



# PILOT STUDY

Cosmetic

## Pilot Study: Minimally Invasive Hyoid Suspension Lift: A Case Series and Technical Description

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**Background:** The cervicomental angle is a critical anatomical feature in neck aesthetics, and age-related changes can lead to sagging, platysma bands, and loss of definition. Traditional neck rejuvenation techniques focus on tightening the horizontal platysma but often fail to restore the cervicomental angle. This study evaluated a minimally invasive hyoid suspension (MIHS) lift, which anchors the platysma to the prehyoid deep cervical fascia through a limited submental incision. **Methods:** Between October 2023 and July 2024, 6 female patients (mean age, 63.0 y) underwent the MIHS lift alongside face lift and liposuction. The technique involved minimal subcutaneous dissection and direct platysma anchoring to reduce scarring and tissue trauma. The submental incision was limited to approximately 2 cm. Outcomes were assessed using the Knize cervicomental classification and the Gupta platysma band grading. Two surgeons performed all procedures and evaluations.

**Results:** Neck contour and the cervicomental angle improved in all patients, with no complications. Preoperatively, 2, 1, and 3 patients were classified as Knize cervicomental class I, II, and III, respectively; postoperatively, all patients achieved class I. Platysma bands resolved in all patients. Submental scarring was minimal and inconspicuous on clinical examination.

**Conclusions:** The MIHS lift appears to offer a low-morbidity, natural-appearing option for neck contouring by minimizing invasiveness. Although early outcomes are promising, further validation is needed. This technique may be useful for individuals prone to hypertrophic scarring (eg, Asian patients). (*Plast Reconstr Surg Glob Open 2025;13:e7112; doi: 10.1097/GOX.00000000000007112; Published online 23 September 2025.*)

## **INTRODUCTION**

The aesthetics and youthful appearance of the neck significantly influence one's overall appearance. Age-related changes, such as wrinkles and sagging, make the neck a key focus for aesthetic improvement. Recently, the rise of social media has heightened the demand for a consistently attractive appearance from all angles, thereby boosting interest in neck rejuvenation procedures.<sup>1</sup>

According to Ellenbogen and Karlin,<sup>2</sup> an aesthetically pleasing neck is characterized by a well-defined mandibular angle, subhyoid depression, prominent thyroid

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cartilage, visible sternocleidomastoid muscles, and cervicomental angle of 105–120 degrees. Age-related morphological changes, including blunting of the cervicomental angle, formation of platysma bands, and loss of a well-defined jawline, are traditionally attributed to horizontal laxity caused by decreased muscle tone. The absence of platysma bands in patients with facial nerve paralysis<sup>3</sup> suggests that their formation is due to both platysma laxity and factors such as vertical hypercontraction (platysmal hyperfunction).<sup>4</sup> This indicates that age-related changes in neck morphology are a multifactorial process and cannot be fully explained by muscle laxity alone.

One potential factor is the gradual forward displacement and straightening of the platysma muscle, which

Limitations regarding long-term follow-up inherently exist in this article type.

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aligns from the clavicle to the mandibular border. Gradually, this repetitive motion may blunt the cervicomental angle.<sup>5</sup> Additionally, weakening of platysmal retaining ligaments, such as the hyoplatysmal and auriculoplatysmal ligaments, likely contributes to these changes.<sup>6-9</sup> The accumulation of subplatysmal fat may also contribute to age-related neck changes; however, its presence in younger individuals suggests that factors beyond aging are involved. 4,10 By contrast, platysmal bands are more commonly observed in older people, 11 likely due to age-related excessive contraction of the platysma and weakening of ligaments. These changes contribute to key aesthetic concerns, such as the blunting of the cervicomental angle and loss of a well-defined jawline. Vertical muscle hyperfunction (platysmal hyperfunction) of the hard dynamic bands of the platysma has been reported as a significant contributing factor to the formation of platysma bands.<sup>4,12</sup>

Traditionally, procedures such as extensive subcutaneous dissection and anterior platysmaplasty have been performed to address horizontal platysma laxity and skin sagging in the neck.<sup>13</sup> These procedures aim to tighten the platysma horizontally; however, issues such as recurrence and limited long-term efficacy have been reported. These limitations may include age-related changes in the platysma, such as thinning, shortening, and laxity,<sup>14,15</sup> as well as aging-related alterations in the hyoplatysmal and auriculoplatysmal ligaments that support the platysma.

Given the previously described mechanisms of neck aging, treatments focusing solely on horizontal platysma tightening are insufficient to fully address the blunting of the cervicomental angle or platysma bands. Marten and Elyassnia<sup>4</sup> also highlighted that age-related neck changes cannot be solely attributed to horizontal platysma laxity.

Le Louarn<sup>16,17</sup> and Yousif et al<sup>5</sup> proposed anchoring the platysma to the prehyoid deep cervical fascia and shifting it toward the hyoid bone to achieve a more effective improvement in the cervicomental angle than traditional methods. The prehyoid deep cervical fascia is a robust connective tissue structure formed by the fusion of the 3 layers of the deep cervical fascia anterior to the hyoid bone. This fascia provides stable support, making it a suitable anchor to the platysma. Additionally, the "synfibrosis," a fibrous fusion joint located between this fascia and the hyoid bone, ensures adequate mobility, enabling secure fixation without disrupting natural swallowing movements. The method described by Le Louarn uses a lateral approach, presenting challenges in securing the operative field and performing suturing. In contrast, the approach described by Yousif, which involves a submental incision, enables direct visualization for deep manipulation; however, it requires an incision of 3-4 cm and extensive subcutaneous dissection, making it a highly invasive procedure and increasing the risk of scarring, particularly in Asian patients.

Asian individuals are more prone to noticeable scars, such as hypertrophic and keloid scars. <sup>18</sup> To mitigate these risks, reducing the size of the skin incision and the extent of subcutaneous dissection is preferable. These factors highlight the importance of selecting a technique based

## **Takeaways**

**Question:** Can the blunting of the cervicomental angle and the appearance of platysma bands, signs of cervical aging, be improved using a less invasive approach than conventional methods?

**Findings:** We evaluated the efficacy of the minimally invasive hyoid suspension lift in 6 patients. Using a 2-cm submental incision and limited dissection, the platysma was anchored to the deep cervical fascia. This approach led to improvements in the cervicomental angle and resolution of platysma bands, with no complications or visible scarring.

**Meaning:** The minimally invasive hyoid suspension lift offers a low-morbidity technique for neck rejuvenation that may be especially beneficial for scar-prone patients, including Asians.

on patient-specific considerations, particularly for individuals prone to scarring, where the balance between efficacy and invasiveness should be carefully weighed.

This report presents the favorable outcomes of the "minimally invasive hyoid suspension (MIHS) lift," a procedure that anchors the platysma to the prehyoid deep cervical fascia through a small submental incision with minimal subcutaneous dissection. By limiting the submental incision to 2 cm and reducing subcutaneous dissection, this technique minimizes postoperative scarring while effectively securing the platysma. It is particularly beneficial as a low-invasive approach for patients with a high risk of hypertrophic scarring, such as Asian patients.

## **MATERIALS AND METHODS**

Between October 2023 and July 2024, 6 female patients (mean age, 63.0 y; range, 52–75 y) underwent an MIHS lift at the Shiromoto Clinic. All procedures were performed alongside an extended deep-plane face lift and liposuction. The average follow-up period was 246.8 days (range, 175–391 d).

The inclusion criteria were adult female patients presenting with submental laxity and cervical aging. Patients with prior submental surgery and significant comorbidities were excluded. Two plastic surgeons performed all procedures: surgeon A (12 y of experience) performed cases 1–4 and case 6, and surgeon B (16 y of experience) performed case 5.

Evaluations were conducted using the Knize classification system <sup>19</sup> and the platysma band grading system by Gupta et al. <sup>20</sup> (See figure, Supplemental Digital Content 1, which displays the Knize classification of cervicomental angle deformities, <a href="https://links.lww.com/PRSGO/E322">https://links.lww.com/PRSGO/E322</a>.) (See figure, Supplemental Digital Content 2, which displays the platysmal band grading described by Gupta, <a href="https://links.lww.com/PRSGO/E323">https://links.lww.com/PRSGO/E323</a>.) Two independent plastic surgeons performed the postoperative assessments.

Additionally, complications and neck scar characteristics were assessed. The study was approved by the institutional review board of Shiromoto Clinic and was

conducted in accordance with the principles of the Declaration of Helsinki.

#### **Surgical Technique**

The procedure was performed under general anesthesia. Approximately 100 mL of tumescent solution was injected subcutaneously into each side of the neck, followed by liposuction targeting the subcutaneous fat layer in the submental region. The submental incision was made as described by Marten and Elyassnia<sup>10</sup> (Fig. 1), positioned midway between the menton and hyoid bone, approximately 1.5 cm below the submental crease, at the most prominent point of the hammock-shaped skin in this region. The incision length was limited to approximately 2 cm, compared with the 3–4 cm used in previously reported techniques, to minimize the risk of postoperative scarring, particularly in patients prone to hypertrophic or keloid scars.

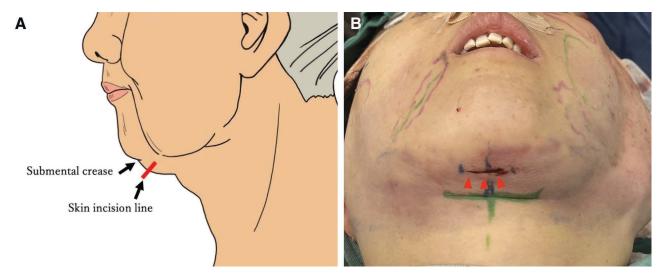
Minimal dissection was performed over the platysma, followed by an incision along its medial edge. (See figure, Supplemental Digital Content 3, which displays intraoperative photograph showing minimal subcutaneous dissection over the platysma and a medial incision along its edge. The subplatysmal fat is clearly visible through this limited exposure. This approach allows for en bloc removal and anchoring of the platysma to the prehyoid deep cervical fascia, while preserving surrounding tissues, https://links.lww.com/PRSGO/E324.) The subplatysmal fat was excised en bloc under careful hemostasis by minimally dissecting the platysma and separating it from the surrounding tissues (Fig. 2A). During subplatysmal fat excision, the tissue was carefully dissected between the medial edges of the platysma and separated from the prehyoid deep cervical fascia. Adequate hemostasis was ensured using bipolar coagulation forceps to control bleeding from small blood vessels in the area. Minimal sharp subcutaneous dissection was limited to the area necessary to secure the anterior edge of the platysma. The remaining subcutaneous tissue was accessed and mobilized via liposuction, which minimized trauma and reduced the risk of scarring.

After meticulous hemostasis, the medial edges of the platysma were sutured continuously from the caudal to the cranial end. At a level immediately above the hyoid bone, the platysma was anchored to the prehyoid deep cervical fascia using 4-0 Vicryl sutures (Fig. 2B). A drain was placed if necessary, and the incision was closed (Fig. 2C).

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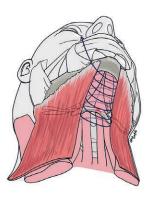
#### RESULTS

Six female patients underwent an MIHS lift procedure. (See table, Supplemental Digital Content 4, which displays the patient characteristics, https://links.lww. com/PRSGO/E325.) In all patients, the cervicomental angle significantly improved, resulting in an aesthetically favorable neck contour. This improvement reflects the direct effect of anchoring the platysma to the prehyoid deep cervical fascia, which sharpens the cervicomental angle by repositioning the platysma along deeper neck structures and reducing subplatysmal fat volume. This anatomical correction not only restored the angle to its youthful proportions but also contributed to a smoother, more defined jawline, enhancing the cosmetic outcome. Submental scars were inconspicuous in all patients, and no complications, including hematoma, skin necrosis, or facial nerve palsy, were observed. No cases of hypertrophic



**Fig. 1.** Submental skin incision for the minimally invasive hyoid suspension (MIHS) lift. A, Skin incision line. The incision is positioned approximately midway between the menton and the hyoid bone, approximately 1.5 cm caudal to the submental crease, at the most prominent point of the hammock-shaped skin in this region. B, Arrowhead: skin incision line.







**Fig. 2.** Key operative steps of the MIHS lift. A, The subplatysmal fat is meticulously dissected from the surrounding tissues under careful hemostasis and excised en bloc. B, The medial edges of the platysma were sutured continuously from the caudal to the cranial end. At the level just above the hyoid bone, the platysma was anchored to the prehyoid deep cervical fascia using 4-0 Vicryl sutures. C, The incision was closed.

scarring, keloid formation, hematoma, seroma, infection, or any adverse nerve-related events were observed.

Preoperatively, the classification of the cervicomental angle based on the Knize classification system<sup>19</sup> included 2, 1, and 3 cases classified as classes I, II, and III, respectively. Postoperatively, all cases were classified as class I. Regarding the grading of the platysma band type, evaluated using the system described by Gupta et al,<sup>20</sup> 5 cases were classified as grade 1 and 1 case as grade 0 preoperatively. Postoperatively, all patients were classified as grade 0.

In cases 3 and 6, the preoperative Knize classification was grade 1, which indicated no significant blunting of the cervicomental angle. However, both patients had grade 1 platysma bands preoperatively. Postoperatively, the platysma bands resolved completely, thereby achieving a postoperative classification of grade 0.

These results demonstrate the effectiveness of the MIHS lift in improving the cervical angle and resolving platysma bands, even in cases with minor preoperative changes. These 3 representative cases were selected to demonstrate the technique's versatility across different anatomical presentations, including both advanced cervicomental blunting and isolated platysma banding.

## **CASES**

#### Case 1

A 54-year-old woman presented with submental laxity and an undefined jawline. The patient had previously undergone high-intensity focused ultrasound treatment and liposuction; however, the effects of these treatments were limited, with persistent issues, including submental laxity and an undefined jawline. To achieve more substantial improvement, the MIHS lift was selected for this case. Preoperatively, her platysma banding was evaluated as grade 0 using the Gupta platysmal banding scale; however, her cervicomental angle was classified as class II based on the Knize classification system to indicate blunting (Figs. 3A, B). Owing to skin redundancy and the blunted cervicomental angle, a face lift was performed in

combination with the MIHS lift. Postoperatively, the cervical angle improved from class II to class I, which resulted in a more defined jawline (Figs. 3C, D). One year postsurgery, the submental scar was inconspicuous (Fig. 3E).

#### Case 2

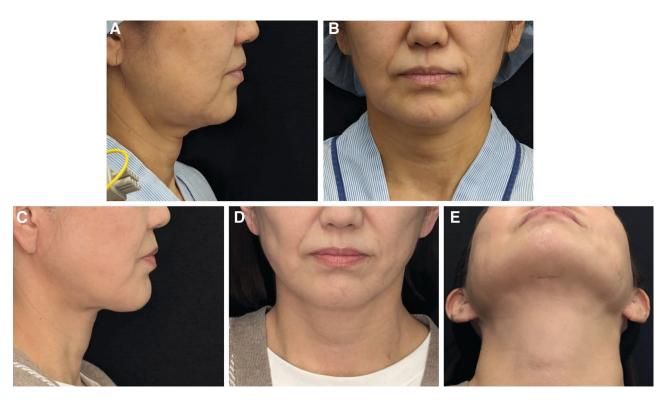
A 74-year-old woman presented with submental laxity, platysmal band formation, and an undefined jawline. Preoperatively, her cervicomental angle was classified as class II according to the Knize classification. Her platysma banding was graded as grade 1 on the Gupta scale (Figs. 4A, B). Similar to case 1, skin redundancy was present, necessitating a combined face lift procedure. Postoperatively, platysma banding improved from grade 1 to 0, and the cervical angle improved from class II to class I (Figs. 4C, D). Six months postsurgery, the submental scar was well hidden and nearly imperceptible (Fig. 4E).

## Case 3

A 62-year-old woman presented with submental laxity, platysmal band formation, and an undefined jawline. Preoperatively, her cervicomental angle was classified as class I according to the Knize classification, with no significant blunting observed; however, her platysma banding was graded as grade 1 on the Gupta scale (Figs. 5A, B). Similar to cases 1 and 2, skin redundancy was present, necessitating a combined face lift procedure. Postoperatively, platysma banding improved from grade 1 to 0, and the cervicomental angle appeared more defined (Figs. 5C, D). Six months postsurgery, the submental scar was well hidden and nearly imperceptible (Fig. 5E).

## **DISCUSSION**

Traditionally, treatments for cervical aging, such as anterior platysmaplasty or lateral suspension of the platysma, have focused primarily on addressing horizontal platysmal laxity. To enhance the effectiveness of these techniques, full-width platysmal transection and digastric corset repair have been performed; however, these approaches are associated with a heightened risk of hematoma formation and significant surgical invasiveness with



**Fig. 3.** Case 1. A 54-year-old woman presented with complaints of submental laxity and an undefined jawline. Her cervicomental angle was classified as class II according to the Knize classification system, indicating blunting of the cervicomental angle. Postoperatively, her cervicomental angle improved from class II to class I. A, Preoperative side view. B, Preoperative frontal view. C, One-year postoperative side view. D, One-year postoperative frontal view. E, At 1 year postoperatively, the submental scar was inconspicuous.

a reported likelihood of recurrence within 1 year postoperatively.<sup>12</sup> Moreover, excessive tightening of the platysma poses the risk of cervical tightness or discomfort during respiration.

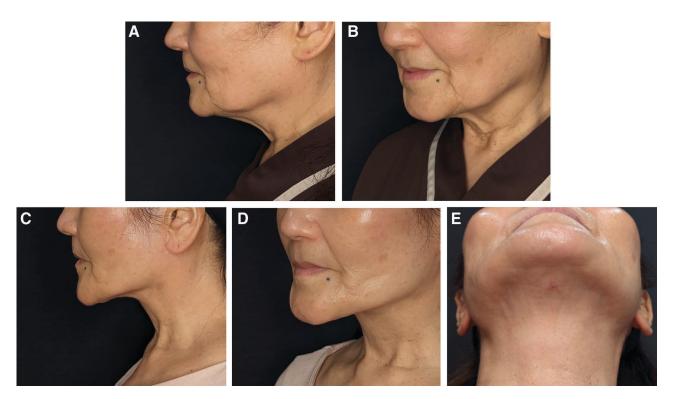
Marten and Elyassnia<sup>4</sup> highlighted that cervical aging involves not only horizontal platysmal laxity but also excessive accumulation of subplatysmal fat and platysmal hyperfunction. Subplatysmal fat is located beneath the platysma, extending caudally near the hyoid bone and cranially near the menton.<sup>21</sup> According to Renaut et al,<sup>22</sup> the average weight of this fat layer is 3.7g (range, 0.8–13.3g), with evidence suggesting age-related increases in its volume.<sup>4</sup> Rohrich and Pessa<sup>23</sup> further demonstrated that the subplatysmal supramylohyoid fat is organized into the following 3 compartments: central, medial, and lateral. The removal of subplatysmal fat has been shown to improve the aesthetic concerns of the neck, including blunting of the cervicomental angle.<sup>9</sup>

Yousif et al<sup>5</sup> also implicated the weakening of the deep retaining ligaments of the platysma as a contributor to cervical aging. Therefore, in addition to resecting excessive subplatysmal fat, reconstructing the lax deep retaining ligaments, specifically the hyoid ligaments, <sup>3,18,16</sup> and shifting the platysma toward the hyoid bone are considered effective strategies.

Le Louarn<sup>16,17</sup> and Yousif et al<sup>5</sup> reported that anchoring the platysma to the prehyoid deep cervical fascia results in a more effective improvement in the cervicomental angle than conventional techniques, as demonstrated in the hyoid suspension neck lift.<sup>16,19</sup> Between the prehyoid deep cervical fascia and hyoid bone lies a joint-like structure known as synfibrosis, which provides a "gliding space."<sup>17</sup> Direct fixation of the platysma to the hyoid bone carries risks, such as swallowing difficulties and unnatural bulging of the platysma.<sup>3</sup> Thus, anchoring the platysma to the prehyoid deep cervical fascia is preferable.<sup>16,17</sup>

Removing subplatysmal fat facilitates the achievement of a sharper cervicomental angle and provides the advantage of easier access to the underlying deep cervical fascia. Subplatysmal fat cannot be completely removed through submental liposuction alone and should be meticulously excised under direct visualization by dissecting from the surrounding tissues. Regarding the extent of deep removal of the subplatysmal fat, resecting the fat tissue located between the digastric muscles may lead to unnatural submental depression; therefore, this portion of fat is preserved during the procedure.<sup>8</sup>

Additionally, excessive removal of submental subcutaneous fat carries the risk of accentuating the platysma bands.<sup>21</sup> Hence, preserving a moderate amount of subcutaneous fat is essential for maintaining a youthful neck contour.<sup>4</sup> Yousif et al<sup>5</sup> described a hyoid suspension lift involving a submental incision measuring 3–4cm with extensive subcutaneous dissection. However, in Asian patients prone to noticeable scarring, minimizing the incision length and extent of subcutaneous dissection is desirable. Accordingly, we reduced the submental incision to 2cm and limited sharp subcutaneous dissection to the



**Fig. 4.** Case 2. A 74-year-old woman presented with submental laxity, platysmal band formation, and an undefined jawline. Preoperatively, her cervicomental angle was classified as class II according to the Knize classification. Her platysma banding was graded as grade 1 on the Gupta scale. Postoperatively, platysma banding improved from grade 1 to 0, and the cervical angle improved from class II to class I. A, Preoperative side view. B, Preoperative oblique view. C, Six-month postoperative side view. D, Six-month postoperative oblique view. E, At 6 months postoperatively, the submental scar was inconspicuous.

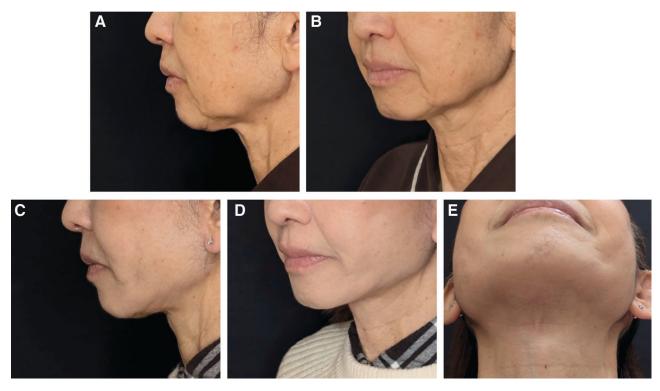
area necessary to secure a suture line at the anterior edge of the platysma. The remaining subcutaneous dissection was confined to the subcutaneous tissue via liposuction. This approach provided sufficient exposure for removing the subplatysmal fat and anchoring the platysma to the deep cervical fascia.

Skin excision is generally avoided in the submental areas to minimize scarring and preserve natural contours. By shifting the platysma toward the hyoid bone with the hyoid suspension lift, the platysma transitions from a linear shape, extending from the clavicular region to the menton into a more arched configuration. This redistribution enables excess skin to follow the new contour. Furthermore, the use of botulinum toxin to relax the platysma postoperatively may further enhance the results by ensuring smooth, natural contours. <sup>17</sup>

The patients in this report were predominantly older adults presenting with reduced skin elasticity and facial sagging, necessitating a combination of face lifts; however, the proposed method alone is expected to achieve satisfactory results in younger patients with localized submental laxity and preserved skin elasticity. Even for patients in cases 3 and 6, where no blunting of the cervicomental angle was observed but platysma bands were present, the procedure resulted in significant improvement. This outcome can be attributed to the reorientation of the platysma along deep structures, which alleviates platysmal hyperfunction and eliminates platysma bands. Furthermore,

the improvement in the cervical angle achieved through the intervention directly enhances aesthetic outcomes. By sharpening the cervicomental contour and addressing platysmal hyperfunction, the hyoid suspension lift offers a harmonious and youthful neck profile. Thus, this technique effectively enhances both the cervicomental angle and the appearance of platysma bands.

This study had some limitations. First, the small sample size (n = 6) limits the generalizability of the findings. Second, all cases had short-term follow-up durations of less than 12 months, which may not fully capture the longterm efficacy or recurrence. Third, the absence of a control group makes it difficult to isolate the specific effect of the MIHS lift from concurrent procedures such as face lift or liposuction. Fourth, although this technique was designed to minimize visible scarring in scar-prone populations such as Asians, none of the patients in our cohort had hypertrophic or keloid scars, limiting our ability to assess that specific benefit. Fifth, although 2 surgeons jointly conducted all postoperative evaluations, the procedures were performed by different operators, which may introduce procedural variability. Finally, individual anatomical variations, including hyoid bone position, mandibular resorption, or retrognathia, were not assessed. Additionally, the efficacy of the MIHS lift as a standalone procedure was not evaluated. Consequently, larger scale, long-term, controlled studies are warranted to further validate these findings.



**Fig. 5.** Case 3. A 62-year-old woman presented with complaints of submental laxity, platysmal band formation, and an undefined jaw-line. Preoperatively, her cervicomental angle was classified as class I according to the Knize classification, with no significant blunting observed. However, her platysma banding was graded as grade 1 using the Gupta scale. Postoperatively, the platysma banding improved from grade 1 to 0. A, Preoperative side view. B, Preoperative oblique view. C, Six-month postoperative side view. D, Six-month postoperative oblique view. E, At 6 months postoperatively, the submental scar was inconspicuous.

## **CONCLUSIONS**

The MIHS lift introduced in this study provides a viable alternative for patients seeking natural, long-lasting rejuvenation by minimizing surgical invasiveness while effectively enhancing neck aesthetics. This technique is particularly beneficial for individuals prone to hypertrophic scarring, such as Asian patients, and offers a refined approach to neck contouring with minimal morbidity.

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## **DISCLOSURE**

The authors have no financial interest to declare in relation to the content of this article.

## PATIENT CONSENT

Patients provided written consent for the use of their images.

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