

The Effect of Linear Incision Technique on Infection and Cosmetic Results in Deep Brain Stimulation

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Ismail Simsek,¹ Halit Anil Eray,² Habibe Yildiz,¹ Huseyin Kuyuk,¹ Atilla Yilmaz,¹

¹ Medicana Atasehir International Hospital. Turkey

² Ardahan State Hospital. Turkey.

Corresponding author: Ismail Simsek email: ismailsimsek92@yahoo.com

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Abstract

Introduction: Deep brain stimulation (DBS) surgery is an effective method in the treatment of movement disorders. Different skin incisions such as bicoronal and semilunar are preferred in DBS surgery. However, linear incision is a less preferred method, especially if there is a foreign body under the skin, like DBS, and its effects on surgical recovery process, infection rates and cosmetic results have not been sufficiently studied. In this study, we aimed to evaluate the effect of the linear incision technique on electrode entry side we applied in DBS surgery on infection rates and cosmetic results.

Method: We retrospectively analyzed 450 patients who underwent DBS surgery in 2021-2025 with the diagnoses of Parkinson's disease, essential tremor and dystonia in our clinic. All patients underwent intervention with linear incision technique by same senior surgeon. During surgery, the incisions were carefully closed in accordance with the anatomical layers. Special care was taken to suture the fascia, subcutaneous and skin tissues separately. Before the closure process, vancomycin powder was applied into wounds. No additional bone drilling applied around burr holes to counter-sink burr hole cap. Patients were evaluated for postoperative infection development and cosmetic results. Infection rates were compared with standard data reported in the literature.

Results: Only 5 patients had minor skin problems which necessitate local procedure so electrode entry site infection rates were determined as 1.1%. This is comparable to the superficial infection rate of 1.5% reported in the literature (Morishita et al., 2017). Cosmetic evaluation revealed that the linear incision yielded aesthetically favorable outcomes. Compared to bicoronal and semilunar incisions, the linear approach resulted in smaller scars, avoided skin bulging, and better aligned with the natural hairline—benefits particularly appreciated by patients with sparse or no hair. However, further prospective studies with larger cohorts are needed to validate long-term cosmetic and clinical benefits.

Discussion: The linear incision technique for electrode entry



Figure 1. Comparative cosmetic results of our patients who underwent bicoronal and linear incisions
A) Long term result in bicoronal incision B) Long term result in linear incision

side in DBS surgery demonstrated a low infection rate of 1.1%, which is comparable to previously reported superficial infection rates of 1.5%, and provided cosmetically satisfactory results, even without any drilling for countersinking burr hole cap. Although linear incision is less preferred in cases where there is a foreign body under the skin, our closure technique may be effective in reducing infection rates.

Conclusions: Our findings support the wider use of linear incision in DBS surgery, and more comprehensive studies are needed to clarify the advantages of this technique. Our closure technique appropriate to anatomical layers including fascia and the application of intra-wound vancomycin may be effective in reducing infection rates.

References

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