

## Surgery traction canine of impacted in the maxillary: a case report

### *Cirurgia de tracionamento de canino impactado em maxila: relato de caso*

Oscar Alejandro Picon **PUA**<sup>1</sup>  0000-0002-2499-3380

Jefferson Pires da **SILVA JÚNIOR**<sup>1</sup>  0000-0001-6977-1629

Jorge Henrique de Sousa **MARTINS**<sup>1</sup>  0000-0003-2315-2464

Bruna Mirely da Silva **CAVALCANTE**<sup>1</sup>  0000-0003-2786-7686

Pedro Paulo Lopes de **ALMEIDA**<sup>1</sup>  0000-0003-4602-1598

Flávio Lima do Amaral **SILVA**<sup>1</sup>  0000-0002-4182-3316

Leandro Coelho **BELÉM**<sup>1</sup>  0000-0001-5355-6262

Anderson Moreira de **MEDEIROS**<sup>1</sup>  0009-0002-5142-157X

### ABSTRACT

Permanent canines are essential for the preservation of the stomatognathic system, as they are part of the occlusal and aesthetic function and balance. During the normal development of occlusion, canines follow a long and complex trajectory until their eruption, that is, they are more likely to suffer disturbances during this process. Removal of the permanent canine should only be considered in extreme cases, where the canine itself is not susceptible to orthodontic traction. Orthodontic traction is the most indicated treatment due to the high morphofunctional and aesthetic value of the permanent canine. The aim of this study is to report a clinical case of traction surgery of the superior permanent canine included in the maxilla. A 13-year-old female patient attended the dental clinic at the Nilton Lins University accompanied by her guardian, referred by an orthodontist for canine traction surgery. During the exam in the clinical analysis, tooth 13 was absent from the dental arch. The patient had a computed tomography scan, where it was possible to verify the actual position of the tooth impacted with the partially erupted crown on the alveolar ridge. After planning, surgery was performed to install an orthodontic button and adapt the ligature with a 0.30 mm wire. After the 10-month follow-up period, the presence of the tooth in arch, completely erupted, was observed, showing effectiveness in the proposed treatment. Therefore, the procedure for bonding the orthodontic device was performed satisfactorily without complications or interurrences, making it possible to continue the orthodontic treatment. The patient remains under follow-up.

**Indexing terms:** Cuspid. Ectopic tooth eruption. Surgery, oral.



<sup>1</sup> Universidade Nilton Lins. Av. Professor Nilton Lins, 3259, 69058-030, Parque das Laranjeiras, Manaus, AM, Brasil. Correspondence to: JP Silva Júnior. E-mail: <juniorvasconcelos15@gmail.com>.



How to cite this article

Pua OAP, Silva Júnior JP, Martins JHS, Cavalcante BMS, Almeida PPL, Silva FLA, et al. Surgery traction canine of impacted in the maxillary: a case report. RGO, Rev Gaúch Odontol. 2023;71:e20230052. <http://dx.doi.org/10.1590/1981-86372023005220230009>

## RESUMO

*Os caninos permanentes são essenciais para a preservação do sistema estomatognático, visto que, fazem parte da função e equilíbrio oclusal e estético. Durante o desenvolvimento normal da oclusão, os caninos seguem uma longa e complexa trajetória até seu irrompimento, ou seja, estão mais propensos a sofrerem distúrbios no decorrer desse processo. A extração do canino permanente só deve ser considerada em casos extremos, onde o próprio não se encontra suscetível à tração ortodôntica. O tracionamento ortodôntico é o tratamento mais indicado devido ao alto valor morfofuncional e estético do canino permanente. Sendo assim, o objetivo deste estudo é relatar um caso clínico de cirurgia de tracionamento de canino permanente superior incluso em maxila. Paciente de 13 anos, gênero feminino, compareceu a clínica odontológica da Universidade Nilton Lins acompanhado de seu responsável, encaminhada por um ortodontista para cirurgia de tracionamento de canino. Durante o exame clínico observou-se ausência do dente 13 na arcada dentária. A paciente apresentou a tomografia computadorizada, onde foi possível verificar o real posicionamento do dente impactado com a coroa parcialmente irrompida no rebordo alveolar. Após o planejamento, realizou-se a cirurgia destinada a instalação de botão ortodôntico e adaptação da amarrilha com fio 0,30 mm. Posteriormente ao período de acompanhamento de 10 meses, observou-se a presença do dente em arco, totalmente erupcionado, mostrando efetividade no tratamento proposto. Portanto, o procedimento de colagem de dispositivo ortodôntico ocorreu de forma satisfatória sem complicações ou intercorrências, tornando possível a continuidade do tratamento ortodôntico. A paciente permanece em acompanhamento.*

**Termos de indexação:** Dente canino. Erupção ectópica de dente. Cirurgia bucal.

## INTRODUCTION

Dental anomalies are frequently found during the diagnosis process of orthodontic patients, especially ectopic eruptions [1,2]. Dental impaction can occur in primary, mixed and permanent dentition (most common), third molars are the most involved teeth, followed by of the upper permanent canines [3,4]. Permanent canines are essential for the preservation of the stomatognathic system, as they are part of the occlusal and aesthetic function and balance, in addition to being important in lateral movements [5].

Permanent canines have a more premature mineralization process compared to incisor teeth and first molars [3]. However, during the normal development of occlusion, they follow a long and complex trajectory to their eruption, taking twice as long to erupt, being more prone to suffer disturbances during this process [2-5]. Its etiology is considered multifactorial, including obstruction of the lateral incisors, lack of space in the dental arch, among others [1-3]. In addition, it may be associated with other disorders such as microdontia, agenesis and dental transpositions, Crouzon syndrome, metabolic conditions (hypothyroidism and hypopituitarism) [1-4].

The prevalence of impaction of these teeth in the general population is 0.8 to 3.6%, it usually affects more women than men and up to 90% of cases is found in the palatine cortex [1-6]. Caucasian individuals are the most affected by impaction via the palate, while in the Asian population it is more prevalent through the vestibular [5-7]. Dental retention can cause reflex pain, ankylosis, local infections, favor the formation of periodontal pockets and dentigerous cysts, cause resorption of the roots of adjacent teeth and loss of tooth length of dental arch [1,2,8].

Some clinical signs may point to the presence of the impacted canine, such as delayed eruption of the primary canine after 14-15 years of age, distal tipping, or migration of the lateral incisor [4]. However, most impacted canines are asymptomatic, requiring performing radiographic exams: panoramic, periapical, occlusal and teleradiography [9]. However, some authors believe that cone beam computed tomography (CBCT) allows more accurate location information without the presence of tissue overlap and contrasts, in addition to identifying cases of resorption root and alveolar bone loss from the supporting tissues around each tooth [1,5-7].

A very important factor is the assessment of periodontal risk, which needs to be incorporated into the diagnostic and planning processes, in order to further improve the quality of the proposed treatment [2]. The extraction of the permanent canine should only be considered if it is not susceptible to orthodontic traction [10-12]. Therefore, orthodontic traction is the most indicated treatment due to the high morfofunctional and aesthetic value of the permanent canine [1,2,4,6].

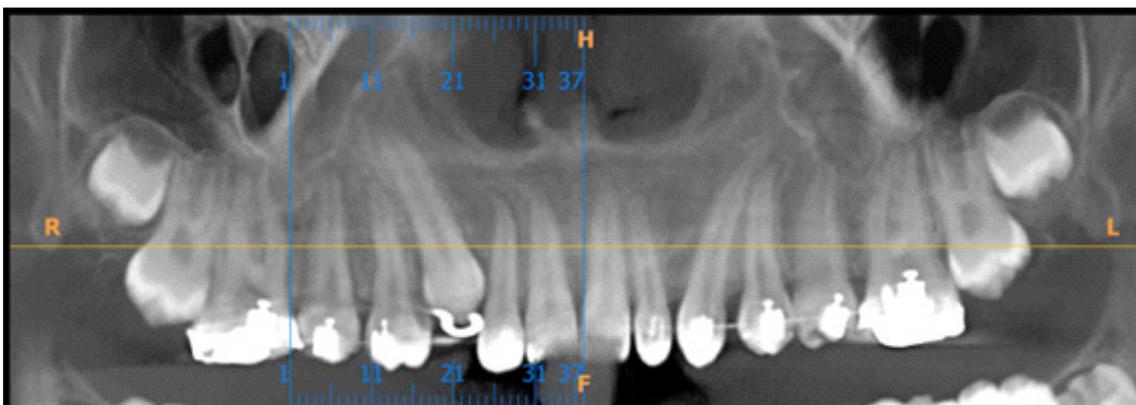
That said, the aim of this study is to report a clinical case of traction surgery of the superior permanent canine included in the maxilla.

## CASE REPORT

A 13-year-old female patient attended the dental clinic at the Nilton Lins University accompanied by her guardian, referred by an orthodontist for canine traction surgery. during the examFrom the clinical point of view, tooth 13 was absent from the dental arch (figure 1). The patient presented a cone beam computed tomography (figure 2) where it was possible to check the tooth13 impacted with the crown partially erupted in the alveolar ridge. After confirming the diagnosis and its exact location, surgical planning was carried out. Firstthe patient and guardian were instructed on the importance of surgical intervention for the success of traction of the impacted canine 13.



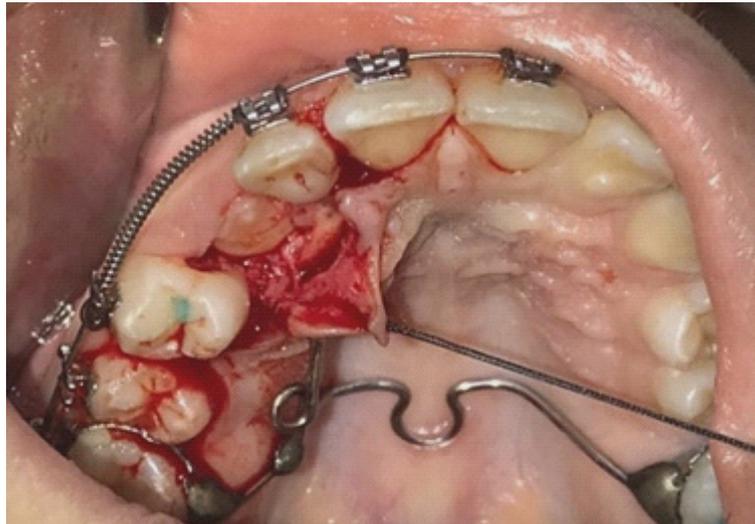
**Figure 1.** Initial clinical appearance from the occlusal view.



**Figure 2.** Panoramic partial reconstruction, showing tooth impaction.

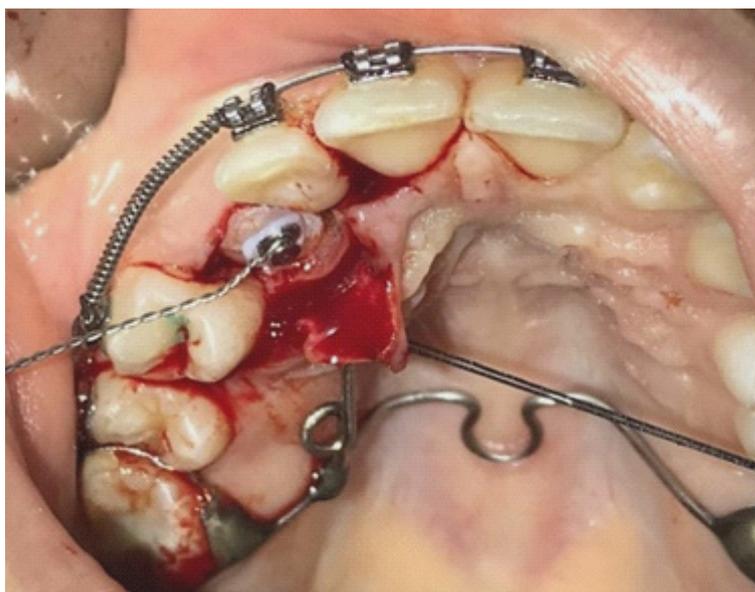
In this scenario, preoperative anti-inflammatory medication was prescribed steroid (dexamethasone 8 mg) 1 hour before the procedure. To perform the surgical procedure, intraoral antiseptics were performed with 0.12% chlorhexidine diglucon and extraoral with povidone iodine. Then, the nasopalatine nerves and right anterior superior alveolar nerve were blocked with a short needle and anesthetic salt 2% lidocaine associated with epinephrine, at a concentration of

1:100.000. Then, an incision was made in the alveolar ridge with a 15 scalpel blade, through the palatal surface with the aid of a 9 Molt detacher, the total mucoperiosteal flap was dislocated and contralateral anchorage was performed using a nylon 4-0 (figure 3).



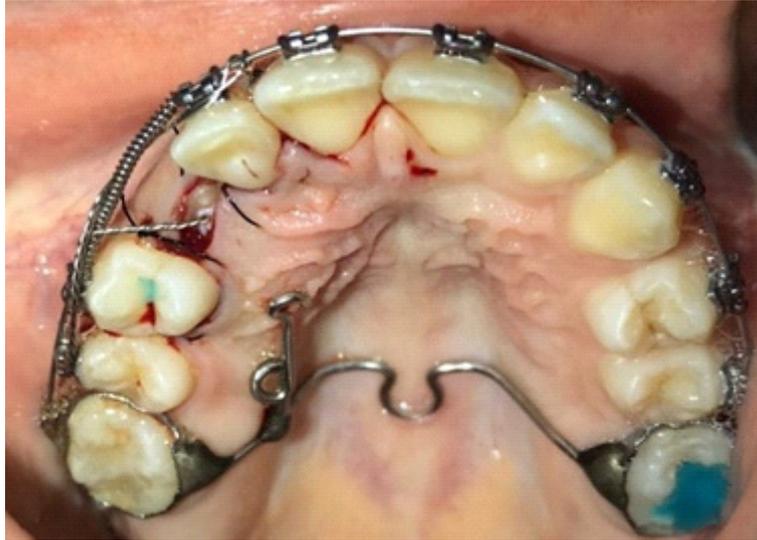
**Figure 3.** Contralateral anchorage after incision.

Subsequently, ostectomy was performed with a #702 high-speed surgical bur and abundant irrigation with 0.9% saline solution, drying with sterile gauze, conditioning with 37% phosphoric acid, washing, drying, application of adhesive (Adpper Single Bond, 3M ESPE, Saint Paul, Minnesota, USA). Subsequently, the orthodontic button was bonded followed by light curing (Emitter A Fit, Schuster, Santa Maria, RS, Brazil) for 40 seconds. Subsequently, the 0.30mm braided tie wire was connected with orthodontic resin (Orthocem, FGM, Joinville, SC, Brazil) (figure 4).



**Figure 4.** Orthodontic button installation.

Surgical synthesis was performed with simple stitches with 4-0 nylon thread, leaving the clinical crown of the impacted canine tooth partially exposed (figure 5). For postoperative care, the following was prescribed: antibiotic (amoxicillin 500mg) every 8 hours for 5 days; and analgesic (dipyron 500mg) every 6 hours for three days. After the surgical procedure, proper instructions on oral hygiene and postoperative care were provided. After a follow-up period of 10 months, the patient returns to check the current position of tooth 13, where the presence of the tooth in a fully erupted arch was observed, showing the effectiveness of the treatment (figure 6).



**Figure 5.** immediate clinical aspect after flap repositioning and synthesis.



**Figure 6.** Final clinical appearance after 10 months of follow-up, in occlusal view.

## **DISCUSSION**

Permanent canines are of great importance for smile harmony, which in turn are vital for the full functioning of the stomatognathic system, as they are directly involved in occlusal balance and in the execution of laterality movements

[13]. The literature reinforces the high rate of this tooth with regard to impaction, only behind the third molars [14]. When not diagnosed and treated, they can cause neoplastic, infectious and mechanical complications [13,14]. Compared to genders, they are more commonly found in women, highlighting the maxillary bone as the highest prevalence of the cases found [1-4,15]. In the present case, in agreement with the literature, the patient reported belongs to the female gender and had tooth 13 impacted in the maxillary bone.

Generally, dental impaction is diagnosed during clinical and especially radiographic examinations. In these assessments, the absence of an arched canine is highlighted, making the diagnostic hypothesis possible [15]. Watted et al. [16] state that the earlier the detection of the impacted canine, the greater the possibility of an appropriate surgical and orthodontic intervention, consequently leading to a better functional and esthetic prognosis. Rdiagnosis and surgical procedure is recommended during themixed dentures in order to minimize the intervention time, avoiding costs and more complex approaches in adulthood [2,4,6,15,16]. The patient in this report informed about the start of her orthodontic treatment, she is 13 years old, age compatible with mixed dentition.

Mohammed et al. [6] state that, before defining the treatment, the exact location of the tooth to be pulled and nearby structures is essential, through clinical, radiographic and CBCT examinations. However, radiographic exams, according to Hamada et al. [17], do not include exact information about the corresponding distance from the impacted area and nearby supporting structures. It is noteworthy that these tests do not identify the presence or absence of root resorption in adjacent teeth [6]. In this study, the clinical examination showed the absence of tooth 13 in arch, but the patient communicated about orthodontic follow-up by CBCT to confirm its actual position.

In this scenario, CBCT is the most appropriate tool, as it provides images in high definition, demonstrating the precise location of the impacted canine in three planes of space, thus providing sufficient data for the surgical and/or orthodontic planning of the case [1-7,17-19]. According to Silva et al. [1] and El et al. [10], other factors should be considered before defining the treatment, such as: patient age, position, morphology of close teeth, tooth mobility, bone delineation, presence of ankylosis, root lacerations and resorption of permanent incisors. The tooth in question in this study is indicated for traction with an adequate position in the axis of movement, not showing any notable alterations in its close structures.

Orthodontic traction according to Watted et al. [16] aims to redirect, assist or even replace the trajectory and eruptive force of the impacted tooth. The traction methodology consists of tooth movement, and three associated techniques can be used as an adjunct: launching the orthodontic wire around the cemento-enamel junction; crown perforation; and bonding of orthodontic device [2]. For the clinical case of the patient in this report, bondingorthodontic was chosen, that is, bonding of the orthodontic buttonand connection of the 0.30 mm braided binding wire, as it has a better prognosis in addition to preserving healthy dental structures due to the absence of tooth wear.

The technique bonding orthodontic is considered more conservative, where its main advantage is the possibility of avoiding possible retractions [4,17]. In addition, it has a lower biological cost as it protects the tooth, eliminating the need for enamel perforation, and as a result, lower risk of injury pulp [19,20]. Silva et al. [1] and Dalessandri et al. [13], agree in their research that this technique used offers greater movement control and consequently greater effectiveness in the applied force.

In this perspective, Capellozza Filho et al. [21] state that orthodontic traction is not only an efficient procedure, but also a safe one in clinical practice. Above all, the application of controlled forces and movements must be carried out, not allowing pulpal or periodontal changes, much less the occurrence of odontoblastic lesions causing tooth resorption. In the present case, the selected movements and forces were shown to be satisfactory in the findings clinical and radiographic, where the patient did not report the presence of tooth sensitivity or painful symptoms after eruption and adaptation of tooth 13 in arch.

## CONCLUSION

Therefore, the procedure of orthodontic device bonding occurred in a way satisfactory without complications or making it possible to continue the orthodontic treatment. The patient remains under follow-up.

## Collaborators

OAP Pua, conceptualization, data curation and writing - review & editing. JP Silva Júnior, investigation, methodology, project administration and writing - original draft. JHS Martins, investigation, methodology and writing - review & editing. BMS Cavalcante, investigation and project administration. PPL Almeida: conceptualization and writing - original draft. FLA Silva, supervision, methodology and writing - original draft. LC Belém, supervision, investigation and methodology. AM Medeiros: supervision and writing - review & editing.

## REFERENCES

- Silva AC, Capistrano A, Almeida-Pedrin R, Cardoso MA, Conti ACCF, Capellozza Filho L. Root length and alveolar bone level of impacted canines and adjacent teeth after orthodontic traction: a long-term evaluation. *J Appl Oral Sci.* 2017;25(1):75-81. <https://doi.org/10.1590/1678-77572016-0133>
- Schroeder MA, Schroeder DK, Capelli Júnior J, Santos DJS. Orthodontic traction of impacted maxillary canines using segmented arch mechanics. *Dental Press J Orthod.* 2019;24(5):79-89. <https://doi.org/10.1590/2177-6709.24.5.079-089.sar>
- Aiello CA, Alves ACM, Sorgini MB, Maranhão OBV, Ferreira PM. Is it possible to orthodontic treatment of a permanent canine impacted with alveolodental ankylosis? *Rev Clin Ortod Dental Press.* 2017;16(5):45-56. <https://doi.org/10.1590/2177-6709.25.6.019-025.oin>
- Nisha S, Shashikumar P, Chandra S. Maxillary canine impaction to treat or not. *Indian J Multidiscip Dent.* 2017;7(1):124-128. [https://doi.org/10.4103/ijmd.ijmd\\_21\\_17](https://doi.org/10.4103/ijmd.ijmd_21_17)
- Damante SC, Lopes WC, Rodrigues CDB, Adriaola MM, Bertoz APM, Bigliuzzi R. Traction of included canines: diagnosis and therapy. *Arch Health Invest.* 2017;6(12):580-585.
- Mohammed AK, Sravani G, Vallappareddy D, Rao AR, Qureshi A, Prasa AN. Localization of impacted canines - a comparative study of computed tomography and orthopantomography. *J Med Life.* 2020;13(1):56-63. <https://doi.org/10.25122%2Fjml-2020-0001>
- Cross RM. Orthodontic traction of impacted canines: concepts and clinical application. *Dental Press J Orthod.* 2019;24(1):74-87. <https://doi.org/10.1590/2177-6709.24.1.074-087.bbo>
- Ucar FI, Celebi AA, Tan E, Topcuoglu T, Sekerci AE. Effects of impacted maxillary canines on root resorption of lateral incisors. *J Orofac Orthop.* 2017;78(3):233-40. <https://doi.org/10.1007/s00056-016-0077-6>
- Carvalho AAB, Corrêa LAF, Freitas FF, Dias PC. Importance of cone beam computed tomography in the evaluation of canine impacted maxilla. *Rev Bras Odontol.* 2017;74(2):143-149.
- El H, Stefanovic N, Palomo JM, Palomo L. Risk management during impacted maxillary canine treatment. *Turk J Orthod.* 2020;33(2):123-132.
- Jorge M, Pedro A, Santos OS, Pinho T, Espinha F. Risks and failures in the use of mini-implants. *Rev Port Estomatol Med Dent Cir Maxilofac.* 2016;56(1):37-43.
- Dias DS, Silva MFCL, Lima LM, Pego LP, Aquino TJJ, Araújo MM, et al. Orthodontic traction of a maxillary permanent canine: case report. *REAS.* 2020;41(2418):1-8. <https://doi.org/10.1590/2177-6709.24.5.079-089.sar>
- Dalessandri D, Parrini S, Rubiano R, Gallone D, Migliorati M. Impacted and transmigrant mandibular canines incidence, aetiology, and treatment: a systematic review. *Eur J Orthod.* 2017;39(2):161-169. <https://doi.org/10.1093/ejo/cjw027>
- Silva AC, Heleno PS, Silva RNP, Izolani Neto O, Barbosa CCN, Barbosa OLC. Canine tooth traction included: literature review. *Braz J Surg Clin Res.* 2018;23(3):78-80.
- Heravi F, Shafae H, Forouzanfar A, Zarch SHH, Merati M. The effect of canine disimpaction performed with temporary anchorage devices (TADs) before comprehensive orthodontic treatment to avoid root resorption of adjacent teeth. *Dental Press J Orthod.* 2016;21(2):65-72. <https://doi.org/10.1590/2177-6709.21.2.065-072.oar>
- Watted N, Hussein E, Proff P, Dodan A, Muhammad AH. Surgery of labially impacted canine & orthodontic management – a case report. *Open J Dent Oral Med.* 2017;5(1):1-6. <http://dx.doi.org/10.13189/ojdom.2017.050101>
- Hamada Y, Timothius CJC, Shin D, John V. Canine impact - review of the prevalence, etiology, diagnosis and treatment. *Semin Orthod.* 2019;25(2):117-123. <https://doi.org/10.1053/j.sodo.2019.05.002>
- Schulze RKW, Drage NA. Cone-beam computed tomography and its applications in dental and maxillofacial radiology. *Clin Radiol.* 2020;75(9):647-657. <https://doi.org/10.1016/j.crad.2020.04.006>.
- Hassouna E, Nada S, Ines D, Samir T, Adel BA. Challenging orthodontic treatment for a patient with an impacted maxillary canine: a case report. *Sch J Dent Sci.* 2021;8(1):63-70. <https://doi.org/10.36347/sjds.2021.v08i01.010>
- Soares VK, Menezes LM. Approach to impacted upper canines. *RGO, Rev Gaúch Odontol.* 2016;20(1):4-12. <https://doi.org/10.1590/1981-86372017000100003277>
- Capellozza Filho L, Consolaro A, Cardoso MD, Siqueira M. Enamel perforation for canine traction: advantages, disadvantages, description of the surgical technique and biomechanics. *Dental Press J Orthod.* 2011;16(5):172-205. <https://doi.org/10.1590/S2176-94512011000500024>

Received on: 6/3/2023  
Approved on: 5/7/2023

Assistant editor: Luciana Butini Oliveira