



Single layer closure of hard palate cleft and oronasal fistula

Palatoplastia em plano único e fístula oronasal

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■ ABSTRACT

Background: Traditionally, cleft of the hard palate is repaired in two layers, with a nasal mucosal layer and an oral mucoperiosteal layer. The aim of this study was to evaluate the results of one layer closure of hard palate cleft compared to the traditional two layers closure. **Methods:** The charts of 101 consecutive cases of repair of hard palate cleft performed by the authors from 1981 to 2012 at a tertiary care clinic/hospital in central Wisconsin were reviewed. The cases utilized the single layer closure and were followed in the Cleft Palate Clinic on a yearly basis. Cases included unilateral and bilateral cleft lip and palate as well as isolated cleft palate. **Results:** All cases healed satisfactorily except for two cases that later required small fistulae repair. **Conclusion:** Single layer closure of the hard palate cleft is as effective as traditional two-layer closure, with minimal complications.

Keywords: Cleft palate; Craniofacial; Hard palate repair; Oronasal fistula.

■ RESUMO

Introdução: Tradicionalmente, a fissura palatina é corrigida em duas camadas - uma camada mucosa nasal e camada mucoperiosteal oral. Este estudo avaliou os resultados do fechamento em camada única de fissura palatina comparado ao fechamento tradicional em camada dupla. **Métodos:** Trata-se de revisão de pronturários de 101 casos de correção de fissura palatina realizados entre 1981 e 2012 em uma clínica assistencial/hospital terciário localizado no centro de Wisconsin. Os casos utilizaram fechamento em camada única e foram acompanhados em Clínica de Lábio Leporino por 12 meses. Foram incluídas fissura labial e palatina também como fissura palatina isolada. **Resultados:** Todos os casos apresentaram cicatrização satisfatória exceto dois casos que necessitaram de correção posterior de pequena fistula. **Conclusão:** O fechamento em camada única de fissura palatina é tão efetivo quanto o fechamento tradicional em camada dupla, além disso apresenta mínimas complicações.

Descritores: Fissura palatine; Craniofacila; Correção de Palato Duro; Fístula Oronasal.

Institution: Study performed at the Marshfield Clinic, Marshfield, Wisconsin, USA.

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INTRODUCTION

The hard palate acts as a partition between the nasal and oral cavities, preventing regurgitation of fluids into nasal cavity, and promoting resonance of voice during speech. Traditionally, hard palate cleft has been repaired in two layers, with a nasal mucosal layer and an oral mucoperiosteal layer. This paper reviews 101 cases of hard palate clefts repaired by the authors using only the mucoperiosteal layer, as a single layer closure. All cases were done at Marshfield Clinic/St. Joseph's Hospital, a tertiary care center in central Wisconsin, where patients were followed in the Cleft Palate Clinic on a yearly basis. The Cleft Palate Clinic team consists of plastic surgeons, oral surgeons, an orthodontist, a speech therapist, an audiologist, pediatricians, a geneticist, and social workers.

METHODS

The study was reviewed and determined to be exempt by the Marshfield Clinic Institutional Review Board, and the requirement for consent was waived. The total number of cases reviewed was 101. Of these cases, 50 were unilateral cleft lip and palate (UCLP), 25 were bilateral cleft lip and palate (BCLP), and 26 were isolated cleft palate. Bilateral cases had wider gaps than unilateral clefts. The average gap at the posterior border of the hard palate before repair was 1 cm to 1.5 cm as measured using calipers (Table 1). Cases excluded from the study were submucous clefts, cleft lip with alveolar cleft only, and cases with severe cognitive deficiency.

Table 1. Summary overview of cleft palate cases repaired.

Description	Number of Cases
Unilateral cleft lip and palate	50
Bilateral cleft lip and palate	25
Isolated cleft palate	26
Total cases	101

The protocol followed for repair of the cleft cases was: lip repair at age 3-4 months, soft palate repair at age 6-7 months, and hard palate repair at age 12-18 months. Following repair of the soft palate, the hard palate cleft was obturated by an acrylic plate to prevent regurgitation of food and fluid and to continue speech therapy. During this waiting period before the hard palate repair, the palatal gap narrowed with the growth of the child, and more palatal tissues become available for repair of the cleft with minimal tension. The method of hard palate repair was the two flap technique as described by Bardach¹, raising mucoperiosteal

layers on both sides as unipedicle axial flaps based on greater palatine vessels. Lateral relaxing incisions were made from the maxillary tuberosity to the anterior end of the palatal cleft. Flaps were mobilized towards the midline from each side and closure was done with 4-0 Vicryl sutures after freshening the cleft edges with a No. 11 surgical blade. Oral feeding was started with clear liquids on the day of surgery, and infant formula was given beginning the day after surgery. The child was kept in the hospital for 2 days.

The raw areas at the gingival margins were narrowed down by placing two or three 4-0 Vicryl sutures. Alveolar gaps greater than 5 mm at the anterior end were closed by a labial mucosal or vomer flap. Alveolar gaps less than 5 mm were left open, to be repaired at the time of bone grafting. Figures 1 through 6 illustrate six cases of unilateral cleft palate repair pre-operatively and then post-operatively at approximately 2.5 years of age.



Figure 1. Photograph showing unilateral cleft palate: (A) pre-operative at 3 months, and (B) post-operative at 2.5 years of age.

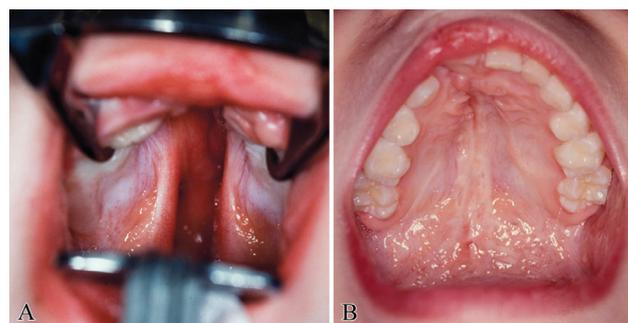


Figure 2. Photograph showing unilateral cleft palate: (A) pre-operative at 3 months, and (B) post-operative at 2.5 years of age.

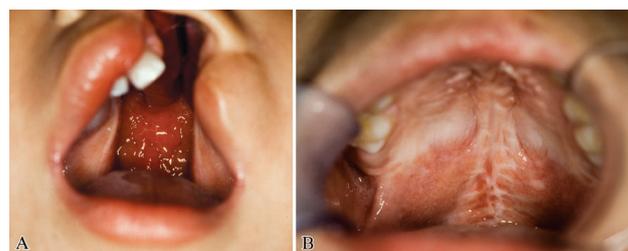


Figure 3. Photograph showing unilateral cleft palate: (A) pre-operative at 3 months, and (B) post-operative at 2.5 years of age.

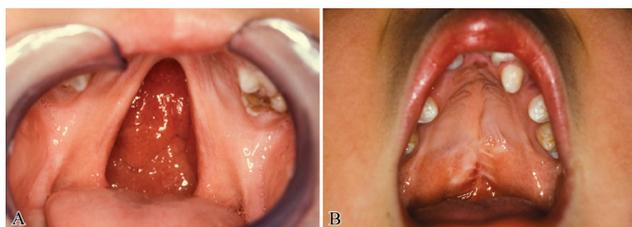


Figure 4. Photograph showing unilateral cleft palate: (A) pre-operative at 3 months, and (B) post-operative at 2.5 years of age.



Figure 5. Photograph showing unilateral cleft palate: (A) pre-operative at 3 months, (B) post-operative closure of the soft palate at 6 months, and (C) final result at 2.5 years of age.



Figure 6. Photograph showing unilateral cleft palate: (A) pre-operative at 3 months, and (B) post-operative at 2.5 years of age.

RESULTS

All cases healed well, except for two patients who developed small fistulas at the operative site; one at the anterior end in a UCLP case and one at the junction of the hard and soft palates in a BCLP case. These were repaired at a later period when scar tissue had softened.

DISCUSSION

Although hard palate cleft repair has been traditionally performed using two layers, personal experience of the authors with the above-described 101 cases shows that effective repair can be done in one layer using a mucoperiosteal flap. This flap is an axial flap, well-vascularized and tough in texture. In early delayed, two-stage palatoplasty (i.e., repairing between the ages of 12-18 months)², the hard palate gap becomes narrowed, and repair can be performed with minimal tension. Even the gaps at the gingival margins as a result of lateral release can be narrowed down by using two to three 4-0 Vicryl sutures, thus leaving a minimal bony raw area. Single mucosal flaps are not elevated, and the palatal shelves are not completely denuded. An intact hard palate acts as a resonator of voice, so avoiding a fistula of the hard palate aids in speech.

In the authors' experience, the incidence of fistula has been low—only 2 cases in 101 patients. Fistula has been defined as a breakdown after palatal repair³. Small openings (< 5mm) at the anterior end do not cause any functional problem and can be left alone, thus, not producing any scarring in the area, which would be helpful during bone grafting at a future date. Common causes for fistula include wide palatal gap^{4,5}, tension at the suture line⁶, infection⁷, technique and experience of the surgeon⁷, and age of the patient at time of repair⁸. Common sites for fistula formation (in order of rate of occurrence) are (1) at the junction of the hard and soft palates, (2) the mid-palatal area, and (3) anterior palate-post alveolar areas⁹. Recurrent fistulas are difficult to repair due to scarring, and failure is quite common; therefore, it is very important to do everything possible to avoid recurrence.

The true incidence of fistula formation is difficult to assess from the literature due to lack of clarity in defining true fistula. Some authors have defined true fistula as a breakdown after palatal repair, while others have included all palatal openings present on operated or non-operated areas. The reported incidence of fistula formation in the literature ranges from 0% to 37%¹⁰⁻²², with recent publications reporting a recurrence rate between 25% to 40%⁹. The incidence in the study reported here is 2%. This low incidence can be attributed to: (1) repair with minimum tension; (2) good vascularity of the flaps; and (3) operating when the palatal gap gets narrower, at age 12–18 months.

CONCLUSIONS

Repair of hard palate cleft can be successfully achieved with minimal complications, using a one layer closure. In this approach, the mucoperiosteal flap is well vascularized. Attention must be paid to careful elevation of the flap and to completing the repair with minimum tension. Sparing the nasal mucosa avoids complete denudation of the palatal shelves and does not increase fistula formation.

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