MJMR, Vol. 33, No. 2, 2022, pages (188-196).

Open Access
ISSN:2682-4558

Research Article

WALANT Technique Versus Conscious Sedation in Minor Hand Surgery

Osama A. A. Mohammed[1], Jozef Z. Attia[1], Tarek A. Abdelzaher[1]
[1] Department of Anesthesia and Intensive Care, Faculty of Medicine, Minia University, Egypt

Abstract
Background; Many hand surgeons are moving away from traditional surgery using a tourniquet and sedation to an approach that utilizes wide-awake local anesthesia and no tourniquet (WALANT). The Primary aim of this study was to evaluate and compare the effect of WALANT technique versus local intravenous anaesthesia in hand surgery regarding patient comfort and time of surgery. The secondary aim of this study was provide safe and effective anaesthesia and analgesia for patient undergoing hand surgery without the need to perform general anesthesia and decreasing hospital stay. **Methods:** This study was performed in Minia university hospital. After taking informed consent, 100 Patients undergoing hand surgry were enrolled in the study based on inclusion and exclusion criteria. For patients who met eligibility criteria, the study physician performed anaesthesia using either methods included in the study (WALANT technique or conscious sedation). Patients were randomized into two groups. Both the patients and investigators were aware of the procedures conducted. **Result:** Blood loss was significantly higher in WALANT group compared to conscious sedation group ($p< 0.001$). The mean VAS score in WALANT group was 3.68± 1.79 and ranged from 0 to 8 while the in conscious sedation group it ranged from 4 to 10 with mean± SD was 6.94± 1.24. VAS score was significantly lower in WALANT group compared to conscious sedation group ($p= 0.001$). **Conclusion:** The WALANT technique was more effective than conscious sedation in relation to pain control. WALANT procedure was associated with lower discomfort (VAS score) among study participants.

Keywords: WALANT technique, Hand surgery, conscious sedation.

Introduction
Many hand surgeons are moving away from traditional surgery using a tourniquet and sedation to an approach that utilizes wide-awake local anesthesia and no tourniquet (WALANT). Lidocaine and epinephrine are the only medications injected for anesthesia and hemostasis [(1)].

The WALANT approach is not appropriate for all patients, but most who can have dental procedures without sedation will do well with this approach.

It was once widely believed that injected epinephrine frequently caused finger ischemia and necrosis. That belief was widespread before 1948 when procaine was the only injectable local anesthetic [(2)].

Before expiration dates were mandated by the FDA in 1972, procaine (pH 3.6) that had become increasingly acidic during storage was used in surgical procedures [(2)].

More finger necrosis occurred with procaine without epinephrine than occurred with procaine combined with epinephrine, but epinephrine was blamed because of its vasoconstrictive effect [(2)]

Level I evidence has shown that phentolamine, an alpha blocker that became available in 1957, reliably reverses epinephrine vasoconstriction in the human finger. However, its use is seldom required in clinical practice [(3)].

Wide-awake local anesthesia no tourniquet (WALANT) technique with the combination of

common drugs, pioneered over the last decade, has seen excellent outcomes.

It has various significant advantages, namely, faster operating time, ability to visualize functional repair of bone and soft tissue while providing adequate tension for tendon repair as well as discarding the tourniquet in hand surgery together with its associated complications[3].

It also provides conscious sedation can produce minimal pain for certain surgical procedures of the hand and wrist, and the technique can be reliably taught to medical students and residents. Most patients feel only the first poke of a 27-gauge needle [4]. The details of the technique with drawings and movies have been published elsewhere [5]

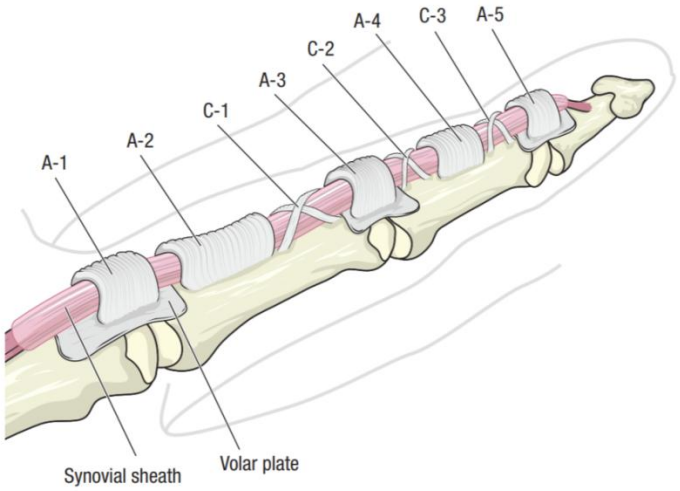

Figure **(1)**: Oblique view of a finger showing annular **(A)** and cruciform **(C)** pulley system of the flexor tendon sheath. Note the volar plates found at the metacarpophalangeal and interphalangeal joints **(Bianchi, Gitto, & Draghi, 2019)**.

Patients and methods

This study was performed in Menia university hospital. After taking informed consent, 100 Patients undergoing hand surgry were enrolled in the study based on inclusion and exclusion criteria. For patients who met eligibility criteria, the study physician performed anaesthesia using either methods included in the study (WALANT technique or Local intravenous). Patients were randomized into two groups. Both the patients and investigators were aware of the procedures conducted.

Inclusion criteria: Age between (18-50) years old, undergoing hand surgery and

Exclusion criteria: Patient refused**,** patient with allergy to local anaesthetics**,** anxiety, psychiatric illness, vascular insufficiency, peripheral vascular disease and patients with bleeding tendency

All patients were subjected to the following

Written informed consent: It was taken before the start of the study. No risks were found and any unexpected risk appearing during the study was cleared to the patients and the committee on time.

Complete history taking: Personal history, any complaint**,** obstetric history, menstrual history, past medical and past surgical history and family history

General examination: To exclude systemic diseases. **Vital signs** (Blood pressure, Temperature, Heart rate, Respiratory rate), **Signs of** (Pallor, Cyanosis, Jaundice, and Lymph node enlargement)

Body Mass Index (BMI): Calculated by dividing weight in kgs by height in meters squared

Temperature obtaining: We used mercury thermometer under septic condition to obtain temperature.

Blood Pressure: Sphygmomanometer had been used to measure the blood pressure.

WALANT technique: In the WALANT method, we used 15 ml of a solution composed of 1% lidocaine and 1: 100,000epinephrine mixed with 1.5 ml of 8.4% sodium bicarbonate to buffer the acidic pH of the lidocaine. The infiltrative local anesthesia was administered

via a 27-gauge needle 30 minutes before the surgery with patients were in a supine position. Finally, a 10-ml subcutaneous injection was administered under the incision mark. At the 25th minute following local anesthetic administration, the patient was prepared and draped by the surgeon.

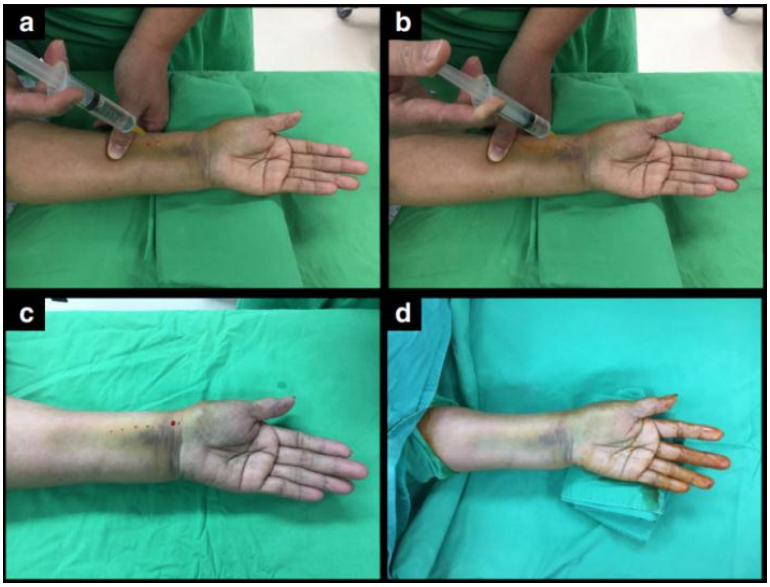

Figure **(2)**: Subcutaneous injection for volar plating. a 1% lidocaine mixed with 1:40000 epinephrine for local anesthesia. b Injection from proximal to distal wherever any incision. c After injection, the injured forearm was sterilized and prepared for operation and wait for the hemostatic effect. d The optimal hemostatic effect was achieved about 18 min after

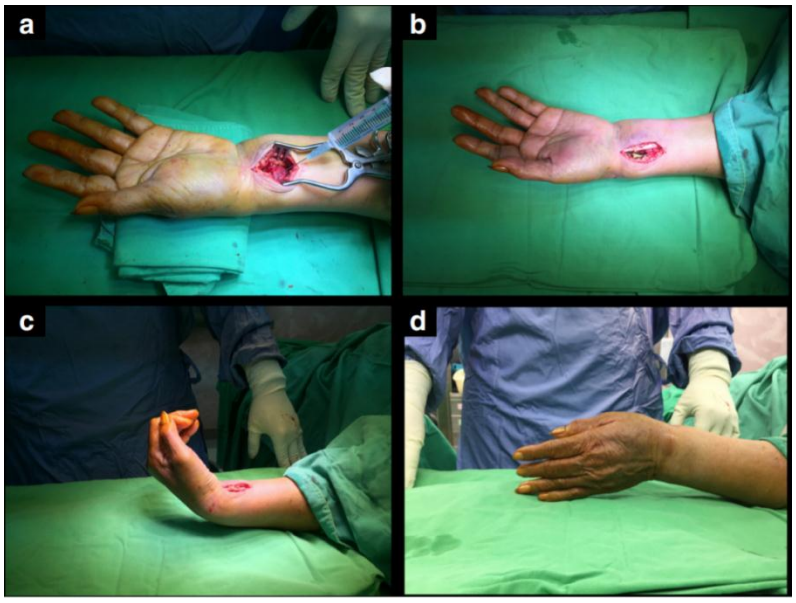

Figure **(3)**: Henry approach via WALANT technique. a Before splitting the pronator quadrates, injected an additional 5 ml of 1% lidocaine mixed with 1:40000 epinephrine beneath it for later procedures. b Volar ORIF with plating. c The patient was required to perform active range of motion with wrist extension and flexion. d Perform radial and ulna deviation (Abitbol, Merlini, Masmejean, Gregory, & Rehabilitation, 2021).

Conscious sedation: In the conscious sedation method, patients were monitored by the anesthesiologist, and intravenous 22-gauge catheters were placed in the other one in another extremity to manage any possible complications and ingect of ketamine and nalufin.

Parameters assessed: Preoperative preparation time, defined as the duration between the injection and skin incision, duration of surgery from skin incision till last suture**,** the surgeon provided a hemostasis score (1–10: 1 as minimal bleeding and 10 as profuse bleeding), the perceived comfort during surgery was quantified using a visual analogue scale (VAS) during and every hour post-operative till 6 hours post-operative, all patients were reviewed in the clinic 2 weeks postoperatively to assess for any complications and hospital Stay

Visual Analogue Scale: The Visual Analogue Scale (VAS) consists of a straight line with the endpoints defining extreme limits such as 'no pain at all' and 'pain as bad as it could be'. The patient was asked to mark his pain level on the line between the two endpoints. The distance between 'no pain at all' and the mark then defined the subject's pain.

Ethical consideration: Informed consent was obtained from all participants after being informed about the aims and process of the study as well as applicable objectives. The study procedures were free from any harmful effects on the participants as well as the service provided.

Statistical Analysis

Data were checked, entered and analyzed using SPSS version 23 for data processing. The following statistical methods were used for analysis of results of the present study. Data were expressed as number and percentage for qualitative variables and mean $\pm$ standard deviation (SD) for quantitative one. Inferential analyses were done for quantitative variables using independent t-test in cases of two independent groups with parametric data and Mann Whitney U in cases of two independent groups with non-parametric data. Inferential analyses were done for qualitative data using Chi square test for independent groups. The level of significance was taken at P value <0.05 is significant, otherwise is non-significant. The p-value is a statistical measure for the probability that the results observed in a study could have occurred by chance.

Results

This study was conducted on 100 patients underwent hand surgery and referred at Menia university hospital. Patients were randomized into two groups according to anesthesia using either methods included in the study (WALANT technique or conscious sedation).

The age of patients in WALANT group ranged from 18 to 60 years with mean ±SD was 39.02± 11.16 years while the in conscious sedation group it ranged from 18 to 60 years with mean± SD was 38.50± 12.23 years with no statistical significant difference between the two groups (p=0.826). Regarding sex, there was no statistically significant difference between WALANT group and conscious sedation group (p=0.229) as there were 40% males and 60% females in WALANT group while in conscious sedation group there were 54% males and 46% females. Table (1)

The weight of patients in WALANT group ranged from 65 to 110 Kg with mean ±SD was 81.42± 10.19 Kg while the in conscious sedation group it ranged from 66 to 109 Kg with mean± SD was 79.74± 8.90 Kg with no statistical significant difference between the two groups (p=0.460). Regarding comorbidities, there was no statistically significant difference between WALANT group and conscious sedation group in terms of hypertension (p=0.766), DM (p=0.295) and other comorbidities (p=0.1440). Table (2)

The mean duration of surgery in WALANT group was 34.62±6.28 minutes and ranged from 21 to 48 minutes while the in conscious sedation group it ranged from 22 to 40 minutes with mean± SD was 30.66±4.61 minutes. Duration of surgery was significantly higher in WALANT group compared to conscious sedation group (p= 0.001). Table (3)

The mean blood loss in WALANT group was 59.0± 29.78 ml while in conscious sedation group the mean loss was 12.0± 21.57 ml. Blood loss was significantly higher in WALANT group compared to conscious sedation group (p< 0.001). Table (4)

The mean VAS score in WALANT group was 3.68± 1.79 and ranged from 0 to 8 while the in conscious sedation group it ranged from 4 to 10 with mean± SD was 6.94± 1.24. VAS score was

significantly lower in WALANT group compared to conscious sedation group (p= 0.001). Table (5)

In the adjusted model (controlling for age, sex and type of surgery), WALANT was still associated with a lower VAS score (B = -1.298, p<0.001). Therefore, WALANT procedure was associated with lower discomfort (VAS score) among study participants.Table (6)

Table (1): Demographic & clinical characteristics among the two groups

		Group A (WALANT group) (n = 50)		Group B (conscious sedation group) (n = 50)		Test value	P-value	Sig.
		N	%	N	%			
Age (years)	**Mean± SD**	39.02± 11.16		38.50± 12.23		T=0.221	0.826	NS
	Median	37.0		36.0				
	Range	18.0- 60.0		18.0- 60.0				
Sex	**Male**	20	40.0%	27	54.0%	X^2=1.445	0.229	NS
	Female	30	60.0%	23	46.0%			

p≤0.05 is considered statistically significant, p≤0.01 is considered high statistically significant,

Table (2): Clinical characteristics among the two groups

		Group A (WALANT group) (n = 50)		Group B (conscious sedation group) (n = 50)		Test value	P-value	Sig.
		N	%	N	%			
Weight (Kg)	**Mean±SD**	81.42± 10.19		79.74± 8.90		Z_{MWU}= 0.738	0.460	NS
	Median	79.0		77.0				
	Range	65.0- 110.0		66.0- 109.0				
Hypertension	**No**	43	86.0%	44	88.0%	X^2= 0.088	0.766	NS
	Yes	7	14.0%	6	12.0%			
DM	**No**	44	88.0%	47	94.0%	X^2= 1.099	0.295	NS
	Yes	6	12.0%	3	6.0%			
Other comorbidities	**No**	48	96.0%	44	88.0%	X^2= 2.174	0.140	NS
	Yes	2	4.0%	6	12.0%			

p≤0.05 is considered statistically significant, p≤0.01 is considered high statistically significant,
SD=standard deviation, -comparison between groups done by Mann-Whitney test, Pearson Chi-Square test

Table (3): Comparison between studied groups according to duration of surgery

		Group A (WALANT group) (n = 50)	Group B (conscious sedation group) (n = 50)	Test value	P-value	Sig.
Duration of surgery	**Mean±SD**	34.62± 6.28	30.66± 4.61	Z_{MWU}= 3.387	**0.001**	HS
	Median	35.0	30.0			
	Range	21.0- 48.0	22.0 – 40.0			

p≤0.05 is considered statistically significant, p≤0.01 is considered high statistically significant,
SD= standard deviation, comparison between groups done by Mann-Whitney test

Table (4): Comparison between studied groups according to blood loss

		Group A (WALANT group) (n = 50)		Group B (conscious sedation group) (n = 50)		Test value	P-value	Sig.
		N	%	N	%			
Blood loss	**No**	3	6.0%	38	76.0%	X^2= 50.64	**<0.001**	HS
	Yes	47	94.0%	12	24.0%			
Amount of blood loss	**Mean±SD**	59.0± 29.78		12.0± 21.57		Z_{MWU}= 7.149	**<0.001**	HS
	Median	50.0		0.0				
	Range	0.0- 150.0		0.0 – 50.0				

p≤0.05 is considered statistically significant, p≤0.01 is considered high statistically significant,
SD= standard deviation, comparison between groups done by Mann-Whitney test

Table (5): Comparison between studied groups according to VAS score

		Group A (WALANT group) (n = 50)	Group B (conscious sedation group) (n = 50)	Test value	P-value	Sig.
VAS score	**Mean± SD**	3.68± 1.79	6.94± 1.24	Z_{MWU}= 7.305	**<0.001**	HS
	Median	3.0	7.0			
	Range	0.0- 8.0	4.0 – 10.0			

p≤0.05 is considered statistically significant, p≤0.01 is considered high statistically significant,
SD= standard deviation, comparison between groups done by Mann-Whitney test

Table (6): Association between techniques of anesthesia and VAS score

	VAS									
	Crude					Adjusted				
Techniques of Anaesthesia	**B**	**P-value**	**OR**	**95% CI**		**B**	**P-value**	**OR**	**95% CI**	
				Lower limit	**Upper limit**				**Lower limit**	**Upper limit**
WALANT * conscious sedation as reference	-1.196	**<0.001**	.303	.195	.468	-1.298	**<0.001**	.273	.164	.455

B: Regression coefficient; OR.: Odds ratio, CI: Confidence interval,

Discussion

This study was conducted on 100 patients underwent hand surgery and referred at Minia university hospital. Patients were randomized into two groups according to anesthesia using either method included in the study (WALANT technique or conscious sedation). The age of the patients ranged from 18 -60 years with the mean value of 38.76 years and a median value of 37 years with 63% of cases had more than 30 years. There were 47 males and 53 females.

The age of patients in WALANT group ranged from 18 to 60 years with mean ±SD was 39.02± 11.16 years while the in conscious sedation group it ranged from 18 to 60 years with mean± SD was 38.50± 12.23 years with no statistically significant difference between the two groups (p=0.826). Regarding sex, there was no statistically significant difference between WALANT group and conscious sedation group (p=0.229) as there were 40% males and 60% females in WALANT group while in conscious sedation group there were 54% males and 46% females.

Our results were supported by study of Srisai,[6] as they reported that there was no statistically significant difference between their studied groups as regard age and sex. There were 46

patients' surgery by using WALANT technique for anesthesia, 63.01% were male, 47.08 years was mean age. Out of 46 patients who underwent surgery using the conventional method of anesthesia, 67.39% were male, 46.13 years was mean age.

Similarly, Okamura et al.,[7] revealed that there was no statistically significant difference between WALANT and conscious sedation groups as regard age and sex. The sample consisted mostly of women (97.2%), with a mean age of 51 years.

The present study showed that the weight of patients in WALANT group ranged from 65 to 110 Kg with mean ±SD was 81.42± 10.19 Kg while conscious sedation it ranged from 66 to 109 Kg with mean± SD was 79.74± 8.90 Kg with no statistically significant difference between the two groups (p=0.460). Regarding comorbidities, there was no statistically significant difference between WALANT group and conscious sedation group in terms of hypertension (p=0.766), DM (p=0.295) and other comorbidities (p=0.1440).

In accordance with our results, study of Lee et al.,[8] as they reported that there was no statistically significant difference between WALANT and conventional groups as regard weight.
Also, Pina et al.,[9] demonstrated that there was no statistically significant difference between both studied groups as regard comorbidities.

The current study showed that the mean preoperative preparation time in WALANT group was 24.18± 4.96 minutes and ranged from 15 to 35 minutes while the in conscious sedation group it ranged from 20 to 30 minutes with mean± SD was 25.24±3.07 minutes. No significant differences found between groups as regards preoperative preparation time (p= 0.201). The mean hospital stay in both groups was 4 days.

The mean duration of surgery in WALANT group was 34.62±6.28 minutes and ranged from 21 to 48 minutes while the in conscious sedation group it ranged from 22 to 40 minutes with mean± SD was 30.66± 4.61 minutes. Duration of surgery was significantly higher in WALANT group compared to conscious sedation group (p= 0.001).

Our results were supported by study of Gunasagaran et al.,[10] as they reported that the mean time for preoperative preparation in WALANT group was 19.17±12.61 min and in conscious sedation/tourniquet group was 7.05± 3.44 min. The difference between these groups was statistically significant ($p < 0.01$). But the average time taken to perform the surgeries in both groups was similar, 17.72±7.32 min under WALANT and 16.64±7.49 min under conscious sedation /tourniquet ($p > 0.05$).

In contrary to our results, study of Lee et al.,[8] as they reported that in each procedure, the operation time was not statistically different between two groups. The preparation time was significantly longer in the WALANT group with a difference of about 20 minutes in all procedures. The difference may be due to different inclusion criteria of selected cases and different experience of surgeons.
However, in the study of Srisai,[6], there was no statistically significant difference between the two groups concerning operative time.

While, in the study of Far-Riera et al.,[11] the time spent in hospital, understood as the time from the patient's admission to hospital to their discharge, was significantly lower, 1h (1–2), in the small operating room group compared to the operating theatre group, 6h (4–7).

Whereas Farzam et al.,[12] stated that no significant difference was found in demographic data including age and sex and duration of surgery between the two groups.
In the study in our hands, the mean blood loss in WALANT group was 59.0±29.78 ml while in conscious sedation group the mean loss was 12.0±21.57 ml. Blood loss was significantly higher in WALANT group compared to conscious sedation group ($p< 0.001$).
However, Gunasagaran et al.,[10] revealed that the blood loss was not significant in WALANT surgeries (mean volume 3.22±2.39 ml; $p = 0.06$) compared to the blood loss in conscious sedation/tourniquet surgeries (mean volume 2.05±1.40 ml).
However, in the study of Srisai,[6] there was no statistically significant difference between the two groups concerning blood loss.

The present study showed that the mean VAS score in WALANT group was 3.68±1.79 and ranged from 0 to 8 while the in conscious

sedation group it ranged from 4 to 10 with mean± SD was 6.94±1.24. VAS score was significantly lower in WALANT group compared to conscious sedation group (p= 0.001). As regard association between techniques of anesthesia and VAS score. In the adjusted model (controlling for age, sex and type of surgery), WALANT was still associated with a lower VAS score (B= -1.298, p<0.001). Therefore, WALANT procedure was associated with lower discomfort (VAS score) among study participants.

Our results were in line with study of Ruxasagulwong et al.,[13] as they reported that tourniquet arm pain score was significantly higher in the conventional group (0.03±0.18 vs. 3.82±2.12).

Also, Iqbal et al., [14] demonstrated that patients undergoing carpal tunnel decompression with an arm tourniquet experienced significantly more pain and discomfort (mean VAS = 4.6, median VAS = 5) as compared with those who had their operation performed without a tourniquet (mean VAS = 2.8, median VAS = 2.5) (p = 0.003, 95% CI = 0.60 to 2.98).

Lee et al.,[8] observed that postoperative pain was significantly lower in the WALANT group until one day after surgery, and there was no significant difference thereafter. The biggest difference in pain scores was at 6 hours after surgery. The use of analgesics was significantly lower in the WALANT group until the second day after surgery, and there was no significant difference thereafter.

Similarly, Farzam et al., [12] stated that the need for analgesia and severity of pain (VAS) during surgery and one hour later were significantly less in WALANT group.

Furthermore, Okamura et al.,[12] reported that as regard pain (VAS); there were statistical differences between the groups at the following times: trans-operative period, immediate post-operative period, 2 hours, 4 hours, 6 hours and 8 hours. Statistical differences with clinical relevance (> 2 VAS points) occurred in the immediate postoperative period and 2 hours after surgery.

However, in the study of Srisai,[6] there was no statistically significant difference between the two groups concerning pain scores pre-operative, pain score intraoperative and overall patient satisfaction.

Conclusion

The WALANT technique was more effective than conscious sedation in relation to pain control. WALANT procedure was associated with lower discomfort (VAS score) among study participants.

References

1. Lalonde D, Martin A. E pinephrine in local anesthesia in finger and hand surgery: The case for wide-awake anesthesia. J Am Acad Orthop Surg 2013; 21 (8):443-447.
2. Thomson CJ, Lalonde DH, Denkler KA, Feicht AJ. A critical look at the evidence for and agai nst elective epinephrine use in the finger. Plast Recomtr Sur;g 2007; 11 9(1): 260-266.
3. Lalonde DH, Bell M, Benoit P, Sparkes G, Denkler K, Chang P. A multicenter prospective study of 3,110 consecutive cases of elective epinephrine use in the fingers and hand: The Dalhousie Project clinical phase. J Hand Sur gAtll 2005; 30(5):1061-1067.
4. Lalonde DH. "Hole-in-one" local anesthesia for wide-awake carpal tunnel surgery. Plast Reconstr Surg 2010;126(5): 1642-1644.
5. Farha ngkhoee H, LalondeJ, Lalonde DH. Teaching med ical students and residents how to inject local anesthesia almost painlessly. Can J Plast Surg 2012; 20(3):169-172.
6. Srisai, C. Comparison of Effectiveness in Flexor Tendon Hand Repairs between WALANT Technique and Conventional Method. The Thai Journal of Orthopaedic Surgery. 2020; 44(3-4), 19-25.
7. Okamura A, Moraes V, Fernandes M, Raduan-Neto J, Belloti J. WALANT versus intravenous regional anesthesia for carpal tunnel syndrome: a randomized clinical trial. Sao Paulo Medical Journal. 2021; 139, 576-578.
8. Lee S, Kim S, Choy W. A randomized controlled trial of minor hand surgeries comparing wide awake local anesthesia no tourniquet and local anesthesia with tourniquet. Orthopaedics & Traumatology: Surgery & Research. 2020; 106(8), 1645-1651.
9. Pina M, Cusano A, LeVasseur M, Olivieri-Ortiz R, Ferreira J, Parrino A. Wide Awake Local Anesthesia No Tourniquet Technique in Hand Surgery: The Patient

Experience. HAND. 2021; 15589447211058838.
10. Gunasagaran J, Sean E, Shivdas S, Amir S, Ahmad T. Perceived comfort during minor hand surgeries with wide awake local anaesthesia no tourniquet (WALANT) versus local anaesthesia (LA)/tourniquet. J. Orthopaedic Surgery (Hong Kong). 2017; 25(3).
11. Far-Riera A, Pérez-Uribarri C, Jiménez M, Serrano M, González J, Hernández I. Prospective study on the application of a WALANT circuit. Revista Española de Cirugía Ortopédica y Traumatología (English Edition), 2019; 63(6), 400-407.
12. Farzam R, Deilami M, Jalili S, Kamali K. Comparison of Anesthesia Results between Wide Awake Local Anesthesia no Tourniquet (WALANT) and Forearm Tourniquet Bier Block in Hand Surgeries: A Randomized Clinical Trial. The archives of bone and joint surgery, 2021;9(1),116-121.
13. Ruxasagulwong S, Kraisarin J, Sananpanich K. Wide awake technique versus local anesthesia with tourniquet application for minor orthopedic hand surgery: a prospective clinical trial. J Med Assoc Thai, 2015; 98(1), 106-110.
14. Iqbal H.J, Doorgakant A, Rehmatullah N, Ramavath A, Pidikiti P, Lipscombe S. Pain and outcomes of carpal tunnel release under local anaesthetic with or without a tourniquet: a randomized controlled trial. J. Hand Surg. Eur. 2018; 43(8):808–812.
15. Bianchi, S., Gitto, S., & Draghi, F. J. J. O. U. I. M. (2019). Ultrasound features of trigger finger: review of the literature. 38(12), 3141-3154.
16. Abitbol, A., Merlini, L., Masmejean, E. H., Gregory, T. J. H. S., & Rehabilitation. (2021). Applying the WALANT technique to surgical treatment of distal radius fractures. 40(3), 277-282.
17. Huang, Y.-C., Hsu, C.-J., Renn, J.-H., Lin, K.-C., Yang, S.-W., Tarng, Y.-W., . . . research. (2018). WALANT for distal radius fracture: open reduction with plating fixation via wide-awake local anesthesia with no tourniquet. 13(1), 1-11.