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Hand

Patients Tracking Pain Episodes Show Wide-awake Local Anesthesia Without Tourniquet Can Be Nearly Painless

Jean Paul Brutus, MD*
Amir A. Ahmad, MBBS, DrOrth†
Thomas Apard, MD, FEBHS‡
Bianief Tchiloemba, MScOT, MD§
Min Cheol Chang, MD¶
Donald H. Lalonde, FRCSC‖

Background: Minimally painful tumescent local anesthesia ensures patients feel only the first needle insertion, with no further pain. This technique includes real-time patient feedback, where they report each pain event during injection.
Methods: This prospective study involved 154 consecutive patients undergoing wide-awake local anesthesia no tourniquet surgery at 3 hand surgery centers (January–April 2024). Patients objectively scored pain events during injection and rated pain intensity (0–10 Likert scale), intraoperative pain, anxiety, and overall experience.
Results: During local anesthesia injection, 61 (40%) patients reported no pain, 92 (59.7%) reported 1 pain event, and 1 (0.7%) patient reported 2 events. Among the 93 patients who felt pain, 90 reported only mild discomfort (1–2 of 10), whereas 3 reported moderate pain (3–5 of 10). Anxiety levels during anesthesia and surgery were 3 of 10 or less for 147 (95.5%) patients.
Conclusions: Real-time patient feedback improved surgeons' ability to administer tumescent local anesthesia with minimal pain. As a result, most patients experienced no pain or only 1 minor event during local anesthesia injection for wide-awake local anesthesia no tourniquet surgery. *(Plast Reconstr Surg Glob Open 2025;13:e6568; doi: 10.1097/GOX.0000000000006568; Published online 21 March 2025.)*

INTRODUCTION

Traditional tourniquet with sedation in hand surgery often results in patient discomfort, anxiety, nausea, and vomiting, which can be avoided with wide-awake local anesthesia no tourniquet (WALANT).[1–8] Reducing local anesthesia injection pain can further improve the patient's WALANT experience.

*From the *Department of Hand Surgery, Exception MD, Montreal, Quebec, Canada; †Department of Orthopedic Surgery, Prince Court Medical Centre, Kuala Lumpur, Malaysia; ‡Department of Orthopedic Surgery, Ultrasound Guided Hand Surgery Center, Versailles, France; §Division of Plastic Surgery, University of Calgary, Alberta, Canada; ¶Department of Physical Medicine and Rehabilitation, College of Medicine, Yeungnam University, Daegu, Republic of Korea; and ‖Department of Orthopedic Surgery, Dalhousie University, Saint John, New Brunswick, Canada.*

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Some WALANT surgeons excel at administering local anesthesia with minimal pain, whereas others cause more discomfort. Finding an objective way to measure the discomfort of local anesthesia injection is important so that all surgeons can know the pain they are causing and improve their technique.

Most studies measure local anesthesia injection pain with either a 0–10 Likert or a 0–10 visual analog scale.[9,10] Both scales are subjective and difficult to measure consistently due to the qualitative nature of pain intensity. It is easier for a patient to say whether they experience pain or not than it is for them to describe how much pain they feel. Pain is either present or absent. Counting the number of pain events that a patient experiences during the entire process of local anesthesia injection offers a more reliable, quantitative approach.[11]

To count the number of pain events during local anesthesia injections, before starting the injections, the surgeon asks each patient to report each time they

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experience pain during the entire injection process. (**See Video [online]**, which displays WALANT carpal tunnel tumescent local anesthesia injection. The surgeon explains to the patient how to score the injection pain. After the patient feels the first 30G needle insertion, they are asked to tell the surgeon each time they feel pain during the injection process, so the surgeon can count the total number of times the patient feels pain after the first needle insertion. This number "scores" the surgeon's injection ability and provides a yardstick for improvement in injection skill.)

The number of times the patient feels pain is counted as a golf score.[12] If the patient only feels pain 1 time with the first needle insertion, the surgeon scores a "hole in one." If the patient feels pain twice, the injecting surgeon scores an "eagle"; 3 times, a "birdie"; and 4 times, "a bogey." If the patient does not even feel the first needle insertion, this is called a "hole in zero." This immediate objective feedback from the patient enables the surgeon injector to identify parts of his technique that are causing pain so he can make improvements. Many surgeons like the simplicity and reproducibility of the golf analogy. The purpose of this study was to quantify the number of times patients experience pain events during the minimally painful tumescent local anesthesia injection and WALANT surgery processes.

Takeaways

Question: Is immediate patient pain feedback during the wide-awake local anesthesia no tourniquet (WALANT) local anesthesia injection process beneficial in reducing injection pain to improve the patient experience?

Findings: Three surgeons in 3 countries prospectively obtained immediate objective feedback from 154 WALANT patients who counted the number of pain events during the local anesthesia injection process. With continuously improving local anesthesia injection techniques from patient feedback, there were very few pain events during the injection process in most patients.

Meaning: Patient objective scoring of the number of pain events during WALANT local anesthesia injection helps improve surgeon injection skills, so most patients only feel the first tiny needle insertion.

METHODS

A multicenter prospective study was conducted in 3 countries between January and April 2024. All consecutive patients scheduled for elective hand surgery under WALANT were enrolled with informed consent. Patient demographics were collected, including age and sex. Three experienced WALANT surgeons (2 orthopedic surgeons [T.A., France and A.A.A., Malaysia] and 1 plastic surgeon [J.P.B., Canada]) personally administered all anesthesia injections and performed all procedures. The type of surgery performed was recorded.

The patients were asked to tell us each time they experienced pain during the local anesthesia injection and surgery processes. These objective pain event numbers were counted and recorded. We also recorded the patient verbal reports of (1) the subjective intensity of each pain event (0–10 of 10); (2) their anxiety (0–10 of 10) before and during anesthesia, intra- and postoperatively; and (3) their overall experience with a Likert (0–10 of 10) scale as well as narrated descriptive feedback.

WALANT Injection Technique

A mixture of 0.5% or 1% lidocaine with 1:100,000 or 1:200,000 epinephrine was used to prepare the WALANT local anesthesia solution. Two surgeons used bicarbonate to buffer the solution (T.A. and A.A.A.), whereas the third did not (J.P.B.). The 13 tips of minimal pain tumescent local anesthesia injection technique described by Lalonde were used by all surgeons.[13] Surgeons were careful to hold the 30G injection syringe and needle very still, immobile like a mosquito, to avoid any painful wobbling of the needle during the first injection until the skin was numb. Subsequent injections were performed very slowly from proximal to distal. All needle reinsertions were in already numbed skin, so patients only felt the first needle insertion. The 30G needle was replaced with a 27G or 25G needle after the first 3–5 mL were injected. We always injected a large volume of local anesthesia, so the skin was visibly and palpably swollen (tumesced) at least 2 cm beyond anywhere we were planning to dissect. We always waited at least 30 minutes between the end of the injection and the surgery to make sure the local anesthesia was optimally effective.

RESULTS

A total of 154 patients were prospectively enrolled in this study. The mean age of the patients was 51 years (ranging from 13 to 91 y). The sex ratio was 53.6% women to 46.4% men. The types of surgical procedures are outlined in Table 1. There were 50 patients from Malaysia, 50 from France, and 54 from Canada.

Objective Number of Pain Event Scores During the Local Anesthesia Injection Process

During the local anesthesia injection process, 61 of the 154 patients did not feel any pain at all with the first needle insertion, or during the rest of the local anesthesia injection process (Table 2). The pain event number score for these patients was 0 (hole in zero). Of 154 patients, only 92 patients felt the pain of the first needle insertion (hole in one). Only 1 of the 154 patients felt pain more than once (eagle score for that patient) during the local anesthesia injection process. None of the patients felt pain more than 2 times during the injections. The pain score results were similar in the 3 countries.

Subjective Pain Intensity (0–10) Scores During the Local Anesthesia Injection Process

For the 93 of 154 patients who felt some pain during the injection of local anesthesia, the intensity of the pain

Table 1. WALANT Procedures Performed on the 154 Patients

Forearm	Patients	Wrist	Patients	Hand	Patients
Lacertus release	50	Carpal tunnel release	42	Tumor removal	2
Cubital tunnel release	13	The Guyon canal release	1	Fasciectomy	10
Radial tunnel release	11	Ganglion cyst removal	6	Extensor tendon repair	1
		Foreign body removal	2	The Fowler tenotomy	2
		Plate fixation	2	Thumb ligament repair	1
		Thumb carpometacarpal implant reconstruction	2	Mallet finger repair	1
				A1 pulley release	8
				Osteotomy	1
Total		17 Procedures		154 Patients	

Procedures performed under WALANT.

Table 2. Quantitative Pain Scores: Number of Times Patients Felt Pain During the Entire Local Anesthesia Injection Process

Hole in zero	Pain experienced 0 times	61 patients
Hole in one	Pain experienced 1 time	92 patients
Eagle	Pain experienced 2 times	1 patient
Birdie	Pain experienced 3 times	0 patients
Bogey	Pain experienced more than 3 times	0 patients

was 1–2 out of 10 for 90 of the 93 patients and 3–5 out of 10 for the remaining 3 of 93 patients (Fig. 1).

Subjective Pain Intensity (0–10) Scores During the Surgery

Of 164 patients, 152 felt no pain during the surgery. In the 12 patients who felt pain during the surgery, the intensity was 2 of 10 or less for 11 patients. The 12th patient had a pain intensity of 5. The procedures performed on the patients who experienced pain events during surgery were 3 lacertus releases, 2 fasciectomies, 1 carpal tunnel release, 1 cubital tunnel release, 1 wrist ganglion excision, and 4 radial nerve releases. Intraoperative supplemental addition of local anesthesia was required for only 3 of 154 patients (1 carpal tunnel release, 1 fasciectomy, and 1 radial tunnel release).

Patient Anxiety Assessment

Anxiety levels during the process of injection of local anesthesia were low at 0–2 of 10 for 136 of 156 patients. Anxiety levels during the surgery were even lower at 0–2 of 10 for 145 of 156 patients. Figure 2 illustrates how anxiety levels decreased from before injection to during injection and again decreased during the surgery. (**See table, Supplemental Digital Content 1**, which displays the patient anxiety scores, **http://links.lww.com/PRSGO/D888**.)

Patient Experience Assessment

Patients rated their overall wide-awake surgical experience very highly with a mean score of 9.16 of 10 (Fig. 3). Patients most commonly explained their scores based on the perceived high attentiveness of the surgical team, the avoidance of general anesthesia, and the simplicity of the process.

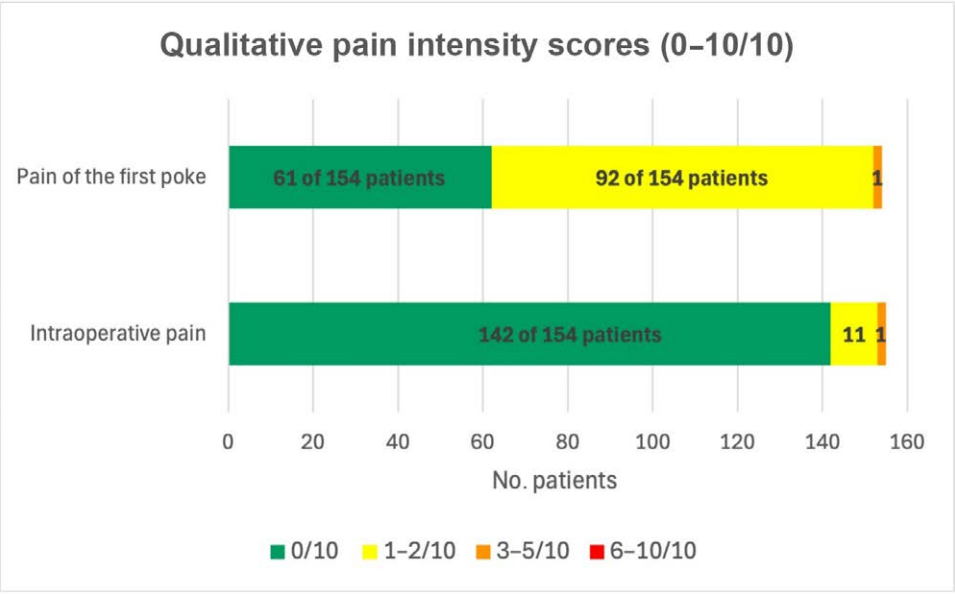

Fig. 1. The distribution of qualitative pain intensity scores reported by patients during 2 stages: the first sting of the local anesthesia injection and intraoperative pain during WALANT surgery.

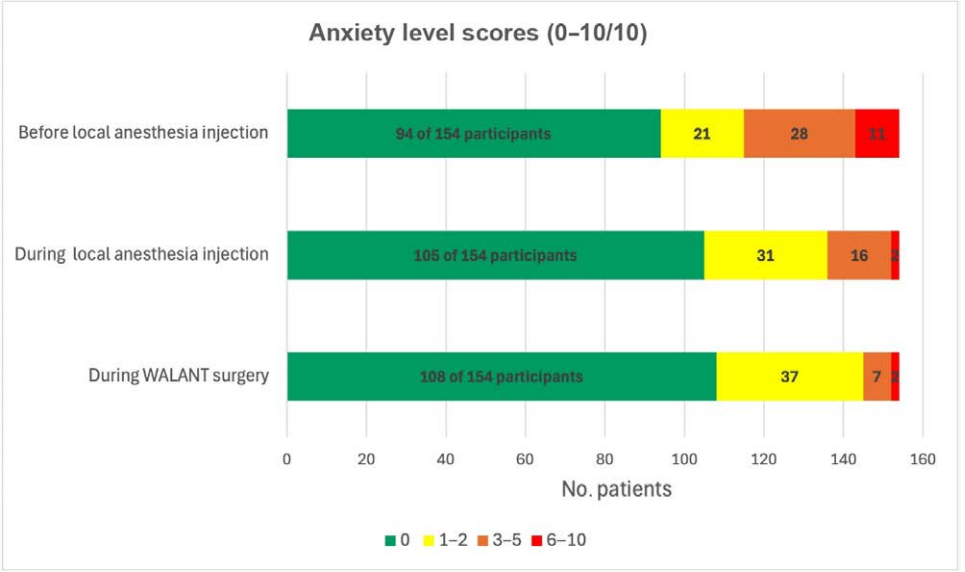

Fig. 2. The anxiety levels of patients at 3 different stages: before the local anesthesia injection, during the injection, and during WALANT surgery.

Fig. 3. The overall patient experience scores after WALANT hand surgery.

DISCUSSION

We prospectively measured the quantitative (number of pain events) and qualitative (0–10 Likert scale) pain experience of 154 consecutive patients from 3 continents undergoing tumescent local anesthesia injection for WALANT hand surgery using the previously described 13 tips of minimally painful injection.[13] We found that 61 of 154 patients did not feel any pain at all, even with the first insertion of the 30G needle (hole in zero). Of 154 patients, only 92 felt the first needle insertion (1 pain event or hole in one), and then no more pain events during the rest of the local anesthesia injection. Only 1 patient felt pain more than once in the entire injection process (2 pain events, or eagle) (Table 2). The pain intensity (quality) of the local anesthesia injection was only 1–2 of 10 for 90 of 93 patients who felt any pain during the local anesthesia, and only 3–5 of 10 for the remaining 3 of 93 patients. This study confirms that WALANT local anesthesia injection really can be minimally painful, if not painless.

Most studies have measured subjective Likert pain scale outcomes after the procedure rather than during the anesthesia process itself.[14–16] In contrast, our study used the objective pain event counting method that provided real-time feedback during the local anesthesia injection process. This instant feedback offers surgeons actionable insights that can be used to improve injection techniques immediately to reduce the number of pain events.

The authors have found that consistently asking for objective patient feedback and counting the number of pain events while injecting patients has been beneficial to keep improving their injection skills in the years since they started doing this (**see Video [online]**). They feel that this is one of the reasons that their pain scores are so low today. It is a good habit for surgeons to count the number of pain events and self-scores while performing WALANT injection. By asking about when they hurt, they will know, learn, and be motivated to get better injection pain scores with fewer pain events.

Counting the number of pain events to generate a score for the injector is one of the most important of the 13 tips of minimal pain tumescent local anesthesia, which can be found in videos at the following open access link: https://journals.lww.com/prsgo/fulltext/2021/08000/how_to_minimize_the_pain_of_local_anesthetic.7.aspx.[13] A second important tip is to hold the syringe immobile with 2 hands to avoid painful movement of the needle after its insertion. Moving a needle in sensate skin hurts until the initial local anesthetic is working, which can take up to 60 seconds. It is worth considering an analogy from nature: the mosquito's method of feeding. A mosquito can sting a human without pain because its survival depends on a stealth bite. The mosquito lands on the skin, and gently and slowly pierces it with its proboscis, often without us even noticing (hole in zero). The mosquito holds the stinger perfectly still. Like the WALANT surgeon, it injects a small amount of anesthetic to numb the skin to remain discrete. This approach to stinging is one of minimal disturbance and an innate understanding of the perception of the human target.

The other 10 tips to minimal pain injection are as follows: (1) use sensory noise such as taking a deep breath, coughing, skin cooling, vibration, or pinching to decrease needle insertion pain. (2) Insert the needle at 90 degrees to the skin. (3) Inject into the subdermal fat, not into the dermis or into a tendon sheath. (4) Inject at least 2 mL slowly before moving the needle at all. (5) Do not advance sharp needle tips anywhere that is not numb. (6) Reinsert needles in numb skin so they only feel the first insertion. (7) Do not inject quickly! Slow down! (8) Always inject too much volume instead of not enough volume. (9) Always inject from proximal to distal. (10) Inject with blunt-tipped filler cannulas instead of sharp-tipped needles for large areas such as thigh skin grafts.

In this study, 142 of 154 patients felt 0 pain during the surgery. In 11 of the 12 patients who did feel pain, the intensity was only 1–2 of 10. In the 12th patient, the pain intensity was 5. Additional anesthesia was required in only 3 of 154 cases. We try to never have to "top up" or inject additional local anesthesia because of intraoperative pain. We understand that most surgeons expect top-ups as a "normal" part of local anesthesia surgery. We aim for the goal of top-ups becoming a "never event" like waking up in the middle of general anesthesia and feeling pain. We have found that the most common reasons for top-up requirements are (1) not injecting enough volume of local anesthesia to flood the entire operative site and (2) not waiting at least 30 minutes before cutting for the local anesthesia to work effectively.[17,18]

Most of our patients started with low preoperative anxiety scores that only got lower throughout the local anesthesia injection and surgery processes. We do not give antianxiety medication to our patients. We feel that providing a friendly, cozy environment for surgery outside the hospital's main operating room environment does more to decrease anxiety than medication. Patient-selected music, dimmed lights, and constant friendly communication between the patient and surgeon optimize the surgical experience and minimize perioperative anxiety.[19] Surgeons should cultivate a "good WALANT bedside manner." If surgeons and their staff do not want to interact pleasantly with patients during the surgery, they will not reproduce our patient anxiety scores.

Our study revealed the broader impact of patient feedback on strengthening the doctor–patient relationship by improving patient experience scores. Patients primarily cited the surgeon's attentiveness, the avoidance of side effects associated with general anesthesia, and the simplicity of the procedure as the primary reasons for their high ratings. This underscores the importance of patient-centered care practices and the pivotal role of WALANT in optimizing patient satisfaction and outcomes in hand surgery.[20,21]

When we asked: "How can I improve the overall experience for you next time?" we learned that our preoperative instructions need to emphasize that there is no need to fast or stop medications such as anticoagulants[22] for WALANT surgery. Patients with diabetes should not fast or change their insulin regimens. Many patients assume there is a need to do these things because of traditional sedation rules with surgery. Providing better preoperative written information, verbal instruction, or videos about WALANT will help decrease these misperceptions.

LIMITATIONS

This study has limitations. First, there was no control group, limiting our ability to compare outcomes with traditional techniques. Second, the absence of blinding may have introduced bias. Third, there was surgeon variability in the use of bicarbonate to buffer the anesthetic, which may have influenced outcomes. Fourth, patient comorbidities and medication use, which could affect pain perception, were not recorded. Finally, no power analysis was conducted, and the sample size was not optimized for detecting statistical differences between groups. A larger, more powered study is recommended to validate these findings.

We did not perform a comparative analysis of the number of pain events over time or in the 3 groups for 2 reasons. Our pain event numbers were extremely low because the 3 surgeons have been counting pain events for years. They were not likely to get better over 50 cases. Second, we did the study to get a snapshot of how often our patients actually experience pain now that we have been counting pain events for years. Despite the limitations, the study highlights the value of patient feedback to improve WALANT injection techniques and patient experience.

CONCLUSIONS

The surgeons in this study have observed that immediate patient feedback and objective scoring of the number of pain events during the injection of tumescent local anesthesia improves their ability to anesthetize and operate in a truly minimally painful or painless fashion.

Jean Paul Brutus, MD
Department of Hand Surgery, Exception MD
1605 Boulevard Marcel Laurin, Suite 230
Montreal H4R 0B7, Canada
E-mail: jpbrutus@gmail.com

DISCLOSURES

Dr. Lalonde receives royalties from Thieme Medical Publishers and is a consultant for ASSI, Corp. The authors have no financial interest to declare in relation to the content of this article.

REFERENCES

1. Gunasagaran J, Sean ES, Shivdas S, et al. Perceived comfort during minor hand surgeries with wide awake local anaesthesia no tourniquet (WALANT) versus local anaesthesia (LA)/tourniquet. *J Orthop Surg (Hong Kong).* 2017;25:2309499017739499.
2. Ki Lee S, Gul Kim S, Sik Choy W. A randomized controlled trial of minor hand surgeries comparing wide awake local anesthesia no tourniquet and local anesthesia with tourniquet. *Orthop Traumatol Surg Res.* 2020;106:1645–1651.
3. Connors KM, Guerra SM, Koehler SM. Current evidence involving WALANT surgery. *J Hand Surg Glob Online.* 2022;4:452–455.
4. Derby MJ, McKnight KN, Van Demark RE. Infections and patient satisfaction in WALANT hand surgery in a hospital procedure room. *Hand (N Y).* 2024;5:15589447241284814.
5. Siu A, Wong RS, Ahmed Z, et al. Patient satisfaction using wide-awake local anaesthesia no tourniquet (WALANT) in adults undergoing elective hand surgery: a systematic review and meta-analysis. *J Plast Reconstr Aesthet Surg.* 2024;99:475–485.
6. Zimmermann H, Quemeneur C, Goetsch T, et al. Wide-awake local anesthesia no tourniquet in hand surgery: a systematic review and meta-analysis. *Hand Surg Rehabil.* 2024;43:101778.
7. Lawand J, Hantouly A, Bouri F, et al. Complications and side effects of wide-awake local anaesthesia no tourniquet (WALANT) in upper limb surgery: a systematic review and meta-analysis. *Int Orthop.* 2024;48:1257–1269.
8. Shou Wai AT, Abdullah S, Ahmad AA, et al. Prospective evaluation of pain and anxiety levels between wide-awake local anesthesia no tourniquet and general anesthesia with tourniquet in excision of wrist ganglions. *J Hand Surg Glob Online.* 2022;4:414–420.
9. Bloc S, Squara P, Quemeneur C, et al. Wide awake local anesthesia no tourniquet (WALANT) technique improves the efficiency of distal nerve blocks for carpal tunnel release. *Anaesth Crit Care Pain Med.* 2023;42:101229.
10. Verrewaere D, Reyniers P, Vandevivere H, et al. Comparison of WALANT versus locoregional nerve block in staged bilateral endoscopic carpal tunnel release. *Hand Surg Rehabil.* 2024;43:101974.
11. Farhangkhoee H, Lalonde J, Lalonde DH. Teaching medical students and residents how to inject local anesthesia almost painlessly. *Can J Plast Surg.* 2012;20:169–172.
12. Lalonde DH. "Hole-in-one" local anesthesia for wide-awake carpal tunnel surgery. *Plast Reconstr Surg.* 2010;126:1642–1644.
13. Joukhadar N, Lalonde D. How to minimize the pain of local anesthetic injection for wide awake surgery. *Plast Reconstr Surg Glob Open.* 2021;9:e3730.
14. Bansal N, Tiwari P, Dev P. Wide-awake local anesthesia and no tourniquet (WALANT) in upper limb fractures. *Acta Orthop Belg.* 2023;89:547–550.
15. Knystautas S, Braziulis K, Zacharevskij E, et al. Wide awake local anesthesia no tourniquet surgery of carpal tunnel syndrome: patients' experience and recall bias in a day-care setting. *Medicina (Kaunas).* 2023;59:979.
16. Pina M, Cusano A, LeVasseur MR, et al. Wide awake local anesthesia no tourniquet technique in hand surgery: the patient experience. *Hand (N Y).* 2023;18:655–661.
17. Mckee DE, Lalonde DH, Thoma A, et al. Achieving the optimal epinephrine effect in wide awake hand surgery using local anesthesia without a tourniquet. *Hand (N Y).* 2015;10:613–615.
18. Barone N, Lalonde DH, Brutus JP. Tips, tricks, and pearls for a superior patient and surgeon experience for wide-awake Dupuytren surgery. *Plast Reconstr Surg Glob Open.* 2024;12:e5570.
19. Brutus JP, Lalonde DH. How to create an exceptional hand surgery patient experience with WALANT. *Plast Reconstr Surg Glob Open.* 2022;10:e4681.
20. Elsaftawy A, Ostrowski P, Bonczar M, et al. Evaluating patient satisfaction with WALANT for hand surgery: a comprehensive questionnaire-based study. *Eur J Orthop Surg Traumatol.* 2024;34:3023–3028.
21. Reiser D, Brandt V, Sagerfors M. Patient-experience of trapeziectomy for trapeziometacarpal osteoarthritis in wide-awake local anesthesia no tourniquet, 2-year follow-up. *Acta Chir Orthop Traumatol Cech.* 2024;91:175–181.
22. Plusch KJ, Miller C, Wood K, et al. The effect of anticoagulant and antiplatelet medications on wide-awake hand surgery: an analysis of 2,162 cases. *J Hand Surg Am.* 2024;49:966–970.