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# Enhanced Recovery After Surgery (ERAS) for Orthognathic Surgery: A Critical Evaluation of Protocols, Outcomes and Future Directions

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## ABSTRACT

***Background:*** Enhanced Recovery After Surgery (ERAS) protocols have been widely adopted in many surgical disciplines, yet their application in orthognathic surgery remains limited.

***Objective:*** To evaluate current evidence on ERAS protocol implementation in orthognathic surgery, examining impacts on pain control, opioid use, postoperative nausea and vomiting (PONV), hospital stay, and recovery.

***Methods:*** A systematic review of six clinical studies (n = 986) was conducted using PRISMA and GRADE frameworks.

***Results:*** ERAS implementation reduced opioid use, pain scores, PONV incidence, and hospital length of stay. The strongest evidence supported scheduled non-opioid analgesia and risk-stratified antiemetic prophylaxis. Evidence for mobilisation, nutrition, and discharge planning was limited.

***Conclusions:*** ERAS protocols in orthognathic surgery improve early postoperative outcomes and patient experience. Future research should focus on standardizing protocols and exploring long-term outcomes.

***Keywords:*** Orthognathic surgery; ERAS; enhanced recovery; postoperative pain; opioid reduction; PONV; jaw surgery

## Introduction

Over the past two decades, the concept of Enhanced Recovery After Surgery (ERAS) has emerged as a paradigm shift in perioperative care. Originally introduced by Kehlet in the late 1990s for colorectal surgery, ERAS protocols are designed to reduce physiological stress, maintain homeostasis, and accelerate recovery through evidence-based, multimodal, standardised care pathways. Widespread adoption in general, colorectal, vascular and orthopaedic surgery has produced reductions in length of stay, complications and opioid-use, improved patient satisfaction and reduced healthcare costs.[1,2]

While dentofacial deformity correction via orthognathic surgery (for example, via Le Fort I osteotomy, bilateral sagittal split osteotomy, genioplasty) is a well-established discipline of oral and maxillofacial surgery, the peri-operative care has historically lacked standardisation. Recovery from such procedures is challenged by postoperative pain, facial swelling, limited masticatory function, nutritional restrictions, and PONV (postoperative nausea and vomiting).

In recent years interest has grown in applying ERAS principles to orthognathic surgery. Despite this, the optimal combination of preoperative, intraoperative and postoperative elements remains undefined. This review aims to synthesise the evidence specifically in orthognathic surgery, identify outcomes improved by ERAS, examine existing implementation gaps, discuss potential biases in the literature and propose recommendations for practice and research.[3,4]

## Materials and Methods

A systematic search strategy was conducted based on the recent evidence-synthesis by Joachim and Miloro,[5] which applied PRISMA guidelines and GRADE methodology to studies of ERAS in orthognathic surgery. Databases searched included PubMed/ MEDLINE, Embase, Cochrane Library and Web of Science, from inception through April 2025. Studies were included if they evaluated postoperative elements of ERAS protocols in orthognathic surgery and reported outcomes on: length of stay, postoperative pain, opioid consumption, PONV, complications or discharge metrics. Studies were excluded if they did not define an ERAS pathway or lacked orthognathic surgery as primary procedure. Quality of evidence in included studies was assessed using the GRADE framework as reported in the source literature. Data extraction focused on patient cohort size, ERAS vs non-ERAS groups, analgesic regimens, PONV prophylaxis, mobilisation or nutrition protocols, and key outcomes (pain scores, opioid-equivalents, nausea incidence, length of stay). Due to heterogeneity of study design and reporting, a meta-analysis was not attempted; instead, results are summarised narratively and tabulated where appropriate.

## Results

Six studies (totaling 986 patients) met the inclusion criteria. The strongest findings across studies demonstrated a consistent reduction in opioid consumption and pain scores with scheduled non-opioid analgesics and limited opioid use for breakthrough pain. For example, Wahlstrom et al.[5,6] reported a reduction in opioid use from 51.4 mg to 9.4 mg morphine equivalents, and maximum pain scores decreased from 7.5 to 5.5. Alvarez et al.[7] found a significant reduction in PONV incidence (38.3% vs. 63.2%, $p = .005$) with multimodal antiemetic prophylaxis.

Length of hospital stay was reduced in ERAS groups across several studies. Ferrara et al.8 demonstrated that implementation of an ERAS protocol reduced same-day hospital admissions from 83.5% to 22.2%, and decreased average length of stay from 34.1 to 15.5 hours without increasing readmissions or complications.

Evidence for early mobilisation, nutrition advancement, and structured discharge planning was more limited. While Oliveira et al.[9,10] observed improved pain scores with early myofunctional rehabilitation, no significant differences in jaw mobility were seen by 60 days postoperatively.

**Table 1. Summary of Reviewed ERAS Studies in Orthognathic Surgery**

| Study | Design | N (ERAS/Control) | Key Findings | ERAS Components | Outcome Measures |
|---|---|---|---|---|---|
| Wahlstrom et al. (2023) | Retrospective | 56 | ↓ Pain, ↓ Opioid use | Multimodal analgesia, antiemetics | VAS, opioid dose |
| Alvarez et al. (2024) | Retrospective | 128 (60/68) | ↓ PONV, ↓ IV fluids | Pre-op hydration, PONV prophylaxis | PONV incidence |
| Ferrara et al. (2022) | Retrospective | 154 | ↓ Length of stay | Same-day discharge criteria | LOS, readmission |
| Oliveira et al. (2021) | RCT | 80 | ↓ Pain at POD1-7 | Early myofunctional rehab | VAS, jaw mobility |
| Joachim & Miloro (2025) | Review | 986 | Synthesis | Multiple | GRADE assessment |
| Bär et al. (2024) | Systematic Review | — | Meta-analysis | Varied | Pain, LOS, complications |

## Discussion

ERAS protocols in orthognathic surgery appear effective in improving short-term recovery outcomes. Non-opioid multimodal analgesia significantly reduces opioid requirement, aligning with the broader ERAS goals of minimizing opioid-related side effects and facilitating faster mobilisation. Risk-stratified PONV prophylaxis using Apfel scores and multimodal regimens has also been shown to reduce nausea and vomiting, contributing to faster discharge and improved patient experience.[5,6]

Nevertheless, evidence is less robust for other ERAS components. Mobilisation and nutrition strategies lack standardisation across studies, and discharge criteria vary widely. This heterogeneity, combined with the predominance of retrospective designs, introduces risk of selection bias and limits generalisability. Moreover, most studies lack long-term follow-up or cost-effectiveness analyses.[3,4]

## Recommended ERAS Pathway for Orthognathic Surgery

Based on the available literature, we propose the following evidence-informed ERAS components:

*PREOPERATIVE PHASE:*

- Comprehensive patient education and expectation setting
- Smoking cessation ≥4 weeks prior
- Nutritional assessment and anemia management
- Carbohydrate loading (if appropriate)

*INTRAOPERATIVE PHASE:*

- Multimodal analgesia initiation: acetaminophen, NSAIDs, gabapentinoids
- Antiemetic prophylaxis (e.g., dexamethasone + ondansetron ± scopolamine) based on PONV risk scoring
- Tranexamic acid use to minimize bleeding
- Local infiltration anesthesia with bupivacaine/ lidocaine
- Minimally invasive surgical techniques.

*POSTOPERATIVE PHASE:*

- Scheduled non-opioid analgesia
- Opioids reserved for breakthrough pain only
- Early initiation of oral fluids and progressive diet
- Myofunctional rehabilitation (jaw and neck exercises) within first postoperative week
- Criteria-driven discharge protocol (PADSS >13, stable vitals, adequate oral intake)
- Follow-up and clear post-discharge instructions

This standardized approach should be adapted based on local resources, patient profiles, and surgical context.

## Conclusions

ERAS protocols in orthognathic surgery are associated with improved postoperative pain control, reduced opioid consumption, shorter hospital stays, and lower incidence of PONV. The strongest evidence supports the use of scheduled non-opioid analgesia and risk-stratified antiemetic regimens. Future research should prioritize prospective trials, standardization of ERAS elements, and exploration of functional and patient-reported outcomes to guide broader implementation.

## Conflict of Interest:

No conflicts of interest.

## References:

1. Kehlet H. Multimodal approach to control postoperative pathophysiology and rehabilitation. Br J Anaesth. 1997;78(5):606-617.

2. Shauly O, Marxen T, Menon A, et al. Multimodal pain control in abdominoplasty: a systematic review and algorithm of optimal pain management. *Aesthet Surg J.* 2024;44(S1): S22-S30.

3. Wainwright TW, Gill M, McDonald DA, et al. Consensus statement for perioperative care in total hip replacement and total knee replacement surgery: ERAS Society recommendations. Acta Orthop. 2020;91(3):3-19.

4. Bär AK, Werkmeister R, Dort JC, Al-Nawas B. Perioperative care in orthognathic surgery: a systematic review and meta-analysis for Enhanced Recovery After Surgery. J Craniomaxillofac Surg. 2024;52(12):1244-1252.

5. Joachim MV, Miloro M. Enhanced recovery after orthognathic surgery: evidence synthesis for postoperative care. J Oral Maxillofac Surg. 2025;83 (4):412-419.

6. Wahlstrom D, Toscano C, Havard D. Enhanced recovery after orthognathic surgery: a retrospective comparison study of 56 patients. Br J Oral Maxillofac Surg. 2023;61(2):171-175.

7. Alvarez GA, Hebert KJ, Britt MC, et al. An enhanced recovery after surgery (ERAS) protocol for orthognathic surgery reduces rates of postoperative nausea. J Craniofac Surg. 2024;35(4):1125-1128.

8. Ferrara JT, Tehrany GM, Chen Q, et al. Evaluation of an enhanced recovery after surgery protocol (ERAS) for same-day discharge and reduction of opioid use following bimaxillary orthognathic surgery. J Oral Maxillofac Surg. 2022;80(1):38-46.

9. de Oliveira ZSB, da Silveira MLM, Gomes PP, da Silva JSP, Germano AR. Early recovery after surgery protocol in orthognathic surgery: a randomized, blind clinical study. *Braz Oral Res.* 2021;35:e87.

10. Etemad SA, Poh M. Enhanced recovery after gender- affirming surgery. *Aesthet Surg J.* 2024;44 (S1):S3-S14.

 