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Case Report

Columellar Lengthening on Corrected Cleft Lip and Palate (La---aL) Post Cheilorrhaphy: A Case Report

Evane Jovanie Zeeva[1], Norholila[1], Clara Cindy Ateng Santoso[1], Muchiddin Andri Setyo Effendi[1], Nadra Odifa Medina[1], Ronald Pratama Adiwinoto[2], Renata Prameswari[3*]

[1] Department of Medicine, Faculty of Medicine, University of Hang Tuah Surabaya, East Java, Indonesia
[2] Department of Public Health, Faculty of Medicine, University of Hang Tuah Surabaya, East Java, Indonesia
[3] Department of Dermatology, Venereology, and Aesthetics, Faculty of Medicine, University of Hang Tuah Surabaya, East Java, Indonesia

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CORRESPONDING AUTHOR*
Renata Prameswari
dr.renata.p@gmail.com
Department of Dermatology, Venereology, and Aesthetics, Faculty of Medicine,
University of Hang Tuah Surabaya,
East Java, Indonesia

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ABSTRACT

Introduction: The Cleft Lip and Palate (CLP) is a congenital malformation involving the orofacial region. The failure of frontonasal and maxillary processes to fuse causes a gap through the lips, alveoli, base of the nose, and in the hard and/or soft palate.

Case Presentation: This case report illustrates a 2-year-3-month-old female patient diagnosed with bilateral cleft lip and palate at birth. The patient underwent cheilorrhaphy at 4 months old and currently plans to have scar revision and columellar lengthening surgery at Dr. Ramelan Naval Hospital, Surabaya. The patient presents with a flat nose, a hypertrophic scar above the lip, and speech articulation impairment. Her medical history includes prenatal maternal hypertension, neonatal pneumonia, and exposure to cigar smoke. Additionally, there is a family history of cleft lip and palate. This case highlights the vital role of columellar lengthening in enhancing nasal appearance and airway patency for optimal outcomes without complications.

Conclusion: Cleft lip and palate (CLP) require multidisciplinary care. Columellar lengthening and scar revision have been proven effective in enhancing nasal functions and aesthetics. The presence of prenatal maternal hypertension, exposure to cigar smoke, and familial history of CLP accentuates etiological complexity. The case shows successful intervention balancing function, aesthetics, and craniofacial growth in CLP repair. This study aims to increase insight for future management concerning nasal deformities in CLP patients.

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INTRODUCTION

Cleft lip and palate (CLP) arises from incomplete fusion of facial structures during embryogenesis, where failure of frontonasal and maxillary process fusion creates a cleft lip, while non-union of palatal shelves results in a cleft palate [1,2]. Risk factors involve genetic-environmental interactions, including maternal smoking and familial history, with global incidence of 1 in 700 live births, higher in Asians than Caucasians. Combined cleft lip/palate predominates (45.3%) with a 4:1 male-to-female ratio. Familial recurrence risk increases to 14.9–15.8% with dual parental/sibling involvement [1,3].

Bilateral CLP often presents with persistent nasal deformities such as short columella, alar base displacement, and flattened nasal tips despite primary repair. This requires secondary interventions to address functional and aesthetic impairments [4,5]. Nasal structural deficiencies can impair various functions, including inaccurate articulations, recurrent otitis media, feeding difficulties, nasal aesthetics, and airway

patency that require secondary interventions such as columellar lengthening [6]. According to research, this procedure enhances nasal structural stability and alleviates tissue tension in the nasal region, leading to improved aesthetic and functional outcomes [7,8]. Surgical techniques prioritize aesthetic and functional outcomes, often employing advancement flaps or autologous grafts to enhance nasal stability and harmony [9,10].

Postoperative protocols, including aseptic measures and antibiotics, minimize complications like infections and fistulas [11]. However, CLP demands lifelong multidisciplinary care integrating plastic surgery, orthodontics, and speech therapy to address anatomical, psychosocial, and developmental challenges [12,13]. The role of teamwork from plastic surgeons, pediatricians, and speech therapists is vital for optimal outcomes [14,15]. Early correction before school mitigates psychological trauma, with 80% achieving speech improvement through therapy [16]. Nasal revisions are delayed until preschool to optimize outcomes by aligning with nasal growth trajectories [17,18]. This staged approach balances timely intervention with developmental adjustments, enhancing speech, appearance, and well-being [19,20].

Columellar lengthening effectively addresses nasal deformities in patients with CLP, which aligns with previous research findings [21,22]. This case reports a pediatric case addressing the challenge of bilateral CLP management, requiring secondary columellar lengthening, focusing on nasal symmetry and functional restoration. This study aims to increase insight for future management concerning nasal deformities in CLP patients.

CASE PRESENTATION

This case report uses a descriptive, retrospective design to document the patient. The study is based on a comprehensive analysis of medical records, preoperative and postoperative clinical findings, laboratory investigations, and radiological imaging. The patient's history was obtained through heteroanamnesis with the parents, adhering to ethical standards of patient confidentiality. The surgical intervention followed established protocols for short columellar in CLP management. Ethical approval for this case report was obtained from the Institutional Review Board of the Naval Hospital Dr. Ramelan, Surabaya. Written informed consent was provided by the parents for the publication of anonymized clinical data.

A 2-year-and-3-month-old female patient and her mother went to the plastic surgery outpatient clinic. The patient's chief complaints are a hypertrophic scar above the lip and a flat nasal appearance. The patient was born with a bilateral cleft lip (La---aL) that had been corrected at 4 months of age via cheilorrhaphy surgery. However, residual nasal asymmetry and unclear pronunciation of the letter "R" persisted.

Prenatal ultrasonography at 9 months of gestation determined cleft lip and palate, prompting referral for specialized fetal-maternal assessment. The patient was born through cesarean section at 37–38 weeks of gestation with the help of an obstetrician in a hospital. The procedure was indicated because of premature rupture of amniotic membranes and failed normal labor even with oxytocin induction. There is maternal hypertension managed with nifedipine during pregnancy. At birth, the patient's weight was 3.100 grams, height was 47 centimeters, and APGAR (Appearance, Pulse, Grimace, Activity, Respiration) scores of 7–8. The patient was given a vitamin K injection and Hepatitis B immunization.

Postnatal difficulties included pneumonia requiring neonatal intensive care unit admission for one week, episodes of diarrhea at 4 months of age, bronchopneumonia at 3 months of age, and primary cheilorrhaphy performed at 4 months and 20 days. There was no history of congenital heart disease. Growth and developmental milestones were age-appropriate, with regular immunization status and transition to a family diet by 2 years of age. Family history revealed a sister of the grandmother with a similar cleft condition. The patient was a firstborn conceived after 10 years of marriage. The patient's social history included residence in a house with adequate ventilation and reliance on bottled and public water sources. The patient has insurance with her father working as a farmer and housewife mother. There is paternal smoking of 4–8 cigarettes daily. Highlighting potential genetic and environmental risk factors.

The decision to proceed with columellar lengthening was made because of the patient's residual nasal deformity, functional speech challenges, and psychosocial considerations. Surgery was deferred until preschool age to allow nasal growth, aligning with recommendations for secondary revisions. The procedure of columellar elongation is to restore nasal symmetry and minimize scarring. Postoperative care included antibiotics (amoxicillin syrup), analgesics (paracetamol syrup), and wound monitoring (Fig.1).

Investigation

The patient presented in good general condition, with a Glasgow Coma Scale (GCS) score of 15 and age-appropriate anthropometric measurements per WHO standards: weight 12 kg, height 88 cm, and head circumference 47 cm. Vital signs were stable, including a heart rate of 118 bpm, respiratory rate of 20/min,



Fig. 1. (**A**).Patient before columellar lengthening surgery, and (**B**). Patient after columellar lengthening surgery

temperature of 36.3°C, and oxygen saturation of 99% on room air. Physical examination revealed a well-healed hypertrophic scar superior to the oral commissure (post-cheilorrhaphy), a shortened columella, and alveolar ridge deformity. No abnormalities were detected in the neck, thorax, abdomen, or extremities.

Laboratory findings indicated mild neutropenia (26.1% neutrophils) and elevated serum glutamic-oxaloacetic transaminase (SGOT: 45 U/L), prompting pediatric consultation. Radiological imaging excluded cardiopulmonary anomalies. A multidisciplinary team recommended secondary columellar lengthening, deferred until preschool age to align with nasal growth patterns, aiming to optimize symmetry and reduce scarring risks.

Preoperatively, the repaired bilateral cleft lip showed residual scarring and alveolar misalignment. Nasal assessment confirmed an underdeveloped columella but no active cleft-related defects. Postoperatively, the columella was successfully elongated using an advancement flap, achieving improved nasal projection. Sutures remained intact without dehiscence, bleeding, or fluid leakage. Persistent alveolar deformity was noted, necessitating future orthodontic intervention.

Differential Diagnosis

The diagnosis of residual nasal deformity and alveolar cleft in bilateral cleft lip and palate (CLP) involved excluding syndromic causes (CHARGE, Stickler, Pierre Robin) via absence of cardiac, skeletal, or airway anomalies. Nasal asymmetry and short columellar were attributed to intrinsic maxillary hypoplasia and medial crura hypoplasia, not surgical failure. Speech deficits stemmed from dental-alveolar misalignment, confirmed by intact velopharyngeal closure. Systemic contributors (metabolic disorders, teratogens) were ruled out through normal hematologic and hepatic profiles, despite transient neutropenia and elevated liver enzymes. Maternal hypertension (managed with nifedipine) and paternal smoking highlighted environmental risks. A multidisciplinary team confirmed non-syndromic CLP, emphasizing anatomical-developmental correlation and excluding comorbidities to isolate residual deformities post-primary repair.

Treatment

The patient underwent columellar lengthening surgery on January 9, 2025, to correct nasal asymmetry from prior cheilorrhaphy. Preoperative protocols included a 6-hour fast, IV ceftriaxone prophylaxis, and chlorhexidine gluconate (Savlon) skin antisepsis. The procedure utilized an advancement flap to elongate the columella, enhancing nasal symmetry and structural integrity. Postoperatively, she received IV D5 ½ NS for hydration, oral amoxicillin (150 mg TID) for infection prevention, and paracetamol syrup (150 mg TID) for pain management.

Over 48 hours of monitoring, clinical progress was noted without complications such as infection or wound dehiscence. Upon discharge, she was instructed on strict wound hygiene, medication adherence, and scheduled a one-week follow-up to assess healing, nasal contour, and speech therapy adjustments. This integrated surgical and supportive approach aimed to optimize functional and aesthetic outcomes while reducing psychosocial burden through coordinated multidisciplinary care. The emphasis on infection control, analgesia, and structured

follow-up underscored the commitment to achieving long-term recovery and patient satisfaction.

Outcomes and Follow-Up

The patient's postoperative recovery was closely monitored through follow-up physical examinations. Vital signs remained stable after surgery, with intact nasal sutures and no signs of dehiscence, bleeding, or infection. Pain was effectively controlled with oral analgesics. On postoperative day one, vital signs included a pulse of 110/min, respiratory rate of 21/min, temperature of 36.0°C, and oxygen saturation of 99% on room air. Mild surgical site pain was managed with medication. By day two, vital signs stabilized further (pulse 112/min, respiratory rate 22/min, temperature 36.2°C, oxygen saturation 98%), with reduced pain and resumption of routine activities, prompting discharge.

At the one-week follow-up, the surgical site was fully healed, sutures were removed without complications, and the wound remained dry. The columellar lengthening advancement flap successfully restored nasal symmetry and addressed preoperative functional concerns, achieving significant clinical improvement. The patient maintained good health throughout recovery, with no adverse events reported. This outcome highlights the procedure's efficacy in balancing functional restoration and aesthetic enhancement, supported by diligent postoperative monitoring and pain management. The patient's smooth recovery and return to baseline activities underscore the success of the integrated surgical and postoperative care approach.

Ethical Considerations

Research ethics approval was obtained for this case report from Hang Tuah University number board I/018/UHT.KEPK.03/V/2025, and patient confidentiality was strictly maintained solely for the purpose of this report.

Patient's Perspective

The patient's parents described how understanding her daughter's cleft during pregnancy was heartbreaking. Despite the sadness, early education for treatments makes the family more prepared mentally. She noted that her daughter now thrives and expressed gratitude for the surgical team's guidance.

DISCUSSION

In this case report, the patient's bilateral CLP with residual nasal deformity and alveolar cleft underlines the multifactorial etiology of the condition, which involves genetic predisposition and environmental interactions. Studies reveal that maternal smoking, familial history, and nutritional factors during pregnancy significantly elevate CLP risk, as observed in this patient, whose father smoked 4–8 cigarettes daily and whose grandmother's sister had a similar cleft condition. The higher incidence of CLP in Asian populations (0.82–4.04 per 1,000 live births) aligns with the patient's demographic background, reflecting genetic susceptibility and regional environmental exposures. Combined cleft lip and palate, constituting 45.3% of cases, often presents complex anatomical challenges, as seen here, where primary cheilorrhaphy at 4 months left residual nasal asymmetry and a shortened columella [1,20].

The persistence of nasal deformities after primary repair accentuates the limitations of initial interventions in bilateral CLP. Research emphasizes that bilateral clefts frequently require secondary procedures due to innate hypoplasia of the medial crura and maxillary, rather than surgical failure [20]. In this case, columellar lengthening is deferred until preschool, a strategy supported by evidence advocating delayed revisions to accommodate nasal growth and optimize symmetry [6]. The advancement flap technique, acclimated from methodologies described by SM Balaji, successfully elongated the columella using autologous tissue, restoring nasal proportions while minimizing scarring [20]. This approach mirrors outcomes in similar studies where delayed revisions improved nasal projection and reduced tissue tension, which is critical for long-term aesthetic and functional outcomes [6,22].

Speech articulation difficulties, particularly with the phoneme "R," were a key concern for this patient. Such deficits correlate with anterior dental irregularities caused by alveolar clefting, as described by Karmakar and Dixit, who identified malpositioned incisors and ectopic eruptions as contributors to speech distortion [5]. This aligns with guidelines recommending multidisciplinary evaluations to distinguish between VPI and dental-alveolar causes of speech impairment, ensuring targeted interventions [11]. The patient's treatment plan included future orthodontic procedures to address alveolar misalignment, reflecting the importance of staged care in CLP management [14].

The multidisciplinary approach incorporating plastic surgery, pediatrics, and speech therapy demonstrates the best procedures for CLP care. Collaborative teamwork, according to Sathyabama and Veerabahu, addresses not only anatomical defects but also psychosocial well-being, specifically in children facing social stigma due to facial differences. Preoperative counseling prepared the family for staged interventions, while postoperative protocols prioritized infection prophylaxis (e.g., ceftriaxone and amoxicillin) and analgesia (paracetamol), minimizing complications such as dehiscence or fistula formation. These strategies

are per long-term studies showing reduced morbidity when antimicrobial and anti-inflammatory measures are applied [12].

This case also underscores the role of prenatal diagnostics in CLP management. Prenatal ultrasonography at 9 months of gestation facilitated early referral and parental counseling, consistent with recommendations that antenatal detection improves preparedness for postnatal surgical planning. However, the ethical and technical challenges of fetal surgery, as noted in the more comprehensive literature, reinforce the preference for postnatal interventions in most cases [4].

The patient's successful recovery, marked by intact sutures, resolved nasal asymmetry, and improved speech at follow-up, highlights the efficacy of evidence-based, guideline-driven care. Staged interventions, timed to align with developmental milestones, are critical in balancing functional restoration and psychological well-being. For instance, delaying columellar lengthening until preschool allowed natural nasal growth, while early speech therapy mitigated communication barriers [19]. These principles are in accordance with global guidelines, such as those from the American Cleft Palate-Craniofacial Association, which advocates for individualized, multidisciplinary protocols tailored to anatomical severity and psychosocial needs [14].

CONCLUSION

Columellar lengthening is a critical surgical intervention for children with bilateral cleft lip and palate (CLP), addressing residual nasal deformities and functional impairments post-primary repair. Persistent nasal asymmetry, including a shortened columella and flattened nasal tip, often necessitates techniques such as the advancement flap—a common method using autologous tissue to elongate the columella, restore symmetry, and alleviate tissue tension. Early recognition and multidisciplinary intervention are vital to prevent complications (e.g., speech deficits, psychosocial distress) and improve prognosis. Delaying revisions until preschool age optimizes outcomes by aligning with nasal growth trajectories, while postoperative protocols prioritize infection control and analgesia. This approach enhances breathing, articulation, and aesthetics, fostering confidence and developmental well-being. The case underscores the importance of integrating plastic surgery, orthodontics, and speech therapy in staged CLP management, emphasizing the role of tailored, team-based care in achieving anatomical harmony and long-term patient satisfaction.

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CONFLICT OF INTEREST

The authors declare that there is no known conflict of interest that could influence the work reported in this paper.

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