

Case Report

Use of Elastic Tapes in Presurgical Nasoalveolar Molding: A Case Report

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ABSTRACT

Objective: One of the objectives of presurgical nasoalveolar molding (PNAM) is to bring the lips together in order to decrease the severity of the deformity before surgery. This case report aims to present PNAM therapy of an infant with bilateral cleft lip and primary palate using prefabricated elastic tapes.

Materials and Method: A 3-day-old baby girl with bilateral cleft lip and alveolus was referred to our clinic. Her extraoral examination revealed a deviated and protruded premaxilla, a deficient columella, a short prolabium, depressed alar cartilages, and separated lip segments. A PNAM appliance combined with dynamic tapes (DynaCleft, Canica Design Inc, Ontario, Canada) was delivered the same day.

Results: After 3 months of PNAM therapy the premaxillary deviation was corrected, the columella and prolabium were lengthened, and projection and symmetry of the nose were obtained. The horizontal elastic tapes decreased the muscle tension and brought the lips together.

Conclusion: Dynamic bands are very effective because of the active force derived from their elastic components and thus can be recommended during PNAM therapy as an alternative to conventional tapes. (*Turkish J Orthod* 2014;27:34–38)

KEY WORDS: nasoalveolar molding, prefabricated dynamic tapes

INTRODUCTION

Cleft lip and palate is the most common congenital craniofacial malformation; it is seen in approximately 1/700 births and requires care from multiple professionals to optimize the treatment outcomes.¹ The orthodontic discipline has been part of this interdisciplinary team from the start, delivering presurgical and postsurgical orthopedic and orthodontic treatments.

Numerous techniques have been documented as modern presurgical infant orthopedic treatments, beginning with McNeil² in 1950, followed by Georgiade and Latham,³ Hotz *et al.*,⁴ Matsuo *et al.*,⁵ and Nakajima *et al.*⁶ In 1993, Grayson *et al.*⁷ described presurgical nasoalveolar molding (PNAM), which addresses not only the alveolus but also the lip and the nose. For patients with bilateral cleft lip and palate, this technique involves actively molding and repositioning the alveolar processes, retracting and centering the premaxilla, approximating the lip segments, elongating the columella, improving the

nasal tip projection by modifying the plate, and use of nasal stents and tapes. The adhesive tapes actively bring the lip segments closer.⁸ However, the traditional tapes used for this purpose can be contaminated by such fluids as saliva or milk and adhesion may be weakened by a baby's orofacial functions, which necessitates frequent changes of the tape, which can cause skin irritations. Dynamic tapes can be used to overcome these side effects. Prefabricated dynamic tapes, which have elastic parts, apply constant force without being affected by oral functions; therefore, they only need to be replaced every 3 to 4 days.⁹

This case report aims to present the PNAM therapy of an infant with bilateral cleft lip and primary palate using prefabricated elastic tapes.

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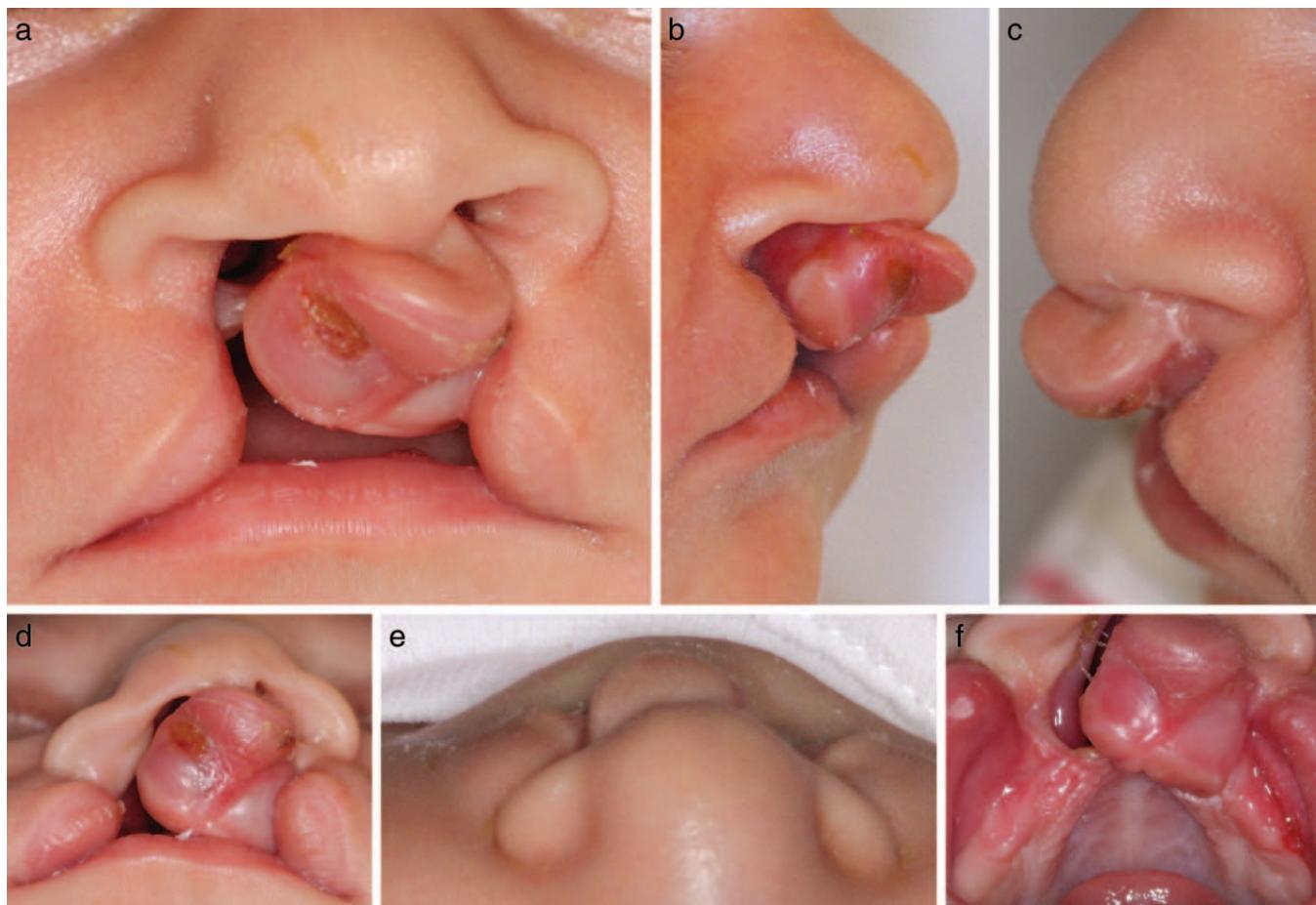


Figure 1. Initial photographs. Note the premaxillary deviation, short columella and prolabium. (a) Frontal view. (b) Right lateral view. (c) Left lateral view. (d) Columellar view. (e) Nasal view. (f) Intraoral view.

CASE REPORT

A 3-day-old baby girl with bilateral cleft lip and alveolus was referred to our cleft clinic. Her clinical examination revealed a deviated and protruded premaxilla, a deficient and deviated columella, a short prolabium, insufficient nasal projection, depressed alar cartilages, and separated lip segments (Fig. 1a through f). Intraoral and extraoral impressions were taken.

At the same appointment, an acrylic molding plate was fabricated. Bilateral surgical tapes (Steri-Strip, 3M Health Care, Neuss, Germany) were applied extraorally to the cheeks from the retention arms. The parents were advised to use the plate 24 hours per day except for when cleaning after feeding. The patient was monitored weekly. The PNAM plate was modified through selective addition and removal of acrylic to reduce the alveolar gap. In order to bring the lip segments closer, prefabricated dynamic tapes (DynaCleft, Dynamic Cleft Approximation, Canica Design Inc, Almonte, Ontario, Canada), instead of

conventional surgical tapes, were applied horizontally beginning at the second visit until the end of PNAM therapy (Fig. 2a through d). The parents were instructed to apply the tapes on the left side first and then pull all the way across the face to the right side to bring the prolabium and columella to the midline.

In the second week, nasal cartilage molding was started by adding nasal stents. The bilateral nasal stents were bent from 0.8-mm stainless steel wire in the form of a swan neck and were kept close to create a desired columella of appropriate width in a manner identical to the protocol of Grayson *et al.*⁸ and Grayson and Maull.¹⁰ The circumference of neck of the stents was covered with a thin hard acrylic layer to increase endurance and then with a soft acrylic layer to prevent irritation. Lengthening of the columella and enhancement of the nasal tip projection were achieved by adding soft acrylic over the nasal stents weekly. The nasal stents were connected to each other by an acrylic bridge at the sixth week of PNAM therapy.

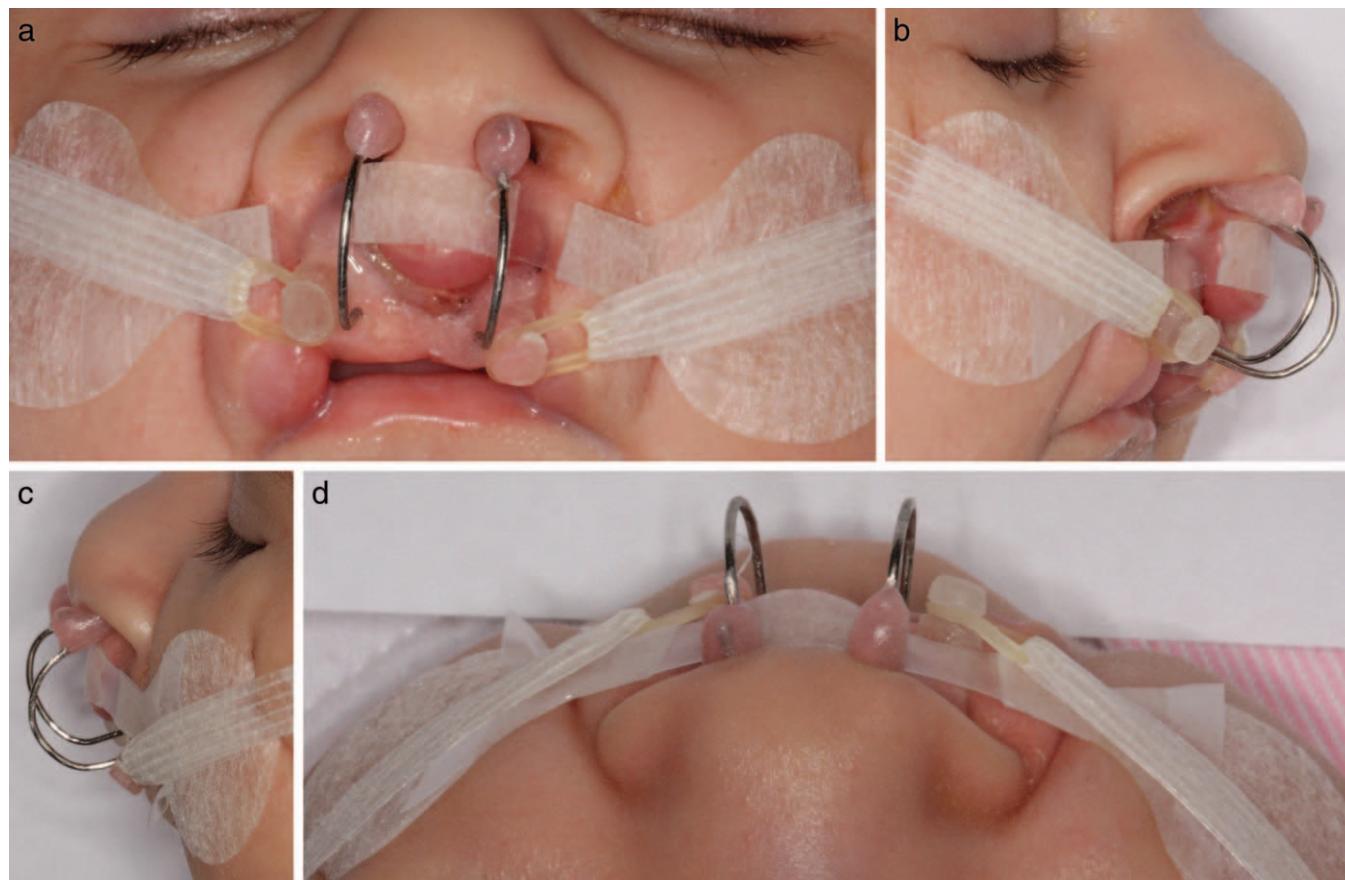


Figure 2. Application of prefabricated dynamic tapes during nasoalveolar molding. Note the nasal stents were added to mold the nasal cartilages. (a) Frontal view. (b). Right lateral view. (c) Left lateral view. (d) Nasal view.

After 3 months of PNAM therapy the premaxillary deviation was corrected, the short columella was lengthened, and the projection and symmetry of the nose were achieved (Fig. 3a through e). The horizontally applied elastic tapes brought the lips closer by decreasing muscle tension. The primary surgery was performed in the third month.

DISCUSSION

The main objective of PNAM is to reduce the severity of the initial cleft deformity. A milder deformity and a precisely defined nasolabial complex, including hard and soft tissues, enables the surgeon to operate under less tissue tension and results in a finer surgical scar. Therefore, it is argued that the surgical morbidity risks are decreased and the costs of secondary scar operations are eliminated.⁸

Taping the lip segments together across the cleft is one of the most important but sometimes neglected steps in the PNAM protocol. Lip taping not only approximates the lips but also enhances the

PNAM effect, producing the desired movements of the alveolar segments and the nasal base regions as mentioned by Grayson et al.¹⁰ In addition, the deviated columella can be brought toward the midfacial plane to achieve acceptable symmetry of the nostrils, and the protruded premaxilla can be retracted by properly directed lip taping that exerts constant force.

Lip taping is not a new concept; it began before the introduction of the modern school of neonatal maxillary orthopedic treatments. In fact, taping of the face and application of adhesive tapes to narrow the cleft before surgery was used centuries ago.¹¹ Moreover, some authors argue that preoperative lip taping eliminates the need for initial orthodontics in all patients except those born with maxillary collapse.¹² In the present case, we used the PNAM procedure because the patient required columellar elongation and correction of premaxillary deviation and protraction.

Another alternative to taping for narrowing the cleft and approximating the lips is use of the lip adhesion technique before definitive surgery. Although lip

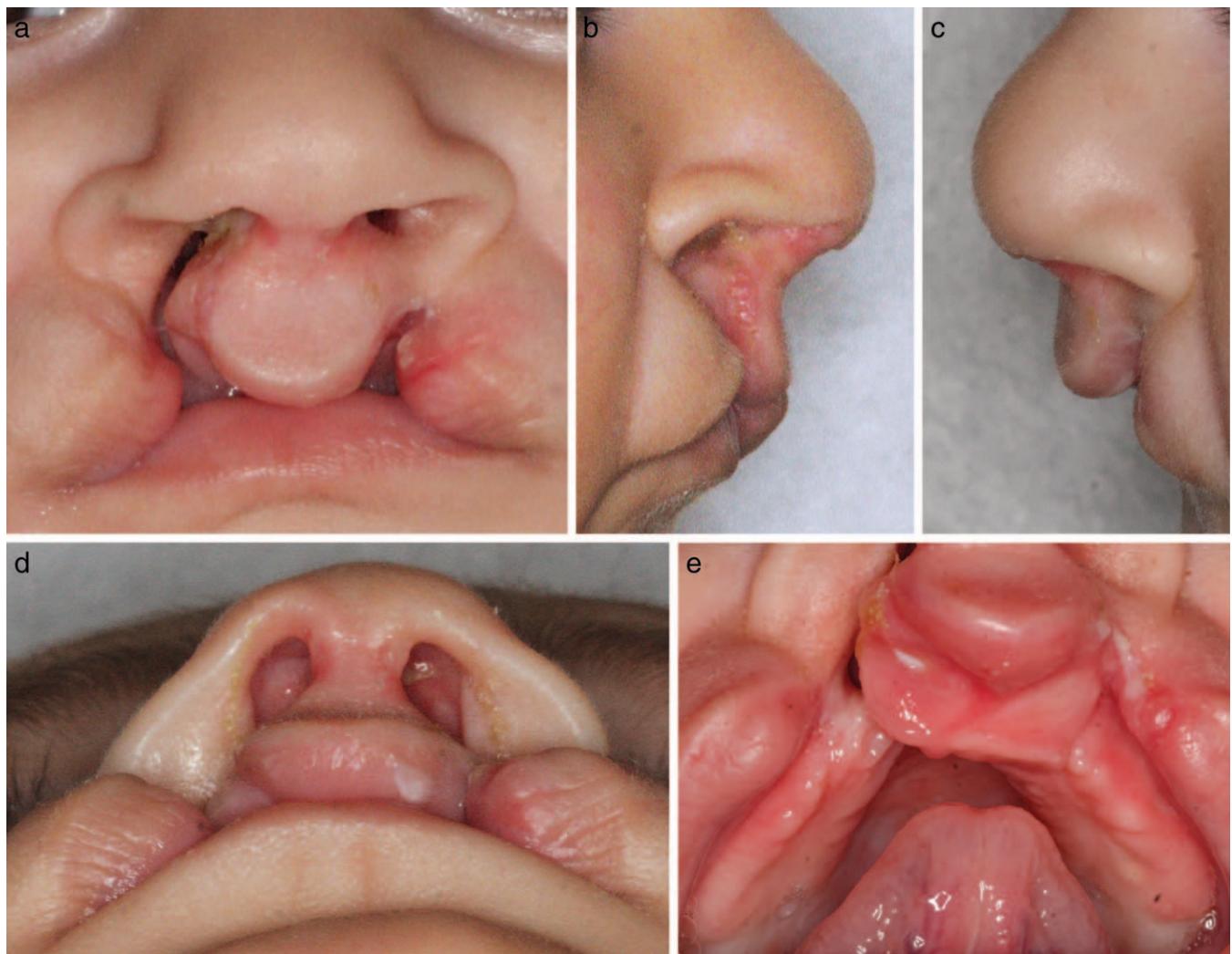


Figure 3. Photographs after presurgical nasoalveolar molding therapy. Note the correction of premaxillary deviation, elongation of the columella and prolabium. (a) Frontal view. (b) Right lateral view. (c) Left lateral view. (d) Columellar view. (e) Intraoral view.

taping provides some of the benefits of surgical lip adhesion without the associated surgical morbidity, hospital admission, cost, and scarring, as mentioned by Grayson *et al.*,⁸ it is neither easy nor comfortable for the parents and the infant. The strips are affected by sweating and may be contaminated by milk or saliva or by a baby's orofacial functions, all of which may weaken the adhesion between the skin and the tapes. As a result, the ideal light and constant force cannot be achieved. To overcome these problems, more frequent changing of the tapes may be advised during the day, or skin-friendly tapes with a lighter adhesion capacity can be used.

Prefabricated dynamic tapes are developed to guide the tissues into a more anatomically normal position by producing the desired constant force. The tapes have an elastic center, which flexes during oral functions and returns to its initial

dimensions afterward. In this way, the delivered force from the tapes to the separated cleft segments is constant, which can enhance the successful approximation of the lip and alveolar segments. Dynamic tapes can be used alone or in conjunction with PNAM (plate + nasal stents) as presented in this case report. In addition, they can be combined with nasal stents attached to the forehead.⁹ These dynamic tapes, described as skin friendly by the manufacturer, did not cause any skin irritation in our patient. Furthermore, the parents mentioned that these tapes were easy and fast to apply and could be left on the skin approximately 2–3 days without loosening. The strong adhesion of the tapes to the cheeks and prolabium is what enables the durability; however, this strong adhesion can be a disadvantage during removal. Therefore, we advise parents

to use a moisturizing cream or oil before removing the tapes.

CONCLUSION

Parents are active participants in PNAM therapy, and use of this therapy shows how satisfactory results can be achieved when the parents are informed about what they have to do between physician visits and when attention is paid to their complaints. One of the most stressful steps for parents is applying and maintaining the tapes. Lip tapes must deliver constant force, ideally 24 hours per day, to produce the desired molding effects; however, oral functions such as feeding, crying, or even smiling may weaken the adhesion between the skin and tape. Therefore, use of a type of tape that is not affected by motions of the mouth can decrease the number of tape changes and increase the comfort of the baby and the parents. The prefabricated dynamic tapes described here can be recommended as an alternative to conventional surgical tapes in PNAM therapy because of the active force delivered from its elastic component and ease of use.

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