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# Profile of Patients with Gnatoschizis Post Alveolar Bone Graft: A Serial Case Study

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**Abstract:** Gnatoschizis, or cleft alveolus, is a common congenital anomaly in Indonesia. This condition significantly impacts dental and facial development, and often requires alveolar bone grafting to stabilize the maxillary arch, facilitate tooth eruption, and improve facial aesthetics. This was a serial case study involving 11 patients aged 12–18 years with gnatoschizis who underwent alveolar bone grafting using autologous iliac cancellous bone at Prof. Dr. R. D. Kandou Hospital. The results showed that the majority of patients were female, with labiopalatoschizis being the most common type. Surgical procedures included orthodontic preparation, iliac crest bone harvesting, and peri-alar augmentation. Postoperative outcomes demonstrated successful upper dental arch continuity and alar base reconstruction, with minimal donor site morbidity. In conclusion, this study provides valuable insights into the patient profile and clinical outcomes of gnatoschizis post alveolar bone graft. The predominance of female patients and the high incidence of labiopalatoschizis highlight the need for targeted interventions and comprehensive care strategies. A multidisciplinary approach is essential for optimal outcomes. Future research should focus on optimizing treatment protocols and exploring novel therapeutic modalities to further improve patient outcomes. Additionally, long-term follow-up studies are necessary to assess the stability and durability of the surgical outcomes, as well as the overall quality of life of patients with gnatoschizis.
**Keywords:** gnatoschizis; alveolar bone grafting; cleft alveolus

## INTRODUCTION

In Indonesia, gnatoschizis is relatively common among congenital malformations. Between 1980 and 1989, its prevalence was 1.07 per 1000 live births, accounting for 8.78% of all congenital malformations. Across Asia, gnatoschizis is also prevalent. According to the Global Health Observatory Data Repository, congenital anomalies, including gnatoschizis, are significant contributors to infant morbidity and mortality in the South-East Asia region. Globally, gnatoschizis is found in approximately 75% of patients with labio and palatoschizis (cleft lip and palate). The World Health Organization (WHO) reports that congenital anomalies, including labio and palatoschizis, affect millions of individuals worldwide, with varying prevalence rates depending on geographic and socioeconomic factors.[1-4]

Gnatoschizis, commonly known as cleft alveolus, is a congenital anomaly characterized by a defect in the alveolar ridge, which significantly impacts dental and facial development. This condition can present various challenges including difficulty in feeding, speech development, dental malocclusions, and psychosocial issues due to facial appearance. Alveolar bone grafting, a surgical procedure where bone is transplanted to the alveolar cleft, is a critical intervention that aims to facilitate the eruption of teeth, stabilize the maxillary arch, and enhance facial aesthetics.[1] The success of alveolar bone grafting in patients with gnatoschizis is contingent upon multiple factors including the timing of the surgery, the source and type of graft material, and the presence of other congenital anomalies or complications. Despite the advances in surgical techniques and postoperative care, the management of gnatoschizis remains complex and requires a multidisciplinary approach involving pediatricians, oral and maxillofacial surgeons, orthodontists, and speech therapists.[5]

This manuscript presents a serial case study of patients with gnatoschizis who underwent alveolar bone grafting. The objective is to analyze the clinical outcomes, evaluate the postoperative challenges, and discuss the long-term prognosis of these patients. Through a detailed examination of these cases, this study aims to contribute to the existing body of knowledge and provide insights that may help optimize the management and treatment protocols for gnatoschizis.[7]

## METHODS

This serial case study was conducted at Prof. Dr. R. D. Kandou Hospital. Informed consent was obtained from all participants or their guardians. The study included a total of 11 patients diagnosed with gnatoschizis who underwent alveolar bone grafting. The inclusion criteria were patients with gnatoschizis, age 12-18 years old, non-reactive COVID-19 test, and the patient concerned or their immediate family gave written consent to participate in the study through an informed consent sheet. Exclusion criteria were patients with poor oral hygiene, accompanied by suboptimal nutritional status characterized by a body mass index below the 5th percentile in the CDC growth and development curve.

All patients underwent alveoloplasty with iliac, autologous, grafting, cancellous bone grafting during a mixed period of tooth growth. Orthodontic equipment was used before surgery to expand the collapsed upper jaw arch and postoperatively for the stability of the upper jaw arch. When sketching the cleft chamber, it appeared as an asymmetrical pyramid with a narrower base and a wider roof as illustrated. The base of the pyramid was the boundary of the inferior gap and the roof was the base of the nose. The side walls represented the surface of the mesial and distal bone gaps. When considering the convex upper jaw arch, the anterior gap margin was elevated and the posterior gap margin was elevated as the point where the roof, base, and the two side walls met. Usually in the alveolar cleft, the base of the nose is wider than the inferior cleft margin contributing to the asymmetry of the cleft pyramid. The autologous cancellous bone was taken from the iliac crest based on the patient's slit size estimated by preoperative 3D CT scan. A linear incision of 1.5-2 cm was made over the anterior-superior iliac bone (SIAS) to expose the iliac crest. The hinged rectangular cortical cap was open, and the cancellous bone was taken with a

bone curettage. The amount taken (0.5 mL more than the amount estimated by CT3D) of the cancellous bone was grafted, not only to fill the volume of the cleft but also to provide volume for the augmentation of the peri-alar from the cleft side.

In this way, the cleft side depression in the pyriformis gap hads been excessively corrected. Finally, the anterior labial flap and palatal flap were sewn in a watertight way. Through this procedure, alveolar bone grafting with peri-alar augmentation was successfully achieved. On the basis of this well-constructed nasal frame, patients underwent cleft nose surgery simultaneously. The rhinoplasty method was adjusted to each patient's deformity. Approaching with an 'inverted U' incision combined with a transcolumellar incision, the abnormal lateral crura attached from the alal cartilage were repositioned, and the alar asymmetry was corrected by engineering sutures and cartilage grafts when necessary.

The management of cleft lip and palate patients requires specialized management and a multidisciplinary team. Most of the bone grafts performed in our study were iliac cancellous bone grafts. This technique has the best level of integration reported worldwide. The morbidity of the donor site is minimal and the patient's outcome is good with ambulation at three days with few complications. At this point, the graft autonomic is the one with more acceptance in cleft patients. They are divided into cortical and chancellaneous, depending on their origin. Another important aspect of alveolar cleft treatment is age at the time of surgery. Boyne established a useful classification based on the age of the patient. This classification departs from secondary or primary graft (early, intermediate, and late). The most frequently used thing in our service was the secondary conventional grafting which lasted from 6 to 12 years. The reasons why we proposed to operate patients with gnatoschizis at these ages were: to promote the eruption of caninus teeth, to produce fewer changes in the growth of the middle facial skeleton, and to obtain a less reabsorption rate.[7]

## RESULTS

Based on this study, there were 11 patients involved consisted of seven females and four males. Figure 1 showed that the most common type of cleft was labiopalatoschizis (37%), followed by labiognatopalatoschizis (18%), and the other types (each of 9%).

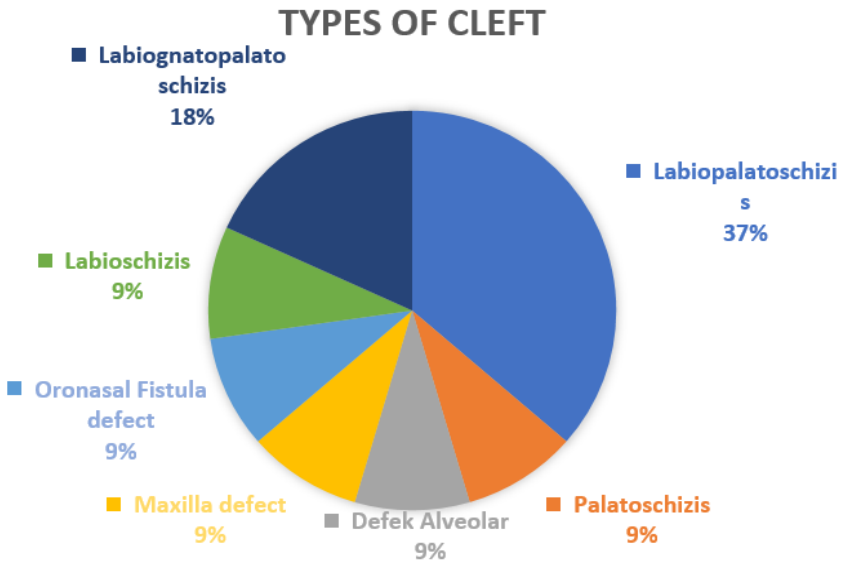


**Figure 1**. Distribution of cleft types in the patients

## DISCUSSION

The present study aimed to analyze the patient profile of gnatoschizis post alveolar bone graft, focusing on the demographic characteristics and clinical outcomes. Our findings indicated

that the majority of cases were observed in female patients, which aligns with previous studies suggesting a higher prevalence of gnatoschizis among females.[1,5] This gender disparity in gnatoschizis cases could be attributed to a combination of genetic, hormonal, and environmental factors. Studies have shown that females may have a higher susceptibility to craniofacial anomalies, potentially due to differences in embryological development and genetic predispositions, in this case, there are more cases among female patients.[7,8]

Additionally, labiopalatoschizis emerged as the most common type of gnatoschizis in our cohort, consistent with existing literature. The high incidence of labiopalatoschizis could be linked to the complex interplay of genetic and environmental factors that influence craniofacial development. Early diagnosis and intervention are crucial for these patients, as timely surgical repair can significantly improve both functional and aesthetic outcomes.[9,] Alveolar bone grafting remains a cornerstone in the management of gnatoschizis, providing structural support and facilitating dental rehabilitation. Our results demonstrated that the use of autogenous iliac crest bone grafts yielded satisfactory outcomes, with most patients achieved continuity of the upper dental arch and optimal alar base reconstruction. These findings were in line with previous reports highlighting the efficacy of autogenous bone grafts in gnatoschizis repair. The choice of graft material is critical, and autogenous bone grafts are preferred due to their osteogenic, osteoinductive, and osteoconductive properties.[10-12]

However, the complexity of gnatoschizis necessitates a multidisciplinary approach involving orthodontics, prosthodontics, and speech therapy to address the functional and aesthetic challenges associated with this condition. Orthodontic treatment plays a vital role in aligning the dental arches and preparing the maxillary segment for bone grafting.

## CONCLUSION

This study provides valuable insights into the patient profile and clinical outcomes of post alveolar bone graft gnatoschizis. The predominance of female patients and the high incidence of labiopalatoschizis highlight the need for targeted interventions and comprehensive care strategies. Future research should focus on optimizing treatment protocols and exploring novel therapeutic modalities to further improve patient outcomes. Additionally, long-term follow-up studies are necessary to assess the stability and durability of the surgical outcomes, as well as the overall quality of life of patients with gnatoschizis.

### Conflict of Interest

The authors affirm no conflict of interest in this study.

## REFERENCES

1. Ardiyanti E, Fitriana. Comparison of biomaterials as a graft material for gnatoschizis: a literature review. J Int Dent Med Res. 2023;16(3):1375-82. Doi: 10.5455/jidmr.2023.16.3.1375-1382
2. Hidayat A. Prevalensi sumbing bibir dan langit-langit di RSUD Dr. Saiful Anwar Malang (1980-1989). Indonesian Bulletin of Health Research. 1992;20(1):256. Doi: 10.22435/bpk.v20i1 Mar.256
3. Putri FA, Pattamatta M, Anita SES, Maulina T. The global occurrences of cleft lip and palate in pediatric patients and their association with demographic factors: a narrative review. Children (Basel). 2024;11(3):322. Doi:10.3390/children11030322
4. World Health Organization. World Health Statistics 2024: Monitoring Health for the SDGs, Sustainable Development Goals. Available from: https://www.who.int/data/gho/publications/world-health-statistics.
5. Limarga N, Hatibie M, Oley MC. Graft tulang alveolar dan pemberian terapi oksigen hiperbarik pada gnatoschizis: laporan kasus. e-CliniC. 2021;9(2):368-77. Doi: 10.35790/ecl.2021.v9i2.36877
6. Wahyuni A. The difference uses of panoramic photo and CBCT evaluation of the gnathoplasty surgery outcome. Journal of Dentomaxillofacial Science. 2017;2(2):110. Doi: 10.15562/jdmfs.v2i2.535
7. Tammama T, Syamsudin E, Fathurachman, Smith J, Johnson R, et al. Alveolar cleft closure with iliac bone graft: a case report. J Dentomaxillofac Sci. 2017;37(1):37-40. Doi: 10.15562/jdmfs.v37i1.103
8. Samosir SM, Rachmiawaty A, Fatati I, Aziz A. Multiple congenital anomalies: meningoencephalocele,

labiopalatoschisis, and clubfoot with normal chromosomal analysis. J Clin Neonatol. 2022;10(1):49-53. Doi: 10.32771/inajog.v10i1.1366
9. Florensia N, Triwani T, Wardiansah W. Karakteristik pasien labioplatoschizis pada anak di RSUP Dr. Mohammad Hoesin Palembang periode 2015-2017 [Undergraduate thesis]. Palembang: Universitas Sriwijaya; 2018. Available from: https://repository.unsri.ac.id/1816/
10. Campbell A, Costello BJ, Ruiz RL. Cleft lip and palate surgery: an update of clinical outcomes for primary repair. Oral Maxillofac Surg Clin North Am. 2010;22(1):43-58. Doi: 10.1016/j.coms.2009.11.003
11. Deatherage J, Bourgeois T, O'Brien M, Baylis A. Examining risk of speech-language disorders in children with cleft lip. J Craniofac Surg. 2022;33(2):395-9. Doi: 10.1097/SCS.0000000000008000
12. Feng J, Zhu C, Zou J, Zhang L. Hyperbaric oxygen therapy for the treatment of bone-related diseases. Int J Mol Sci. 2025;26(3):1067. Doi:10.3390/jjms26031067