

Wide-Awake Local Anesthesia No Tourniquet for Hand and Wrist Procedures: A Narrative Review of Current Concepts and Evidence

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ABSTRACT

Wide-awake local anesthesia no tourniquet (WALANT) has emerged as an important anesthetic and surgical approach in hand and upper extremity surgery. By combining local anesthetic with epinephrine, WALANT enables procedures to be performed without sedation or tourniquet while allowing intraoperative communication and functional assessment. Beyond its anesthetic role, this technique has implications for surgical precision, patient-centered care, training environments, and health-system efficiency. This narrative review synthesizes current evidence and expert perspectives on WALANT, with emphasis on common procedures, expanding indications (e.g., fracture fixation and tendon repair), patient selection, safety considerations, and economic impact in urban healthcare settings. Available evidence indicates that WALANT achieves clinical outcomes comparable to those of conventional anesthesia techniques, with favorable patient-reported experiences, shorter recovery times, and reduced resource utilization. WALANT may be considered a suitable first-line option for selected upper extremity procedures when applied in appropriately chosen patients.

Keywords: hand surgery, local anesthesia, upper extremity, WALANT, wide-awake surgery

INTRODUCTION

Wide-awake local anesthesia no tourniquet (WALANT) represents a paradigm shift in hand and upper extremity surgery. Traditionally, procedures involving the hand and wrist have been performed under general anesthesia, regional nerve blocks, or intravenous regional anesthesia and almost universally combined with tourniquet use. Although effective, these procedures are associated with anesthesia-related risks, tourniquet discomfort, delayed recovery, and substantial resource utilization. By contrast, WALANT relies on local infiltration of lidocaine combined with epinephrine directly into

the surgical field, eliminating the need for sedation and tourniquet application.¹⁻³

Early reluctance toward the adoption of WALANT was largely driven by historical concerns regarding epinephrine's safety in digital surgery. However, contemporary clinical and experimental evidence has definitively refuted this dogma, demonstrating that epinephrine at appropriate concentrations does not increase the risk of digital ischemia or necrosis.⁴⁻⁶ Consequently, WALANT has gained widespread acceptance and is increasingly incorporated into routine hand surgery practice worldwide.

The awake nature of WALANT introduces new dimensions to surgical care. Surgeons can perform real-time functional assessments, patients avoid the physiological and cognitive effects of sedation or general anesthesia, and procedures can be shifted from the main operating room to ambulatory or clinic-based settings. These characteristics are particularly relevant for urban health systems facing increasing procedural volume, workforce constraints, and the need for cost-effective and efficient care delivery.⁷⁻⁹

This narrative review was conducted using a targeted literature search of PubMed, Scopus, and Google Scholar databases. Keywords included “WALANT,” “wide-awake surgery,” “hand surgery,” “upper extremity,” and “local anesthesia.” Relevant articles published in English, including randomized controlled trials, cohort studies, systematic reviews, and key expert opinion papers, were included. Reference lists of selected articles were also screened to identify additional relevant studies. The review aimed to synthesize current concepts and clinically relevant evidence rather than perform a formal systematic review.

CONTENT OF REVIEW

Principles and Techniques

WALANT is based on the principles of tumescent local anesthesia using dilute lidocaine (0.5%-1%) combined with epinephrine (1:100,000-1:200,000). Epinephrine induces localized vasoconstriction, which provides a relatively bloodless surgical field and prolongs the anesthetic duration, thereby obviating the need for a tourniquet. As such, adequate time between injection and incision (typically 20-30 min) is critical to ensure optimal hemostasis and patient comfort.¹⁰

The injection technique plays an important role in patient tolerance. Slow infiltration, buffering of lidocaine with sodium bicarbonate, and continuous patient communication during injection can significantly reduce discomfort and anxiety.^{11,12} These technical

considerations are essential for the successful implementation of WALANT, particularly in anxious or first-time patients.

To facilitate practical implementation, a concise checklist for WALANT setup is provided below (**Figure 1**).

Clinical Efficacy Across Procedures

Strong evidence supports the use of WALANT for common procedures, including carpal tunnel and trigger finger release. According to randomized controlled trials and meta-analyses, WALANT consistently demonstrates equivalent surgical success, functional outcomes, and complication rates when compared with traditional anesthesia methods, with superior patient comfort because of the elimination of tourniquet pain.¹³⁻¹⁶ These findings have established WALANT as a first-line anesthesia option for these procedures in many institutions.

The expanding indications for WALANT include fracture fixation of the distal radius, metacarpals, and phalanges. In these settings, awake active motion testing enables the intraoperative assessment of fracture stability, alignment, and hardware positioning. According to cohort studies and comparative analyses, the clinical and radiographic outcomes under WALANT are comparable to those achieved with general or regional anesthesia, with additional benefits including reduced postoperative pain and shorter recovery times.¹⁷⁻¹⁹

WALANT has also been successfully applied to flexor tendon repair and selected nerve decompression procedures. In tendon repair, the ability to assess active tendon gliding intraoperatively enables the immediate identification and correction of gapping, catching, or excessive tension, reducing postoperative complications and the need for revision surgery.^{20,21} Cubital tunnel decompression performed under WALANT has demonstrated comparable efficacy to regional blocks while avoiding prolonged postoperative numbness.²²

- Lidocaine with epinephrine (1:100,000–1:200,000), dose adjusted to body weight
- Consider buffering with sodium bicarbonate to reduce injection pain
- Slow, staged injection technique to minimize discomfort
- Allow adequate time (approximately 20–30 minutes) before incision for optimal vasoconstriction
- Ensure availability of phentolamine for rare cases of epinephrine-related vasoconstriction
- Maintain continuous patient communication and reassurance throughout the procedure

Figure 1 Checklist for WALANT Procedure Setup

Patient-Centered Outcomes

From a patient-centered perspective, WALANT is associated with consistently high satisfaction rates. Patients value remaining awake, avoiding preoperative fasting, and maintaining autonomy throughout the surgical process. Moreover, rapid postoperative recovery without prolonged numbness enables earlier return to activities of daily living and work.^{7,11,14}

Pain control with WALANT is generally adequate intraoperatively and postoperatively. Compared with traditional local anesthesia techniques, the absence of tourniquet-related discomfort represents a major advantage. Patient anxiety can also be effectively managed through preoperative counseling and intraoperative communication, further enhancing the overall experience of WALANT.^{12,15}

Safety Profile

WALANT has a favorable safety profile. Across published studies, the complication rates remain low and comparable to those of traditional anesthesia methods. When established protocols are followed, no increase in infection, nerve injury, or vascular compromise has been reported. The safety of epinephrine in digital surgery is now well supported by high-quality evidence.^{4-6,16} In rare cases of prolonged vasoconstriction or suspected digital ischemia, phentolamine can be used as a reversal agent for epinephrine, restoring perfusion effectively. Although such events are uncommon, the availability of phentolamine provides an additional safety measure.

In addition, the elimination of tourniquet use avoids tourniquet-related pain, nerve compression injuries, and time constraints associated with tourniquet tolerance. These factors contribute to patient comfort and surgeon efficiency.^{13,15}

Surgeon Experience and Educational Value

Surgeon experience with WALANT has been overwhelmingly positive. The reported advantages of WALANT include improved visualization, unhurried operative conditions, and the ability to communicate with patients during surgery. In addition, WALANT's learning curve is considered manageable, particularly when surgeons begin with simple procedures, including carpal tunnel or trigger finger release.^{8,9}

In training hospitals, WALANT offers unique educational value. Trainees can directly observe the relationship between surgical technique and immediate

functional outcomes, reinforcing anatomical understanding and surgical decision-making. This real-time feedback may enhance technical learning and confidence among residents and fellows.²³

Health System and Economic Impact

At the system level, WALANT substantially reduces healthcare resource utilization. According to economic analyses, WALANT reduces procedural costs by approximately 70%-85% by avoiding general anesthesia, operating room time, and postoperative recovery units in selected healthcare systems, particularly in studies conducted in the United States and similar resource settings.²⁴ These cost savings are derived from reduced staffing requirements, shorter procedural times, and elimination of anesthesia-related resources.

Office-based and ambulatory WALANT programs improve access to care and procedural throughput, which is particularly relevant in urban health systems with high patient volume and limited operating room availability. WALANT consistently demonstrates efficiency gains and improved resource allocation, even in settings where total societal cost differences are less pronounced.²⁵ Representative clinical and economic evidence from key studies is summarized in **Table 1**.

Clinical Implications

This comprehensive review highlights WALANT as a safe, effective, and increasingly influential anesthetic strategy for upper extremity surgery. Across a range of procedures, WALANT demonstrates comparable anesthetic adequacy, surgical success, and functional outcomes to those of traditional anesthesia techniques while offering distinct advantages in patient experience, intraoperative assessment, and health-system efficiency. Its complication rates remain low, patient satisfaction is consistently high, postoperative recovery is rapid, and pain control is acceptable. Importantly, the long-standing concern regarding epinephrine use in digital surgery has been definitively refuted, with contemporary evidence confirming its safety when used at appropriate concentrations. Appropriate patient selection includes individuals who are cooperative, able to tolerate awake procedures, have no severe anxiety or needle phobia, and have no contraindications to the use of local anesthetics with epinephrine.

From a surgical perspective, WALANT introduces unique technical benefits, including real-time intraoperative functional testing, improved visualization without tourniquet

Table 1 Representative Clinical and Economic Evidence of WALANT in Upper Extremity Surgery

Study	Procedure	Study Design	Sample Size (n)	Comparator	Key Findings
Virtos et al. ¹⁴	Carpal tunnel release	Randomized controlled trial	120	Ultrasound-guided axillary block	Non-inferior outcomes; faster recovery and shorter discharge time
Ki Lee et al. ¹⁵	Minor hand surgery	Randomized controlled trial	60	Local anesthesia with tourniquet	Similar surgical outcomes; reduced pain associated with tourniquet avoidance
Levit et al. ¹⁶	Trigger finger release	Systematic review and meta-analysis	1,233 (pooled)	Local anesthesia with tourniquet	Comparable clinical outcomes; reduced intraoperative discomfort
Lin et al. ¹⁸	Metacarpal fracture fixation	Retrospective cohort study	80	General anesthesia	Lower postoperative pain; reduced resource utilization
Chen et al. ¹⁹	Distal radius fracture fixation	Retrospective cohort study	70	General anesthesia	Comparable radiographic and functional outcomes
Rhee et al. ²⁴	Clinic-based hand surgery	Cost analysis study	100	Intravenous sedation anesthesia	Approximately 70–85% reduction in procedural cost for the Military Health Care System
Alter et al. ²⁵	Carpal tunnel release	Cost analysis study	190	Sedation anesthesia	Lower direct and indirect healthcare costs with WALANT

constraints, and direct communication with awake patients. These features may enhance surgical precision and confidence, particularly in tendon repair and selected fracture fixation procedures. Moreover, surgeon experiences with WALANT are largely positive, with a manageable learning curve and high professional satisfaction, especially when implementation begins with common, low-complexity procedures.

At the system level, WALANT offers substantial economic and operational advantages. Compared with operating-room-based procedures under general anesthesia, WALANT reduces costs by approximately 70%–85%, reflecting decreased anesthesia utilization, shorter procedural times, and reduced postoperative recovery requirements. The feasibility of performing WALANT procedures in office-based and ambulatory settings expands access to care, improves throughput, and aligns well with the needs of urban healthcare systems facing increasing demand and resource constraints.

Based on current evidence, WALANT represents a valuable option for selected upper extremity procedures, particularly carpal tunnel release, trigger finger release, and other soft tissue operations. Its use can be extended to fracture fixation, tendon repair, and nerve decompression in carefully selected patients, with consideration of surgeon experience and procedural complexity. Successful implementation requires appropriate training in anesthetic technique, thoughtful patient selection, standardized institutional protocols, and attention to patient communication throughout the perioperative process.

Despite growing evidence supporting the use of WALANT for common hand procedures, several limitations and knowledge gaps remain. Current evidence for more complex reconstructions is largely derived from observational studies, and long-term outcomes beyond 6–12 months are insufficiently reported. In addition, comprehensive cost-effectiveness

analyses incorporating societal costs, productivity, and quality-adjusted life years are limited.

Future research should therefore focus on high-quality, procedure-specific studies, including large-scale randomized trials for complex reconstructions, long-term outcome evaluations, and robust economic analyses. Further investigation in special populations and low-resource settings is also needed to better define the generalizability and broader applicability of WALANT in contemporary upper extremity surgery.

Limitations and Contraindications

Despite its advantages, WALANT has several limitations that should be considered in routine clinical practice. Patient-related factors remain important, as some individuals may not tolerate awake surgery because of anxiety, needle phobia, or psychological discomfort. Although these concerns can often be mitigated through effective communication and counseling, they may limit the applicability of WALANT in selected cases. From a technical perspective, inadequate anesthesia may occur, particularly in procedures involving extensive dissection or prolonged operative time, requiring supplemental injections or conversion to alternative anesthesia techniques. In addition, although epinephrine-induced vasoconstriction generally provides a bloodless field, minor bleeding may still occur in certain procedures, potentially affecting visualization.

Contraindications to WALANT include known allergy to local anesthetic agents, inability to cooperate during awake procedures, and caution in patients with severe peripheral vascular compromise. Careful patient selection and surgeon experience are therefore essential for optimal outcomes.

CONCLUSION

WALANT has evolved from an alternative anesthetic technique into a comprehensive care model integrating anesthesia, surgery, education, and health-system efficiency. The current evidence supports its safety, efficacy, and high patient acceptance for a broad range of upper extremity procedures. WALANT can be considered an important approach in appropriately selected patients, particularly within urban and resource-conscious healthcare settings.

Conflict of Interest

The author declares no conflicts of interest related to this work.

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