



## Faculty of Pain Medicine

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# Pain-Orientated Sensory Testing ('POST') Guidelines

### PREAMBLE

These guidelines outline *standardised* terminology, equipment and techniques for *Pain-Orientated Sensory Testing* ('POST') during clinical examination, for Fellows and Trainees of the *Faculty of Pain Medicine, Australian and New Zealand College of Anaesthetists* (FPM).

Because such a wide variety of sensory testing techniques are used in clinical practice, the Faculty developed these guidelines to facilitate a consistent and practical approach for pain medicine practitioners, particularly those presenting for FPM examinations.

POST is based on the publications listed in the references [1-5], and on the Faculty's *Pain Oriented Physical Examination* (POPE) guidelines [6].

### 'POST' STANDARDISED EQUIPMENT CHECKLIST

- Camel hair brush (1 cm brush width)
- Cotton wool balls
- Cocktail sticks (toothpicks)
- Neurotips™ (optional)
- 128 Hz stainless steel tuning fork ('large' size with a flat base plate)
- 50 mm paper clips (for two-point discrimination testing)
- Tendon hammer (larger size)
- Tape measure (flexible) (two-point discrimination testing & measuring surface area)
- Marker pen (for mapping areas of altered skin sensation)
- Timer/stopwatch
- Alcohol wipes (for sterilisation of camel hair brush between patients)
- Sharps container
- OPTIONAL: Water bath, thermometer & C-size batteries (warmth allodynia testing)

### COMPARING 'SIDES' AND 'SITES' IN SENSORY TESTING

- ✓ In order to detect *altered skin and soft tissue* sensation which is the aim of 'POST', always compare *symmetrical anatomical sites* (right versus left) and '*abnormal*' with (*presumably*) '*normal*' sites, in a systematic fashion.

## 'POST' TERMINOLOGY AND CLINICAL TESTING TECHNIQUES

### ALLODYNIA

- ✓ "Pain due to a stimulus that does not normally provoke pain".<sup>1</sup>
- ✓ "Pain in response to a non-noxious stimulus" OR, "a situation where a 'non-noxious' stimulus leads to an unexpectedly painful response".<sup>1</sup>
- ✓ Allodynia is a clinical term. It does not imply a specific mechanism<sup>1</sup> although it is considered a 'clinical test' for the presence of central sensitization.

#### a) Dynamic Mechanical Allodynia (brush-evoked)

Tangentially stroke the skin with a *camel hair brush* OR a *cotton wool ball*.  
Apply a 2 cm long 'brush-stroke' over 1 second\*, then repeat.

**Pattern:** ■■■■ ■■■■ ■■■■ ■■■■

\*Counting "one thousand-and-one" = 1 second

#### b) Punctate Mechanical Allodynia

Stimulate the skin with a *cocktail stick (toothpick)* OR the '*blunt*' end of a *Neurotips™*.  
Apply 2 stimuli per second\*, then repeat.

**Pattern:** || || || ||

\*Counting "one thousand-and-one" = 1 second

#### c) Pressure-evoked Mechanical Allodynia

Apply pressure to *soft tissues* with the *tip of your index finger*, until your nail bed 'blanches'.  
Apply the stimulus for 1 second\*, then repeat.

**Pattern:** ■ ■ ■ ■

\*Counting "one thousand-and-one" = 1 second

#### d) Cold Allodynia

Apply the cold 'prongs' of a *stainless steel tuning fork* to the skin.  
Apply the stimulus for 1 second\*, then repeat.  
(Stainless steel acts as a 'heat sink' at approximately 20°C) (Non-noxious 'cold')

**Pattern:** ■ ■ ■ ■

\*Counting "one thousand-and-one" = 1 second

#### e) Warmth Allodynia (optional test)

Warm a C-size battery in water at 45°C for 5 minutes.  
Then apply base of the battery to the skin.  
Apply the stimulus for 1 second\*, then repeat.  
(Battery acts as a 'heat source' at 45°C) (Non-noxious 'warmth')

**Pattern:** ■ ■ ■ ■

\*Counting "one thousand-and-one" = 1 second

## HYPERALGESIA

- ✓ “Increased pain from a stimulus that normally provokes pain”.<sup>1</sup>
- ✓ Increased pain response to a stimulus that is ‘noxious’ (‘tissue damaging’).
- ✓ Increased pain response associated with supra-threshold stimulation.
- ✓ Analogous to *punctate mechanical allodynia* (see ‘b’ above).
- ✓ By definition, the examiner must *deliberately apply a painful stimulus* to the subject in order to demonstrate hyperalgesia.

### Punctate Hyperalgesia (optional test)

Apply a Neurotips™ needle to the skin as a ‘pin-prick’ (noxious) stimulus.  
Apply 2 stimuli per second\*, then repeat.

**Pattern:** ||        ||        ||        ||

\*Counting “one thousand-and-one” = 1 second

## HYPERPATHIA

- ✓ “A painful syndrome characterized by an abnormally painful reaction to a... repetitive stimulus, as well as an increased threshold”.<sup>1</sup>
- ✓ Sometimes called ‘temporal summation’, hyperpathia is the *clinical analogue of the experimental paradigm known as “wind-up”*.
- ✓ *Stimulus frequencies vary in the literature from 2 Hz for 30 seconds, to 1 Hz for 10 seconds repeated over 5 cycles.*

### Hyperpathia

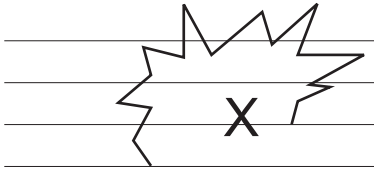
- Stimulate a localised area of skin with a *cocktail stick (toothpick)* or *Neurotips™* needle (optional).
- As a baseline, briefly test as per *punctate mechanical allodynia* (‘b’) (or *hyperalgesia, if using a needle*); ask the subject how *painful* this is as a VNRS score (baseline).
- *Then stimulate the skin repeatedly at a rate of 2 stimuli per second\* (2 Hz), for 30 seconds* (use timer).
- Ask for a post-test VNRS pain score immediately after the last stimulus (ie: at the 30 second mark).
- Increase in pain score compared with baseline demonstrates *hyperpathia*.
- Also, determine if pain continues after stimulation stops (‘after-sensations’).

**Pattern:** || || || (VNRS?)    || || || || || || .....|| (30s) (VNRS?)

\*Counting “one thousand-and-one” = 1 second    (VNRS) Verbal Numerical Rating Scale

## SENSORY AREA MAPPING

- Ask the patient to point to the area of altered skin sensation.
- Mark the approximate centre of this area with an 'X', using the marker pen.
- With an appropriate stimulus (cotton wool ball, brush, cocktail stick, Neurotip™, steel tuning fork), start *outside* the affected area and move *inwards* towards the 'X' in 10 cm long parallel 'vectors', asking the patient to report the exact moment when sensation changes - mark these points on the skin with the pen.
- Outline the 'boundary' of altered skin sensation with the pen.
- The area of altered sensation (cm<sup>2</sup>) can be quantified using the *measuring tape*.



## TWO-POINT DISCRIMINATION TESTING

- ✓ Impaired two-point discrimination may be demonstrated in patients with *chronic regional pain syndromes*, possibly reflecting altered (CNS) neuro-processing?

### Two-point discrimination testing

- 'Unfold' both ends of a 50 mm paperclip into a  shape to form *two points*.
- Adjust the distance (mm) *between* the two points to the desired *discrimination threshold*, using the measuring tape.
- Discrimination thresholds for various body regions – finger tip: 5 mm; palms & soles: 10 mm; face (excluding lips) 15 mm; limbs: 40 mm; back & torso: 40 mm.
- Apply the two-point stimulus for 1 second\*, then repeat.
- Record 'yes' if the subject feels 2 points and 'no' if they feel 1 point or nothing at all.
- If 'no' at the appropriate *discrimination threshold*, then there is *reduced two-point discrimination* at that site.

**Pattern:**  (site 1: Y/N?)  (site 2: Y/N?)  (site 3: Y/N?)







\*Counting "one thousand-and-one" = 1 second








## REFERENCES:

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<http://www.iasp-pain.org/Content/NavigationMenu/GeneralResourceLinks/PainDefinitions/default.htm>. 2011 (accessed 2 October 2011).
2. Haanpaa M, Rowbotham M. Diagnosing Neuropathic Pain: Clinical Examination, Neurophysiology and Neuroimaging. Pain 2012. Refresher Course, 14th World Congress on Pain. Tracey I. (Ed). IASP Press, Seattle 2012. 111-22.
3. Cruccu G, Sommer C, Anand P, et al. EFNS guidelines on neuropathic pain assessment: revised 2009. *Eur J Neurol* 2010;17(8):1010-8.
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5. Walk D, Sehgal N, Moeller-Bertram T, et al. Quantitative sensory testing and mapping: a review of nonautomated quantitative methods for examination of the patient with neuropathic pain. *Clin J Pain* 2009;25(7):632-40.
6. Pain Oriented Physical Examination (POPE). Cohen M. (Ed); FPMANZCA, Melbourne Australia, 2003 (DVD).

**APPENDIX 1**

**POST definitions, equipment and clinical techniques.**

Terminology	Equipment		Technique	Transmission	Inference
<b>Dynamic Mechanical Allodynia (Brush-evoked)</b>	Camel hair brush OR Cotton wool ball		Tangentially stroke the skin  2cm brush stroke over 1 sec, then repeat	Aβ → 2° neuron	central sensitization of nociception
<b>Punctate Mechanical Allodynia</b>	Cocktail stick (toothpick) OR <i>blunt</i> end of Neurotips™		Stimulate the skin using a cocktail stick OR <i>blunt</i> end of Neurotips™  2 stimuli/sec, repeat	Aδ → 2° neuron	central sensitization of nociception
<b>Pressure-evoked Mechanical Allodynia</b>	Index finger		Press soft tissues with tip of index finger until nail bed "blanches"  Apply the stimulus for 1 sec, then repeat	Aδ → 2° neuron (C fibre?)	central sensitization of nociception
<b>Cold Allodynia</b>	128 Hz steel tuning fork		Apply the steel 'prongs' of a tuning fork to the skin  Apply the stimulus for 1 sec, then repeat	Aδ → 2° neuron	central sensitization of nociception
<b>Warmth Allodynia (Optional)</b>	C-sized battery warm water bath (such as baby-bottle warmer), thermometer, stopwatch		Warm battery in water at 45°C for 5 minutes; apply base of battery to the skin  Apply the stimulus for 1 sec, then repeat	C fibre → 2° neuron	peripheral sensitization of nociception
<b>Hyperpathia Temporal Summation</b>	Cocktail stick (toothpick) OR Neurotips™ needle (optional)		Stimulate skin at  <i>2 stimuli per second (2 Hz) for 30 seconds</i> & assess for change in pain scores, and after-sensations	Aδ → 2° neuron	central sensitization of nociception  clinical analogue of 'wind-up'

Terminology	Equipment		Technique	Transmission	Inference
<b>Hyperalgesia</b> (Optional)	Neurotips™ needle		Stimulate the skin using Neurotips™ needle  2 stimuli/sec, repeat	A $\delta$ → 2° neuron	central sensitization of nociception
<b>Touch Sensation</b>	Cotton wool		Touch the skin using a single 'dabbing' motion	a $\beta$ fibre → dorsal columns	Intact a $\beta$ fibre & dorsal columns function
<b>Vibration Sensation</b>	128 Hz steel tuning fork			a $\beta$ fibre → dorsal columns	Intact a $\beta$ fibre & dorsal columns function
<b>Two-point Discrimination</b>	50 mm paper clip Bent into  shape		Thresholds: finger: 5mm palm: 10mm sole: 10 mm face: 15 mm limb: 40 mm back: 40 mm torso: 40 mm  Apply the stimulus for 1 sec, then repeat	a $\beta$ fibre → dorsal columns	Intact a $\beta$ fibre & dorsal columns function  ↓ discrimination due to altered CNS processing?
<b>Sensory Area Mapping</b>	Marker pen and tape measure		Map area of altered skin sensation, using various stimulus modalities; calculate area		
<b>Deep Tendon Reflexes</b>	Tendon hammer			I a & II sensory afferents → $\alpha$ motor neuron	motor reflex arc

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