

- B. Greater range of normal than for the sural nerve.
  - C. Nerve sometimes branches between the stimulating and recording points.
  - D. Occasionally the nerve runs near and parallel to the deep peroneal motor fibers distal to the ankle.
  - E. No definite landmark—placement of recording electrode variable.
- VIII. Normal Values (28)

	AMPLITUDE $\mu$ v	DISTAL LATENCY msec
A. Range	5-40	2.0-4.0
B. Side-to-Side Variations	0-10	0-0.5

Posterior Tibial (motor)/abductor digiti quinti pedis (10, 48, 50)

- I. Position of Patient
  - A. Patient is supine with lower extremity extended.
  - B. Lower extremity is supported by the bed at all times.
- II. Equipment
  - A. 2 disc electrodes (G1 active, G2 reference)
  - B. 1 ground (G0)
  - C. 1 bipolar stimulator (S1 cathode, S2 anode)
- III. Machine Settings
  - A. Sweep speed (ms/div)—2 to 5
  - B. Gain (mv)—1 to 10
  - C. Filters—1.6(Hz), 8(KHz)
- IV. Electrode Placement
  - A. G0 (ground)—dorsum of the foot between G1 and distal S1.
  - B. G1 (active)—over the belly of the muscle abductor digiti quinti pedis, midportion of the lateral aspect of the fifth metatarsal. The motor point of this muscle is more variable than most. This frequently necessitates moving G1 slightly proximal or distal to this point.
  - C. G2 (reference)—midportion of the proximal phalanx of the fifth toe.
- V. Stimulation Sites and Measurements
  - A. Ankle (distal):
    - 1. Stimulate—S1, 1 to 3 cm proximal to the medial malleolus, anterior to the achilles tendon.
    - 2. Measure—distance from S1 to G1 across the bottom of the foot. On adults use distance between 15 and 20 cm.

## B. Knee:

1. Stimulate—S1, approximately in the middle of the popliteal fossa.
2. Measure—distance from knee-S1 to ankle-S1 following the contour of the medial side of the leg.

## VI. Calculations

- A. Distal Latency—Calculate from the shock artifact to the takeoff of the negative deflection of the distal response. If dip occurs, takeoff is to the bottom of the dip.
- B. Amplitude—Calculate from baseline to the peak of the negative deflection.
- C. Conduction Velocity—Using latencies measured to the takeoff, subtract the distal from the proximal latency, divide the difference into the distance between proximal-S1 and distal-S1, and multiply by 10.

## VII. Variations and Pitfalls

- A. Amplitude and configuration may vary depending on the placement of G1.
- B. If amplitude at knee drops more than 30 percent of the ankle amplitude:
  1. Check for maximal stimulation at the knee.
  2. Check if peroneal muscles in the foot are being erroneously stimulated at the ankle (plantarflexion of the foot correct movement).
- C. If amplitude at knee is higher than amplitude at the ankle:
  1. Check for maximal stimulation at the ankle.
  2. Check if peroneal muscles in the foot are being erroneously stimulated at the knee.
- D. It is not always possible to obtain a response with an initial negative deflection. If an initial positive dip occurs, the takeoff is to the bottom of the dip.

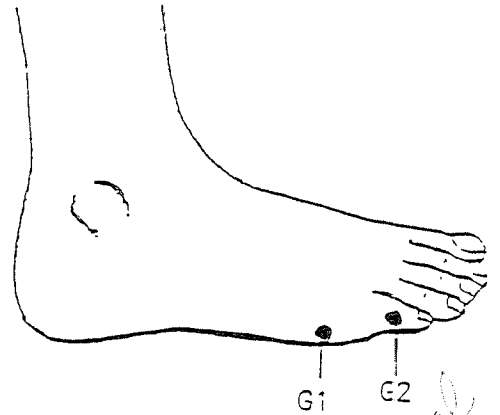
## VIII. Normal Values (Cleveland Clinic Foundation EMG Laboratory)

AGE	AMPLITUDE	DISTAL LATENCY	CONDUCTION VELOCITY
0-9	6-18 (12)	side-to-side	41-55 (49)
10-19	10-36 (14)	comparison for	41-56 (49)
20-29	9-38 (19)	the same distance	41-57 (49)
30-39	8-36 (17)		41-58 (48)
40-49	6-30 (15)		41-57 (48)
50-59	4-26 (14)		41-56 (47)
60-69	4-25 (13)		41-57 (46)
70-	4-21 (11)		40-52 (45)

POSTERIOR TIBIAL (motor) / abductor digiti quinti pedis

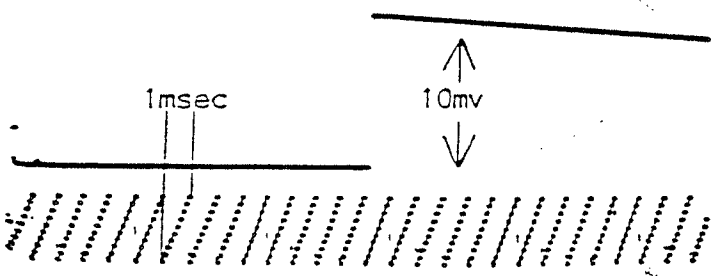
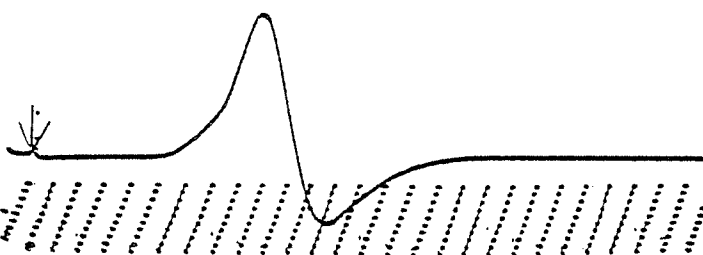
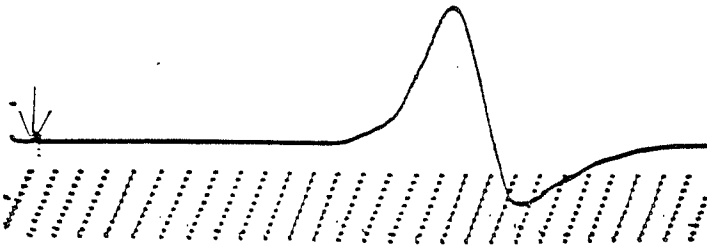
age = 22

Stimulation Site	Amp. mv	Latency msec	Dist. cm	C.V. M/sec
knee	9.0	12.1	35.5	51
ankle	9.0	<u>5.1</u>	16.0	
		7.0		

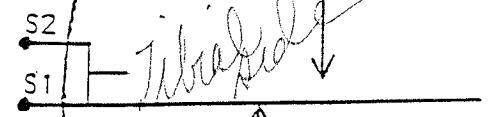


ELECTRODE PLACEMENT

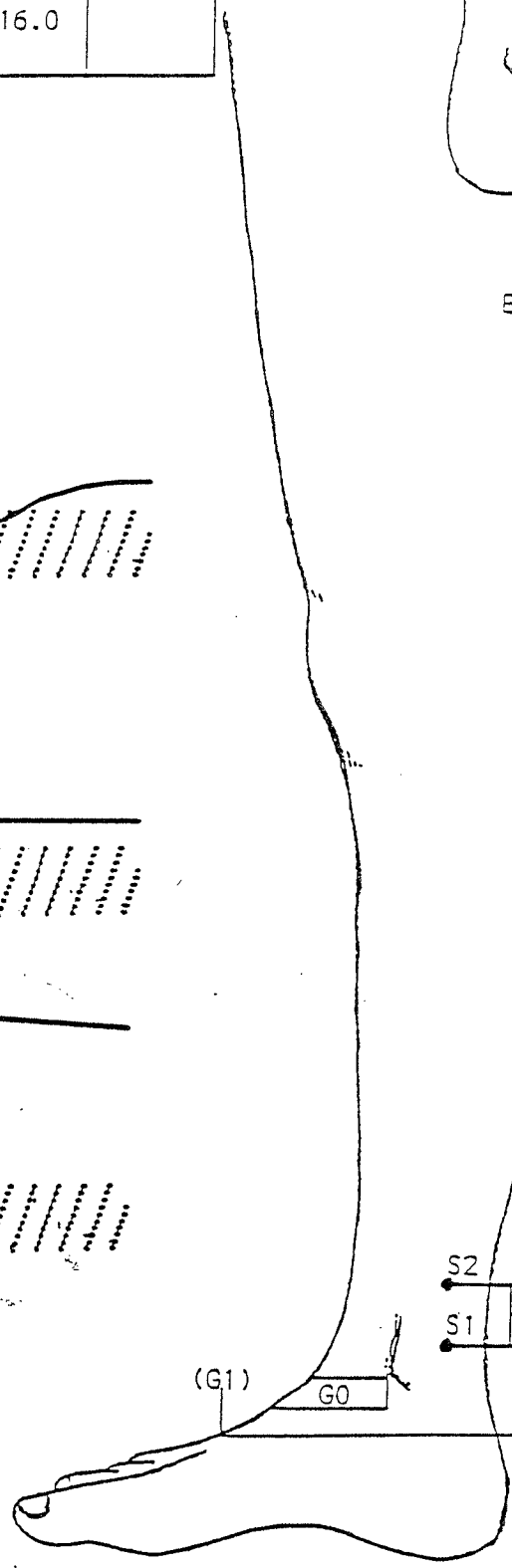
*Coronoid ridge*



measured distance for conduction velocity -knee (35.5cm)



*Tibial ridge*  
measured distance for distal latency (16cm)



(G1) G0

## Posterior Tibial (motor)/abductor hallucis (10, 48, 50)

- I. Position of Patient
  - A. Patient is supine with lower extremity extended.
  - B. Lower extremity is supported by the bed at all times.
- II. Equipment
  - A. 2 disc electrodes (G1 active, G2 reference)
  - B. 1 ground (G0)
  - C. 1 bipolar stimulator (S1 cathode, S2 anode)
- III. Machine Settings
  - A. Sweep speed (ms/div)—2 to 5
  - B. Gain (mv)—1 to 10
  - C. Filters—1.6(Hz), 8(KHz)
- IV. Electrode Placement
  - A. G0 (ground)—dorsum of the foot between G1 and distal S1.
  - B. G1 (active)—over the belly of the muscle abductor hallucis, posterior to the first cuneiform at the base of the first metatarsal. The motor point of this muscle is more variable than most. This frequently necessitates moving G1 slightly proximal or distal to this point.
  - C. G2 (reference)—midportion of the proximal phalanx of the big toe.
- V. Stimulation Sites and Measurements
  - A. Ankle (distal):
    1. Stimulate—S1, 1 to 3 cm proximal to the medial malleolus anterior to the achilles tendon.
    2. Measure—distance from S1 to G1 in a straight line. On adults use distance between 6 and 11 cm.
  - B. Knee:
    1. Stimulate—S1, approximately in the middle of the popliteal fossa.
    2. Measure—distance from knee-S1 to ankle-S1 following the contour of the medial side of the leg.
- VI. Calculations
  - A. Distal Latency—Calculate from the shock artifact to the takeoff of the first deflection of the distal response. If dip occurs, takeoff is to beginning of dip or the initial deflection from baseline.
  - B. Amplitude—Calculate from baseline to the peak of the negative deflection.
  - C. Conduction Velocity—Using latencies measured to the takeoff, subtract the distal from the proximal latency, divide the difference into the distance between proximal-S1 and distal-S1, multiply by 10.

POSTERIOR TIBIAL (motor) / abductor hallucis

age = 28

Stimulation Site	Amp. mv	Latency msec	Dist. cm	C.V. M/sec
knee	13.0	12.4	36.5	48
ankle	13.5	4.8	8.5	
		7.6		

