

Radiographic and computed tomography monitoring of a fractured needle fragment in the mandibular branch

Maria Isabel de Oliveira e Britto Villalobos^{1,*}, Thaisa Cristina Gomes Ferreira Leite¹,
Samila Gonçalves Barra¹, Daniela Teresa Pinto da Cunha Werneche¹, Flavio Ricardo Manzi¹,
Claudia Assunção e Alves Cardoso¹

¹Department of Dentistry, Pontifical Catholic University of Minas Gerais, Belo Horizonte, Brazil

ABSTRACT

Some complications can arise with the usage of local anesthesia for dental procedures, including the fracture of needles in the patient. This is a rare incident, usually caused by the patient's sudden movements during anesthetic block. Its complications are not common, but can include pain, trismus, inflammation in the region, difficulty in swallowing, and migration of the object, which is the least common but has the ability to cause more serious damage to the patient. This report describes a case in which, after the fracture of the anesthetic needle used during alveolar nerve block for exodontia of the left mandibular third molar, the fragment moved significantly in the first 2 months, before stabilizing after the third month of radiographic monitoring. (*Imaging Sci Dent 2017; 47: 63-8*)

KEY WORDS: Anesthesia, Dental; Surgery, Oral; Needles; Radiology

At the beginning of the 19th century, anesthetic procedures were introduced for more invasive dental procedures, such as surgery, endodontic treatments, and dental implants. The needles were thick and had to be sterilized, which was the reason why they constantly broke.¹⁻⁴ With the use of flexible and disposable needles, the chance of fractures has decreased, but they can still occur. There are multiple reasons for needle fractures in the mandibular branch: 1) a patient's (usually a child's) sudden movement at the moment of the nerve block;^{2,5-7} 2) an inexperienced professional performing the technique;⁶⁻⁹ 3) the use of pre-bent needles; and 4) manufacturing errors in the needle.

Any element apart from dental and bone structures found in the body is considered a foreign body.^{7,8} In general, they are asymptomatic, but can result in symptoms, depending on the location. In the case of a metallic foreign body such as an anesthetic needle, it is possible to

observe it on regular radiographs, such as panoramic, side, and frontal telerradiographs. However, for the correct diagnosis, to ensure the proper localization of the object, and for optimal monitoring of the case, techniques specific for a given region should be used, such as computed tomography (CT).^{1,6,10}

Case Report

A 28-year-old male patient visited our dental office for exodontia of the third molars. During the inferior left alveolar nerve block, an anesthetic needle fracture occurred due to patient movement or a possible manufacturing error. The left mandibular third molar was removed and radiographic monitoring was carried out (Fig. 1). Initially, the authors opted to take a panoramic radiograph because it provides an image of both arches, including the areas of the jaw and soft tissues of the maxilla and mandible. The patient was monitored weekly with the goal of preventing painful symptoms. Panoramic radiographs obtained at intervals of 15 days demonstrated that the metallic object had changed its location. The patient did not complain

Received November 18, 2015; Revised October 2, 2016; Accepted February 8, 2017
*Correspondence to : Dr. Maria Isabel de Oliveira e Britto Villalobos
Dom Jose Gaspar Avenue, 500 - Building 46 - Department of Dentistry - Belo Horizonte, Minas Gerais 30535-901, Brazil
Tel) 55-31-3319-4414, Fax) 55-31-3319-4415, E-mail) contato@misabel.com.br



Fig. 1. Initial panoramic radiographs. The fractured needle is indicated with arrows in the area of the ascending branch of the mandible.



Fig. 2. Panoramic radiograph after 15 days. Notice the fractured needle moving away from the area of the ascending branch of the mandible.



Fig. 3. Panoramic radiograph (A) and lateral cephalography (B) show the foreign object (white arrows) at 1 month of monitoring.

of symptoms in that area (Fig. 2). To accurately localize the needle, the following radiographs were obtained: 1) panoramic, 2) lateral cephalography, and 3) multislice CT with 64 detectors (Figs. 3 and 4). It was found that the fractured needle was partially located in the medial pterygoid muscle and partially in the parapharyngeal space. Loss of the anatomical fat structure and the formation of granulomatous tissue was also observed (Figs. 5-7). The patient was referred to a head and neck surgery specialist for evaluation of the necessity of removing the object, but

because of its location, monthly radiographic monitoring was chosen. Three months after the incident, the fractured fragment stabilized, obviating the need for surgical removal (Fig. 8). Quarterly radiographic monitoring was advised, and 2 years later, the patient did not present with any symptoms (Fig. 9).

Discussion

The occurrence of anesthetic needle fractures in dental practice is rare. However, their occurrence is frequently associated with the inferior alveolar nerve block, and the fragment usually settles in the region near the pterygo-mandibular raphe,^{1,4-8,10} as observed in this case. Therefore, complementary exams are necessary, as panoramic radiographs and specific radiographic techniques, including CT, are required to assess its location accurately.^{2,4-7,9,10} Some authors have reported the use of metal detectors, magnetic resonance imaging, and ultrasound for the accurate localization of the object.^{3,6,7,10} In this case, panoramic radiographs, teleradiography, and the Waters view were performed to verify the location of the fractured fragment, as well as CT to evaluate its relationship with adjacent structures.

Bedrock et al. in 1999² described controversies regarding the removal of the fractured needle fragment, and argued that due to the absence of symptoms, the removal of

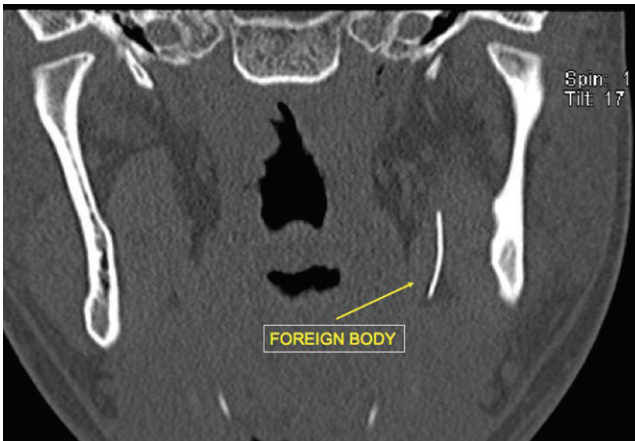


Fig. 4. An axial cone-beam computed tomographic image (bone window) shows the fractured needle in the region of the medial pterygoid muscle.

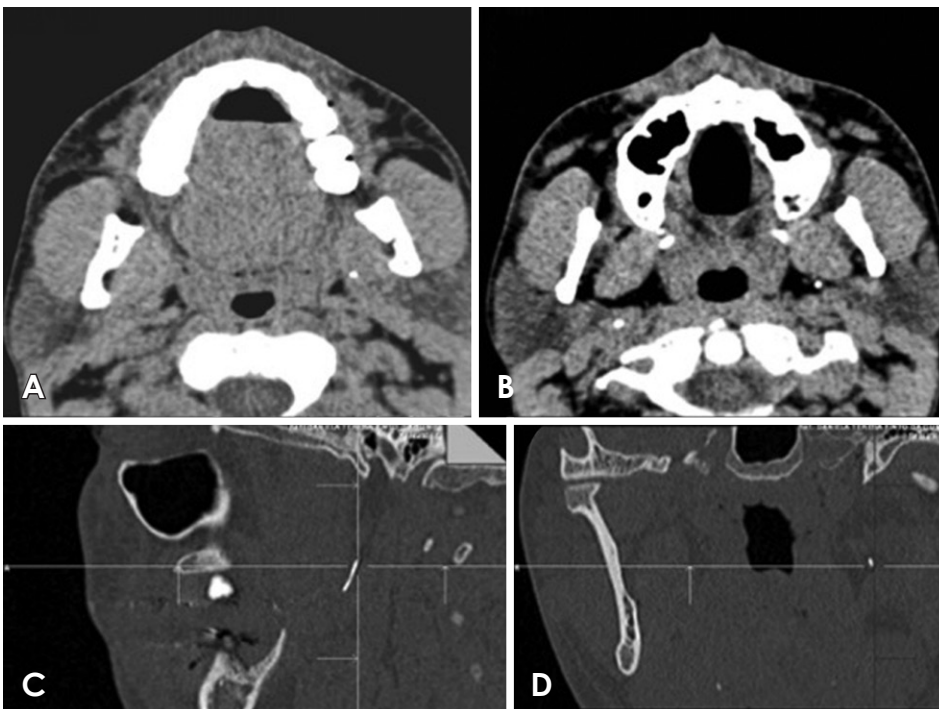


Fig. 5. Multislice computed tomography with 64 detectors. (A and B) The axial images (soft-tissue window) show the foreign body; the top part of the needle was located in the parapharyngeal space and the bottom part in the medial pterygoid muscle. Notice the loss of anatomical fat structures with the formation of granulomatous tissue. (C and D) Sagittal and coronal planes, respectively, which were useful for localizing the needle at 1 month of monitoring.



Fig. 6. Panoramic radiography shows the fractured needle, which was located in the posterior area of the ascending branch of the mandible at 2 months of monitoring.

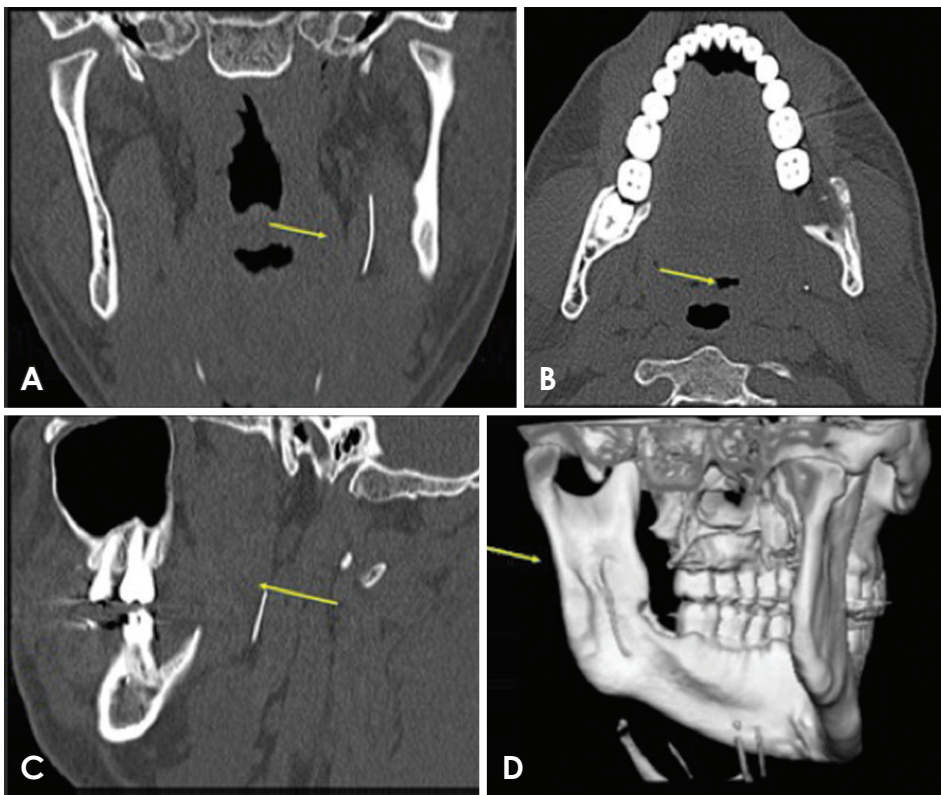


Fig. 7. Multislice computed tomography with 64 detectors. The coronal (A), axial (B), and sagittal planes (C) and 3-dimensional reconstructed (D) images show the foreign body (yellow arrows); the top part of the needle was located in the medial pterygoid muscle and the bottom part in the parapharyngeal space, at 2 months of monitoring.

the object is not generally necessary, as removal appears to be favorable only for the patient's psychological state with the goal of calming the patient. The possibility of migration of the fractured fragment is insignificant, although its removal might be recommended because of the possibility that it could cause injuries in adjacent tissues, especially when it is located near important structures.^{1,3,6,10} In association with a needle fracture, the patient can present

with an infection, inflammation, pain, trismus, difficulty in swallowing, and other symptoms indicating that surgical removal may be necessary.^{2,3,8,9} In this case, fragment removal was initially recommended because of its migration in the first 3 months and the patient's uneasiness. After it stabilized, its location was verified to be in the parapharyngeal space (Fig. 5), the patient was reassured, and with the consensus of the team of professionals involved,



Fig. 8. Panoramic radiograph showing the stabilized fragment at 3 months of monitoring.



Fig. 9. Panoramic radiograph taken 2 years after the fracture, showing its stable position.

it was decided to carry out radiographic monitoring of the fragment.

Dentists should develop the practice of explaining anesthetic block and possible complications during the procedure to their patients, requesting their cooperation in addition to a detailed inspection of the needle before the procedure. If defective needles are noticed, they should be discarded.¹⁻³ It is very important that professionals know the proper technique for the nerve block of each nerve and use specific and appropriate needles, since the same type of needle should not be used for each nerve.²⁻⁴ This can prevent difficulties during dental local anesthesia.

It is necessary for dental surgeons to adopt procedures to prevent needle fractures and to perform a detailed inspection before anesthetic procedures. If a fracture oc-

curs, it is ideal to inform the patient while trying to sedate him/her and to obtain the patient's cooperation in carrying out the necessary procedures for his/her well-being, such as radiographic monitoring or in some cases, surgery to remove the fragment.

References

1. Augello M, von Jackowski J, Grätz KW, Jacobsen C. Needle breakage during local anesthesia in the oral cavity - a retrospective of the last 50 years with guidelines for treatment and prevention. *Clin Oral Investig* 2011; 15: 3-8.
2. Bedrock RD, Skigen A, Dolwick MF. Retrieval of a broken needle in the pterygomandibular space. *J Am Dent Assoc* 1999; 130: 685-7.
3. Chrcanovic BR, Menezes Junior DC, Custodio AL. Compli-

- cation of local dental anesthesia - a broken needle in the pterygomandibular space. *Braz J Oral Sci* 2009; 8: 159-62.
4. Pogrel MA. Broken local anesthetic needles: a case series of 16 patients, with recommendations. *J Am Dent Assoc* 2009; 140: 1517-22.
 5. Ethunandan M, Tran AL, Anand R, Bowden J, Seal MT, Brennan PA. Needle breakage following inferior alveolar nerve block: implications and management. *Br Dent J* 2007; 202: 395-7.
 6. Faura-Solé M, Sánchez-Garcés MA, Berini-Aytes L, Gay-Escoda C. Broken anesthetic injection needles: report of 5 cases. *Quintessence Int* 1999; 30: 461-5.
 7. Zeltser R, Cohen C, Casap N. The implications of a broken needle in the pterygomandibular space: clinical guidelines for prevention and retrieval. *Pediatr Dent* 2002; 24: 153-6.
 8. Kim JH, Moon SY. Removal of a broken needle using three-dimensional computed tomography: a case report. *J Korean Assoc Oral Maxillofac Surg* 2013; 39: 251-3.
 9. Nezafati S, Shahi S. Removal of broken dental needle using mobile digital C-arm. *J Oral Sci* 2008; 50: 351-3.
 10. Thompson M, Wright S, Cheng LH, Starr D. Locating broken dental needles. *Int J Oral Maxillofac Surg* 2003; 32: 642-4.