




Fluoroscopy for intraoral removal of fractured needle

Fluoroscopia para remoção de agulha fraturada por via intraoral

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ABSTRACT

There are few reports in the literature concerning needle fractures during the local administration of anesthetic solution in dental procedures. However, the risk still exists. The patient's unexpected movement during anesthesia, bending the needle prior to its use in the tissue, incorrectly performed anesthetic technique, uncooperative patient, small needle diameter or size may be considered substantial risks of fracture. At the moment the needle fracture occurs in the tissues it can move to the patient's vital regions, and it is of utmost importance to remove it. If it is not possible to remove the needle immediately, an oral surgeon should be contacted to remove it under general anesthesia at the hospital. This paper aims to report a case of needle fracture in third molar exodontia during lower alveolar, lingual and buccal right nerve block, referred to the oral and maxillofacial surgery and traumatology department of the State University of Maringá. After clinical examination and tomography assessment, the patient underwent a surgical procedure to remove the needle in the operating room under general anesthesia and aid of trans-operative fluoroscopy. Therefore, we conclude that fluoroscopy is an extremely important resource in cases such as this one, since it allows a guided procedure, reducing the surgical trauma of an exploratory surgery.

Keywords: Accidents. Local Anesthesia. Fluoroscopy.

RESUMO

Há poucos relatos na literatura de fraturas de agulha durante a administração da solução anestésica local em procedimentos odontológicos. Porém o risco ainda existe. O movimento inesperado do paciente durante a anestesia, curvar a agulha antes de utilizá-la no tecido, técnica anestésica realizada incorretamente, paciente não cooperativo, diâmetro ou tamanho pequeno da agulha podem ser considerados riscos consideráveis para a fratura. No momento em que ocorre a fratura da agulha nos tecidos, a mesma pode se deslocar para regiões vitais do paciente, sendo de total importância removê-la. Se não for possível sua remoção imediata, deve-se procurar um especialista cirurgião bucomaxilofacial para removê-la sob anestesia geral no centro cirúrgico. O presente trabalho tem como objetivo relatar um caso de fratura de agulha na exodontia de terceiro molar durante o bloqueio do nervo alveolar inferior, lingual e bucal direito, encaminhado ao serviço de cirurgia e traumatologia bucomaxilofacial da Universidade Estadual de Maringá. Após exame clínico e tomográfico, a paciente foi submetida a um procedimento cirúrgico para a remoção da mesma em centro cirúrgico sob anestesia geral e com auxílio da fluoroscopia transoperatória. Desta maneira, concluímos que a fluoroscopia é um recurso extremamente importante em casos como este, já que possibilita um procedimento guiado, diminuindo o trauma cirúrgico de uma cirurgia exploratória.

Palavras-chave: Acidentes. Anestesia Local. Fluoroscopia.

INTRODUCTION

The inferior alveolar, lingual and buccal nerve block technique is the most used in dentistry when we think about an intra-oral surgical procedure in the mandible. However, it is one of the techniques that present the most complications, namely: paresthesia, hematomas and needle fracture (You, Kim, Oh, Choi & Jih, 2017). It is estimated that for every 14 million local anesthesia there is one case of needle fracture (Pogrel, 2009), and about 70% of fractures occur during the inferior alveolar, lingual and buccal nerve block technique (Lukas, Jan, Constantinus & Paul, 2020).

Needle fracture during anesthesia is associated with several factors, including: incorrectly performed technique, patient's unexpected movement, bending the needle prior to its use in the tissue, manufacturing failure of the needle, gauge or length of the needle used incorrectly, needle penetration into tissue up to the end of the hub, incorrect needle choice (Augello, Jackowski, Gratz & Jacobsen, 2010; Malamed, 2013). After the needle fracture, it is of utmost importance to remove it; if it is not possible to remove the needle immediately, the patient should be instructed and an oral surgeon should be contacted to remove it, as it can move to vital regions and tissues of the patient (Okumura et al., 2015). Various methods are used to locate and remove the needle fragment, such as: conventional radiography, computed tomography, fluoroscopy, metal detectors (Camarini et al., 2011) and, more recently, trans-operative navigation and 3D virtual planning and fabrication of surgical guides (Lukas et al., 2020; Schorn et al., 2021).

This case report aims to present a clinical case of needle fracture during a third molar extraction, which occurred after the right inferior alveolar, lingual and buccal nerve block. The case was treated by the Oral and Maxillofacial Surgery and Traumatology Department of the State University of Maringá. The procedure was performed under general anesthesia at the Metropolitan Hospital of Sarandi with the aid of trans-operative fluoroscopy.

CASE REPORT

A 28-year-old female patient was referred to the Oral and Maxillofacial Surgery and Traumatology Department at the State University of Maringá for removal of a fractured needle, located in the right pterygomandibular region. The patient complained of discomfort when swallowing and was very concerned about the possibility of moving the needle.

The fracture occurred during the anesthetic right inferior alveolar, lingual and buccal nerve block technique during the extraction of the lower right third molar, performed by another professional. The patient was instructed on what had happened and then imaging exams were requested for planning. When analyzing the tomography images (Figures 1 and 2), a 30G gingival needle of approximately 20 mm was observed, which was located medial to the right mandibular branch. Therefore, in the operating room at Metropolitan Hospital of Sarandi, we opted for an approach under general anesthesia with nasotracheal intubation for intraoral removal of the fragment.

A mucoperiosteal incision was performed in the region of the right mandibular branch and blunt dissection with hemostatic forceps. During the procedure, a C-arm X-ray (Fluoroscopy) was used to help locate the needle during the trans-operative period. The needle fragment was removed and simple sutures were performed with 4-0 vicryl. The patient was discharged from the hospital the following day with instructions on postoperative care and analgesic, anti-inflammatory medication and oral antibiotic therapy (Dipyron 500 mg orally every 6 hours for 3 days, Ibuprofen 600 mg orally every 8 hours for 3 days, Amoxicillin 500 mg orally every 8 hours for 7 days).



Figure 1. A, Axial view of cone-beam tomography of the right mandibular branch, highlighting the post-extraction alveolus. B, C and D, coronal view of cone-beam tomography of the right mandibular branch, highlighting the needle located medially (pterygomandibular space).

Source: The authors.

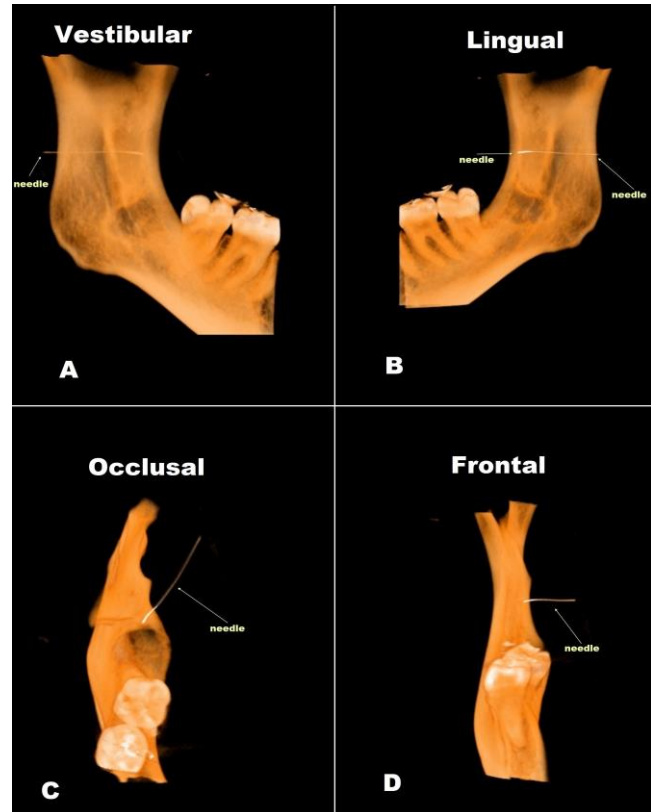


Figure 2. 3D reconstruction of the right mandibular branch. The needle is highlighted by the white arrow.

Source: The authors.

DISCUSSION

There are few reports in the literature concerning needle fractures during the anesthesia. Augello et al. (2010) performed a systematic review assessing cases of needle fracture, concluding that in 70% of the cases the fracture was triggered during inferior alveolar nerve block. The most frequent region of needle fracture is the pterygomandibular space (Augello et al., 2010). Oliveira, Abdo, Barbosa e Stefenon (2018) reported that a 25G long needle is more acceptable for the inferior alveolar, lingual, and buccal nerve block, as it provides more safety during tissue penetration, due to its large caliber and longer length. The 30G needles, that is, those with the smallest gauge, are more prone to fracture during this anesthetic technique, since it is necessary to penetrate 21 mm (on average) of the needle into the tissue to reach the mandibular foramen (Oliveira et al., 2018).

When there is a needle fracture, the correct course is to remove it immediately if you can see it directly, otherwise, the patient must be warned, instructed about what happened and referred to a specialist. Some authors report that it is not necessary to remove the fractured needle as long as the patient has no symptoms (Augello et al., 2010). However, studies show that for the psychological benefit of the patient, the most indicated action is the removal of the fragment under general anesthesia in a hospital environment with the Oral and Maxillofacial specialist, thus ensuring the safety and quality of the treatment. This should be done because the needle can move to vital regions and structures of the body, such as veins, arteries and organs, which can cause trismus, pain and infections, in addition to psychological discomfort (Kim & Moon, 2013; Okumura et al., 2015).

The pterygomandibular region is composed of the medial pterygoid, temporal and buccinator muscles, in addition to the inferior alveolar and lingual nerves. Thus, the correct location of the fragment in this region is extremely important. Preoperative images are important for a correct diagnosis and surgical planning, to locate small objects in certain parts of the human body. This procedure helps to prevent possible complications during surgery, since these fragments are found in areas with multiple noble structures (Moraes, Silva, Félix & Rebelatto, 2010).

It is known that computed tomography can provide us with this preview. For this clinical case, a cone-beam computed tomography with 3D reconstruction was requested in order to obtain a precise location of the needle and adjacent structures (Camarini et al., 2011). During the surgery, the BV Endura C-arm X-ray device (Phillips®, Eindhoven, Netherlands) was used, capable of transmitting real-time images of the patient's internal structures during surgery, which was of utmost importance, as we were able to locate the fragment and remove it by moving the instruments.

The C-arm X-ray (Fluoroscopy) allows an immediate image from several angles without displacing the reference needle, and has the option of intensifying the image while maintaining its quality (Nezafati & Shahi, 2008; Perelli et al., 2016). One of the advantages of performing an image-guided surgery is the precision and efficiency in locating the fragment, facilitating surgical access, reducing manipulation and tissue dissection when compared to other traditional techniques, minimizing the risks of morbidities, trismus, infections and damages to adjacent noble structures in the postoperative period (Park et al., 2012; Stein, 2015).

Metal detector and panoramic radiographs during the trans-operative period are not widely used due to space and availability limitations, in addition to prolonging the surgery time (Camarini et al., 2011). Trans-operative navigation and 3D virtual planning are techniques with excellent results, however they are still very expensive and consequently have little use in Brazil (Lukas et al., 2020, Schorn et al., 2021). Fluoroscopy, on the other hand, can provide rapid acquisition of high-quality images from several angles, according to the surgeon's needs, in addition to being a low-cost exam and being available in many public and private hospitals because it is routinely used by orthopedists and vascular surgeons (Camarini et al., 2011).

CONCLUSION

Fluoroscopy is an extremely important resource in cases like this, as it allows a guided procedure, reducing the surgical trauma of exploratory surgery, in addition to being a low-cost resource present in many hospitals.

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