

## Wide Awake Hand Surgery Handbook

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### **Introduction**

In the current climate of the COVID-19 crisis our access to theatres and anaesthetic support will be limited. We will need to work flexibly and be imaginative about ways to treat patients whilst maintaining a high level of care.

Wide Awake Hand Surgery – or more commonly referred to as WALANT (Wide Awake Local Anaesthesia No Tourniquet) is one way that we can continue to treat patients with hand and wrist injuries without an anaesthetic team and crucially without generating aerosolised particles and putting our and our colleagues lives at greater risk.

### **What is it?**

WALANT uses a mixture of lignocaine and adrenaline to provide anaesthesia and haemostasis in one injection. It is used in a “field block” technique where large volumes of mixture (see “Safe dose” below) are infiltrated everywhere that needs to be anaesthetic during the case.

### Adrenaline

The adrenaline causes local haemostasis, so the skin will go white where you have injected but it does not prevent larger arterial or venous flow. It has been proven to be safe to inject dilute adrenaline mixtures into digits. The area of infiltration should cover the sites of incision for the haemostatic effect of the adrenaline e.g. inject proximally when operating on the digit for anaesthesia but into the pulp or over each phalanx for the adrenaline effect where the incisions will be placed. No anticoagulants need to be stopped pre-operatively.

### Timing

Wait a minimum 15 – 20 minutes from injection to incision for haemostatic effect of adrenaline but you can wait up to 90-120 minutes before operating. The field will be drier the longer you wait as the fluid will have dispersed. Organising one’s time is important to the success of WALANT. One approach is to inject in the anaesthetic room, start (usually 15 minutes later anyway once scrubbed) and by the time you have your exposure the bed has dried sufficiently to do continue with the procedure. An alternative is to leapfrog cases, injecting on the ward (no monitoring etc.) and always injecting 1-2 cases ahead of yourself.

## Tourniquet

A tourniquet can be applied but not inflated unless required. Not having a tourniquet inflated removes any time constraint and also the pain that they cause. Ischaemic pain after 15-20 minutes from tourniquets also prevents full muscle/tendon unit gliding so can prevent active testing of repairs or reconstructions. Reperfusion is also very painful. The surgical site will not be "dry" but should not cause undue interference with the operation. Forearm tourniquets may be less painful than proximal in some surgeons experience. Generally you will find that you need a couple of extra swabs per 15 minutes of operating compared to the bloodless field provided by a tourniquet. This is normal.

## Duration of action

1% lignocaine with 1:200 000 adrenaline will last 4-5 hours. 0.5% bupivacaine will last up to 15 hours but be mindful of the fact that pain sensation will return before protective sensation.

## **What to use**

- 1% lignocaine with 1:200 000 adrenaline pre-mixed or DIY solution (see appendix)

### Optional

- 8.4% bicarbonate (1ml per 10mls solution – see Appendix)
- 0.5% bupivacaine (injected either combined with lignocaine/adrenaline mixture or at the end of the case, for longer term pain relief)

## **Safe doses for average 72kg patient**

- 50mls 1% lignocaine with 1:200 000 adrenaline (7mg/kg)
- If more is needed – add saline (0.5% Lignocaine is still markedly effective)
- 30mls 0.5% bupivacaine (2mg/kg)

## **Cases that should be considered for WALANT (not exclusive)**

### Hand

- Any single digit injury involving nail, bone, nerve, tendon, with no vascular compromise - (suspected single vessel injuries are NOT a contraindication to this technique) – e.g. thumb UCL, flexor, extensor etc.
- Any multiple digit injury involving nail, bone, nerve tendon, with no vascular compromise that can be completed within 2 hours
- Metacarpal fractures and/or dislocations e.g. MCPJ / CMCJ
- Superficial infections of the digit tip
- Superficial foreign bodies of the digit

### Wrist & forearm

- Lacerations which are likely to be completed within 2 hours, including multiple tendon or single large vessel injury – consider temporary tourniquet
- Soft tissue cover requiring simple or pedicled flaps or skin grafts

- Simple carpal fractures e.g. scaphoid, trapezium or hamate

#### **Cases that should be performed under other anaesthetic**

- Complex single/multiple digit injuries that require revascularisation or replantation
- Wrist injuries that are likely to take longer than 2 hours
- Penetrating Injuries proximal to the distal third forearm
- Deep foreign bodies of the palm and wrist and forearm
- Deep infection cases of the digit, palm wrist or forearm
- Soft tissue cover requiring free flaps

#### **Patient considerations for general anaesthesia/ contraindications for WALANT**

- Documented hypersensitivity to lignocaine e.g. allergy
- Compromised peripheral circulation - Patients with previous vascular injury, vasculitis, Buerger's disease, scleroderma
- Patient does not wish to be awake
- Patient who you suspect will be anxious and non-compliant to instruction
- Paediatric cases
- Patient with infection at sites of injection
- Cardiac disease – consider diluting adrenaline 1:400 000

#### **Rare complications/ Reversal of WALANT**

In cases where the finger remains white after 4 hours - rewarm the finger, massage the digit, locate phentolamine (1mg in 1ml) and inject at previous injection sites or topically for reversal. *Bear in mind that Don Lalonde has never used phentolamine.*

## Appendices

- Research and dissemination of learning
- Advantages
- Disadvantages
- Tips and tricks
- DIY solution
- Palmar blocks
- Dorsal blocks
- Pharmacology
- References
- Links

### Research and dissemination of learning

There will be an increasing number of unique cases that will be managed by WALANT and there is an opportunity here to document some interesting cases. Local and national information governance guidance should be followed and documented but subject to the appropriate consents please consider sharing cases on social media (LinkedIn/Instagram/Twitter #walant for example) and conference presentations.

### Advantages

- Anaesthetist is not required
- Intraoperative education of patients
- Pre-assessment is not usually required
- Intraoperative motion is possible to test repair, reconstruction, or transfer of tendons etc.
- No need to starve or stop medication (including anticoagulants) preoperatively
- No need for intraoperative monitoring – check local policies
- Provides postoperative analgesia
- Facilitates postoperative rehabilitation
- Reduces postoperative opiate use
- Facilitates day-case surgery and early discharge (useful in current crisis)

### Disadvantages

- There is a learning curve as the surgical field is not as dry as when using a tourniquet.
- Shorter duration of action than regional block
- Surgeon needs to leave approximately 20 minutes between injection and incision for haemostatic effect of adrenaline to take maximal effect.

### Tips and tricks

- Use as much volume as you think you will need to cover the entire area of the operation, volar and dorsal sides (innervation is extensive and 360 degrees on the whole)

- Younger patients are prone to fainting. Inject lying down and raise legs if fainting occurs
- Buffering can reduce pain and increase speed of onset (see pharmacology)
- Warm solution to room temperature before injection
- Start injections proximally and work distally
- Use 27-gauge (40mm)
- Inject *slowly, perpendicular* to skin
- Steady syringe to avoid movement of needle tip
- Start by injecting 1– 2ml subcutaneously then wait. When stinging stops, continue injection
- *Inject ahead of the needle tip*
- If repositioning needle reinsert into blanched skin, 1cm behind leading edge of tumescence
- Pts will still feel vibration and must be warned to avoid anxiety
- Use the SIMPLE technique for digital blocks (<https://walant.surgery/walant-university>)

### DIY solution

Make 20ml 1% Lidocaine with adrenaline (1:200,000):

- Using a 1ml syringe, draw up 0.1ml adrenaline (from 1:1000 ampoule)
- Add the adrenaline to a syringe of 20ml 1% Lidocaine (plain) – (option: add 2ml 8.4% bicarbonate)

### Palmar blocks

- Palm or wrist: 5-10mls subcutaneously
- Into pulp over P1 or P2: 2mls
- Over pulp of P3: 1ml

### Dorsal blocks

- Wrist or dorsum of hand: 5-10mls
- SIMPLE block (dorsally): 2mls subcutaneously at level of MCPJ
- Into skin over dorsum of digit: 2-3mls per phalanx (not usually required over P3)

### Pharmacology

LAs are *weak bases*

pKa value lignocaine is 7.9: pH at which 50% is ionised/non-ionised

The generic equation for a base is:



- Local anaesthetics cross the cell membrane in an un-ionised state
- Flow across interstitial space is faster in an ionised state
- So having pH of LA close to pKa means better balance between crossing interstitial space and cell membrane so faster onset of action hence the use of buffering
- LA binds to intracellular Na<sup>+</sup> channels to block action potentials and nerve function

- Acidic tissue (e.g. infected tissue) has more H<sup>+</sup> therefore there is less availability of unionised form to cross cell membrane so less efficacious in presence of infection.

## References and links

Walant Basics: <https://walant.surgery/course/introduction-to-walant/>

SIMPLE block: <https://walant.surgery/course/simple-block/>

Flexor tendon repair: <https://walant.surgery/walant-university/flexor-tendon-repair/>

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A critical look at the evidence for and against epinephrine use in the finger: [https://walant.surgery/wp-content/uploads/Articles/Adrenaline\\_myth/critical-look-at-epinephrine-evidence-of-safety-in-fingers.pdf](https://walant.surgery/wp-content/uploads/Articles/Adrenaline_myth/critical-look-at-epinephrine-evidence-of-safety-in-fingers.pdf)

Optimal Time Delay between Epinephrine Injection and Incision to Minimize Bleeding: [https://walant.surgery/wp-content/uploads/Articles/Adrenaline\\_myth/april-2013-epinephrine-timing.pdf](https://walant.surgery/wp-content/uploads/Articles/Adrenaline_myth/april-2013-epinephrine-timing.pdf)

A Multicenter Prospective Study of 3,110 Consecutive Cases of Elective Epinephrine Use in the Fingers and Hand: The Dalhousie Project Clinical Phase:

[https://walant.surgery/wp-content/uploads/Articles/Adrenaline\\_myth/Denkler\\_Epi\\_in\\_fingers.pdf](https://walant.surgery/wp-content/uploads/Articles/Adrenaline_myth/Denkler_Epi_in_fingers.pdf)

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Huang et al. Comparison of Wide-Awake Local Anesthesia No Tourniquet With General Anesthesia With Tourniquet for Volar Plating of Distal Radius Fracture. Orthopedics. 2019;42(1):e93-e98. <https://doi.org/10.3928/01477447-20181206-01>

Walant trauma: <https://walant.surgery/walant-university/trauma/>