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INTEGRATED PERIOPERATIVE CARE PATHWAY FOR DENTAL AND ORAL SURGERY: EFFECTS ON ANXIETY, PAIN CONTROL, INFECTION PREVENTION, AND RECOVERY OUTCOMES

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Abstract

Background: Dental surgery ranges from outpatient implant procedures under local anesthesia to complex oncologic resections requiring inpatient perioperative pathways. In this spectrum, perioperative nursing practices (psychological support, education, infection prevention, and structured oral-care pathways) required to reduce complications and improve recovery related outcomes. We aimed to synthesize open-access evidence on perioperative nursing practices in dental surgery and their effects on patient safety and recovery. **Methods:** A PRISMA aligned systematic review approach was drafted. Open access databases were targeted, focusing on perioperative nursing interventions in dental, oral surgical care. Eligible studies included randomized or non-randomized original research evaluating nursing delivered perioperative practices with patient safety or recovery outcomes. Data were synthesized due to heterogeneity in interventions and outcomes. **Results:** Included studies clustered into: perioperative psychological, comfort interventions around implant surgery, extended care education, coaching after implants, infection prevention quality improvement in dental clinical areas, and comprehensive perioperative nursing bundles in oral cancer surgery. Interventions were associated with improved anxiety, pain measures, better self-efficacy and peri implant indices, and signals toward reduced complications or improved perioperative stability. **Conclusion:** Open-access evidence supports practical perioperative nursing strategies, especially structured psychological support and post procedure coaching, education as contributors to safer dental surgery and improved recovery indicators.

Keywords: Perioperative Nursing; Dental Surgery; Dental Implants; Patient Safety; Recovery; Anxiety; Infection Prevention; Oral Cancer Surgery; Nursing Education.

INTRODUCTION

Dental surgery includes procedures performed under local anesthesia where patients is awake and may experience significant anxiety and pain, and major operations where complications and recovery depend on multidisciplinary perioperative systems. In implant

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settings, perioperative stress worsen cooperation and physiologic stability; implant trials note that patients under local anesthesia experience negative emotions, anxiety and tension, which disrupt the intraoperative course and comfort (1). Patient safety in dentistry had fewer evaluated interventions than in hospital surgery. A systematic review of patient safety interventions in dentistry highlight the importance of structured safety tools such as checklists (2). A systematic review indicates surgical safety checklists are associated with improved team communication and reduced complications in different settings (3). In dental implant surgery specifically, a published checklist framework proposes a planning phase, intraoperative phase, and postoperative phase, reflecting how perioperative teams standardize verification, infection prevention, and patient instructions (4).

Perioperative nursing practices are important to this safety and recovery interface: psychological preparation and intraoperative reassurance, standardized postoperative education and follow-up, and infection prevention and hand hygiene. In implant populations, randomized study suggests structured perioperative cognitive behavioral approaches added to usual care can improve anxiety, pain, and sleep outcomes, and reduce complications in older adults receiving sinus elevation with immediate implantation (5). Acupoint massage combined with touch have been evaluated as adjuncts to routine perioperative education and verbal reassurance (1).

Perioperative dental management has been studied as a safety strategy for major surgery patients, targeting pneumonia and surgical site infections via improved oral hygiene and proactive dental interventions. A scoping review found that perioperative oral hygiene improvement can help prevent postoperative pneumonia and suggests preoperative dental management reduce surgical site infections in some surgical contexts (6). In this systematic review we aimed to address original open-access studies evaluating perioperative nursing practices in dental surgery and their effects on safety and recovery outcomes.

METHODS

We conduct this study according to PRISMA 2020 reporting principles (7).

Eligibility criteria

Population: Patients undergoing dental surgical procedures (implant surgery, oral cancer surgery).

Interventions: Perioperative nursing delivered practices including psychological interventions, structured perioperative education and follow-up, infection prevention and quality improvement practices in dental clinical areas, and comprehensive perioperative nursing bundles.

Comparators: Routine care, standard education.

Outcomes: Patient safety outcomes (complications, infection related indicators, physiologic instability) and recovery outcomes (pain, anxiety, sleep, self-efficacy, peri implant indices, quality of life).

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Study designs: Randomized controlled trials, controlled clinical studies, and quality improvement evaluations with quantitative outcomes.

Setting and access: Articles had to be available in open access full text.

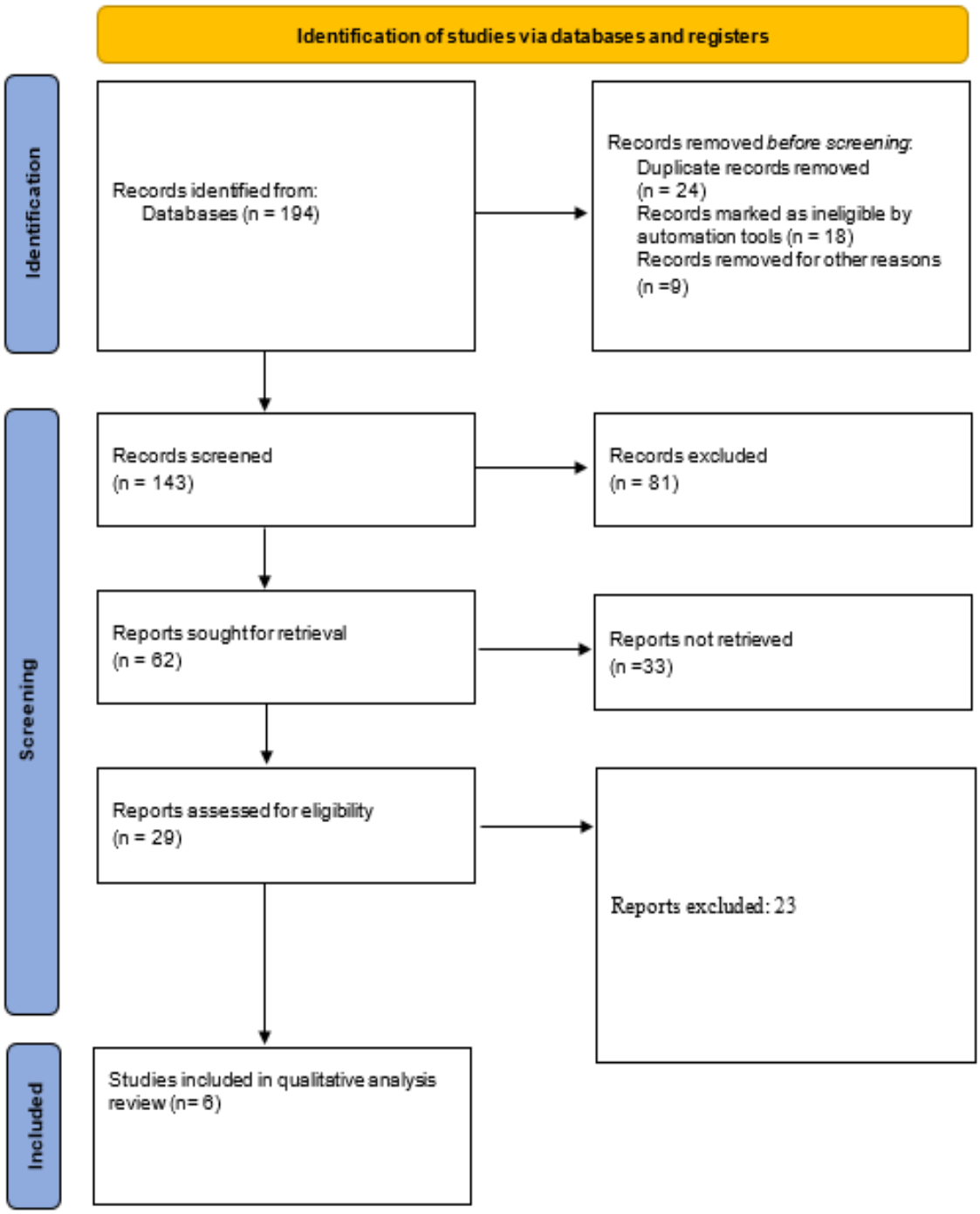

Fig 1: PRISMA flow chart

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Information sources and search approach

An open access focused search strategy was used, PubMed Central and open sources databases. Searches combined terms for dental surgery and nursing practices (dental implant OR oral surgery OR stomatology) AND (perioperative nursing OR nursing intervention OR education OR health coaching OR quality control circle OR hand hygiene OR comfort OR anxiety). Reference lists of relevant open access reviews on dental safety and checklists were checked to identify related perioperative safety concepts (2,8).

Study selection

Titles and abstracts were screened for: dental surgical context, a defined perioperative nursing practice, and quantitative recovery outcomes. Full texts were assessed for eligibility criteria. We include 6 original studies in the final analysis (Fig 1).

Data extraction

For each included study we extract (design, country, setting, sample size, procedure type, intervention components, comparator, outcomes, and main findings).

Risk of bias and synthesis

Results were synthesized narratively, showing direction and consistency of effects. Risk of bias considerations were described qualitatively (randomization and blinding feasibility; outcome measurement objectivity; single center limitations).

RESULTS

Included studies and overview

Six open access original studies met eligibility criteria, covering implant surgery perioperative comfort interventions, extended post implant coaching and education, infection prevention quality improvement in dental clinical areas, and comprehensive perioperative nursing in oral cancer surgery. Characteristics of the included studies were presented in Table 1.

Table 1: Characteristics of included studies

Study	Setting, population	Design, sample	Procedure	Intervention	Outcomes and key findings
Wang et al. 2023 (5)	China, elderly implant patients	RCT, n=40 (20, 20)	Sinus floor elevation + immediate implantation	Cognitive behavioral based comprehensive perioperative intervention added to conventional care	Improved anxiety, postoperative pain, sleep quality, reduced complications vs control (reported as effective).
Qu et al. 2024 (1)	China, implant patients	RCT, n=100 (50, 50)	Oral implant surgery	Acupoint massage + touch therapy + environmental relaxation, on top of routine perioperative	Lower post-intervention dental anxiety scores and pain, lower BP, HR during, after, higher satisfaction.

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				education, reassurance	
Huang et al. 2025 (9)	China, elderly implant restoration patients	Random allocation, N=89 analyzed	Implant restoration (extended care)	Experiential education + health coaching + structured follow-up (WeChat support, coached skills practice) vs standard education	Higher oral health self efficacy at 6 months, better peri-implant indices (PLI, SBI, GI) at 6 months, survival difference not significant.
Chen et al. 2016 (10)	China, stomatology outpatient nurses	Quality improvement, pre, post	Dental outpatient care	Quality Control Circle (PDCA) targeting hand hygiene compliance	Increased hand hygiene compliance and correct technique, reduced bacterial colony counts in sampled areas.
Lu et al. 2021	China, oral cancer surgery patients	Controlled clinical study, n=116	Radical resection for oral cancer	"Comprehensive nursing intervention" bundle vs routine nursing (education, psychological care, pain, infection prevention, rehab guidance)	Lower anxiety, depression and pain, improved QoL, fewer complications reported in intervention group.
Kurasawa et al. 2022 (11)	Japan, cancer surgery patients receiving perioperative oral management	Retrospective cohort, n=477	Major cancer surgery (perioperative oral management program)	Perioperative oral management (team-based oral hygiene, management pathway)	Lower postoperative pneumonia associated with perioperative oral management.

FINDINGS BY NURSING PRACTICE DOMAIN

Perioperative psychological, comfort interventions in implant surgery

Two randomized studies evaluated perioperative anxiety, pain focused nursing interventions around oral implant surgery. Qu et al. reported that implant patients under local anesthesia are conscious and prone to anxiety and pain escalation; their intervention combined routine perioperative explanation and reassurance with structured touch, acupoint massage and a deliberately calming environment. Post-intervention, anxiety and pain were lower in the intervention group and physiologic markers were lower during and after the intervention (1).

Wang et al. evaluated a cognitive behavioral based comprehensive perioperative program added to conventional care for older adults undergoing sinus floor elevation with immediate implantation. They found that routine perioperative care not address mental

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state, and reported improved anxiety, pain, and sleep outcomes with the behavioral intervention, with fewer complications (5).

Extended care education, coaching after implants

Huang et al. evaluated an extended care model combining experiential education and health coaching over 6 months following implant restoration in older adults. Their intervention included an expert team and a structured digital support system, with coached skill building such as brushing technique training and ongoing monitoring, feedback (9).

At six months, self-efficacy improved more in the intervention group, and peri-implant periodontal indices (PLI, SBI, GI) were better in the intervention group; implant survival rate differences were not statistically significant (9).

Infection prevention quality improvement in dental clinical areas

Chen et al. studied a Quality Control Circle (PDCA) project to improve hand hygiene in nurses in a stomatology outpatient department. The project increased compliance and improve hand hygiene technique, with an associated decrease in bacterial colony counts in sampled environments (10).

Comprehensive perioperative nursing bundles in oral cancer surgery

Lu et al. examined comprehensive nursing intervention for patients undergoing radical oral cancer surgery compared with routine nursing. The intervention incorporated psychological support, health education, pain related care, and postoperative guidance. They reported improved psychological scores, lower pain, better QOL measures, and fewer complications in the intervention group. Kurasawa et al. evaluated perioperative oral management within cancer surgery pathways and reported an association with reduced postoperative pneumonia (11).

DISCUSSION

Our review found that perioperative nursing practices in dental surgery affect safety-related and recovery-related outcomes. The strongest and most direct findings were in implant surgery, where trials show that targeted perioperative nursing interventions reduce anxiety and pain, two outcomes that affect intraoperative cooperation, physiologic stability, and postoperative experience. Qu et al. (1) found that implant procedures under local anesthesia occur while patients are conscious, making them more vulnerable to anxiety; their structured touch, acupoint approach improved anxiety and pain and lowered blood pressure, heart rate during perioperative periods, which suggest subjective and physiologic benefits. Wang et al. reported that adding a cognitive behavioral based program to conventional care improved anxiety, pain, sleep quality, and reduced complications in older implant patients, this support psychological nursing care as more than comfort (5). Several observational studies reported an association between perioperative oral care and reduced postoperative pneumonia after cancer resection (6,12,13). According to Huang et al. perioperative nursing should not end at discharge. Their 6 month experiential education and health coaching model improved oral health

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self-efficacy and peri implant indices at six months, outcomes linked to long term implant safety through better plaque control and earlier recognition of complications (9). Infection prevention is important, Chen et al. showed that nursing led quality improvement (QCC, PDCA) increased hand hygiene compliance and improved technique in a dental outpatient environment, with reduced bacterial colony counts, an intermediate but safety marker in settings where patients cycle through procedural areas (10).

For major oral surgery, comprehensive nursing bundles and structured oral management programs were relevant to serious postoperative risks. Lu et al. found improved psychological and pain outcomes and fewer complications after radical oral cancer surgery with comprehensive nursing intervention (Lu et al. 2021). Literature suggests improved perioperative oral hygiene can prevent postoperative pneumonia and preoperative dental, oral management reduce surgical site infections in some surgeries (6). Perioperative oral care and antimicrobial strategies contribute to postoperative safety in surgical operations. Studies reported reduced postoperative pneumonia following structured perioperative oral care and outpatient preoperative bundles (14,15). In implant surgery, postoperative antibiotic regimens influenced patient reported outcomes (16). Dentistry also benefits from standardized safety tools, dental patient safety reviews found limited evaluated interventions and emphasize checklists (2,8). Literature also links checklists to improved communication and reduced complications, and implant specific checklist frameworks exist (3,4).

Limitations:

Included studies were heterogeneous, often single center, and not all used standardized safety outcomes. Future trials should report common outcomes (validated complication definitions, SSI, unplanned returns, adverse events) and describe nursing intervention components to enable replication and meta-analysis.

CONCLUSION

We found that perioperative nursing practices in dental surgery improve patient recovery and safety. In implant surgery, structured perioperative psychological, comfort interventions decrease anxiety and pain and improve physiologic stability. Extended care models using experiential education and coaching improve self-efficacy and peri-implant measures at follow-up. Clinic level infection prevention quality improvement improve safety conditions in procedural environments. In higher risk oral cancer surgery, comprehensive nursing bundles and structured perioperative oral management are associated with better recovery indicators and fewer complications.

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