

Anesthetic locoregional blocks in traumatology emergencies. WALANT Surgery

Ortega Yago^{1,2}, Amparo; Baixauli Perelló, Emilio²

*In traumatology, the use of locoregional anesthesia techniques is becoming more widespread, both for
traumatological emergencies and for upper limb surgeries.¹⁻³ and lower⁴⁻⁶.*

*By learning these techniques, it is possible to carry out, and without the need for general anesthesia, various
procedures that facilitate a greater recovery of the patient and even their collaboration while the intervention
is being performed, thanks to the Walant technique.*

(Wide awake, local, anesthesia, no tourniquet)

*For this, a good knowledge of both the anatomy and the characteristics of the anesthetics and adjuvants that
we will use to perform the locoregional blocks will be necessary.*

1Corresponding author: Amparo Ortega Yago. The Faith Hospital. ortegayago94@gmail.com 2 La Fe
Hospital, Av Fernando abril martorell 106, Valencia Spain

INTRODUCING THE WALANT

A technique that is becoming increasingly popular is the WALANT. The WALANT refers to "wide, awake, local, anesthesia, no tourniquet", that is, in the intervention the patient is awake, performed with local anesthesia and without a tourniquet.

The advantages of the Walant is that it is a technique that does not require an ischemia cuff, and therefore the surgeon is not limited by its time. Among other advantages is that the patient can collaborate in the surgical intervention, and that it does not require an intravenous route or monitoring since the anesthesia is local.

LOCAL ANESTHETICS

The anesthetics used in this technique are very varied. Classically, they have been divided between esters (practically not used) and amides, with lidocaine being used in traumatology, with a faster onset of action, and mepivacaine, with a slower onset of action but the safest at the cardiovascular level. Another of the virtues of

mepivacaine is that it produces less vasodilation than lidocaine.

Regarding LA toxicity, it should be noted that it can occur locally on the nerve, or it can be systemic (whether due to overdose or intravascular injection)⁶.

The first symptom that the patient will refer to us and that should alert us that the anesthetic has passed into the circulation is that he reports a metallic taste of the tongue and mouth. Other possible effects include dizziness,

and at a cardiovascular level with higher doses of hypertension and tachycardia.

ADJUVANTS

What about adjuvants for anesthesia?

ADRENALIN

A question that often arises for the surgeon is whether he can use adrenaline together with local anesthesia. classically it has transmitted for generations that adrenaline together with local anesthetic produces distal necrosis.

This bad reputation comes from the fact that before 1950 procaine was used as a local anesthetic. The alarm went off in 1948, when they realized that administering procaine - without adrenaline - produced tissue necrosis.

This is explained by the fact that procaine has a much lower pH than lidocaine (may even be less than 1) and also because sometimes they used expired bottles of procaine because the law did not require recording expiration dates on local anesthetics. ⁸

Type of Local Anesthetic Used	Digital Infarction Cases	
	with Local Anesthesia with Epinephrine	with Local Anesthesia without Epinephrine
Procaine (Novocaine)	1 ^{12-15,17-20,22-25}	13 (2,14,26,28-30,32)
Unknown agent	1 ¹⁸	2 (3,17,21-26)
Cocaine	2 ²¹	4 (4,27)
Eucaine		1 ¹⁸
Water		1 ¹⁸
Lidocaine	0	0
Total	21	27

Table 1: It is observed that lidocaine with and without adrenaline has a much lower risk compared to other local anesthetics of producing distal infarcts.⁸

Cochrane has recently published a systematic review where no finds evidence for or against the use of adrenaline with local anesthesia ⁹. Without

However, there is increasing evidence that using epinephrine with local anesthetics in distal areas is

10-13 safe

Normally the proportions are usually 1:10,000. Today there are multiple combinations, such as articaine and adrenaline.

There is an antidote called phentolamine.

This drug is an alpha blocker, and reverses the effect of adrenaline in approximately 80 minutes. The application ratio of phentolamine is 1:1 with respect to adrenaline.¹⁴

Even so, it is usual to try to avoid the use of adrenaline in patients with cardiovascular diseases or who take drugs such as MAOIs.

BICARBONATE

Some anesthetics tend to local have precipitate easily, which causes pain to the patient. That is why the use of bicarbonate at 8.4% in

10:1 ratio (lidocaine:bicarbonate) is widely established to decrease injection pain in patients

15.16

SPECIAL CASES

PREGNANT AND WOMEN GIVING LACTATION

lidocaine

The use of lidocaine is category B in pregnant women. Therefore, it can be used if the benefit is greater than the risk.

17

Lidocaine is excreted in breast milk in small doses. Caution must be exercised when using it, although the side effects in the infant would be

rare and would be related to allergic or idiosyncratic reactions. 17

Mepivacaine

The use of lidocaine is category C in pregnant women. Therefore, only

should used if the benefit is much greater than risk. 18

It is not known whether mepivacaine is excreted in milk, therefore it must be administered with caution. 18

PEDIATRIC AGE

lidocaine

It can be used with caution adjusting the doses to the weight of the patient.

17

Mepivacaine

It can be used with caution adjusting the doses to the weight of the patient.

18

LOCO-REGIONAL LOCKDOWNS IN TRAUMATOLOGY

UPPER EXTREMITY

The upper extremity is the most common site where the loco regional block is performed, both in trauma emergencies and in surgery.

The main blocks in traumatology are:

Block terminal branches of the wrist

1.radial

- What is anesthetized: Back of the hand (first fingers + radial edge of 4)

- How to anesthetize: Find the

radial styloid and radial artery.

Anesthetic is injected, and the needle is moved posteriorly along the radial border to the dorsal aspect of the styloid.

The radial nerve usually requires infiltration at different points to

adequately cover the
territory of the curvature around
of the wrist

Many times requires more anesthetic than
normal (>10 ml)

This nerve is superficial, therefore, it requires
No excessively deep infiltration.

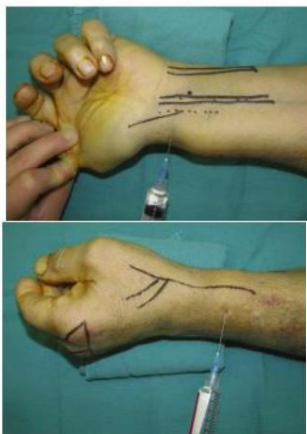
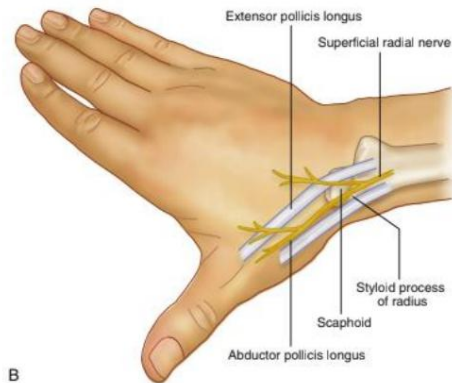


Image 1: location of the radial nerve and its anesthesia. 19



Image 2: location of the ulnar. 19

The ulnar nerve can be anesthetized by both the volar and the dorsal nerves, however its easiest access and with less risk is at the volar level.

3. Medium

- What is anesthetized: Fly face of 1, 2 and 3 fingers and radial half of 4.
- How it is anesthetized: Wrist flexion, palmaris major tendon and flexor carpi radialis are identified, and it is infiltrated in the middle.

Be careful with the needle, it is worth not injecting so deeply so as not to injure the nerve.

2. ulnar

- What is anesthetized: 4th finger and 5th finger ulnar edge is anesthetized on the dorsal side and volar.
- How to anesthetize: Wrist in hyperextension.
Look for ulnar pulse and flexor carpi ulnaris tendon.
Inject into the ulnar border of the FCU.

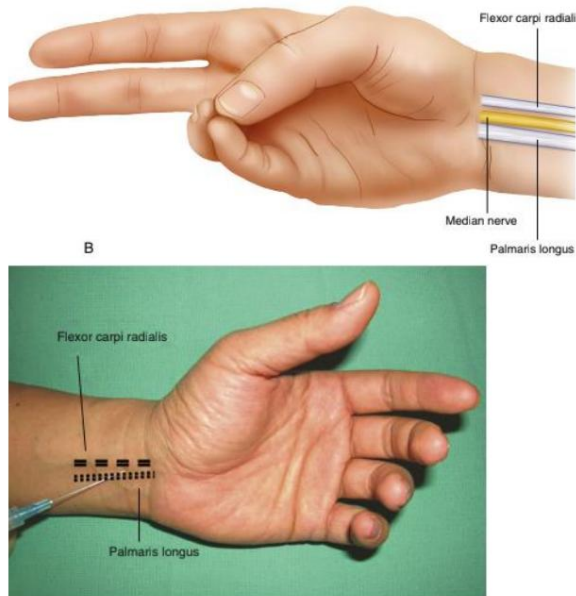


Image 3: location of the median nerve and its anesthesia. 19

Intermetacarpal block -

What is anesthetized: a more complete anesthesia at the distal level is achieved by local injection of the nerve prior to its bifurcation.

- How it is anesthetized: a level metacarpal is injected laterally with local anesthetic.

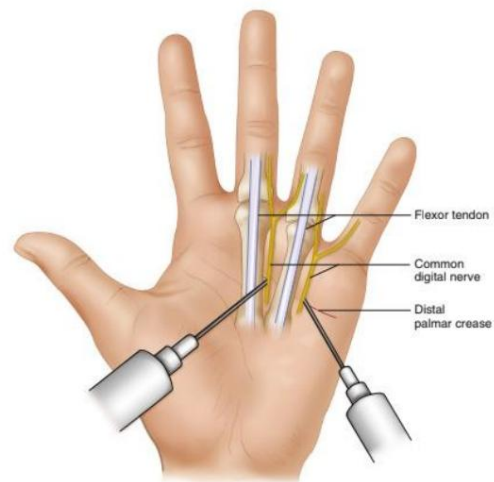
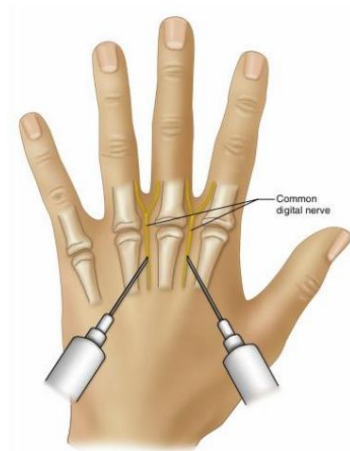


Image 3: intermetacarpal block; anesthesia technique. 19

Digital lock.

There are two main techniques for digital anesthesia:

- Single injection at flying level.
Sometimes the distal dorsal part of the finger is not anesthetized. 20.21
- Two injections at dorsal level.
Sometimes the part of the ball of the finger is left without anesthetizing. 20.21

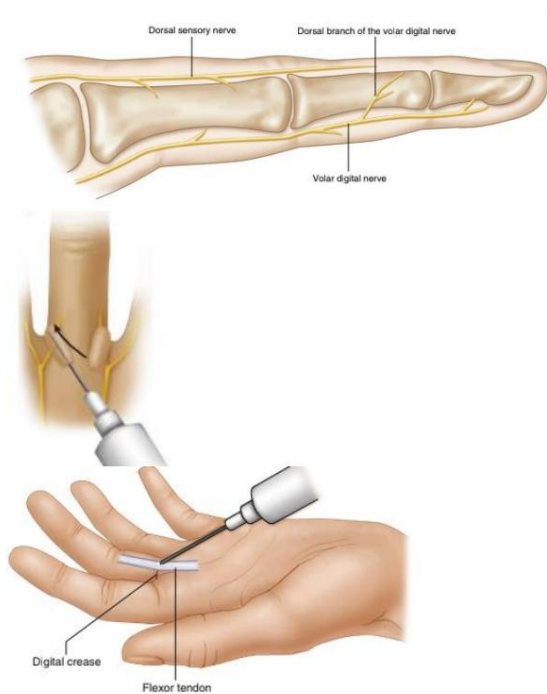


Image 4: digital lock; dorsal and volar injection. 19

WHAT IF I DON'T USE ADRENALINE? ISCHEMIA TECHNIQUES

There are two widely used ischemia techniques. The first of these is to use a manual sphygmomanometer and keep it at a higher pressure than arterial. In this way ischemia of the upper limb is achieved temporarily.

Another of the widely used techniques at the level of the fingers is to use a glove as a ring in such a way that it produces distal ischemia. It should be remembered that if this technique is used, it will be necessary to place a mosquito and then always remember to remove the glove. If it were left and we applied a bandage on top of that, we could produce the same effect as that of a ring that cannot be removed on a swollen finger.

LOWER LIMB

The lower extremity block is increasingly having greater applications both in traumatology emergencies and in day-to-day surgeries.

Block terminal branches of the ankle

1. Superficial peroneal

- What is anesthetized: The distal lateral region of the leg, the dorsum of the foot and the toes (except the first web space)
- How to anesthetize: Palpate the lateral malleolus and go proximal 8-10 cm anterior to the edge of the tibial shaft

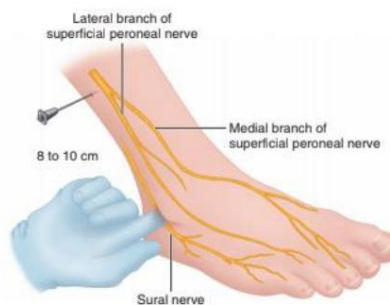


Image 5: location of the superficial peroneal nerve and its anesthesia. 19

2. Deep peroneal

- What is anesthetized: The first interdigital space.
- How to anesthetize: The anterior tibial artery can be palpated 4-5 cm from the ankle joint. The tendon of the tibialis anterior, the common extensor digitorum, and the extensor hallucis are used.

If the artery is not palpable, use the tendon of the tibialis anterior cm as a reference and infiltrate lateral to 1-5 cm

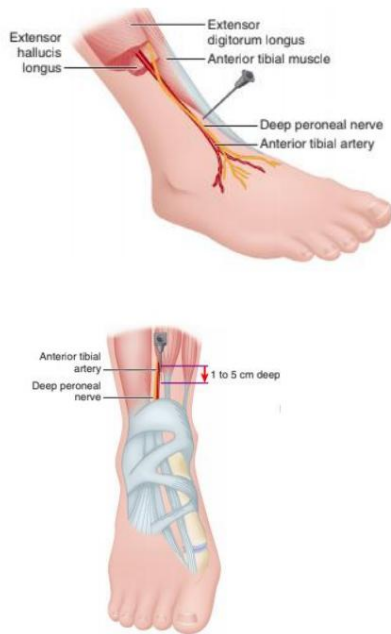


Image 6: location of the deep peroneal nerve and its anesthesia. 19

3. Saphenous

- What is anesthetized: Medial face of the foot.
- How to anesthetize: palpate the medial malleolus, and 3-5 cm, introduce the syringe. The saphenous nerve is medial to the saphenous vein.



Image 7: location of the saphenous nerve and its anesthesia. 19

4- sural

- What is anesthetized: The lateral face of the foot.
- How to anesthetize: Palpate the lateral malleolus. 5 cm proximal to the malleolus, the peroneus longus tendon is palpated attached to the subcutaneous edge of the fibula. Halfway between the tendon and the Achilles tendon passes the sural nerve.

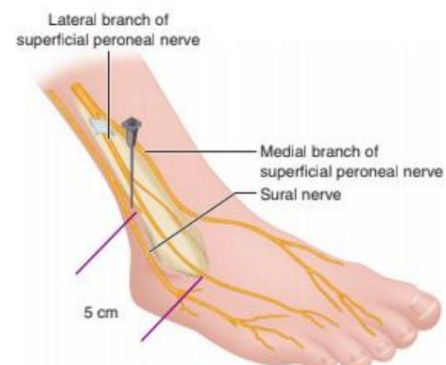


Image 8: location of the sural nerve and its anesthesia. 19

5. Tibial

- What is anesthetized: the heel, and by the two branches that it gives a posteriori; the medial part of the plant, and the three and a half medial fingers (1° to 4°), including the nails, and the lateral plant, and one and a half lateral fingers (4° and 5°).
- How to anesthetize: palpate the posteromedial edge of the tibia, 5 cm proximal to the medial malleolus. The flexor digitorum longus and the tibialis posterior tendon are sought. The medial border of the Achilles tendon is then palpated. Halfway between the two, the artery passes.



Image 9: location of the tibial nerve and its anesthesia. 19

Digital block In

the digital block of the foot the same techniques are performed as in the digital block of the hands.

BIBLIOGRAPHY

- 1- Hagert E. Clinical diagnosis and wide-awake surgical treatment of proximal median nerve entrapment at the elbow: a prospective study. *Hand (NY)*. 2013 Mar;8(1):41-6
- 2- Denkler K. Dupuytren's fasciectomy in 60 consecutive digits using epinephrine lidocaine with and no tourniquet. *PlastReconstrSurg*. 2005 Mar;115(3):802-10
- 3- Farhangkhoe H, Lalonde J, Lalonde DH. Wide-awake trapeziectomy: video detailing local anesthetic injection and surgery. *Hand (NY)*. 2011 Dec;6(4):466-7
- 4- Matsuda T, Taniguchi A, Hayashi K, Nakanishi Y, Tanaka Y. Obtaining Adequate Tension for Extensor Hallucis Longus Tendon Rupture Repair Using Wide-Awake Surgery: A Case Report. *J Foot Ankle Surg*. 2018 Mar-Apr;57(2):414-417
- 5- Wright J, MacNeill AL, Mayich DJ. A prospective comparison of wide awake local anesthesia and general anesthesia for forefoot surgery. *FootAnkleSurg*. 2019 Apr;25(2):211-214
- 6- MacNeill AL, Mayich DJ. Wide awake foot and ankle surgery: A analysis. retrospective. *FootAnkleSurg*. 2017 Dec;23(4):307-310. doi:10.1016/j.fas.2016.09.004. Epub 2016 Oct 5
- 7- Lirk P, Picardi S, Hollmann MW. Local anesthetics: 10 essentials. *euro J Anaesthesiol*. 2014 Nov;31(11):575-85
- 8- Thomson CJ, Lalonde DH, Denkler KA, Feicht AJ. A critical look at the evidence for and against elective epinephrine use in the finger. *PlastReconstrSurg*. 2007 Jan;119(1):260-6
- 9- Prabhakar H, Rath S, Kalaivani M, Bhandari N. Adrenaline with lidocaine for digital nerve blocks. *Cochrane DatabaseSyst Rev*. 2015 Mar 19;(3)
- 10- Lalonde D, Eaton C, Amadio P, Jupiter J. Wide-awake Hand and Wrist Surgery: A New Horizon in Outpatient Surgery. *InstrCourseLect*. 2015;64:249-59
- 11- Muck AE, Bebarta VS, Borys DJ, Morgan DL. Six years of epinephrine digital injections: absence of significant local or systemic effects. *Ann EmergMed*. 2010 Sep;56(3):270-4
- 12- Lalonde D, 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 Surg Am*. 2005 Sep;30(5):1061-7
- 13- Chowdhry S, Seidenstricker L, Cooney DS, Hazani R, Wilhelmi BJ. Do not use epinephrine in digital blocks: myth or truth? PartII. A retrospective review of 1111 cases. *PlastReconstr Surg*. 2010 Dec;126(6):2031-4
- 14- Nodwell T, Lalonde D. How long does it take phentolamine to adrenaline-reverse induced vasoconstriction in the finger and hand? A prospective, randomized,

- blinded study: The Dalhousie project
experimental phase. Can J Plast
Surg. 2003 Winter;11(4):187-90
- 15- Quaba O, Huntley JS, Bahia H,
McKeown DW. A users guide for
reducing the pain of local anesthetic
administration.
EmergMed J. 2005 Mar;22(3):188-9
- 16- Kouba DJ, LoPiccolo MC, Alam M,
Bordeaux JS, Cohen B, Hanke CW,
JellinekN, Maibach HI, Tanner JW,
Vashi N, Gross KG, Adamson T ,
Begolka WS, MoyanoJV. Guidelines
for the use of local anesthesia in
office-based dermatologic surgery.
J Am Acad Dermatol. 2016
Jun;74(6):1201-19
- 17- Drugs.com [Internet]. [Lidocaine](https://www.drugs.com/mtm/lidocaine-injection.html)
information from drugs.com;
c1996-2018 [Updated: 12 June 2018].

Available from: [https://www.drugs.c
om/mtm/lidocaine-injection.html](https://www.drugs.com/mtm/lidocaine-injection.html)
- 18-Drugs.com [Internet]. Mepivacaine
information from drugs.com;
c1996-2018 [Updated: 13 May 2019].
Available

from: [https://www.drugs.com/mtm/
mepivacaine.html](https://www.drugs.com/mtm/mepivacaine.html)
- 19- Canale ST, Beaty J. Campbell's
Operative Orthopedics, 12th ed.
Mosby; 2012.
- 20-Williams JG, Lalonde DH.
Randomized comparison of the
single-injection volar subcutaneous
block and the two-injection dorsal
block for digital anesthesia.
PlastReconstr Surg. 2006
Oct;118(5):1195-200
- 21- Wheelock ME, Leblanc M, Chung B,
Williams J, Lalonde DH. Is it true that
injecting palmar finger skin hurts
more than dorsal skin? New
level 1 evidence. Hand (NY). 2011
Mar;6(1):47-9. doi: 10.1007/
s11552-010-9288-2. Epub 2010 Sep 11