Annals of Clinical Otolaryngology

Research Article
Published: 09 Jan, 2026

The Pillars Concept: Does It Prevent Recurrence Following Otoplasty?

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Abstract

Introduction: The pillars concept is a surgical technique designed to correct hypertrophic concha in otoplasty, theoretically associated with lower recurrence rates. This study aims to compare its efficacy, adverse effects, and patient satisfaction with the standard technique used in our institution.

Methods: A retrospective cohort study was conducted, including patients who underwent otoplasty between 2013 and 2023, with hypertrophic concha and at least 52 weeks of follow-up. Patients were divided into two groups: Standard Technique (ST conchal setback with Mustardé sutures) and Pillars Technique (PT pillars concept added to ST). Primary outcomes were recurrence and patient satisfaction. Secondary outcomes included ear canal stenosis, skin necrosis, bleeding, hematoma, wound dehiscence, and suture extrusion.

Results: A total of 27 surgeries were analyzed (ST: 20; PT: 7). Recurrence was observed in 15% of cases of ST (n=3), no cases of recurrence were found in patients who underwent the pillars technique (p=.08). Suture extrusion occurred in 5% of the standard technique cases (n=1) and skin necrosis was observed in 14.3% (n=1) of PT group (p=.324/p=.22). The average GAIS score was 1,8 ± 0,4 for the pillar's technique and 2,6 ± 0,5 for the standard technique (p=.12).

Conclusions: The pillars concept may offer some advantages in otoplasty, including a lower recurrence rate and greater patient's satisfaction. These results denote that the proposed structural repositioning may be a more effective and long-lasting approach to correcting the auricular prominence. Future studies are needed to confirm these findings and definitively establish the superiority of this technique compared to traditional approaches.

Level of Evidence: Level III, restrospective cohort study

Highlights:

- The pillars technique consists in a structural repositioning of the ear.
- This repositioning may offer greater long-term stability.
- The pillars technique may contribute to a lower recurrence rate.

Keywords: Otoplasty; Pillars; Relapse; Prominauris

Introduction

Otoplasty is a cosmetic procedure used to change the position, shape, or size of the ear. The primary indication for otoplasty is to correct prominauris, or protruding ears [1].

Prominauris is seen in approximately 5% of Caucasians [2]. This auricular condition can be inherited in an autosomal dominant fashion, and many patients report a family history. The etiology of prominauris is related to two main factors which are a poorly developed antihelical fold (most common cause) and excessive conchal cartilage (second most common) [1].

Furnas described otoplasty in 1959, a technique based on permanent conch mastoid sutures to correct the deformity of prominauris (conchal setback) [3]. Mustarde added an additional technique in 1962 which described using permanent conchoscaphal sutures to improve the appearance of the ear [4].

The Furnas technique focuses on correcting excessive conchal cartilage, while the Mustarde technique addresses the underdeveloped antihelical fold [3,4]. The Davis procedure, which involves removing conchal cartilage to treat excessive cartilage, may also be a surgical option associated to

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Received Date: *29 Dec 2025*
Accepted Date: *07 Jan 2026*
Published Date: *09 Jan 2026*

Citation:
Caetano G, Morgado D, Pinto C, Santos M, Veloso I, Robles R, et al. The Pillars Concept: Does It Prevent Recurrence Following Otoplasty?. Ann Clin Otolaryngol. 2026; 9(1): 1059.

the conchal setback [5].

Two schools of thought predominate regarding otoplastic surgery summarized as cartilage cutting and cartilage sparring techniques. Cartilage cutting techniques tend to be favoured in Europe and are preferred due to durability of the correction over time, although there is higher risk of anterior cartilage irregularities. Cartilage sparring techniques predominate in North America and the advantages include less scaring, preservation of the cartilage framework, and prevention of contour irregularities. With these techniques there is in theory fewer stability over time [6].

There are several complications associated with otoplastic procedures, which we can classify into early and late complications, according to the moment in which they arise. Early otoplasty complications (within hours to days) include hematoma, infection and cartilage/skin necrosis. Late complications (weeks to months) encompass keloids, suture complications, recurrence and auricular deformities [6].

The pillars technique was published by José Carlos Neves in 2018. The pillars concept in otoplasty is a surgical technique primarily used to correct the prominence of the conchal cartilage of the auricle. This approach conceptualizes the support structure of the auricle as analogous to a bridge (the antihelix) supported by two pillars. The first pillar is the superior pillar, anchored between the spine of the helix and the inferior crus of the antihelix. The second pillar, the inferior pillar, is stabilized in the intertragic notch. The conchal cartilage is described as the "wall" beneath this "bridge" [7].

In cases where the conchal cartilage is hypertrophic, this technique allows for the concha (the wall) to be reduced without disrupting the overall structure (the bridge) of the ear. If these "pillars" are cut, the support that maintains the ear's prominence is interrupted, allowing the ear to be repositioned posteriorly (closer to the head). This repositioning can be adjusted to achieve the desired aesthetic outcome while preserving the natural contour and definition of the antihelix [7].

When the pillars technique is used, theoretically, there is a lower probability of relapse since the technique does not rely solely on sutures to maintain the shape of the auricle, but rather on structural repositioning that offers greater long-term stability.

However, there are no published articles in the literature that compare this technique with others to verify if it is indeed associated with a lower relapse rate.

Materials and Methods

A retrospective study was conducted, including patients who underwent otoplasty between 2013 and 2023. Inclusion criteria included patients with prominent ear deformity (paediatric and adult) with hypertrophic conchal cartilage and a minimum follow-up of 52 weeks after surgery. Patients with a previous auricular surgery were excluded. The patients were divided into two groups: one group underwent the Standard Technique (ST) which involved Mustardé sutures and conchal setback-and the other group underwent the Pillars Technique (PT) combined with the standard technique. Surgeries were performed by different surgeons and the surgical technique was performed according to the surgeon's preference (indication bias). Both groups received identical postoperative care with wound ointment, antibiotic prophylaxis (amoxicillin-clavulanate), 48 hours compressive dressing after surgery, 1 week with day and night ear bandage and 2 weeks with night only ear bandage.

In addition to the data extracted from patients' clinical records, patient satisfaction was assessed using an unvalidated portuguese version of the Global Aesthetic Improvement Scale (GAIS), which was approved by all authors (Table 1 and 2). If the patient was minor, the guardian's satisfaction was considered.

The relapse rate and patient satisfaction were considered the primary outcomes. Secondary outcomes included ear canal stenosis, skin necrosis, bleeding, hematoma, wound dehiscence and suture extrusion.

Statistical analysis

The Fisher's exact test was used to compare categorical outcomes between the two groups. The Mann Whitney test was used to compare quantitative variables between groups. Data were analyzed using IBM-SPSS software, version 28.0. P-value was set at 0.05 for statistical significance.

Results

The study included 27 surgeries, performed on 14 patients, with a mean age of 9.6 ± 5.4 years, 57.1% male. The average follow-up time was 55.3 weeks (56.6 weeks for the ST group and 53.1 weeks for the PT group). There were no statistically significant differences between the ST and PT groups in terms of follow-up duration, age (mean ages of 9.0 and 11.2 years, respectively), or gender distribution.

The ST was performed in 20 surgeries (74.1%) and the PT was performed in 7 surgeries (25.9%). All operations were performed under general anesthesia associated with intra-operative infiltration of local anesthesia. The majority (92.9%) of patients attended their first follow up visit within 7-10 days post-operatively.

Recurrence was observed in 15% of ST cases (n=3): one associated with both conchal hypertrophy and poor antihelical fold definition, and another attributed solely to conchal hypertrophy. In the other case, the cause of the recurrence was not stated. No cases of recurrence were found in patients who underwent the PT (p=.08). Suture extrusion occurred in 5% of the standard technique cases (n=1) and skin necrosis was observed in 14.3% (n=1) of PT group (p=.324/ p=.22). There were no cases of canal stenosis, hematoma, bleeding or wound dehiscence. The average GAIS score was 1,8 ± 0,4 for the pillar's technique and 2,6 ± 0,5 for the standard technique (p=.12).

Table 1: Global Aesthetic Improvement Scale (GAIS).

1	Very much improved
2	Marked improvement
3	Improved
4	No change
5	Worse

Table 2: Unvalidated portuguese version of the GAIS scale, approved by all authors.

1	Muito melhor
2	Melhoria significative
3	Melhor
4	Igual
5	Pior

Discussion

Theoretically, the pillars technique is associated with a lower likelihood of recurrence since it relies not only on sutures but on structural repositioning that offers greater long-term stability [7]. In a retrospective review by Neves & Arancibia-Tagle, no recurrences were observed in a series of 89 patients with hypertrophic concha [8]. However, no published studies have compared this technique with others to confirm whether it indeed results in a lower recurrence rate.

According to Nuara & Mobley, recurrence rates in otoplasty patients range from 0% to 50%, with most studies reporting rates between 0% to 15% [9]. In our results, both groups showed recurrence rates consistent with the literature, with the pillars technique associated with a lower recurrence rate compared to the standard technique, although not statistically significant. This increased durability of results might be linked to the structural repositioning described by José Carlos Neves, but further studies are needed to confirm these results [8].

A notable point is the occurrence of skin necrosis in 14.3% of patients undergoing the pillars technique. This complication was attributed to the use of an excessively tight ear bandage worn for a longer duration than recommended. Limandjaja, et al. reported that the incidence of cutaneous necrosis to be between 0% to 17% [10]. Although the number of cases is limited, this technique may carry a higher risk of skin necrosis, potentially linked to more extensive tissue dissection. This aspect warrants attention in future studies, with an analysis of strategies to mitigate this risk, such as more rigorous postoperative care protocols.

According to the literature review performed by Limandjaja, et al. [10] Unsatisfactory aesthetic results incidence after otoplasty varies between 0.9% to 20%. The higher aesthetic satisfaction reported by patients in the pillar's technique group (not statistically significant), with an average GAIS score of 1.8 compared to 2.6 for the standard technique, suggests that this approach may provide superior aesthetic outcomes. This finding is particularly relevant as patient satisfaction is a key indicator of success in aesthetic surgery [11]. Although GAIS is a valuable tool for assessing perceived results, it is important to consider that it is a subjective assessment and that evaluations may be influenced by various factors, including preoperative expectations and the recovery process. This scale was used in an unvalidated translated version, approved by all authors.

It is important to acknowledge the limitations of this study, including its retrospective nature, the relatively small sample size, memory and indication bias and multiple surgeons. Compared to the literature, where most studies focus on technical descriptions, this study contributes by providing comparative data between two different approaches [12]. However, the lack of randomized and controlled studies directly evaluating the efficacy of the pillar's technique relative to other otoplasty techniques limits the robustness of the conclusions. Prospective studies with larger samples are essential to confirm whether the advantages observed in this study persist across different clinical contexts and with different surgeons [13].

Overall, despite the inherent limitations of this study, the results suggest that the pillars technique may represent an advancement in otoplasty practice, offering a potentially more durable and aesthetically satisfying approach to correcting auricular prominence. Further investigation in this area could contribute to optimizing surgical techniques and improving patient outcomes.

Conclusion

The results of our study suggest that the pillars technique may offer significant advantages, including a lower recurrence rate and greater aesthetic satisfaction among patients. Despite the study's limitations, the data indicate that the structural repositioning proposed by José Carlos Neves could be an effective approach for enhancing the durability and quality of otoplasty results. Future studies are needed to confirm these findings and definitively establish the superiority of this technique compared to traditional approaches.

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