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 Oriented Physical Examination* (POPE) guidelines.[1-7]

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 <u>your own skin</u> 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.[3]
- 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 (± 20˚C) (mimics non-noxious cold)

HYPERPATHIA (temporal summation)

- An abnormally painful reaction to a repetitive (cutaneous) stimulus.[3]
- 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)**

II II II (baseline pain score) **II → 30 sec → II** (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.**[3]
- 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

II II II II

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 ≥ 1.0˚C between sides is considered significant.[6]

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

Terminology	Equipment		Technique	Transmission	Inference
Warmth Allodynia (Optional)	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 Apply heat stimulus for 1 sec & repeat	C fibre 2˚ neuron	*Peripheral* sensitisation
Infrared Thermometry (Optional)	Held-held infrared (IR) thermometer Measures physiological temperature range: 15-50°C		Point IR thermometer at skin Compare temperature to opposite side	ΔT° ≥ 1.0°C = significant	Altered sympathetic and/or vascular function
Touch Sensation	Cotton wool		Touch the skin using a single 'dabbing' motion	aβ fibre dorsal columns	Intact aβ fibre & dorsal columns function
Vibration Sensation	128 Hz steel tuning fork			aβ fibre dorsal columns	Intact aβ fibre & dorsal columns function
Deep Tendon Reflexes	Tendon hammer			I a & II sensory afferents α motor neuron	Motor reflex arc
Two-point Discrimination	50 mm paper clip bent into ∏ shape millimetre ruler or tape		Thresholds: finger: 5 mm palm: 10 mm sole: 10 mm face: 15 mm limb: 40 mm back: 40 mm torso: 40 mm Apply 2-point stimulus for 1 sec, then repeat	aβ fibre dorsal columns	Intact aβ fibre & dorsal columns function Reduced discrimination due to altered CNS processing

Promulgated: 2013
Date of current document (V2.0): April 2018