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Technical Note

Impacted supernumerary tooth removal by osteotomy and osteosynthesis of the anterior nasal spine

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Abstract – Introduction: For dental avulsion, surgery may be invasive where it affects bone volume and may cause damage to the surrounding anatomical structures. Piezosurgery is a minimally invasive surgery due to the thin and precise cutting of the tooth compared with conventional burs. **Technique:** the authors have presented the case of a thirteen-year-old girl referred by her orthodontists for the extraction of a supernumerary tooth. The anterior nasal spine (ANS) was cut using piezosurgical techniques, repositioned and fixed using osteosynthesis with a bone screw. Postoperative follow ups were promising, and the bone screw was taken out a year later. **Comments:** The preservation of the nasal mucosa had probably aided in the trophicity and healing of ANS. The minimal bone loss by piezosurgical techniques allowed for the replacement of ANS and its osteosynthesis. **Conclusion:** This case describes a minimally invasive procedure which allowed for the removal of a deeply impacted supernumerary tooth, without damaging the surrounding teeth or nasal mucosa, and maintaining ANS bone volume.

Introduction

The avulsion of impacted teeth is common and is usually achieved using rotary instruments, oscillating saws, or surgical scissors. In some cases, however, it is advisable to preserve the maximum amount of bone and avoid damaging delicate anatomical structures (inferior alveolar nerve, sinus mucosa). Piezosurgery seems to be an interesting alternative allowing a fine and precise incision for osteotomy. The use of micro-vibrations and ultrasound allows the selective sectioning of the mineralized tissues without damaging the surrounding soft tissues. Introduced in oral surgery in 1988 by Vercellotti, it has been used in implant and preimplant surgery (sinus filling, bone distraction, lateralization of the inferior alveolar nerve, etc.) for the avulsion of the impacted third mandibular molars, enucleation of maxillary cysts, and also to reposition bone flaps.

Technique

A 13-year-old girl was referred by her orthodontist before treatment for dentomaxillary disharmony at the University Hospital Center for the avulsion of a mesiodens.

Using a preoperative cone-beam computed tomography made it possible to accurately locate this supernumerary odontoid (Fig. 1). It had a conoid morphology and was not in a vertical position: its crown protruded into the nasal fossae beneath the nasal septal cartilage, and its root extended behind the roots of the left central incisor.

The intervention was performed under general anesthesia. A vestibular approach was favored by an intrasulcar incision from the left maxillary canine to the right maxillary canine. Distal canine discharge incisions made distally to the canines created a full-thickness flap. The anterior nasal spine (ANS) was highlighted and a "V"-shaped incision was made with a piezotome, on both sides of ANS while taking care to avoid injuring the roots of neighboring teeth. Then ANS was dislocated, without detaching the nasal mucosa, therefore not affecting its periosteal vasculature. The odontoid was sectioned at the collar and its crown at first, and then its root was extracted. Finally, ANS was repositioned and fixed by an osteosynthesis screw, taking care not to place it in the medial intermaxillary suture, but lateralized two millimeters from the median plane so as to obtain the stability necessary for osteosynthesis (Fig. 2).

The procedures were performed without any complications. The osteosynthesis screw was removed 1 year later through the base of the vestibule, during the avulsion of the wisdom teeth, under general anesthesia (Fig. 3).

Comments

The avulsion of this deeply impacted tooth, which conventionally uses rotary instruments, would have led to

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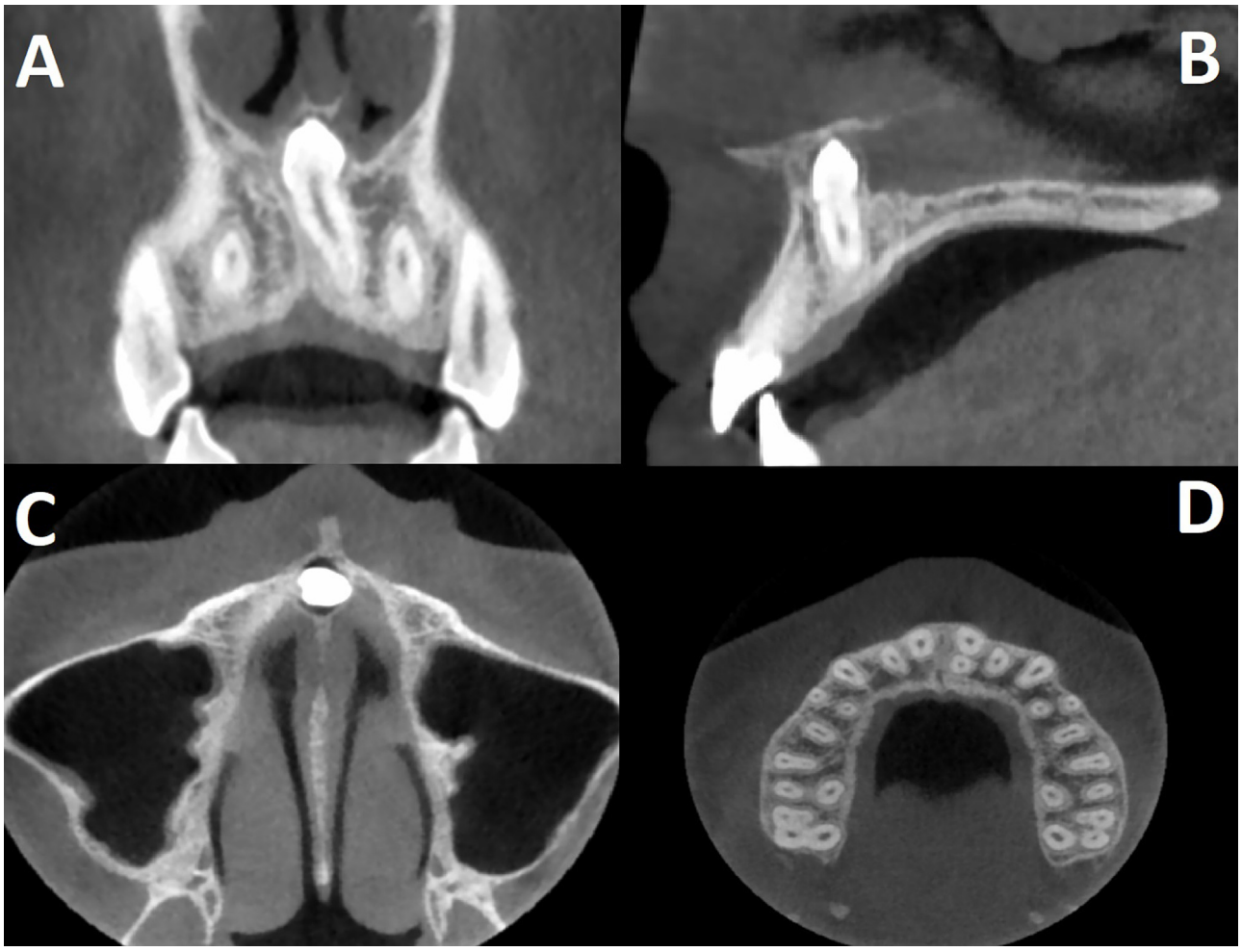

Fig. 1. Preoperative cone-beam computed tomography scan. A: coronal section, B: sagittal section, C and D: axial sections.

major decay and required vestibular access but also palatal access. In fact, given the inverted situation of the tooth axis, it would have been difficult to remove using a palatal or vestibular approach alone. In addition, its vertical access would have complicated the crown–root separation, which would have been possible only through the nose (requiring a reclusion of the nasal mucosa). The choice of a technique to preserve bone (piezotome cutting and repositioning) seemed sensible because it exposed the site adequately and allowed for the cervical fragmentation of the tooth, while sparing the bone volume for the stable repositioning of the dislocated ANS. By not detaching the nasal mucosa and the section of the nasopalatine pedicle, it probably contributed to the trophicity and healing of osteosynthesized ANS. The interest in preserving this region was because of its support of the soft tissues and in its own volume affecting the structure and appearance of the face.

A case report on the avulsion of a supernumerary tooth in the anterior maxillary through the nasal fossae reported that the use of the piezotome had allowed for the extraction of this tooth without damaging either the nasal mucosa or the adjacent tooth roots, and had satisfactory results [1]. The study by Vercellotti *et al.* [2] compared the behavior of bone tissue after osteotomy and osteoplasty procedures using a carbon bur, a diamond bur, and a piezotome. After 56 postoperative days, an increase in bone mass was seen in the procedure using a piezotome, whereas the other two techniques resulted in bone loss. This technique allows for a selective cutting line, and a "clean" operating site thanks to the cavitation effect generated by irrigation associated with oscillatory motion. The Stübinger study [3] on bone remodeling after piezotome incision on sheep tibias also found that, after 8 and 12 weeks, the bone had healed better because of new bone formation around the incision point than with the more conventional methods.

Therefore, piezosurgery is nowadays commonly used in oral surgery in the following situations [4–6]: for corticotomies in preorthodontic surgery to preserve the dental structures, during bone removal, removal of an osseointegrated implant (to preserve as much bone tissue as possible), during crown expansion (decreasing the risk fracture), for creating bone flaps, and even for the avulsion of impacted third molars. This technique also is indicated when the surgical procedure puts the surrounding nerves at risk (during a lateralization of the

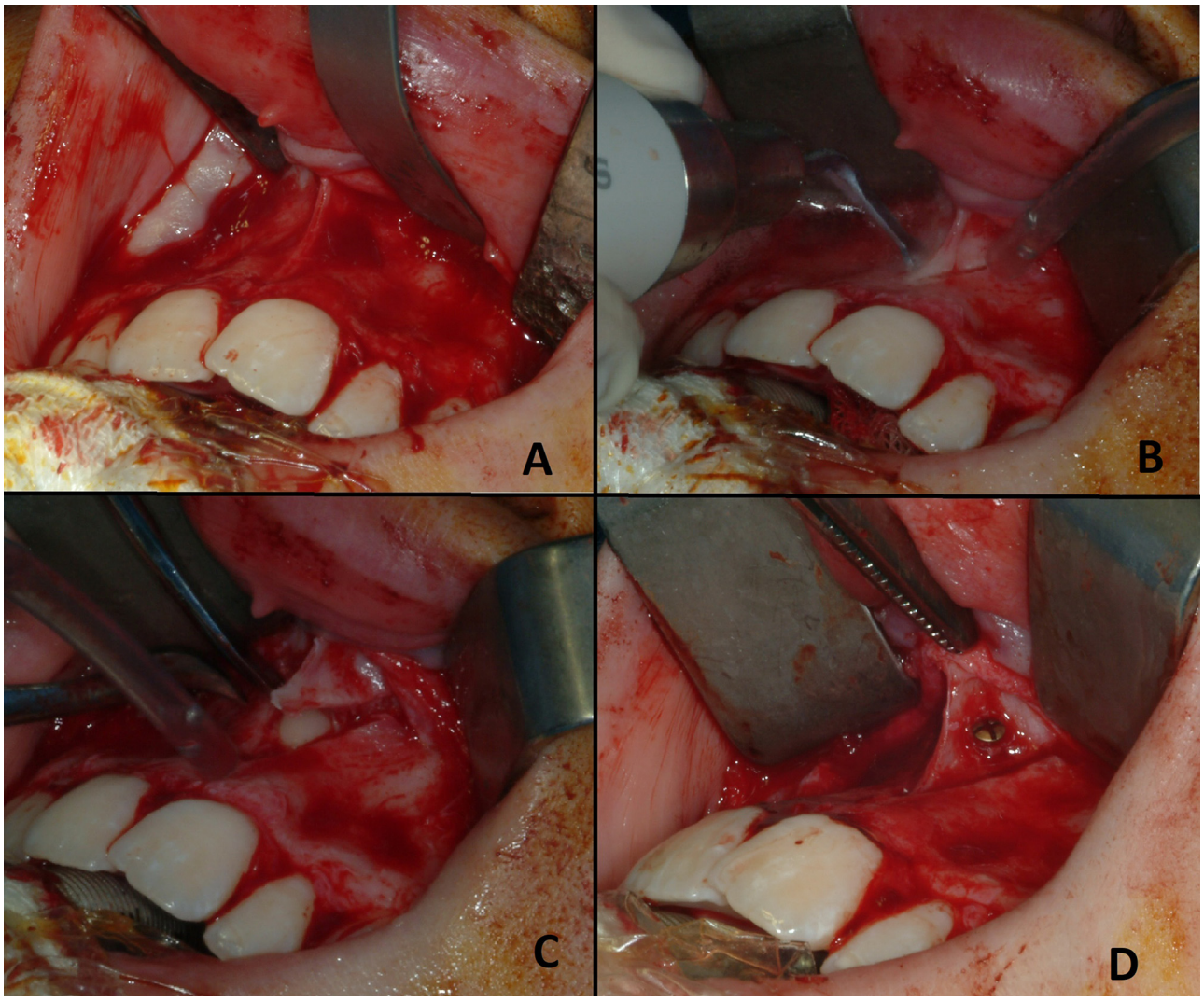

Fig. 2. Surgical steps. A: access flap, B: incision of ANS, in a "V" shape, C: dislocation of ANS, D: placement of the osteosynthesis screw.

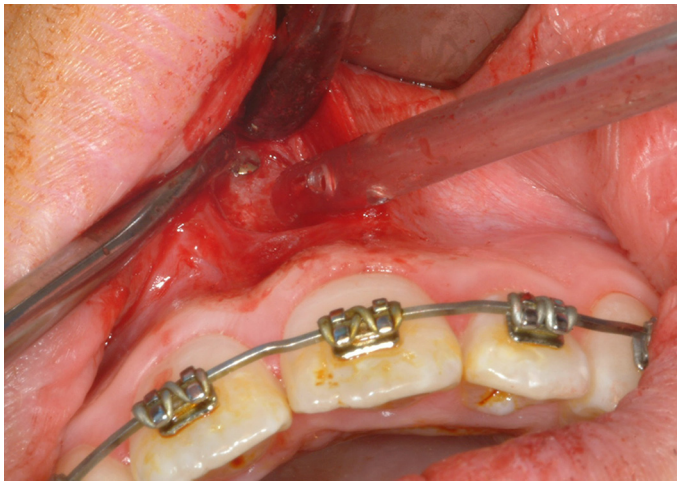

Fig. 3. Ostesynthesis screw removal a year after surgery.

inferior alveolar nerve for example or cystic enucleation) and for sinus fillings to decrease the risk of sinus mucosal trauma. It protects soft tissues and improves the visibility of the operating area; in addition, it decreases bleeding, bone heating, vibration, noise, postoperative pain, and postoperative edema. However, it seems to lengthen the operating time in the case of corticalized bone structures and requires break periods and a different technique (especially when the procedure requires less pressure and more irrigation) compared to other techniques [4,6–8].

Conclusion

This case illustrates the use of the minimally invasive piezotome technique, which allowed for the avulsion of a supernumerary tooth deeply impacted in an inverted vertical

position, without causing damage to the roots of neighboring teeth or the nasal mucosa. The preservation of the bone volume of ANS, a median anatomical structure essential for splitting the piriform opening of the nasal cavity into two sections. This means that this microsurgical intervention can be used as a bridge connecting several disciplines.

Conflicts of interests: The authors declare that they have no conflicts of interest in relation to this article.

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