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CASE REPORT
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Brachycephalic Obstructive Airway Syndrome (BOAS) and Orofacial Cleft in a Dog: Treatment with Palatoplasty, Staphyloplasty, and Unilateral Rhinoplasty

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ABSTRACT

***Background*:** Cleft lip and palate can be categorized as congenital craniofacial malformations, characterized by the failure of maxillary and palatal processes to fuse during the intrauterine period. This defect results in an opening in the palate, potentially causing communication between the nasal and oral cavities. Cleft lip and palate can present with varying degrees of severity. The treatment of choice for cleft lip and palate is surgical intervention, aimed at closing the defect to prevent oronasal communication. The following case report describes an American Bully dog with congenital malformations of cleft lip and palate and Brachycephalic Obstructive Airway Syndrome (BOAS).

***Case*:** A 1-year-and-3-month-old American Bully dog was diagnosed with BOAS, along with a unilateral cleft lip and palate. During the clinical examination, the dog showed characteristic symptoms of BOAS, including coughing, snoring, and exercise intolerance. The assessment also revealed moderate stenosis of the right nostril and food debris accumulation in the palatal cleft, which could lead to infections. Based on the diagnosis, three consecutive surgeries were performed: palatoplasty to correct the palatal cleft, unilateral rhinoplasty to treat the nasal stenosis, and staphylectomy to address the excessively long soft palate associated with BOAS. The palatoplasty involved an incision and coaptation of the cleft edges, while the staphylectomy resected the excess soft palate tissue. The rhinoplasty involved removing a fragment of tissue from the right nasal meatus through a wedge-shaped incision. The surgery was successful, and the patient showed improvement in respiratory symptoms during the postoperative period, although the owner did not attend follow-up appointments. Postoperative management included pain and anti-inflammatory medications, as well as recommendations for soft food and the use of an Elizabethan collar to prevent injury to the surgical site. The successful procedure highlights the importance of surgical correction in brachycephalic dogs with BOAS, improving their quality of life by alleviating respiratory difficulties and the risks associated with palatal clefts.

***Discussion*:** This case underscores the critical role of surgical intervention in managing congenital malformations in brachycephalic dogs. The patient underwent palatoplasty to correct a pre-existing palatal cleft, unilateral rhinoplasty of the right nostril due to moderate stenosis, and staphylectomy following a prior diagnosis of Brachycephalic Obstructive Airway Syndrome (BOAS). These procedures were essential for improving the animal's respiratory function and reducing the risks associated with the cleft palate, such as aspiration and bacterial infections. The rhinoplasty and staphylectomy successfully addressed the anatomical deformities caused by BOAS, alleviating respiratory symptoms and improving airflow. The palatoplasty, while primarily aimed at preventing complications from the cleft, also played a significant role in enhancing the patient's overall health by mitigating the risks of infections due to food debris accumulation in the cleft. While the cleft lip itself did not severely impact the animal's quality of life, it was important to consider the full spectrum of congenital malformations in this breed, as coexisting clefts are often present. Timely and comprehensive surgical intervention, as demonstrated in this case, is essential for improving the quality of life in brachycephalic dogs with congenital anomalies. This approach not only addresses immediate health concerns but also contributes to long-term well-being by enhancing both respiratory function and reducing the risk of secondary complications.

Keywords: brachycephalic dog, cleft lip and palate, congenital defect, corrective surgery, craniofacial malformations, nasal stenosis.

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INTRODUCTION

Brachycephalic dogs face health issues from low genetic diversity and extreme traits [5]. About 7% of puppies have malformations; inbreeding raises cleft lip/palate cases, especially in brachycephalics [4]. Orofacial clefts arise from failed embryonic tissue fusion [17]. Cleft lip, rare in small animals, is due to failed fusion of maxillary prominences and nasal process, influenced by genetics and environment [9]. It causes no functional issues; treatment is cosmetic [3].

Orofacial clefts classify as pre-foramen, transforming, or post-foramen, unilateral or bilateral [18]. They affect the palate alone or extend to lips [2]. Palatine clefts involve primary (rostral) and/or secondary (caudal) palate, separate or combined [7]. Primary clefts, more common, include labial and pre-foramen types; secondary clefts affect hard and soft palates [10,16]. Few studies limit knowledge of breed risks, traits, and related conditions. High mortality and frequent euthanasia call for more research [5].

Congenital malformations in brachycephalics rise from genetic, environmental, and nutritional factors [4]. Artificial selection favors appearance over health and longevity [7,6], causing cranial changes and issues like BOAS and orofacial clefts [19]. BOAS causes short snouts, elongated soft palates, nasal stenosis, and dental/ocular defects, leading to airway and gastrointestinal disorders [1]. Respiratory problems impair thermoregulation and oxygenation, lowering quality of life and risking collapse or death [13].

We reported a brachycephalic American Bully with orofacial cleft and BOAS treated by 3 surgeries: palatoplasty, staphyloplasty, and unilateral rhinoplasty.

CASE

An unneutered 1-year and 3-month-old American Bully dog, weighing 22.5 kg, was examined by the Short Snout Project at the Federal University of Pelotas (UFPel), which aims to diagnose and treat dogs with BOAS. During the anamnesis, the dog presented symptoms of coughing, snoring, exercise intolerance, foul-smelling flatulence, occasional episodes of regurgitation, and pasty stools. On physical examination, a left unilateral cleft lip, a unilateral, complete pre-foramen cleft palate, unilateral stenosis of the right nostril, and a putrid odor from the oral cavity due to food accumulation in the palatal cleft were observed (Figure 1).

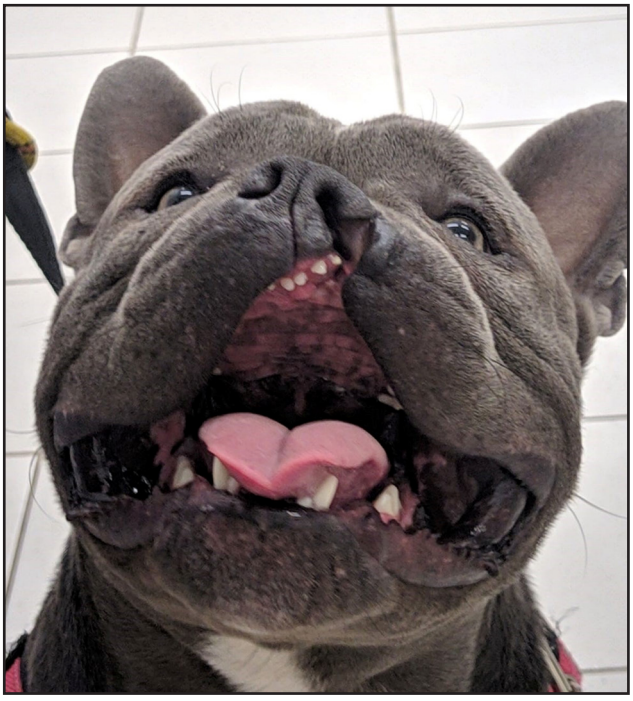

Figure 1. American Bully dog affected by Brachycephalic Obstructive Airway Syndrome (BOAS) associated with a cleft palate.

The dog had a body score of 4/9, pink mucous membranes, a strong and steady arterial pulse, a capillary refill time (CRT) of 2 s, respiratory stridor in the lung auscultation fields, a heart rate of 110 beats per minute (bpm), and a respiratory rate of 36 breaths per minute (rpm). Based on the clinical observations and anamnesis, BOAS was diagnosed along with cleft lip and cleft palate. Additional tests were requested to assess the patient's overall condition.

On cranial radiography, discontinuity of the soft tissues of the left upper lip and partial bone discontinuity of the left primary palate extending through the alveolar process and incisor bone were observed, consistent with a cleft lip and palate, as well as a rightward deviation of the nasal septum in its rostral portion.

After blood count, blood gas analysis, electrocardiogram, and echocardiogram confirmed the dog's ability to undergo anesthetic and surgical procedures, these were performed at the Veterinary Clinics Hospital (HCV) of UFPel. Pre-anesthetic procedures included the administration of pre-anesthetic medications (PAMs) methadone[1] [0.02 mg/kg - intramuscularly (IM)] and acepromazine[2] [0.3 mg/kg - IM] combined. After routine venipuncture[3] preparation, the anesthetic protocol consisted of propofol[3] [4 mg/kg, intravenously (IV)] and fentanyl[1] [3 mg/kg - IV], followed by

orotracheal intubation with an 8-mm tube. Anesthesia maintenance was achieved with propofol[3] and isoflurane[4] [via inhalation].

The patient was positioned in sternal recumbency with the head elevated and mouth open to allow access for the staphylectomy. The procedure began with measuring the excess tissue, followed by placing nylon 2-0 repair sutures at each base of the palatoglossal arch, pulling them cranially; the ends were secured with Kelly clamps. An Allis clamp was then placed on the central aspect of the soft palate and retracted (Figure 2A). The excess soft palate tissue was resected, starting from the left base toward the center, moving caudally to the Allis clamp with a Metzenbaum scissor. Suturing began with a Swift knot and continued with a simple continuous pattern, capturing the mucosal edges with 3-0 polyglactin 910 suture until reaching the midline. Bleeding was minimal and controlled with sterile gauze compression. The resection and suturing on the right side were performed identically to the left, ending with another Swift knot, and the repairs were released.

Prior to the palatoplasty, extraction of the left upper 2nd incisor was necessary due to the dental deviation into the palatal cleft. This involved initially freeing the gingival mucosal edges, breaking the ligaments, luxating, and extracting the tooth. Next, the cleft edges were resected and dissected to free the mucosa and approximate the edges using 4-0 polyglactin 910 suture in a Swift isolated stitch pattern, from the caudal margin toward the lip junction (Figure 2B). Corrective surgery for the cleft lip was not performed, as per the owner's decision.

Finally, a unilateral rhinoplasty of the right nostril was performed (Figure 3). A wedge incision was made to remove an excess tissue fragment from the nasal meatus, and the free edges were approximated with a simple interrupted suture pattern using 3-0 polyglactin 910 suture.

During the postoperative period, the following medications were prescribed: dipyrone[5] [25 mg/kg - orally (PO), every 8 h] for 3 days, and prednisolone6 [1 mg/kg - PO, once daily] for 5 days. The patient was advised to be fed soft food and to wear an Elizabethan collar continuously for 10 days. The owner did not attend follow-up appointments but reported an improvement in the patient's respiratory condition, with a reduction in previously noted symptoms.

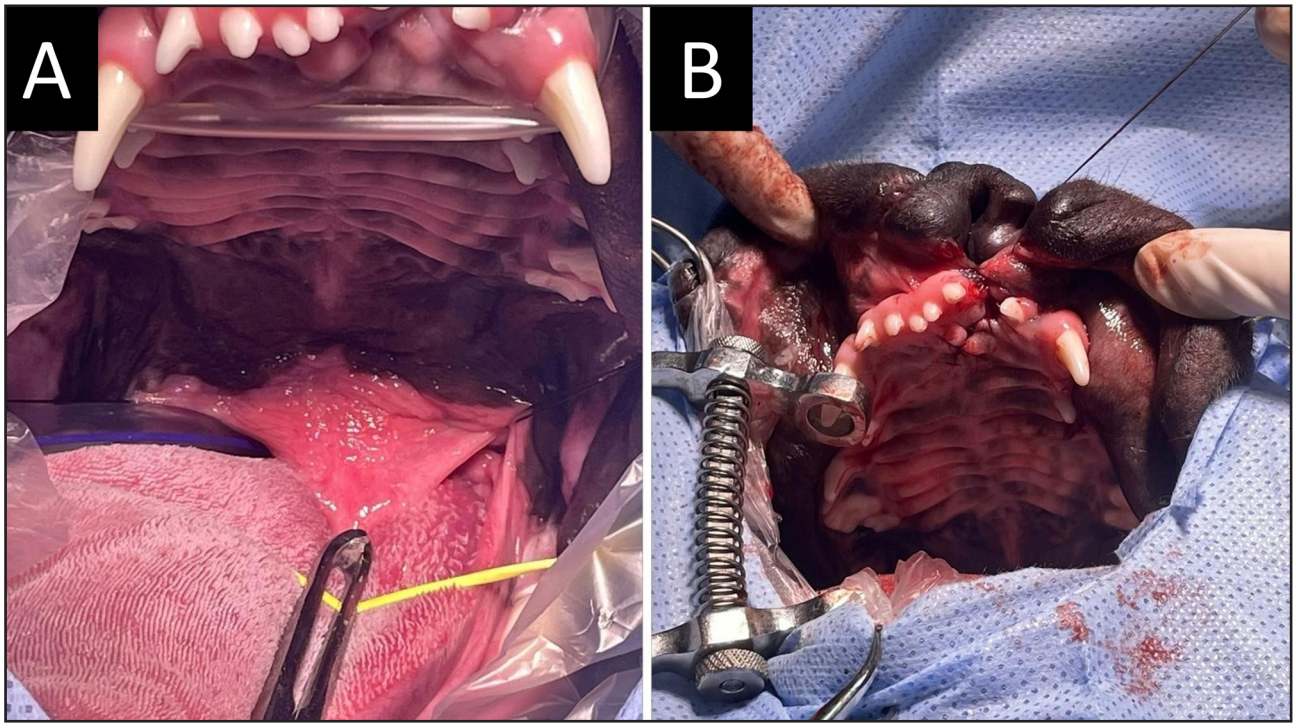

Figure 2. Intraoperative images of a dog affected by brachycephalic syndrome associated with a cleft palate. A- Allis forceps grasping and retracting the central portion of the excessive soft palate during surgery. B- Postoperative correction of the cleft palate using the Swift pattern with isolated sutures and 3-0 polyglactin 910 thread.

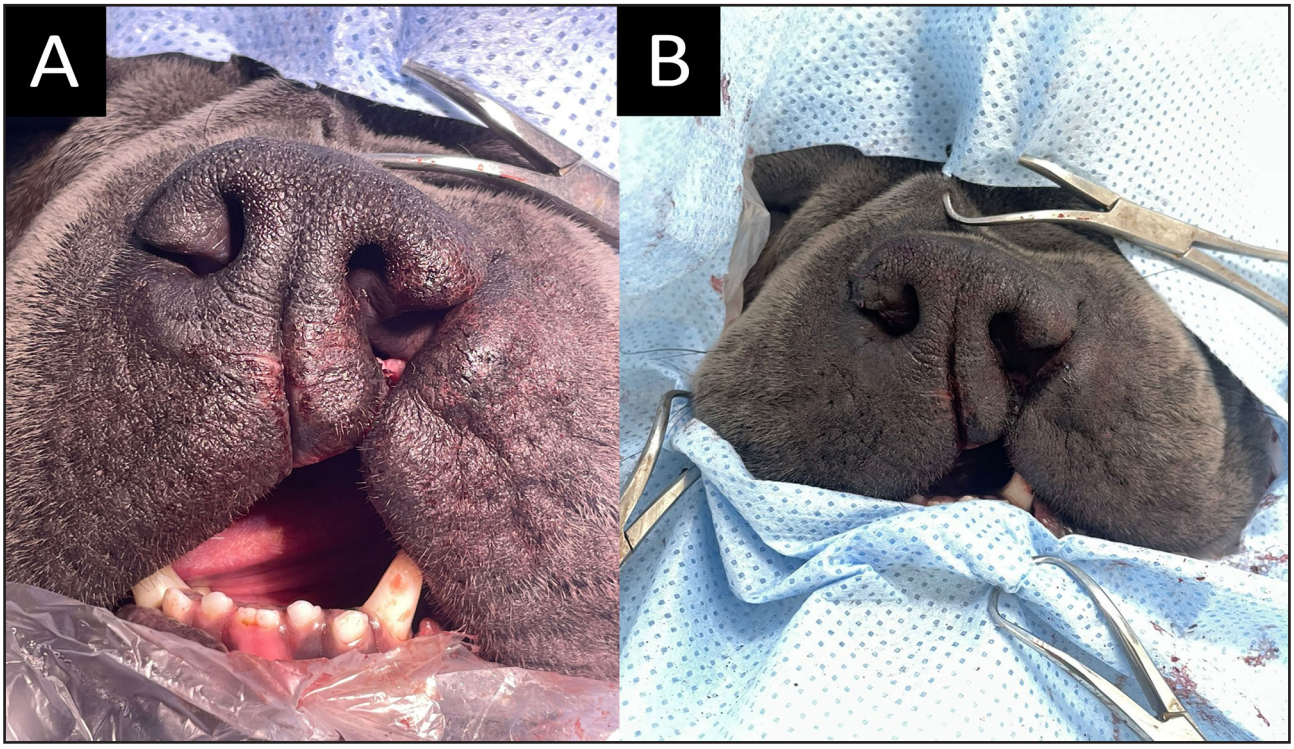

Figure 3. Intraoperative images of a dog affected by brachycephalic syndrome associated with a cleft palate. A- Right nostril showing anterior stenosis before the surgical procedure. B- Right nostril post-rhinoplasty.

DISCUSSION

In brachycephalic dogs, congenital malformations are increasingly common [4]. These malformations arise from various factors, including genetic, environmental, and nutritional influences. Animals from breeding kennels are more affected due to artificial selection [7], especially when the focus is on appearance rather than animal health [6]. This has led to variations in cranial conformation in these animals [19], such as brachycephalic obstructive airway syndrome (BOAS) and cleft lip and palate deformities.

The respiratory difficulty caused by BOAS decreases the animal's quality of life, as the excessive shortening of the muzzle impairs thermoregulation and respiratory functions, preventing proper oxygenation and thermal balance, disrupting hemostasis, and potentially leading to collapse and death [13]. In addition to BOAS, the reported American Bully presented a left unilateral cleft lip and a primary unilateral complete cleft palate, according to the classification by Moura and Pimpão [12]. Individuals affected by cleft lip and palate may experience feeding difficulties, leading to delays in physical development [14]. Despite this, the patient described here appeared clinically stable and in good body condition. However, there was a significant risk of respiratory infections due to the accumulation of bacteria from food debris in the cleft palate.

The surgical procedure for correcting cleft lip and palate is indicated between 4 and 6 months of age for the animal, as this period minimizes the risk of dehiscence and abnormal bone growth [7]. In some cases, the owner's dedication is crucial due to the dog's feeding difficulties, often requiring that food be administered via a feeding tube [17]. The patient reported in this case did not exhibit significant respiratory problems but did show symptoms related to BOAS. These symptoms can lead to various issues in brachycephalic dogs. BOAS occurs due to anatomical deformities that cause obstruction of the upper airways, preventing adequate airflow to the lungs [11].

The surgical procedures of rhinoplasty and staphyloplasty aim to correct 2 anatomical deformities resulting from BOAS: nasal stenosis and elongated soft palate, respectively. These surgical procedures are necessary for the true reversal of BOAS [8].

In humans, the correction of cleft lip begins at birth and extends into adulthood, aiming to provide

aesthetic and functional rehabilitation of the oral cavity, facilitating the social and psychological reintegration of individuals with clefts [15]. This treatment is carried out by a multidisciplinary team involving dentists, plastic surgeons, orthopedic surgeons, physiotherapists, speech therapists, and psychologists, with all treatment costs covered by the Public Health System (SUS) [15]. In animals, lip reconstruction is primarily aesthetic, as it is a condition that does not cause significant functional changes [3], which likely motivated the owner to maintain the defect, given that there was no clinical compromise. Although the cleft lip does not compromise the patient's quality of life, affected animals should be examined for coexisting clefts [3] as described in the report.

This case report highlights the significance of the 3 corrective surgical procedures in improving the quality of life for the presented American Bully. The rhinoplasty and staphylectomy effectively alleviated several respiratory symptoms associated with BOAS, while the palatoplasty significantly reduced the risks of aspiration and infections related to the palatal cleft. Additionally, this case underscores the importance of timely intervention and comprehensive clinical assessment for accurate diagnosis and treatment planning in brachycephalic breeds, where congenital anomalies such as cleft lip and palate are prevalent. Such proactive management can lead to better health outcomes and enhanced well-being for affected animals.

MANUFACTURERS

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REFERENCES

1 **De Lorenzi, D., Bertoncello D. & Drigo M. 2019.** Bronchial abnormalities found in a consecutive series of 40 brachycephalic dogs. *Journal of the American Veterinary Medical Association*. 235(7): 835-840. DOI: 10.2460/javma.235.7.835

2 **Dias F.G.G., Santos P.C.D., Moraes C.L.D., Dias L.G.G.G. & Pereira L.F. 2013.** Lábio leporino em pequenos animais – revisão de literatura. *Revista Científica Eletrônica de Medicina Veterinária*. 11(20): 1-8.

3 **Dias L.G.G.G., Dias F.G.G., Ikenaga F.M., Honsho C.S., Souza F.F., Selmi A.L. & Mattos Jr. E. 2015.** Palatoplastia com Retalho Sobreposto em Cão - Relato de Caso. *Brazilian Journal of Veterinary Medicine*. 37(3): 179-185.

4 **Estevam M.V., Apparicio M. & Toniollo G.H. 2024.** The most common congenital malformations in dogs: Literature review and practical guide. *Veterinary Science*. 171: 105230. DOI: 10.1016/j.rvsc.2024.105230

5 **Estevam M.V., Beretta S., Smargiassi N.F., Apparicio M., Toniollo G.H. & Pereira G.H. 2022.** Congenital malformations in brachycephalic dogs: a retrospective study. *Frontiers in Veterinary Science*. 9: 981923. DOI: 10.3389/fvets.2022.981923.

6 **Federation of European Companion Animal Veterinary Associations (FECAVA) & Federation of Veterinarians of Europe (FVE). 2018.** Breeding healthy dogs: the effect of selective breeding on the health and welfare of dogs. FVE/018/DOC/059:1-17. [Fonte: <https://fve.org/cms/wp-content/uploads/059_Extreme_breeding_Final_adopted.pdf>].

7 **Fiani N., Verstraete F.J.M. & Arzi B. 2016.** Reconstruction of congenital nose, cleft primary palate, and lip disorders. *Veterinary Clinics of North America: Small Animal Practice*. 46(4): 663-675. DOI: 10.1016/j.cvsm.2016.02.001.

8 **Holt D.E. 2004.** Upper Airway Obstruction, Stertor, and Stritor. In: King L.G. (Ed). *Textbook of Respiratory Disease in Dogs and Cats*. Philadelphia: Saunders, pp.35-42.

9 **Lustoza A.B., Belli L.K., Vezaro Y.S.C. & Pereira J.F.S. 2017.** Manejo e Tratamento Cirúrgico do Paciente Neonato com Fenda Palatina – Relato de Caso. *Biociências, Biotecnologia e Saúde*. 19(1): 190-192.

10 **MacPhail C.M. 2014.** Cirurgia do Sistema Respiratório Superior. In: Fossum T.W. (Ed). *Cirurgia de Pequenos Animais*. 4.ed. Rio de Janeiro: Editora Elsevier, pp.906-957.

11 Mendes Jr. A.F., Vaz K.F., Tanaka B.M.B.S., Araújo J.M., Mothé G.B., Soares A.M.B. & Almosny N.R.P. 2021. Anatomical and clinical aspects of brachycephalic syndrome: Literature review. *Research, Society and Development*. 10(13): e269101321221. DOI: 10.33448/rsd-v10i13.21221

12 Moura E. & Pimpão C.T. 2017. A numerical classification system for cleft lip and palate in the dog. *Journal of Small Animal Practice.* 58(1): 610-614. DOI: 10.1111/jsap.12730.

13 Oechtering G.U. 2010. Brachycephalic syndrome-new information on an old congenital disease. *Veterinary Focus*. 20(2): 10-18.

14 Paraguassu A., Joffily D., Moreira S.H., Freitas P. & Malm C. 2019. Tratamento cirúrgico e manejo pós operatório de fenda palatina congênita em cão braquicefálico - relato de dois casos. *Centro Cientifico Conhecer*. 16(29): 1441. DOI: 10.18677/EnciBio_2019A128

15 Ribeiro E.M. & Moreira A.S.C.G. 2005. Atualização sobre o tratamento multidisciplinar das fissuras labiais e palatinas. *Revista Brasileira em Promoção da Saúde*. 18(1): 31-40.

16 Robin N.H., Baty H., Franklin J., Guyton F.C., Mann J., Woolley A.L., Waite P.D. & Grant J. 2006. The multidisciplinary evaluation and management of cleft lip and palate. *Southern Medical Journal*. 99(10): 1111-1120. DOI: 10.1097/01.smj.0000209093.78617.3a

17 Roman N., Carney P.C., Fiani N. & Peralta S. 2019. Incidence patterns of orofacial clefts in purebred dogs. *PLoS One*. 14(11): e0224574. DOI: 10.1371/journal.pone.0224574

18 Spina V., Psillakis J.M., Lapa F.S. & Ferreira M.C. 1972. Classificação das fissuras labiopalatinas. *Revista do Hospital das Clínicas, Faculdade de Medicina de São Paulo*. 27(1): 5-6.

19 Schoenebeck J.J. & Ostrander E.A. 2013. The genetics of canine skull shape variation. *Genetics*. 193(2): 317-325. DOI: 10.1534/genetics.112.145284