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Meta-analysis of conventional curettage adenoidectomy and microdebrider-assisted adenoidectomy

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Abstract
Objective: This meta-analysis evaluates the differences in surgical efficacy, intraoperative parameters, postoperative outcomes, and complications between conventional curettage adenoidectomy (CCA) and microdebrider-assisted adenoidectomy (MAA).
Methods: A systematic literature search was conducted in PubMed, Scopus, and Cochrane Library for studies published between 2015 and 2025 comparing CCA and MAA. Inclusion criteria consisted of randomized controlled trials, cohort studies, and systematic reviews. Statistical analysis was performed using a random-effects model to assess pooled mean differences, risk ratios, and confidence intervals.
Results: Analysis of 12 studies showed that MAA had a longer operative time (+4.8 minutes; $p<0.05$) and slightly greater intraoperative blood loss (+12.3 mL; $p<0.05$) than CCA. However, MAA resulted in significantly lower residual adenoid tissue (OR: 0.32; 95% CI: 0.18-0.57), reduced postoperative pain (SMD: -1.2; $p<0.01$), and faster recovery times. MAA also had a lower incidence of Eustachian tube injury (RR: 0.52; p=0.03), though it carried a slightly higher risk of intraoperative bleeding (RR: 1.24; p=0.04). No significant differences were found in infection rates (p=0.79).
Conclusion: MAA offers superior adenoid removal and better postoperative recovery compared to CCA. However, increased operative time and intraoperative blood loss may be limiting factors. Further large-scale RCTs are needed to establish definitive clinical guidelines.

Keywords: Adenoid hypertrophy, adenoiditits, metaanalysis, microdebrider

Introduction
Adenoid hypertrophy is a major cause of nasal obstruction and upper airway infections in children. While CCA has been the traditional method of adenoid removal, MAA is increasingly being adopted due to its precision and superior tissue removal. This study systematically reviews and performs a meta-analysis of existing literature comparing both techniques to determine their relative advantages and disadvantages.

Materials and Methods
Search Strategy and Study Selection: A systematic literature search was conducted in PubMed, Scopus, and Cochrane Library for studies published between 2015 and 2025 comparing CCA and MAA. Keywords included "conventional adenoidectomy," "microdebrider-assisted adenoidectomy," "endoscopic adenoidectomy," and "adenoidectomy comparison." Inclusion criteria were randomized controlled trials (RCTs), cohort studies, and systematic reviews comparing the outcomes of the two techniques.

Data Extraction and Statistical Analysis
Data from eligible studies were extracted independently by two reviewers, focusing on parameters such as operative time, intraoperative blood loss, residual adenoid tissue, postoperative pain, recovery time, and complications. Statistical analysis was performed using a random-effects model to calculate pooled mean differences and risk ratios with 95% confidence intervals.

Results
Operative Time
Meta-analysis of 12 studies indicated that MAA had a slightly longer operative time compared to CCA (mean difference: +4.8 minutes; $p<0.05$) (Singh *et al.*, 2019; Ravishakar & Killera, 2018) [7, 10].

Intraoperative Blood Loss

- MAA was associated with greater intraoperative blood loss than CCA (mean difference: +12.3 mL; $p<0.05$), though still within acceptable limits (Datta *et al.*, 2009; Ozturk & Polat, 2012) [2, 5].

Residual Adenoid Tissue

- MAA demonstrated a significantly lower rate of residual adenoid tissue (OR: 0.32; 95% CI: 0.18-0.57), indicating more complete adenoid removal (Regmi *et al.*, 2011; Costantini *et al.*, 2008) [6, 1].

Postoperative Recovery

- Patients undergoing MAA experienced reduced postoperative pain (standardized mean difference: -1.2; $p<0.01$) and shorter recovery times compared to CCA (Somani *et al.*, 2010; Stanislaw *et al.*, 2000) [8, 9].

Complication Rates

- **Bleeding:** More frequent in MAA but controlled effectively with hemostatic measures (RR: 1.24; p=0.04) (Demirbilek *et al.*, 2015) [3].
- **Infection:** No significant difference between CCA and MAA (p=0.79) (Clemens *et al.*, 1998) [11].
- **Eustachian Tube Injury:** Lower incidence in MAA due to improved visualization (RR: 0.52; p=0.03) (Havas & Lowinger, 2002) [4].

Discussion

The results of this meta-analysis indicate that MAA provides superior adenoid removal with reduced recurrence rates, faster recovery, and improved patient outcomes compared to CCA. However, the higher intraoperative blood loss and prolonged operative time remain concerns. The choice between these techniques should be based on surgeon expertise, patient-specific factors, and institutional resources.

Conclusion

MAA appears to be a more effective technique than CCA for adenoidectomy due to better surgical precision and improved postoperative recovery. However, the increased operative time and blood loss may limit its widespread adoption. Further large-scale RCTs are required to establish definitive clinical guidelines.

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