Introduction of a combined approach to retrieve a displaced maxillary third molar from the infra-temporal fossa complicating a mismanaged facial pain: A case report

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Abstract: Proper diagnosis based on sound investigations is the key for a successful treatment. Meanwhile, treatment plans should be prepared accurately, and designed according to each individual case. The presented case could be an example of how far a wrong diagnosis and mismanagement can lead to a shift in the treatment plan, from a simple conservative treatment to a complicated and risky one. It describes a mismanaged facial pain, at the area of the right temporo-mandibular joint (TMJ), that eventually lead to exposing the patient to a risky operation under general anesthesia. A maxillary third molar, that was wrongly attributed to be the cause for the facial pain, was displaced upward and backward into the infra-temporal fossa (ITF) during an attempt for its extraction. An operation to retrieve the displaced tooth from the ITF was then a mandate. The operation was planned based on accurate determination of the position of the tooth, guided by interpreting a Pan-ortho-tomogram (OPG) and axial and coronal cuts of Computed Tomography (CT) scan. The intraoral approach to this risky skull base potential space was tried up to its limits. Further, an extra-oral pre-auricular incision with temporal extension was added to the intraoral one. The combined approach allowed reaching the tooth and retrieving it safely.
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Introduction:

Facial pain is common in the general population. A dentist can help to identify the source of the pain with a thorough history taking, systematic examination, appropriate investigations and imaging. This pain often relates to the facial muscles, dental problems, temporo-mandibular joint dysfunction (TMD), sinus problems, neuralgia or reference from a local or distant region.

For some types of pain, the exact cause is not easily diagnosed. However, the impacted wisdom teeth are the most frequently attributed, especially at the adolescence age.

Removal of the impacted maxillary third molars is a frequent procedure and is usually associated with low rates of complications and morbidity. These complications include fracture of the maxillary tuberosity, tooth root fracture, perforation of the maxillary sinus or displacement of the tooth or root(s) into a nearby region [(1)].

Within the past decades, the displacement of a maxillary third molar into the infra-temporal fossa (ITF) was frequently mentioned and reported. Kocaelli *et al.,* have mentioned a sum of ten displacement cases of maxillary third molar in the ITF. These were reported in the English literature in the past four decades with three case reports published in the past 2 years [(2)].

Being bounded by muscles, bones, ligaments and important nerves and vessels, the surgical access to the potential space of the ITF is a relatively difficult one that needs special surgical skills and knowledge. Another difficulty is added because of its contents. It is occupied by the lateral and medial pterygoid muscles, branches of the mandibular nerve, otic ganglion, chorda tympani, internal carotid artery, maxillary artery, and pterygoid venous plexus [(3)].

Occepto-mental views, ortho-pan-tomography (OPG), computed tomography (CT) scan or cone-beam volumetric tomography scan are helpful in this domain. However, the latter two techniques are the most powerful and useful tools as they provide an exact location of the target for their accurate three dimensional (3D) modeling.

The most relevant surgical techniques suggested to remove a tooth from this dangerous space could be either intraoral with or without resection of the coronoid process [(4)], extra-oral Gillies' or hemi-coronal approaches [(5-7)] or a combination of both intraoral and extraoral approaches.

This case report is pointing to new situations with relevant messages, one of them is how do a facial pain mismanagement, due to improper diagnosis,

could cost the patient a potentially dangerous surgery under general anesthesia. Also the surgical treatment options related to a displaced maxillary third molar in the (ITF) are discussed while presenting the "pre-auricular with temporal extension" approach combined with the intraoral one as a good choice to access the (ITF) in such cases.

Case Report:

A 19-year-old female patient presented to our consultation complaining of a right facial pain related to the (TMJ) region. After thorough history taking and systematic clinical examination, temporo-mandibular joint dysfunction **(**TMD) due to disc displacement without reduction was the provisional diagnosis, and Magnetic Resonance Imaging (MRI) was requested. Few days later, I was called for her to manage an unexpected problem. The right maxillary third molar was displaced after an attempt of its extraction done by a general dentist who related her complaint to the impaction of that tooth. The patient was admitted with limitation in her mouth opening, local pain and tenderness in the procedure field. In spite of the trials to explain the situation and calm them down, the patient and her parent were remarkably feared from the potential complications.

An (OPG) and (CT) scan were done to localize the position of the displaced molar (Fig. 1). The tooth was found to be behind the curvature of the junction between the zygomatic arch and the malar eminence, a position which is in a considerable depth within the (ITF). The various possible treatment options whether conservative or surgical were discussed with the patient and her family. Surgical removal was preferred and an informed consent was signed.

Surgical removal of the displaced tooth was justified by: its anatomical site, the possibility of tooth migration and the patient's choice.

Based on accurate determination of the position of the displaced tooth, multiple plans were designed for the surgical removal (plan A, B and C). It was decided to proceed from the least invasive approach to the next according to the per-operative situation and to start with the intraoral vestibular incision approach (plan A). However, in the absence of an image-intensifying cineradiography, the procedure was blind. After sufficient cautious trials, it was decided to stop this blind maneuver, in such a relatively dangerous region, and to shift to (plan B). An extra-oral approach through a pre-auricular with temporal extension incision was attempted. Dissecting in layers with protection of the facial nerve, the anterior border of temporalis muscle was identified. The index finger, assisted with blunt dissection, was used to palpate the tooth within the anticipated site and to push it towards the intraoral incision. Meanwhile, a straight artery forceps was carefully introduced intra-orally to probe and grasp the tooth. The attempt was successful and the tooth was delivered safely (Fig. 2).

Plan C, if ever needed, was about to mobilize the zygomatic arch, to remove the tooth and to reduce the arch back with its fixation by mini-plates and screws.

The routine post-operative care was adopted. Post-operative imaging was performed documenting the removal of the tooth (Fig. 3). The post-operative period was uneventful, and the patient recovered her pre-tooth-displacement mandibular movements 10 days after surgery (Fig. 4). To be mentioned here is that, the original complaint of pain related to the right (TMJ) region persisted after everything had become calm and quiescent.

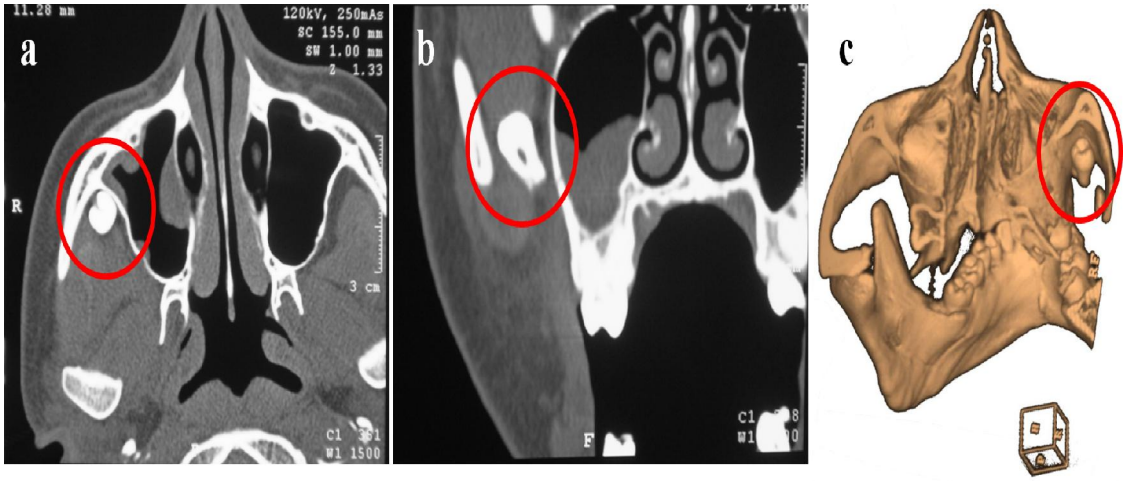

Fig. 1: CT scans with axial (a), and coronal (b) cuts showing the exact position of the displaced right maxillary third molar. 3D reconstructed image viewed from behind and above (c).

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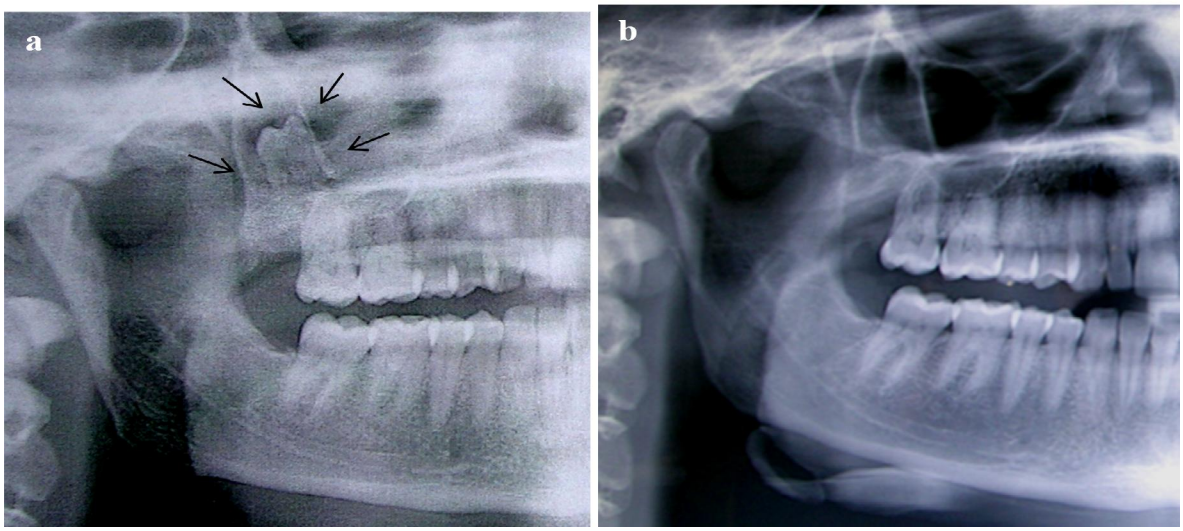

Fig. 3: Cropped (OPG) X-ray view showing the case with the displaced tooth (arrows) pre-operative (a) and post-operative (b). Note that this bi-dimensional radiograph did not allow determining the exact location of the tooth.

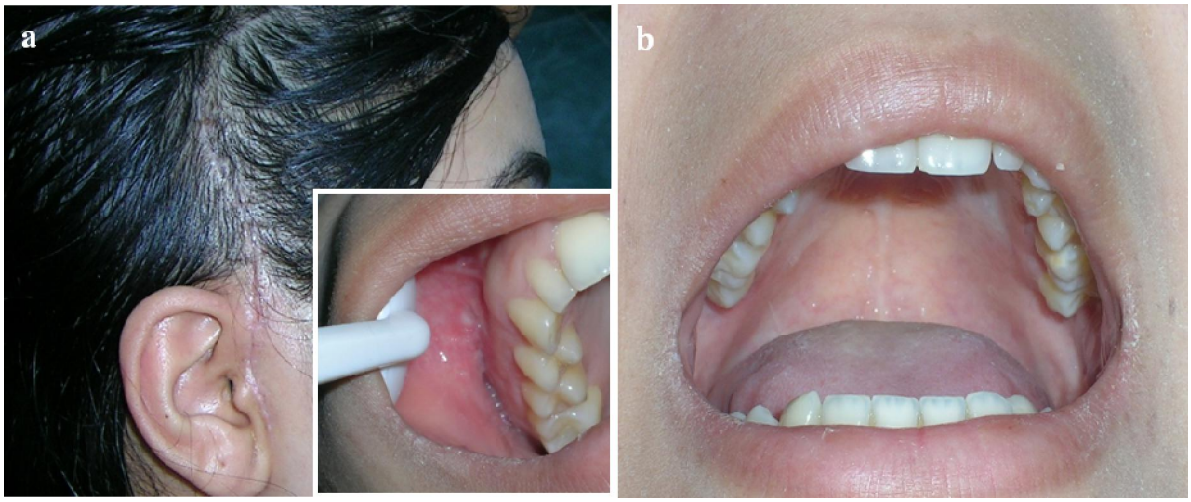

Fig. 4: 10 days post-operative photographs showing healing of the extra-oral and intra-oral incisions (a), and the patient regained her mouth opening that she had prior to tooth displacement (b).

Discussion:

The proper diagnosis of a facial pain is a crucial key for a successful treatment. Accusation of the impacted wisdom teeth as a cause of facial pain is sometimes hypothetical. Some clinicians might find the impacted wisdom(s) as the diagnostic solution to an unexplained or an atypical facial pain. In the presented case, the criteria that justify the impacted wisdom tooth as a cause of facial pain were absent. Precautions for extracting a maxillary third molar should be always followed in order to avoid the involuntary displacement of the tooth.

Displacement of maxillary third molars into the (ITF) is usually associated with an incorrect extraction technique, disto-lingual angulated tooth or limited bone distal to the third molar [(4)]. The extent of displacement depends upon the anatomical conditions as well as the direction and amount of force applied. These teeth usually displace through the periosteum into the (ITF) just adjacent to the lateral pterygoid plate and inferior to the lateral pterygoid muscle [(8)]. Nevertheless, this position may change upwards into the skull base if the tooth is attempted to be retrieved blindly.

In the presented case the tooth was found in the (ITF) in a deeper and higher position. This could be attributed to the trials, done by the dentist, to grasp the slipped tooth blindly and forcibly. Migration of the tooth is another possibility.

Clinically, for delayed retrieval procedures, the patient may be complicated with symptoms such as swelling, pain, limitation of mandibular motion or even trismus if fibrosis is present [(1)]. In other cases, however with shorter periods, the patient could be asymptomatic and with a normal range of mandibular motion [(9)].

Proper radiographic examination is mandatory to locate the displaced tooth and to plan for the retrieval procedures without additional complications. The surgical removal of the tooth is accessible via intraoral and/or extra-oral approaches according to the level of displacement. However, a wrong surgical approach to this space could have a potential for morbidity because of the structures running through it [(4)].

Some authors prefer to postpone the retrieval surgery for several weeks so that fibrous tissue formation can immobilize the tooth preventing its deeper displacement towards the base of the skull [(7)]. According to others, it was better to wait and see for a displaced tooth to migrate downwards into the oral cavity, allowing an easy surgical removal intra-orally [(3,4)]. Nevertheless, others reported migration is impossible because of fibrosis and anatomic boundaries [(5)].

In the presented case, with the described position, the surgical removal of the displaced tooth is rather difficult and carries considerable risks. The intraoral approach alone proved unsatisfactory. Meanwhile, the use of Gillies' approach was not preferred, as it is still a blind maneuver which could result in further changing the precisely located position of the tooth, upon which the plan of surgery was designed. Thus, failure to retrieve it could further complicate the condition. The hemi-coronal approach, from the author's point of view, is needlessly a longer incision with the chances of more blood loss.

Instead, the pre-auricular with temporal extension approach was chosen allowing excellent access with minimum risk of damage to the facial nerve. Being shorter than the hemi-coronal incision, it is expected to be associated with less blood loss and shorter time of surgery and anesthesia. The subsequent

scar is hidden within the hair and the pre-auricular part usually heals esthetically perfect. Although the tooth was successfully removed and the patient and her family were remarkably happy and grateful, the essential complaint of pain persisted as the primary cause was still not managed.

Conclusion:

Facial pain is a clinical condition that should be managed carefully to avoid wrong diagnosis and unnecessary complications.

If the maxillary third molar is displaced during extraction, it is recommended that the dentist should try to precisely locate the position of the displaced tooth rather than attempting to blindly retrieve it.

The decision of surgical removal of a displaced maxillary third molar from the (ITF) should be guided by: the signs and symptoms presented by the patient, precise location of the tooth in addition to the knowledge and skills of the surgeon. In such cases, a specialized surgeon is able to choose the suitable approach to manipulate into the region and decides when to stop the procedure if needed.

References:

1. Sverzut, C.E., Trivellato, A.E., Sverzut, A.T., de Matos, F.P., Kato, R.B. Removal of a maxillary third molar accidentally displaced into the infratemporal fossa via intraoral approach under local anesthesia: report of a case. J Oral Maxillofac Surg. 67:1316–20, 2009.
2. Kocaelli, H., Balcioglu, H.A., Erdem, T.L. Displacement of a maxillary third molar into the buccal space: anatomical implications apropos of a case. Int J Oral Maxillofac Surg. 40:650–3, 2011.
3. Dimitrakopoulos, I., Papadaki, M. Displacement of a maxillary third molar into the infratemporal fossa: case report. Quintessence Int. 38:607–10, 2007.
4. Patel, M., Down, K. Accidental displacement of impacted maxillary third molars. Br Dent J. 177:57–9, 1994.
5. Gulbrandsen, S.R., Jackson, I.T., Turlington E.G. Recovery of a maxillary third molar from the infratemporal space via a hemicoronal approach. J Oral Maxillofac Surg. 45:279–82, 1987.
6. Dawson, K., MacMillan, A., Wiesenfeld, D. Removal of a maxillary third molar from the infratemporal fossa by a temporal approach and the aid of image-intensifying cineradiography. J Oral Maxillofac Surg. 51:1395–7, 1993.
7. Orr, D.L. A technique for recovery of a third molar from the infratemporal fossa: Case report. J Oral Maxillofac Surg. 57:1459–61, 1999.
8. Oberman M, Horowitz I, Ramon Y. Accidental displacement of impacted maxillary third molars. Int J Oral Maxillofac Surg. 15:756–8, 1986.
9. Gomez-Oliveira, G., Arribas-Garcia, I., Alvarez-Flores, M., Gregoire-Ferriol, J., Martinez-Gimeno, C. Delayed removal of a maxillary third molar from the infratemporal fossa. Med Oral Patol Oral Cir Bucal. 15:e509–e511, 2010.

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