Quest Journals
Journal of Medical and Dental Science Research
Volume 12~ Issue 11 (November 2025) pp: 36-37
ISSN(Online): 2394-076X ISSN (Print):2394-0751
www.questjournals.org

Research Paper

Horizontal Strabismus Surgery: Functional and Anatomical Outcomes from 60 Cases

A collaborative study from Hassan II Military Hospital of Laâyoune and the Specialty Hospital of Rabat

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Abstract
Purpose: *To evaluate the functional and anatomical outcomes of horizontal strabismus surgery and identify factors influencing postoperative success.*
Methods: Retrospective study of 60 patients operated on between January 2022 and June 2025 for horizontal strabismus (esotropia or exotropia) in the ophthalmology departments of Rabat and Laâyoune. ***Results:*** *The mean age was 14 years (4–45), with a slight male predominance (55%). Esotropia accounted for 60% of cases and exotropia for 40%. Amblyopia was present in 30% of patients. Bilateral medial rectus recession was performed in 58% of cases and lateral rectus resection in 42%. After a mean follow-up of 12 months, functional success (alignment within ±10Δ) was achieved in 88% of cases and cosmetic success in 95%. Postoperative complications were rare (overcorrection 3%, undercorrection 5%, superficial infection 2%).* ***Conclusion:*** *Horizontal strabismus surgery offers excellent anatomical and functional outcomes when performed early and following standardized protocols.*

Keywords: *Horizontal strabismus; Esotropia; Exotropia; Oculomotor surgery; Recession; Resection.*

*Received 05 Nov., 2025; **R**evised 14 Nov., 2025; **A**ccepted 16 Nov., 2025 © The author(s) 2025.*
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I. Introduction

Horizontal strabismus is the most common form of ocular deviation, including esotropia (convergent deviation) and exotropia (divergent deviation) [1]. These deviations cause significant sensory (diplopia, suppression, loss of binocular vision) and cosmetic disturbances, warranting appropriate surgical management [2]. Despite advances in minimally invasive approaches, the fundamental principles remain the same—recession and resection of the horizontal rectus muscles according to the measured deviation angle [3,4]. This study aims to present the anatomical and functional results of horizontal strabismus surgery performed in two Moroccan centers and identify the prognostic factors of success.

II. Patients and Methods

A retrospective descriptive study was conducted between January 2022 and June 2025 on 60 patients operated on for horizontal strabismus (esotropia or exotropia). Inclusion criteria included stable horizontal strabismus for at least six months and a minimum postoperative follow-up of six months. Exclusion criteria were vertical or paralytic strabismus, previous surgery, or neurological causes.

Data collected included age, sex, deviation type and angle, presence of amblyopia, surgical procedure performed, and postoperative outcomes at six and twelve months.

III. Results

The mean age was 14 years (4–45), with 33 males (55%) and 27 females (45%). Esotropia was found in 60% and exotropia in 40%. Amblyopia was present in 30%, and family history of strabismus in 15%. The mean preoperative deviation angle was 35Δ (20–55). Bilateral medial rectus recession was performed in 35 cases (58%) and bilateral lateral rectus resection in 25 (42%). General anesthesia was used in 90% and local in 10% of cases. No major intraoperative complications were observed.

Postoperative alignment within ±10Δ was achieved in 88%, partial or total binocular recovery in 75%, and satisfactory cosmetic outcome in 95%. Complications included overcorrection (3%), undercorrection (5%), and superficial infection (2%). No persistent diplopia or significant motility restriction was observed. Recurrence was noted in 7% (4 cases), mainly secondary exotropia.

IV. Discussion

Our results confirm the reliability and safety of horizontal strabismus surgery, with a functional success rate of 88% and cosmetic success of 95%, consistent with international series [5–7]. The mean age of 14 years and male predominance (55%) are similar to other mixed pediatric-adult series [8]. Esotropia remains the most frequent type (60%), consistent with Kushner and Wright's findings [9]. Bilateral medial rectus recession remains the most common and effective technique, providing good control of the deviation with minimal overcorrection [10,11]. Lateral rectus resection also achieves excellent outcomes in stable exodeviations [12]. Amblyopia, found in 30% of cases, limits binocular recovery and highlights the importance of preoperative orthoptic therapy [13].

Complications were rare and minor—superficial infection (2%), overcorrection (3%), undercorrection (5%)—comparable to rates reported by Parks and others [14,15]. Recurrence (7%) was mainly related to sensory decompensation or large initial angles. Recent advances, including adjustable sutures and minimally invasive surgery, have improved precision and stability [16,17]. However, success still relies on careful patient selection, symmetrical correction, and consistent orthoptic follow-up.

V. Conclusion

Horizontal strabismus surgery remains a safe, reproducible, and highly effective procedure for correcting ocular misalignment. An individualized approach considering deviation type, age, and amblyopia ensures durable functional and cosmetic results. In our 60-case series, the overall success rate exceeded 90%, confirming the relevance of this surgery in modern ophthalmic practice.

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