



Dual-stage septum-to-nasal spine fixation suture for enhanced caudal septal stability

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Abstract

Background For optimal outcomes in caudal septal deviation repair, it is crucial to establish a secure and stable fixation between the septal cartilage (SC) and the anterior nasal spine (ANS) of the maxilla.

Method This technical note presents a dual-stage septum-to-nasal spine fixation suture technique developed to overcome the rotational and stability limitations that may occur when an F8 suture alone is applied in certain cases.

Conclusion By achieving multidirectional stabilization without increasing procedural complexity, this technique offers a practical and improved method for SC–ANS fixation.

Keywords Nasal septum · Septoplasty · Septorhinoplasty

Relevant surgical anatomy

Caudal septal stability depends on the structural integrity of the L-strut, which extends along the dorsal and caudal edges of the septal cartilage. The ANS of the maxilla serves as the primary bony attachment for the caudal septum, providing a key load-bearing point for surgical fixation [1]. Effective management of caudal septal deviation requires firm and durable fixation between the SC and the ANS. The F8 suture is widely used for this purpose [2]; however, its unidirectional anterior traction may generate asymmetric forces along the L-strut leg, predisposing the posteroinferior segment to rotational instability. This technical note describes a dual-stage septum-to-nasal spine fixation suture designed to overcome this biomechanical limitation.

Surgical technique

All procedures were performed under general anesthesia using a closed septoplasty approach. A right-sided hemitransfixion incision was made, and bilateral mucoperichondrial

flaps were elevated. After correction of the septal pathology and preparation of the L-strut leg, the anterior nasal spine was adequately exposed while preserving surrounding periosteal tissue.

Stage 1 The L-strut leg was positioned onto the ANS. A F8 suture was placed by first passing the needle through the periosteum of the ANS from left to right, followed by passage through the anteroinferior portion of the L-strut leg in the same direction. The suture was tied securely, and the remaining suture was left uncut (Fig. 1).

Stage 2 The needle was then passed transeptally from right to left through the posteroinferior corner of the L-strut leg, approximately 2 mm from the posterior and inferior margins. This pass was tied to the short limb of the F8 suture, providing posteroinferior counter-traction and correcting subtle rotational tendency (Fig. 2). A step-by-step demonstration of the technique is provided in Video 1.

Fixation was performed using a 5–0 polydioxanone (PDS) suture (75 cm) with a 16-mm round-body needle. The incision was closed with a 4–0 absorbable monofilament suture, and internal nasal splints were removed on postoperative day 3. The technique is also applicable in open septoplasty.

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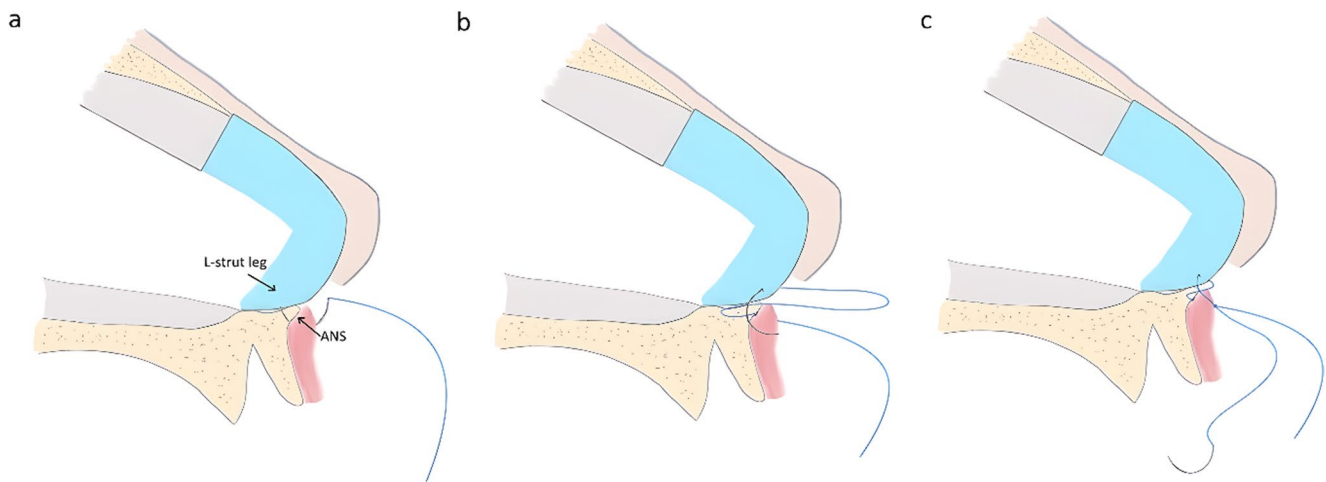


Fig. 1 Schematic illustration of the F8 suture technique (a) The needle is passed from left to right through the periosteum overlying the anterior nasal spine (b) The needle is advanced from left to right through

the anteroinferior segment of the L-strut leg (c) The F8 suture is secured with a knot, and the remaining suture thread is left uncut

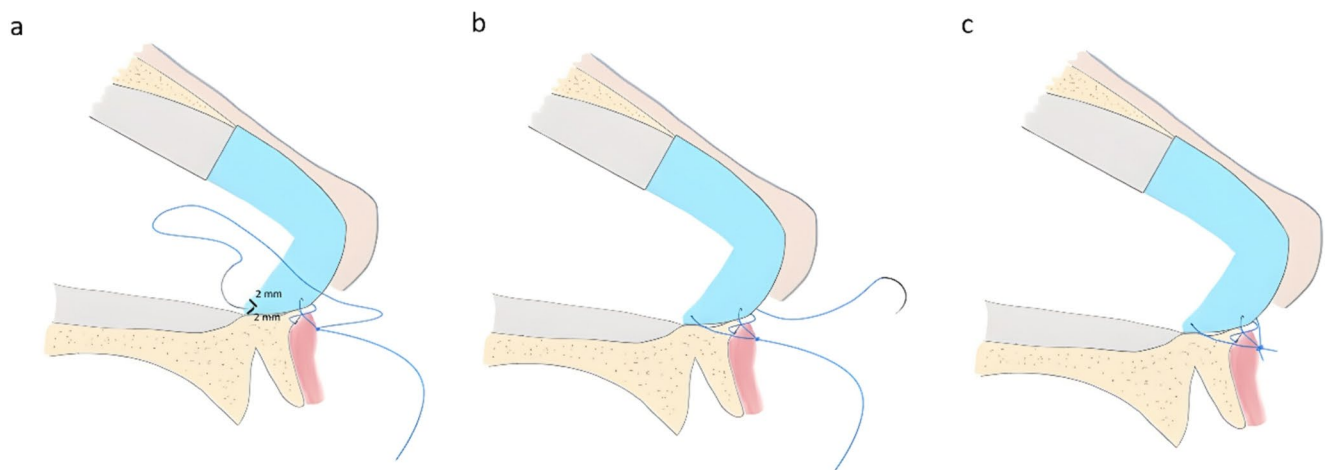


Fig. 2 Schematic illustration of the second stage of the dual-stage fixation technique (a, b) The needle is passed transeptally from right to left through the posteroinferior corner of the L-strut leg (c) The suture is secured by tying it to the short limb of the previously placed F8 suture

Technical reasoning

In caudal septal subluxation or luxation, detachment of the SC from the ANS is unavoidable. When extensive cartilage excision is required with preservation of the L-strut, fixation with an F8 suture alone provides anterior stabilization but leaves the posteroinferior aspect of the L-strut leg unsupported.

The F8 suture generates a predominantly anteriorly directed traction force, creating a rotational moment around the fixed anterior point. The unsupported posteroinferior segment of the L-strut leg may rotate under intrinsic cartilage memory, particularly in SC with preexisting anteroposterior inclination.

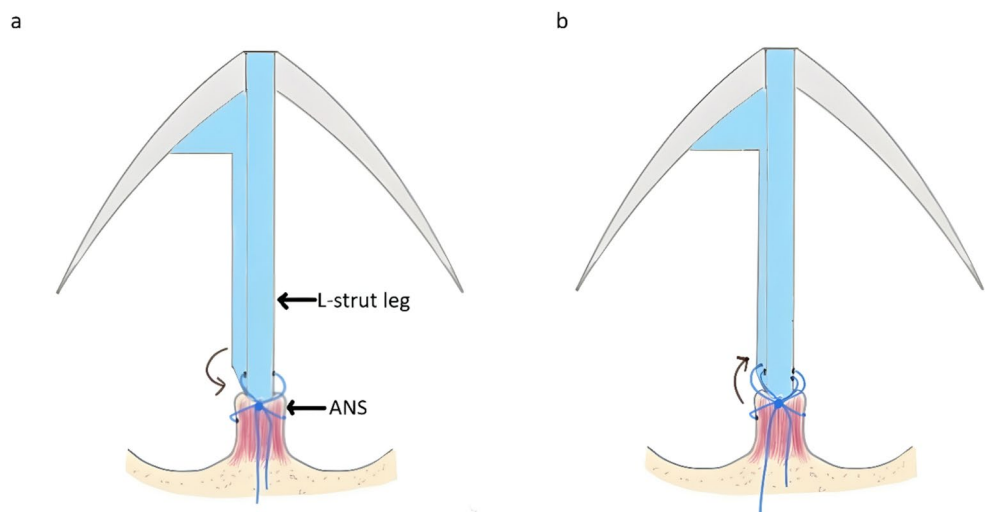
The dual-stage technique applies an additional posteroinferior fixation force opposite to the direction of the F8

suture traction. This counter-traction neutralizes rotational moments and converts unidirectional loading into a balanced, multidirectional stabilization construct, enhancing overall caudal septal stability (Fig. 3).

Indications

This technique is indicated in patients with moderate to severe caudal septal deviation characterized by anteroposterior septal tilt, in whom correction requires detachment of the SC–ANS junction and extensive cartilage excision with preservation of the L-strut. It is particularly useful in cases where fixation with an F8 suture alone results in asymmetric traction or rotational instability of the L-strut leg.

Fig. 3 Schematic representation of traction and stabilizing forces acting on the L-strut leg (a) Rotational tendency of the postero-inferior corner of the L-strut leg after application of the F8 suture (b) Neutralization of rotational forces and stabilization of the L-strut leg after completion of the second-stage suture



How to avoid complications

The L-strut leg must be precisely positioned on the ANS before suturing to ensure effective load transfer and optimize stabilization. The second-stage suture should be placed at the postero-inferior corner of the L-strut leg, close to but not at the cartilage margin, to control rotational forces while minimizing the risk of cartilage tearing. A 5–0 PDS suture with a round-body needle provides sufficient strength, smooth handling, and reduced cartilage trauma during multiple passes. Over-resection of the caudal septal cartilage should be avoided, as it may shorten the L-strut leg and compromise fixation. Finally, the technique should be used cautiously in cases with a hypoplastic, fractured, or absent ANS, as secure anchoring relies on intact bony support.

Participants/clinical outcomes

This dual-stage fixation technique was applied in 23 patients (15 male, 8 female) with caudal septal deviation and antero-posterior tilt. During 6–12 months of follow-up, stable caudal septal positioning was maintained without recurrent deviation. Subjective improvement in nasal breathing was reported by the patients, and no early or late postoperative complications occurred.

Discussion

Deviations affecting the dorsal and caudal portions of the septum are among the most difficult to manage during septoplasty. Achieving complete correction of caudal septal deviation is challenging because of the intrinsic bending memory of SC, which predisposes it to recurrent

deformation [3]. Numerous techniques have been described for the correction of caudal septal deviations, generally categorized into suturing, reshaping, and grafting methods [4]. Mild caudal deviations can often be managed using the swinging door maneuver combined with fixation sutures [5]. In the modified swinging door (doorstop) technique, the caudal septal edge is positioned on the opposite side of the nasal spine, which serves as a “doorstop” to prevent displacement of the caudal septum [1]. The tongue-in-groove technique stabilizes the repositioned caudal septum by positioning it within the groove formed by the medial crura and fixing it with sutures, resulting in simultaneous septal stabilization and nasal tip support [6]. Batten grafts, on the other hand, are particularly effective in correcting convexity along the superoinferior axis of the septum [7]. Each of these approaches has specific indications and limitations, highlighting the importance of individualized surgical planning.

Septoplasty for caudal septal deviation typically requires release of the SC from its attachment to the ANS. Techniques used to fixate the SC to the ANS must ensure strong structural stability to avoid complications such as sideward shift of the caudal septum, saddle nose deformity or tip ptosis [8]. Among suturing techniques used for SC–ANS fixation, the F8 suture is the most commonly applied method [2]. Despite its widespread use, the F8 suture has some biomechanical limitations in certain cases. The dual-stage fixation suture described in this report was developed to address this specific biomechanical limitation. By adding a second-stage postero-inferior fixation to the conventional F8 suture, the technique provides counter-traction opposite to the direction of the initial anterior force. This modification redistributes mechanical loads across multiple vectors, neutralizes rotational moments, and converts unidirectional fixation into a balanced, multidirectional stabilization construct.

Although this report is limited by its descriptive nature and the absence of objective functional outcome measures, the technique provided stable caudal septal positioning and favorable subjective outcomes in the presented patient group. Further comparative studies with larger cohorts, objective airflow measurements, and longer follow-up are required to more clearly define the role of this dual-stage fixation technique in the management of caudal septal deviations.

Summary

- Caudal septal deviation is challenging due to intrinsic cartilage memory and rotational L-strut leg instability.
- The F8 suture provides anterior SC–ANS fixation but leaves the posteroinferior aspect of the caudal L-strut leg unsupported.
- Dual-stage fixation incorporates an additional posteroinferior suture to counteract rotational forces.
- Technique works via closed or open septoplasty.
- Stage one: F8 suture secures L-strut leg to ANS.
- Stage two: a transseptal suture is passed through the posteroinferior corner of the L-strut leg and tied to the F8 thread.
- Converts unidirectional traction into balanced, multidirectional stabilization.
- Indicated for moderate–severe anteroposterior tilt with SC–ANS detachment.
- Applied in 23 patients, achieving stable caudal septal positioning and improved nasal airflow.
- Ensures reliable, efficient, and biomechanically optimized SC–ANS fixation.

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Declarations

Conflict of interest The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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