

WEST-D™ Esthesiometer - Care & Use Manual

Weinstein Enhanced Sensory Test for Detection of tactile neuropathy

Please note!

- Each **WEST™ Softip™** monofilament is individually calibrated for applied force. Therefore, the **lengths may be different**.
- The monofilaments maintain calibration even when they **have a slight bend or are at an angle**. In fact, not being perfectly straight is good, otherwise you might get a spike in the force by time graph. Both using Softip™ monofilaments and not-being-perfectly straight work to prevent that undesirable overshoot of initial force.
- However, if the filaments have a sharp bend the calibration is compromised, and the **WEST™** should be returned for re-calibration.
- If the filament holders become lodged against each other when one is being rotated, simply rotate in the opposite direction until the desired position is reached. Do not force the filaments into position by rotating a filament holder against an adjacent filament holder.

Your WEST™ has been individually calibrated to deliver forces within 15% of the published values. During the calibration process, we vary the filament lengths to establish the prescribed force. Please note it is the force, not the length that is relevant. Never handle the filaments, since moisture from your hands may temporally affect calibration—**please read the entire manual**.

Your WEST is constructed to be tough and give years of use. WEST filament tips have texture that resists slippage from the test site, and the tips present a stimulus that is nonnoxious to the patient.

Thank You For Purchasing the WEST™

Monofilament esthesiometer. The **WEST-D™** is a monofilament esthesiometer. It delivers calibrated forces to intact skin by use of its five force-calibrated Softip™ monofilaments. The bending of the monofilament compensates for natural unsteadiness in the hand (a greater bend does not result in a greater downward force). The calibrated forces are tabulated below.

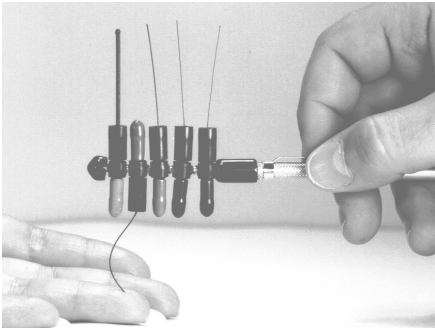
Monofilament Position	Lever Color	Force (g)
Top 5 th	Red	10
4 th	Purple	2
3 rd	Blue	0.5
2 nd	Green	0.07
Bottom 1 st	Green	0.025

The Softip monofilaments provide a less sharp and more consistent contact for the applied force. The result is a more sensitive test of common neuropathy, including neuropathy due to compression, metabolic deficiencies, or laceration.

The WEST can be used with your favorite procedure to evaluate tactile sensation. Because of the consistency of the forces, however, a procedure to rapidly estimate threshold is possible. The Rapid Threshold Procedure generates 11 outcomes for this 5-Softip WEST esthesiometer.

Testing position. Each **Softip™** monofilament can be employed by rotating it to be free and clear of the remaining stacked monofilaments. See Figure. To rotate, grasp the metal handle and rotate the colored lever of choice so that its monofilament is not stacked. After use, rotate back to the stacked position by turning in the opposite direction.

For quick testing, rotate all filaments at approximately a 70 degree angle to each other. Then simply rotate the handle to test.



The WEST-D is an eleven-sensation level, five Softip monofilaments, calibrated-for-applied-force esthesiometer. The WEST-D permits the tracking of the onset and resolution of insensitivity. The patented Softip monofilaments more sensitively reflect common neuropathy, because they stimulate without the sharpness of the common monofilaments.

WEST-D: Outcomes from the Rapid Threshold Procedure		
OUTCOME		Note: Head sensation <= Hand <= Body.
		Note: Feet often have callus that raises threshold
Gram force	ID	Comments
0.01	1	Normal Face [first green lever]
0.025	2	Young woman normal hand
0.048	3	Young man normal hand [second green lever]
0.07	4	Normal for many body sites
0.29	5	Reduced tactile sensation, except for glabrous foot [blue lever]
0.5	6	Reduced tactile sensation foot
1.25	7	Reduced Protective Sensation for hand [purple lever]
2	8	Loss of Protective Sensation for hand
6	9	Reduced Protective Sensation for foot
10	10	Borderline Loss of Protective Sensation for foot [red lever]
10+	11	Loss of Protective Sensation for foot

By the way, ever wonder, “if the WEST-D has only five Softip monofilaments, then how does it test at all those levels?” By “threshold” we mean the 50% detection level at near 0% false positives. Therefore, if the patient reports the application of 10 g half of the time, then 10g is threshold. But if the patient always reports 10 g and never reports 2 g, then the threshold is somewhere between those two values. In that case, we estimate at the average of 10 and 2, i.e., 6 g. The Rapid Threshold Procedure quickly estimates threshold with the WEST-D.

The WEST-D comes with a manual, a soft case, and a clicker to mark the interval of potential stimulation (use the clicker with the Rapid Threshold Procedure).

Description of Procedure

- Testing Instrument.** To ensure that calibrated monofilaments are employed, use only the **WEST**, which is calibrated for force and which additionally employs non-noxious **Softip** monofilaments.
- Application.** To apply each monofilament: keep it perpendicular to the test site; place the tip near the skin; slowly press the monofilament down against the site until it bends; hold it on site for one full second; and then lift the monofilament slowly. In the long run, calibration will be maintained best when the least bend is employed; however, calibration is held for the one-second application with any degree of bend that doesn't place the stalk of the monofilament on the skin.

Rapid Threshold Procedure

The Rapid Threshold Procedure is a modified descending threshold procedure. The three examples following reflect all possible responses. The procedure requires subjects not to reply with false-positive detections. Towards that end, one verbal feedback of a false-positive response is permitted by the tester per test site, and that evaluation is discarded and a new evaluation started. Use catch trials (zero-force stimulations) to verify compliance in about 33% of the trials. If the patient is not reporting nonzero stimuli, the immediate need for catch trials is reduced.

Example 1: Threshold is not at a monofilament force		
Trial No.	Force/Reply	Comments: 0 = catch trial Reply: Y = yes, N = no
1	0.5 / Y	Start with the smallest force that will be detected, or start with a catch trial. At detection decrease force one step.
2	0 / N	Use a catch trial in the first 3 trials
3	0.07 / N	Miss: increase force one step
4	0.5 / Y	Detection: decrease force one step
5	0.07 / N	Second miss at the same level without an intervening "continuation" defines a STOP in the procedure! Threshold is defined as the average of 0.5 and 0.07 grams, 0.285. Note 0.5 g was detected twice and 0.07 g was missed twice, suggesting that the threshold is between those two values.

Example 2: Threshold is at a monofilament force.		
Trial No.	Force/Reply	Comments
1	0 / N	Start with a catch trial (or with a force that will yield detection)
2	0.5 g / Y	The first nonzero stimulus must yield a detection (or start over). At detection, decrease force one step.
3	0.07 / N	Miss: increase force by one step. Need for catch trial lessened.
4	0.5 / N	STOP! Two failures to detect nonzero stimuli in a row (without regard to catch trials) defines a stopping point. Threshold is 0.5 g, which has recently been detected and missed. Note: 0.5 g was probably a poor choice for a starting force, since it's threshold.

Example 3: "Continue:" do not generate a threshold		
Trial No.	Force/Reply	Comments
1	2 / N	Started with a detection
2	0 / N	Passed the catch trial
3	0.5 / N	Miss: increase force by one step
4	2 / Y	Detected: decrease force one step
5	0.5 / Y	Detected: decrease force one step. Even though the response pattern is (N, Y) for this force, this trial was passed. CONTINUE as if no misses ever occurred.
6	0.07 / any	Procedure continues as if there were no misses. Thresholds defined as in Examples 1 and 2.

Mapping and tracking. Once a site of diminished sensation is identified, you may want to map the extent of the sensory loss, and to track that loss during subsequent visits. Vary the topographic position of the stimulus within the site of suspected sensory loss. Peripheral nerve distributions differ from central nervous system (spinal cord) dermatomes. Sites of peripheral nerve compression usually yield a deficit in tactile sensation distal to the compression. Thus mapping may help identify the source of the neuropathy.

Warnings. Never stroke or touch the monofilaments. Calibration may be affected due to moisture from your hands. Only the tips are designed to contact skin. Never leave the WEST where it may be exposed to direct sunlight or heat. Excessive heat affects calibration. The monofilaments have been calibrated for use in typical testing sites, e.g., clinics, hospitals, offices, etc. **Never test open wounds, the eye, mucous membranes, the oral cavity, or burnt skin.** **Note that the larger forces (e.g., 2.0 g) may damage newly grafted, transplanted or otherwise fragile skin. The contacting tips of the Softip monofilaments can be and should be disinfected between patients. See Disinfecting below.**

Disinfecting. The **WEST** should be disinfected between testing patients by touching only the contacting tips to a disinfecting solution. Soak tips in a 10% bleach solution for one hour. Alternatively, if you are in a rush, hydrogen peroxide 3% solution may be used by wiping the tips on a disposable paper towel soaked in 3% hydrogen peroxide. Alcohol solutions are not recommended. Never touch the disinfecting solution to the stalk of the monofilament, this action may compromise the calibration.

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We are pleased to report that several WEST advantages have been documented in a study by MM Al-Qattan, M.D. in The Canadian Journal of Plastic Surgery, 3,1, 1995. Further, the WEST has been recommended to the World Health Organization by former U.S. Surgeon General Dr. C. Everett Koop. These publications are recommended.

- Demonstrates that the WEST and a specially calibrated Semmes-Weinstein Monofilaments yield the same thresholds in normal subjects. Weinstein, S. (1993) Fifty-years of somatosensory research: From the Semmes-Weinstein monofilaments to the Weinstein Enhanced Sensory Test. Journal of Hand Therapy, 6, 11-22.
- Indicates the WEST is more sensitive than the Semmes-Weinstein Monofilaments for neuropathy, and discusses alternative tests that the WEST can perform. Weinstein, S., Drozdenko, R., & Weinstein, C. (1996) Evaluation of sensory methods in neuropathy, In Tendon and Nerve Surgery in the Hand – A Third Decade Review, J. M. Hunter, L.H. Schneider, E.J. Mackin (Ed)
- Indices of reliability and validity using the Rapid Threshold Procedure. Schulz, L.A., Bohannon, R. W., & Morgan, W. J. (1998) Normal Digit Tip Values for the Weinstein Enhanced Sensory Test. Journal of Hand Therapy, 11, 200-205.
- A review of assessment instruments. Perle, S.M., Schneider, M.J., and Seaman, D.R. (1999) Chiropractic Management of Peripheral Neuropathy: Pathophysiology, Assessment, and Treatment. Top Clin. Chiropr., 6-19.

Average Thresholds <i>values in grams force rounded</i>		
Hallux	0.33	0.14
Sole	0.33	0.13
Calf	0.33	0.03
Thigh	0.20	0.02
Belly	0.06	0.01
Back	0.10	0.01
Breast	0.06	0.03
Shoulder	0.12	0.01
Upper Lip	0.09	0.00 (5)
Cheek	0.01	0.00 (5)
Nose	0.01	0.00 (5)
Forehead	0.01	0.01
Upper Arm	0.14	0.01
Forearm	0.17	0.01
Palm	0.22	0.04
Thumb	0.09	0.03
Index Finger	0.10	0.03
Second Finger	0.06	0.02
Third Finger	0.06	0.02
Small Finger	0.05	0.02