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# Kinesio Taping® as an innovative therapeutic tool to prevent nasal septal lesions in newborns: a case study

## *Kinesio Taping® como uma ferramenta terapêutica inovadora para prevenir lesões do septo nasal em recém-nascidos: um estudo de caso*

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**Abstract**

**Introduction:** The immaturity of the integumentary system in premature newborns (PTNB), associated with ventilatory support, contributes to the higher occurrence of nasal trauma. **Objective:** This article reports on the case of a newborn submitted to Kinesio® Taping as an innovative prophylactic therapy for nasal trauma. **Method:** We report on Kinesio® Taping, a material frequently used to treat pain in athletes, as an innovative therapeutic tool to prevent nasal septal lesions in a PTNB undergoing noninvasive mechanical ventilation (NIMV), who, after 13 days on NIMV, presented with nasal septal lesions. **Results:** The Kinesio® Taping, was positioned to protect the nasal septum from friction caused by direct contact of the nasal prong, maintained NIMV pressure, adapted well to the shape of the nose and improved nasal trauma after 3 days of use. **Conclusion:** Given that breathing in this period of life occurs predominantly through the nose and maintaining the integrity of this mucosa reduces not only respiratory discomfort, but also deformities and

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the risk of infections. The present study presents KT as an innovative protective tool against nasal injury in premature newborns submitted to positive pressure ventilation using nasal prongs. Despite describing a single case, the results obtained were promising. However, studies with a larger sample and different groups are needed, primarily to compare with existing methods.

**Keywords:** Preterm Infants. Neonatal Intensive Care Units. Noninvasive Ventilation. Bandages. Nasal Septum.

***Resumo***

***Introdução:*** *A imaturidade do sistema tegumentar em recém-nascidos prematuros (RNPT), associado a necessidade de suporte ventilatório contribuem para uma maior ocorrência de traumas nasais.* ***Objetivo:*** *Este artigo relata o caso de um recém-nascido submetido ao Kinesio® Taping, como terapia profilática inovadora para trauma nasal.* ***Método:*** *Relatamos o uso do Kinesio® Taping, material frequentemente usado para tratamento de dor em atletas, como uma ferramenta de inovação terapêutica para prevenção de lesões do septo nasal em um RNPT em ventilação mecânica não invasiva (VMNI) que após 13 dias em VMNI apresentou lesão nasal e septal.* ***Resultados:*** *O Kinesio® Taping, foi posicionado de forma a proteger a columela e o septo nasal do atrito provocado pelo contato direto da pronga nasal, manteve a pressão da VMNI, boa adaptação ao formato do nariz e melhorou o trauma nasal após 3 dias de uso.* ***Conclusão:*** *Considerando que a respiração nesse período da vida acontece predominantemente pelo nariz, manter a integridade dessa mucosa reduz não só o desconforto respiratório, mas também as deformidades e o riscos de infecções. O presente estudo apresenta o KT como uma ferramenta inovadora de proteção contra lesões nasais em recém-nascidos prematuros submetidos à ventilação com pressão positiva com ponta nasal. Apesar de descrever um único caso, os resultados obtidos foram promissores. No entanto, são necessários estudos com uma amostra maior e grupos diferentes, principalmente para comparar com os métodos existentes.*

***Palavras-chave:*** *Recém-Nascido Prematuro. Unidades de Cuidados Intensivos Neonatais. Ventilação Não Invasiva. Bandagens. Septo Nasal.*

## Introduction

The use of noninvasive mechanical ventilation with continuous positive airway pressure (CPAP) in premature newborns has been established as one of the main means of ventilatory support in neonatal intensive care units (NICUs) in recent decades [1,2]. However, the pressure exerted on the nostrils compromises mucosal integrity, resulting in nasal trauma [3-5].

The worldwide prevalence of nasal trauma in this population is 42.5% and between 85 and 100% in Brazil [6,7]. However, breathing in this period of life occurs predominantly through the nose and maintaining mucosal integrity reduces not only respiratory discomfort, but also deformities and risk of infections [8-10].

Among the preventive measures for septal or nostril trauma, the use of protective devices, such as the NeoSeal, stands out for significantly reducing lesions [11-13]. On the other hand, applying a hydrocolloid dressing to the nose and lips, compared to the upper lip alone, even with the use of Velcro, has shown no significant difference in preventing injuries [14,15].

A treatment alternative to prevent nasal septal lesions is Kinesio® Taping (KT), since other devices more easily injure the nasal septum [14,15]. It is a malleable material, with a thin cotton surface and a latex-free elastic adhesive. The mechanism of action increases local metabolic activity, stimulating collagen and proteoglycan synthesis, which favors skin healing [16], that is, it contains agents capable of tissue repair, thereby avoiding lesions.

Studies have concentrated their results on treating pain and flexibility in adults and athletes [16-18], making the method innovative in the prophylactic treatment of nasal and septal injuries in NICUs. This article reports on the case of a newborn submitted to KT as an innovative prophylactic therapy for nasal trauma.

## Method

Female preterm newborn (PTNB), born on January 2, 2018, with gestational age of 26 weeks and Cesarean delivery. The mother presented with severe preeclampsia and was taking hydralazine, nifedipine and magnesium sulphate. Birthweight was 830 grams, Apgar 8/9.

The newborn was admitted to the NICU after delivery, remaining until April 16, 2018 (81 days). Oxygen was used for 77 days, 23 via mechanical ventilation with an orotracheal cannula, 29 CPAP with a nasal prong, 6 an oxygen hood and 19 incubator air circulation.

During hospitalization in the NICU, prophylactic fluconazole was administered until February 22, 2018, oxacillin + amikacin for 1 day and gentamycin for 5 days. The NB exhibited positive hemoculture for oxacillin-resistant Staphylococcus epidermidis and was treated with meropenem for 7 days and penicillin for 10 days. Other prematurity-related complications were resolved during hospitalization, such as hypothermia, jaundice, persistent pulmonary hemorrhage, apnea, metabolic bone disease of prematurity and bronchopulmonary dysplasia.

## Results

After 13 days on noninvasive ventilation, the newborn exhibited nasal septal lesions. KT was used as an alternative to hydrocolloid plates. The tape was applied similarly to hydrocolloid. It was attached in such a way as to protect the columella and the nasal septum from the friction caused by the direct contact of the nasal prong (Figure 1). Nasal septum integrity was assessed routinely by inspection, ensuring control for subsequent comparisons.

**Figure 1** - Aplicação do KT para a proteção nasal.

The better adherence and malleability of KT compared to hydrocolloid, the material typically used in the neonatal setting, meant it maintained the pressure needed to guarantee ventilatory support, good adaptation to the shape of the nose and improve nasal trauma after three days of use.

The material was cut to cover the nasal wings and the entire columella. During the application period, there was no need to change the material due to dirt or loss of adherence. The lesion was inspected daily during physical therapy to determine whether the material caused any discomfort to the newborn, and none was detected. The application period was satisfactory in favoring the lesion repair process.

## Discussion

Given that preterm newborns are quite susceptible to cutaneous lesions, such as erosions or blisters in response to minimum trauma as a function of the notable immaturity of the integumentary system, and that KT has been shown to increase blood circulation, lower pain levels and improve proprioception [17-20], we present KT as a potential alternative to hydrocolloid in newborns.

The adhesive can be used comfortably for 3 to 4 consecutive days without changing it for bathing, thereby allowing the passage of air and moisture through the tissue pores and limiting skin irritation [18].

Several mechanisms contribute to the appearance of lesions [21,15]. The pressure exerted on the nostrils leads to local ischemia, which could evolve to tissue necrosis [19,22-24]. Another important point is inadequate prong size, which increases air leakage when too small, thereby requiring greater pressure to achieve efficient ventilatory support. On the other hand, larger prongs may compress tissue, leading to mucosal, septal and columellar lesions [15,25-27]. The small number of professionals at the units may also have a direct impact on the care provided. In a study conducted in another Brazilian NICU, there was a predominance of neonatal lesions at night, when there were fewer staff, primarily nurses and physiotherapists [28].

Added to the mechanisms that contribute to lesions in newborns submitted to positive pressure ventilation using nasal prongs is the frequent use of antimicrobials [21,29].

Despite not being documented in the literature as a risk factor for developing nasal trauma, the side effects of some antimicrobials include skin integrity [30].

Fluconazole, used as a prophylactic treatment for fungal infections in the case presented, causes skin rash in up to 10% of patients that use the drug, and a lower incidence of pruritus (itchy skin), hives and exanthem (eruptive rash) [30].

Based on the side effects of the skin lesions caused by antimicrobials and the large number of lesions resulting from prolonged use of nasal prongs, even when protected by hydrocolloid plates, this case report shows the innovative use of KT. It is little used in the ICU, but provides good protection due to the hypoallergenic material, infrequent need to change the tape, small contact surface with the skin and low interference in support pressure provided to the patient via the nasal prong.

The use of KT was described in only one other Brazilian study of newborns using noninvasive mechanical ventilation [28]. However, in the daily routine of this service, an elastic bandage was used to attach a layer of colloid material between the bandage and the columella and nasal wing regions of the patient, in order to limit inadvertent prong movement. The average time of nasal prong use in the aforementioned study was seven days [28].

In the present case, KT made it possible to use a nasal prong for more than 16 days, with regeneration of the previously injured tissue after only 3 days. One hypothesis to explain this rapid evolution is related to the characteristics of KT. As a thin elastic material, it allows more effective attachment and better adaptation to the shape of the patient's nose, which reduces the likelihood of skin lesions caused by the tape moving or becoming detached [16,28]. In addition, it activates the local metabolism and produces agents that favor tissue repair.

## Conclusion

The present study presents KT as an innovative protective tool against nasal injury in premature newborns submitted to positive pressure ventilation using nasal prongs. Despite describing a single case, the results obtained were promising. However, studies with a larger sample and different groups are needed, primarily to compare with existing methods.

## References

1. Winter JP, Vries MAG, Zimmermann LJI. Clinical practice: Noninvasive respiratory support in newborns. Eur J Pediatr. 2010;169(7):777-82.
2. Garg S, Sinha S. Non-invasive Ventilation in Premature Infants: Based on Evidence or Habit. J Clin Neonatol. 2013;2(4):155-9.
3. Bonfim SFSF, Bezerra SMMS, Vasconcelos MGL, Lea LP. Prevenção de lesão de septo nasal em neonatos prétermo: revisão integrativa da literatura. Rev Eletr Enf. 2014;16(2):443-52.
4. Narasimhan R, Krishnamurthy S. A review of non-invasive ventilation support in neonates. Paediatr Child Health. 2014;24(1):7-11.
5. DiBlasi RM. Neonatal Noninvasive Ventilation Techniques: Do We Really Need to Intubate? Respir Care. 2011;56(9):1273-94.
6. O'Brien K, Campbell C, Brown L, Wenger L, Shah V. Infant flow biphasic nasal continuous positive airway pressure (BP- NCPAP) vs. infant flow NCPAP for the facilitation of extubation in infants' ≤ 1,250 grams: a randomized controlled trial. BMC Pediatr. 2012;12:43.
7. Medeiros SKF, Carvalho WB, Soriano CFR. Practices of use of nasal intermittent positive pressure ventilation (NIPPV) in neonatology in northeastern Brazil. J Pediatr. 2012;88(1):48-53.
8. Lefrak L. Infection Risk Reduction in the Intensive Care Nursery. J Perinat Neonatal Nurs. 2016;30(2):139-47.
9. Jatana KR, Oplatek A, Stein M, Phillips G, Kang DR, Elmaraghy CA. Effects of Nasal Continuous Positive Airway Pressure and Cannula Use in the Neonatal Intensive Care Unit Setting. Arch Otolaryngol Neck Surg. 2010;136(3):287-91.
10. Michelin AS, Proto MC, Brito GMG, Andrade FMD, Bezerra AL. Hemodynamic effects of noninvasive ventilation with facial mask in premature infants. Fisioter Pesq. 2013;20(4):367-72.
11. Badr LK, Zeineddine MH, Abbas H, Charafeddine L. NeoSeal to Prevent Nasal Injury in Preterm Infants Receiving Oxygen Therapy. Neonatal Netw. 2016;35(4):228-33.
12. Nunes CR, Castro SB, Motta GCP, Silva AM, Schardosim JM, Cunha MLC. Método de prevenção de lesão nasal causada por CPAP em recém-nascido pré-termo: relato de caso. Revista HCPA. 2012;32(4):480-4.

13. Sousa NFC, Bonfim SFSF, Vasconcelos MGL, Bezerra JLO, Silva DVC, Leal LP. Prevalência de lesão do septo nasal em prematuros no uso de prongas nasais. Rev Esc Enferm USP. 2013;47(6):1285-90.

14. Collins CL, Holberton JR, Barfield C, Davis PG. A randomized controlled trial to compare heated humidified high-flow nasal cannulae with nasal continuous positive airway pressure postextubation in premature infants. J Pediatr. 2013;162(5):949-54.e1.

15. Bonfim SFSF, Vasconcelos MGL, Sousa NFC, Silva DVC, Leal LP. Lesão de septo nasal em neonatos pré-termo no uso de prongas nasais. Rev Latino-Am Enfermagem. 2014;22(5):826-33.

16. González-Iglesias J, Fernández-de-Las-Peñas C, Cleland JA, Huijbregts P, Gutiérrez-Vega MDR. Short-term effects of cervical kinesio taping on pain and cervical range of motion in patients with acute whiplash injury: a randomized clinical trial. J Orthop Sports Phys Ther. 2009;39(7):515-21.

17. Lins CAA, Borges DT, Macedo LB, Costa KSA, Brasileiro JS. Delayed effect of Kinesio Taping on neuromuscular performance, balance, and lower limb function in healthy individuals: a randomized controlled trial. Brazilian J Phys Ther. 2016;20(3):231-9.

18. Kaltenborn JM, Kahanov L. Kinesio Taping®, Part 1: An Overview of Its Use in Athletes. Athl Ther Today. 2007;12(3):17-8.

19. Imbulana DI, Manley BJ, Dawson JA, Davis PG, Owen LS. Nasal injury in preterm infants receiving non-invasive respiratory support: a systematic review. Arch Dis Child Fetal Neonatal Ed. 2018;103(1):F29-35.

20. Artioli DP, Bertolini GRF. Kinesio taping: application and results on pain: systematic review. Fisioter Pesq. 2014;21(1):94-9.

21. Newnam KM, McGrath JM, Estes T, Jallo N, Salyer J, Bass WT. An Integrative Review of Skin Breakdown in the Preterm Infant Associated with Nasal Continuous Positive Airway Pressure. J Obstet Gynecol Neonatal Nurs. 2013;42(5):508–16.

22. Santos TN, Costa AAG, Gomes CS. Nasal prongs in premature newborns: perspective in nursing care. Rev Enferm UFPE. 2015;9(Supl. 4):8071-8.

23. Nascimento RM, Ferreira ALC, Coutinho ACFP, Veríssimo RCSS. Frequência de lesão nasal em neonatos por uso de pressão positiva contínua nas vias aéreas com pronga. Rev Latino-Am Enfermagem. 2009;17(4):1-7.

24. Alves AM, Santos ERS, Souza TG. Prevenção de lesões nasais secundárias ao uso de pressão positiva contínua nas vias aéreas (cpap) em recémnascidos prematuros de extremo baixo peso. Rev Univ Vale Rio Verde. 2013;11(2):209-17.

25. Brunherotti MAA, Martinez FE. Influence of body position on the displacement of nasal prongs in preterm newborns receiving continuous positive airway pressure. Rev Paul Pediatr. 2015;33(3):280-5.

26. Yong SC, Chen SJ, Boo NY. Incidence of nasal trauma associated with nasal prong versus nasal mask during continuous positive airway pressure treatment in very low birthweight infants: a randomised control study. Arch Dis Child Fetal Neonatal Ed. 2005;90(6):F480-3.

27. Chen CY, Chou AK, Chen YL, Chou HC, Tsao PN, Hsieh WS. Quality Improvement of Nasal Continuous Positive Airway Pressure Therapy in Neonatal Intensive Care Unit. Pediatr Neonatol. 2017;58(3):229-35.

28. Ota NT, Davidson J, Guinsburg R. Lesão nasal precoce pelo uso da pronga nasal em recêm-nascidos prematuros de muito baixo peso: Estudo piloto. Rev Bras Ter Intensiva. 2013;25(3):245-50.

29. Shanmugananda K, Rawal J. Nasal trauma due to nasal continuous positive airway pressure in newborns. Arch Dis Child Fetal Neonatal Ed. 2007;92(1):F18.

30. Lexicomp I. Fluconazole: Pediatric drug information. UpToDate. 2018 [cited 2018 Jun 27]. Available from: https://www.uptodate.com/.

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