

## Pain-Orientated Sensory Testing (POST) Guidelines

### PREAMBLE

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

Because a wide variety of sensory testing techniques are used in clinical practice, the Faculty developed these guidelines to facilitate a consistent and practical bedside approach to POST, particularly for trainees presenting for FPM examinations.

POST is based on publications listed in the bibliography including the Faculty's *Pain Orientated Physical Examination* (POPE) guidelines.<sup>1-7</sup>

### STANDARD EQUIPMENT

- Camel hair brush (1 cm brush width)
- Cotton wool balls
- Cocktail sticks (toothpicks) (wooden)
- 128 Hz stainless steel tuning fork ('large' size with flat base plate)
- Tendon hammer (larger size)
- Timer
- Alcohol wipes (disinfection of camel hair brush between patients)

### OPTIONAL EQUIPMENT

- Neurotips™ (hyperalgesia testing)
- Water bath & C-size batteries (warmth allodynia testing)
- Hand-held infrared thermometer (skin or water bath temperature testing)
- 50 mm paper clips (2-point discrimination testing)
- Tape measure (mm markings)

### PRINCIPLES OF SENSORY TESTING (Compare sides & sites)

- **Compare sides:** compare sensation on opposite sides (mirror testing).
- **Compare sites:** compare sensation at test site with a 'normal' (reference) site.

### INFECTION CONTROL

- **DO NOT apply or test any equipment on your own skin prior to using it on the patient**, particularly 'sharps' such as Neurotips™ or cocktail sticks.

## ROUTINE TECHNIQUES

### ALLODYNIA

- Pain due to a (non-noxious) stimulus that does not normally provoke pain.<sup>3</sup>
- Allodynia is a clinical feature from which central sensitisation might be inferred.

#### 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\* and repeat



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

#### Punctate Mechanical Allodynia

Stimulate the skin with a *cocktail stick (toothpick)*  
Apply 2 stimuli per second\* (2 Hz) and repeat



#### Pressure-evoked Mechanical Allodynia

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



#### Cold Allodynia

Apply the cold prongs of a *stainless steel tuning fork* to the skin  
Apply the stimulus for 1 second\* and repeat



Stainless steel fork acts as a 'heat sink' at room temperature ( $\pm 20^{\circ}\text{C}$ ) (mimics non-noxious cold)

## HYPERPATHIA (temporal summation)

- An abnormally painful reaction to a repetitive (cutaneous) stimulus.<sup>3</sup>
- Sometimes called **temporal summation**.
- Hyperpathia is a clinical test for the presence of **central sensitisation**.
- Hyperpathia is the clinical test that demonstrates **wind-up**.

### Hyperpathia (temporal summation)

Stimulate the skin with a *cocktail stick (toothpick)*

Apply 2 stimuli per second\* (2Hz) and repeat

Ask a *baseline* pain score during this stimulation

Then continuously stimulate skin at **2 stimuli per second (2Hz) for 30 seconds** (timer)

Ask a *final* pain score immediately after last stimulus (30 second mark)

**Increased final pain score** compared with baseline = hyperpathia

Ask if pain continues after stimulation ceases (**after-sensations**)

|| || || (baseline pain score) || → 30 sec → || (final pain score)

## OPTIONAL TECHNIQUES

- The following *optional* POST techniques DO NOT need to be performed routinely.
- Optional techniques may be used when clinically indicated, or in pain research.

## HYPERALGESIA

- An increased pain response to a (noxious) stimulus that **normally provokes pain**.<sup>3</sup>
- By definition, must deliberately apply a potentially noxious to test for hyperalgesia.
- A potentially noxious . pinprick stimulus is applied using a Neurotips™ needle.
- Hyperalgesia is a clinical test for the presence of **central sensitisation**.
- *Punctate mechanical allodynia* testing is a suitable alternative to hyperalgesia testing.

### Hyperalgesia (optional)

Stimulate the skin with a *Neurotips™ needle*

Apply 2 stimuli per second\* (2Hz) and repeat

|| || || ||

### Warm Allodynia (optional)

Warm a C-size battery in water bath at 45°C for 5 minutes (use IR thermometer)

Then apply base of the battery to the skin  
Apply the stimulus for 1 second\* and repeat



Battery acts as a heat source at 45°C (non-noxious warmth)

## INFRARED THERMOMETRY

- A hand-held infrared thermometer is used to measure skin temperature in an area where altered sensory, sympathetic nervous system or vascular function is suspected (e.g. complex regional pain syndrome, painful diabetic neuropathy).
- Compare temperatures on opposite sides (mirror measurements).
- A temperature difference of  $\geq 1.0^{\circ}\text{C}$  between sides is considered significant.<sup>6</sup>

### Infrared Thermometry (optional)







Direct a hand-help *infrared thermometer* to an area of skin







Compare skin temperature with the opposite side (mirror measurement)

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**APPENDIX 1: POST definitions, equipment and clinical techniques**

| Terminology  | Equipment                                  |   | Technique  | Transmission            | Inference  |
|--|--|---|--|-------------------------|--|
| <b>Dynamic Mechanical Allodynia (Brush-evoked)</b> | Camel hair brush<br>OR<br>Cotton wool ball |    | Tangentially stroke the skin<br><br>Apply a 2 cm brush stroke over 1 sec & repeat  | A $\beta$<br>2° neuron  | Central sensitisation                                    |
| <b>Punctate Mechanical Allodynia</b>               | Wooden cocktail stick (toothpick)          |    | Stimulate the skin using a cocktail stick<br><br>Apply punctate stimulus; 2 x per sec (2Hz) & repeat                           | A $\delta$<br>2° neuron | Central sensitisation                                    |
| <b>Pressure-evoked Mechanical Allodynia</b>        | Index finger                               |   | Press soft tissues with tip of index finger until nail bed "blanches"<br><br>Apply pressure stimulus for 1 sec & repeat        | A $\delta$<br>2° neuron | Central sensitisation                                    |
| <b>Cold Allodynia</b>                              | 128 Hz steel tuning fork                   |  | Apply steel 'prongs' of a tuning fork to the skin<br><br>Apply cold stimulus for 1 sec & repeat                                | A $\delta$<br>2° neuron | Central sensitisation                                    |
| <b>Hyperpathia</b><br><br>Temporal Summation       | Wooden cocktail stick (toothpick)          |  | Repeatedly apply punctate stimulus to skin; 2 x per sec (2Hz) for 30 sec<br><br>Change in pain score?<br><br>After-sensations? | A $\delta$<br>2° neuron | Central sensitisation<br><br>Clinical test for 'wind-up' |
| <b>Hyperalgesia (Optional)</b>                     | Neurotips™ needle                          |  | Stimulate the skin using a Neurotips™ needle<br><br>Apply sharp, (painful) stimulus; 2 x per sec (2Hz) & repeat                | A $\delta$<br>2° neuron | Central sensitisation                                    |

| Terminology                            | Equipment  |   | Technique   | Transmission  | Inference  |
|--|--|---|---|---|--|
| <b>Warmth Allodynia (Optional)</b>     | C-sized battery, warm water bath (baby-bottle warmer), IR thermometer, stopwatch             |    | Warm battery in water bath at 45°C for 5 minutes; apply base of battery to the skin<br><br>Apply heat stimulus for 1 sec & repeat   | C fibre<br>2° neuron                                    | <i>Peripheral sensitisation</i>  |
| <b>Infrared Thermometry (Optional)</b> | Held-held infrared (IR) thermometer<br><br>Measures physiological temperature range: 15-50°C |    | Point IR thermometer at skin<br><br>Compare temperature to opposite side  | $\Delta T^\circ \geq 1.0^\circ C$<br>= significant      | Altered sympathetic and/or vascular function   |
| <b>Touch Sensation</b>                 | Cotton wool  |    | Touch the skin using a single 'dabbing' motion  | a $\beta$ fibre<br><br>dorsal columns                   | Intact a $\beta$ fibre & dorsal columns function   |
| <b>Vibration Sensation</b>             | 128 Hz steel tuning fork   |  |   | a $\beta$ fibre<br><br>dorsal columns                   | Intact a $\beta$ fibre & dorsal columns function   |
| <b>Deep Tendon Reflexes</b>            | Tendon hammer  |  |   | I a & II sensory afferents<br><br>$\alpha$ motor neuron | Motor reflex arc   |
| <b>Two-point Discrimination</b>        | 50 mm paper clip bent into $\square$ shape<br><br>millimetre ruler or tape                   |  | Thresholds:<br>finger: 5 mm<br>palm: 10 mm<br>sole: 10 mm<br>face: 15 mm<br>limb: 40 mm<br>back: 40 mm<br>torso: 40 mm<br><br>Apply 2-point stimulus for 1 sec, then repeat | a $\beta$ fibre<br><br>dorsal columns                   | Intact a $\beta$ fibre & dorsal columns function<br><br>Reduced discrimination due to altered CNS processing |

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