A Comparative Meta-Analysis of Complications: Maxillomandibular Advancement for OSA versus Orthognathic Surgeries for Dentofacial Deformities

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BACKGROUND

Maxillomandibular advancement (MMA) surgeries for obstructive sleep apnea (OSA) and orthognathic surgeries for dentofacial deformities (DFDs) are both complex procedures with distinct indications. Given the overlap in surgical anatomy and techniques between MMA and DFD-related orthognathic surgeries, there is clinical value in understanding how their postoperative risks and recovery profiles compare. This meta-analysis and systematic review aims to compare complications, and recovery metrics between these surgeries.

Maxillomandibular Advancement for Obstructive Sleep Apnea

- Population: Adults with moderate-severe OSA
- Surgical Approach: Le Fort I osteotomy + Bilateral Sagittal Split Osteotomy
- Expected Outcomes: Significant reduction in AHI (79.6% surgical success rate)

Orthognathic Surgery for Dentofacial Deformities

- Population: Adolescents/young adults with malocclusions
- Surgical Approach: Le Fort I osteotomy ± segmental osteotomies
- Expected Outcomes: Stable occlusion and bite correction for improved function

COMPLICATIONS?

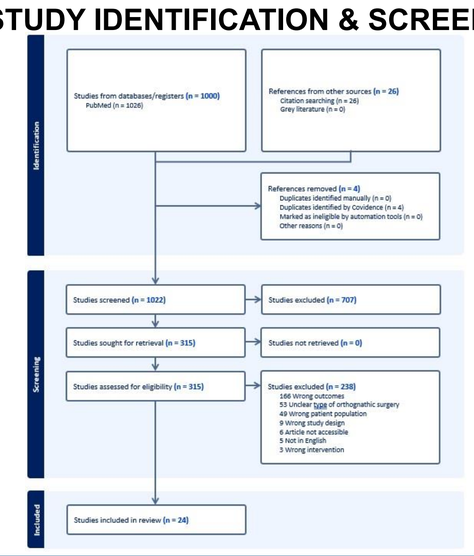
METHODS

A systematic search of CINAHL, Cochrane Library, PubMed, and SCOPUS identified studies focused on MMA for OSA or orthognathic surgeries for DFDs. Included were 18 bimaxillary studies (n=1734), 10 single-jaw (n=3847), and 17 MMA studies (n=601). Outcomes analyzed included operative time, hospital stay, and complications such as neurosensory disturbance, infection, and hardware removal.

RESULTS

The initial search for manuscripts describing complications of orthognathic surgeries in DFD patients yielded 1026 published articles. After removing duplicate papers, 1022 articles were screened according to the eligibility criteria. Three hundred fifteen articles were brought to the full text review stage for assessment of eligibility and 24 of these papers were included for data extraction. MMA demonstrated a surgical success rate of 79.6% and a cure rate of 39%. Compared to bimaxillary surgery, MMA was associated with longer operative time (343.87 vs. 326.95 min; p=0.021) and postoperative hospital stay (4.22 vs. 3.25 days; p<0.05). Neurosensory disturbance was comparable between MMA (40.44%) and bimaxillary surgeries (44.91%; p=0.2189), but highest in single-jaw procedures (55.18%; p<0.001). MMA had higher postoperative infection (16.34%) and hardware removal rates (21.99%) than bimaxillary surgery (3.55% and 4.21%, respectively; p<0.0001). Postoperative OSA developed in 12.25% of bimaxillary cases for DFDs.

STUDY IDENTIFICATION & SCREENING

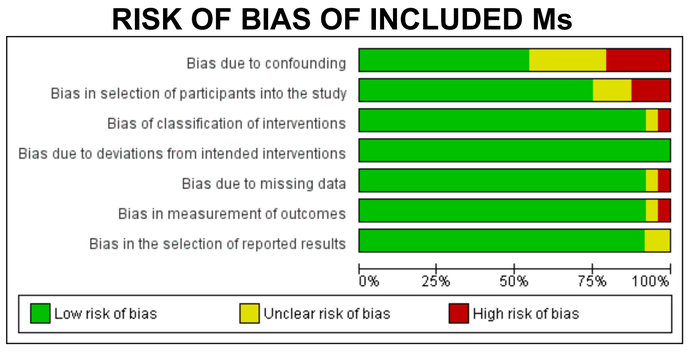


INCLUDED PATIENTS

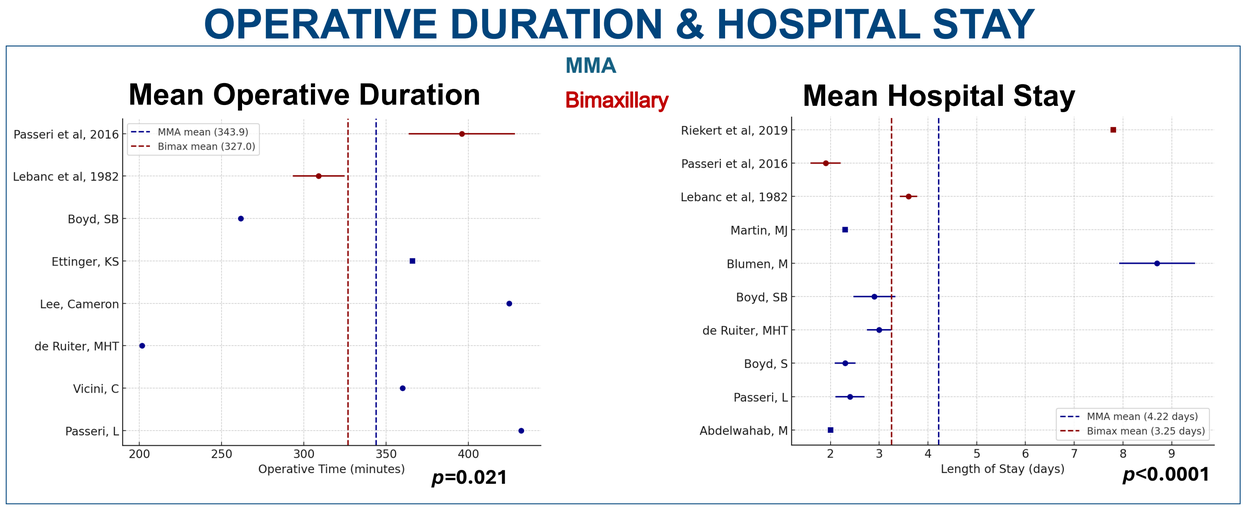
Number of patients	Single Jaw: 3847	Bimaxillary: 1734	MMA: 601
Mean Age (years)	Single Jaw: 23.79	Bimaxillary: 30.40	MMA: 45.52*

*MMA group was statistically significantly older than both DFD groups

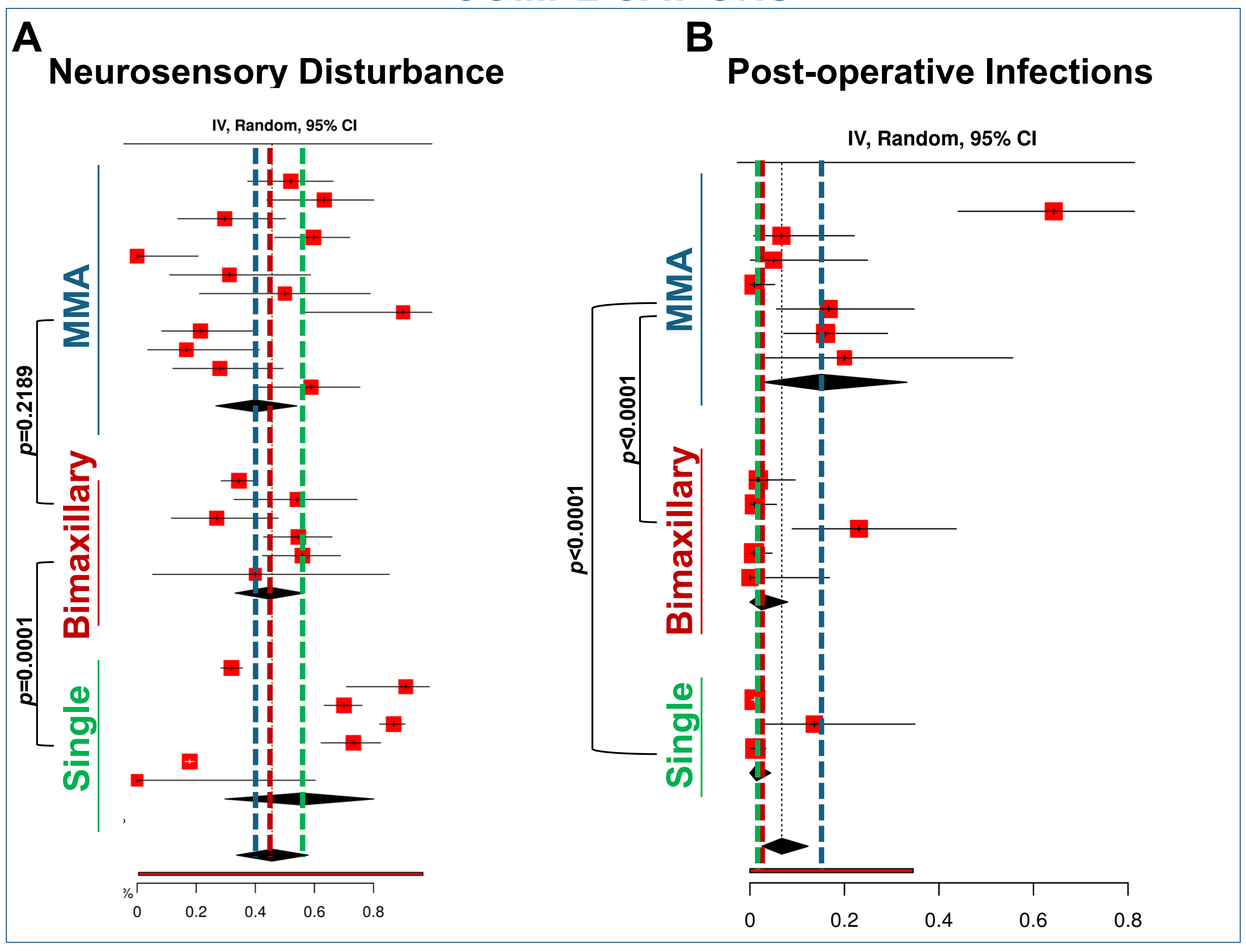
RISK OF BIAS OF INCLUDED Ms



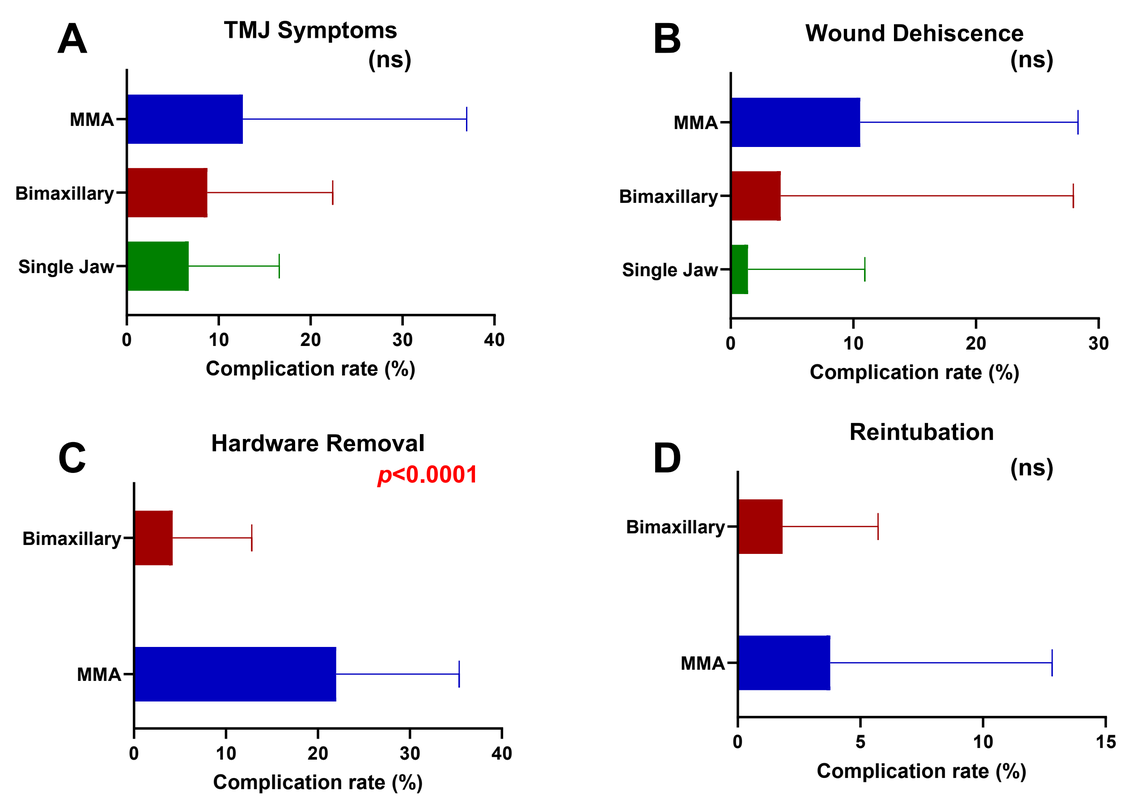
OPERATIVE DURATION & HOSPITAL STAY



COMPLICATIONS



OTHER COMPLICATIONS



DISCUSSION & CONCLUSION

- **Different surgical aims:** MMA requires larger advancements for airway patency in OSA; DFD surgeries focus on occlusion and esthetics.
- **Higher surgical burden with MMA**: greater infection (16.3%), hardware removal (22%), and wound dehiscence rates, likely due to longer operative times, comorbidities, and hardware stress.
- **Neurosensory disturbance:** frequent across groups; risk highest with mandibular osteotomies. Lack of standardized reporting limits comparison of transient vs. persistent changes.
- **Airway considerations:** reintubation more common in MMA; ~12% new-onset OSA reported after DFD mandibular setback.
- **Limitations:** heterogeneous study designs and outcomes, underreporting of patient-centered measures, and possible publication bias.
- **Clinical relevance:** first head-to-head comparison; highlights need for tailored risk counseling and standardized complication reporting.

SUMMARY OF FINDINGS

Maxillomandibular Advancement for Obstructive Sleep Apnea

- Higher surgical burden (longer hospital stay, longer operative time…)
- Higher infection rate, higher rate of hardware removal
- Reintubation more common post MMA

Orthognathic Surgery for Dentofacial Deformities

- Neurosensory disturbance common, highest in mandibular osteotomy
- TMJ symptoms common in MMA and orthognathic surgeries, no sig diff
- Post-operative new-onset OSA in 12.3% after bimaxillary surgery