring with orthopantomography after 6 months.

DISCUSSION

The transnasal approach for the extraction of impacted maxillary canines has been described by several authors; however, the transnasal approach was always described for the extraction of the “nasal teeth,” namely defined by ectopic or supernumerary teeth that erupt in the nasal cavities. Intranasal teeth are frequently supernumerary, and this condition can be completely asymptomatic or associated with various symptoms such as the following: epistaxis, sinusitis, mucopurulent nasal secretions, nasal septal abscess, and oronasal fistulae.6–8 Differential diagnosis of intranasal erupted teeth is with foreign bodies, rinoliti, malignant tumors, osteomas, or odontomas.

Although the transnasal approach for the extraction of “nasal teeth” might be performed under direct vision by surgical headlight, most authors recommend an endoscopically assisted approach. Lee,4 in 2001, was the first to describe the endoscopically assisted extraction of maxillary canines erupted in the nasal cavities. The aid of the endoscope ensures better surgical view, good lighting, and most accurate dissection. Once the intranasal tooth is identified and properly exposed, it can be extracted through a maneuver of dislocation using levers or even grasped with Blakesley clamps when it is movable and surrounded by granulation tissue.

In this article, we described the transnasal approach for the extraction of teeth with a paranasal inclusion. Indications for the endoscopy-guided transnasal approach in our series were as follows: canines with a reverse axis or horizontal to the nasal floor, high localization, and canines close to the side wall of the nose. In these cases, the transoral approach presents a greater invasiveness than does the transnasal approach endoscopically assisted, as described by Samartino et al.11 However, our study presents some limitations: it is not prospective, and the comparison with the classic technique of extraction was only possible on the basis of the medical records and radiographs. Despite this, it is possible to state that patients treated with the transnasal approach required the least amount of pain killers in the postoperative period and the average of the operative time was shorter than that of the transoral extraction. Although this retrospective study did not allow to sharply define the criteria for the selection of the best surgical approach to extract the impacted maxillary canines, however, we found that the transnasal approach endoscopically assisted a safe and effective procedure for the extraction of highly impacted maxillary canines located within 2 cm from the piriform aperture. In conclusion, we think that, in selected cases, the endoscopically assisted transnasal approach should be considered a valid and reliable option for the extraction of impacted canines, although further studies are needed to determine the accurate indications of this technique.

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