

Platysma Muscle Splitting Incision Enhances Early Cosmetic Outcomes Following Anterior Cervical Discectomy and Fusion: A Prospective Randomized Controlled Trial

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Introduction

Anterior cervical discectomy and fusion (ACDF) typically employs a transverse skin incision to optimize cosmesis by aligning with natural skin creases. However, whether the underlying platysma is split vertically (in line with its fibers orientation) or cut transversely (in line with the skin incision) influences incisional cosmetic healing is not known. We sought to evaluate platysma incision orientation's influence on ACDF scar cosmesis.

Materials and Methods

This is a prospective, randomized, single-center trial, and aims for evaluating if platysma incision orientation influences scar cosmesis. Among 128 enrolled patients undergoing elective ACDF, 101 subjects who had standardized follow-up data were included. All patients received a standardized transverse skin incision. Platysma incision was randomized to either vertical (muscle splitting, in line with muscle fibers orientation) or transverse (muscle cutting, in line with skin incision) orientation using block randomization stratified by surgeons. Demographic, comorbidity, and operative variables were collected. Standardized clinical photographs were obtained at 2 weeks, 3 months, 6 months, and 12 months and each was graded independently by two blinded reviewers using the validated, modified Hollander Wound Evaluation Scale (0 - 6, higher = better). The mean score at each time point was analyzed. Univariate analyses followed by multivariate logistic regressions identified predictors of achieving a perfect Hollander grade (6/6) at each timepoint. Inter-rater reliability between graders was measured with intraclass correlation coefficients (ICC).

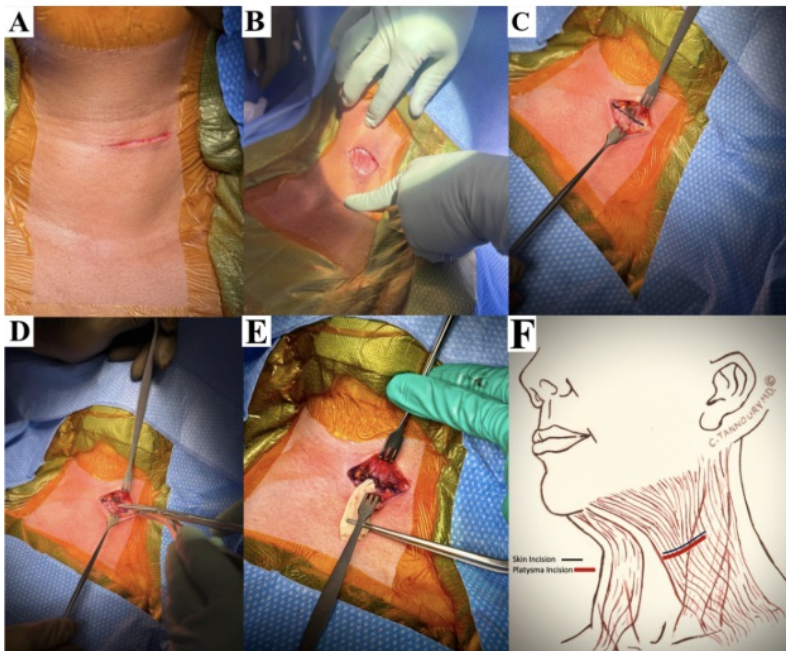
Results

Baseline characteristics were comparable between groups. At 2 weeks, vertical platysma splitting predicted better cosmetic healing (OR 120.3, 95% CI 15.0-964.6; $p < 0.001$). This favorable association with vertical platysma splitting persisted at 3 months (OR 73.8, 95% CI 8.1-668.4; $p < 0.001$). Hyperlipidemia reduced the odds of healing at 3 months only (OR 0.192, 95% CI 0.045-0.828; $p = 0.027$). At 6 and 12 months follow up, there were no significant predictors of achieving a Hollander grade of 6/6. By 6 months, 86% of all patients achieved a Hollander grade of 6/6 and 87.2 % by 12 months. At 12 months, 100% of the vertical group and 75% of the transverse group had perfect scores. Inter-rater reliability was excellent across all timepoints (ICC 0.973 at 2 weeks, 0.956 at 3 months, 0.976 at 6 months), with perfect agreement at 12 months (ICC = 1.000).

Conclusion

Following a transverse ACDF skin incision, vertical platysma splitting rather than a transverse muscle cutting incision, yields superior cosmetic surgical wound healing, especially in the first 3 months and sustained cosmetic advantage at 12 months follow-up. Overlapping transverse skin and transverse platysma incisions may potentiate surgical site inflammation and scarring in the early stages of wound healing. These findings help with patient counseling and can be employed to improve patient satisfaction with wound cosmesis.

A- Standard transverse skin incision along a natural skin crease, B- Superficial dissection exposing the platysma muscle, C- Marking the transverse incision along the platysma muscle, D- Transverse incision cutting through platysma muscle fibers, E- Suture closure and approximation of the platysma's transverse incision (Penrose surgical drain in place), F- Artist's illustration of the overlapping and parallel skin and platysma incisions (The common surface area of healing dermal and muscle layers is large, across the incisions' length)



A- Standard transverse skin incision along a natural skin crease, B- Superficial dissection exposing the platysma muscle, C- Vertical platysma splitting along its native fibers orientation, D- Surgical access through the vertical splitting technique, E- Suture closure and approximation of the vertically split platysma (Penrose surgical drain in place), F- Artist's illustration of the overlapping and intersecting skin and platysma incisions (The common surface area of healing dermal and muscle layers is small, at the intersection).

