Musculocutaneous Motor Conduction Study- Biceps Brachii Recording

Patient Position: The patient should be sitting up for this study.

Skin Prep: Wipe with alcohol, temperature check.

Settings:
Sweep Speed: 2-5 msec/div.
Sensitivity/Gain: 2-5 mV/div.

Recording:
Filters: 2Hz- 10 kHz

Active: The active surface electrode is placed over the most prominent portion of the biceps.

Reference: The reference electrode is placed in the antecubital fossa in the region of its tendon

Ground: The ground is placed between the stimulating and recording electrodes.

Stimulation: Surface stimulation is applied above the upper margin of the clavicle, lateral to the clavicular head of the sternocleidomastoid. The anode is superior, medially

Measurements:

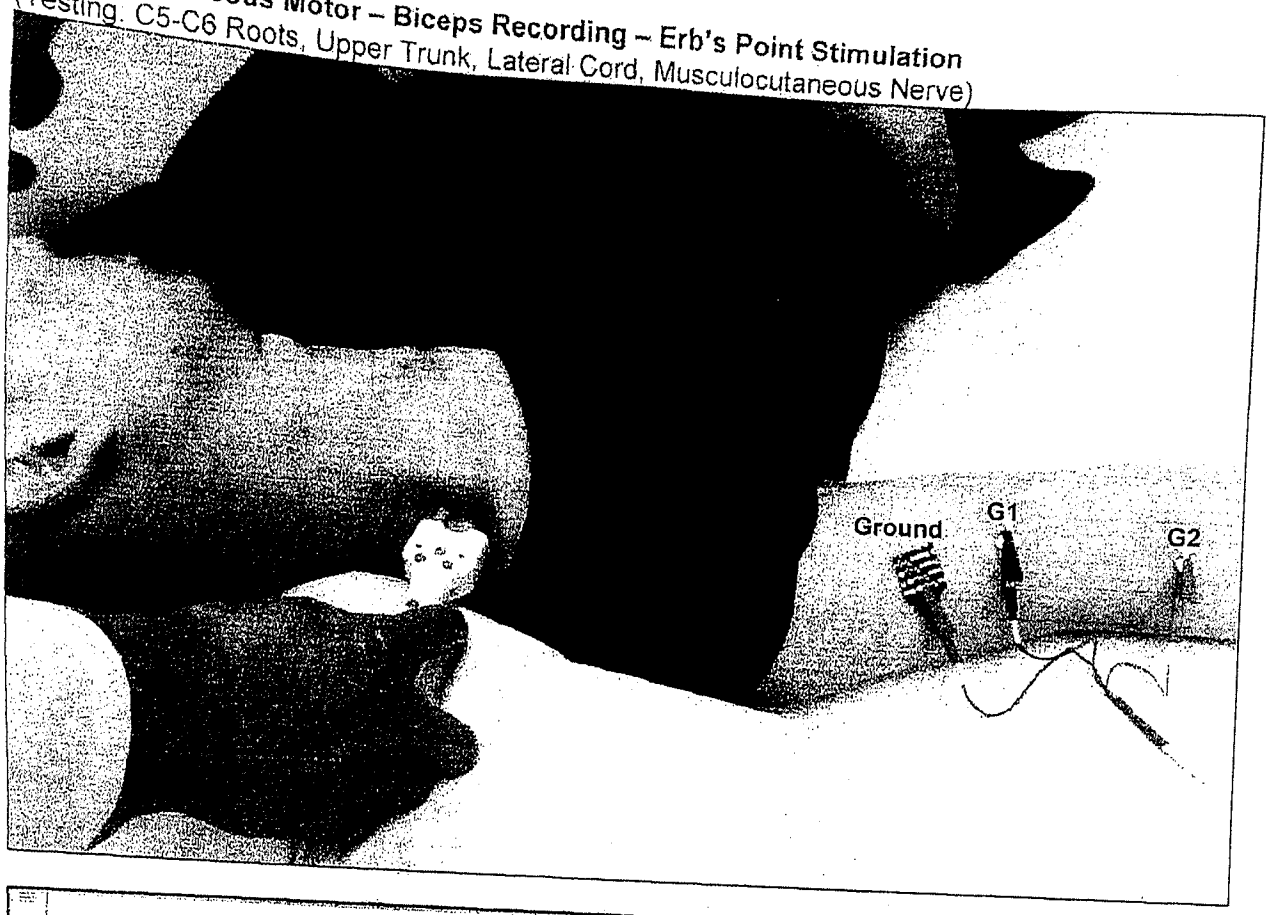
Distance between cathode and active recording electrode taking the shortest distance possible rather than following the course of the nerve.
Latency amplitude and duration for CMAP recording

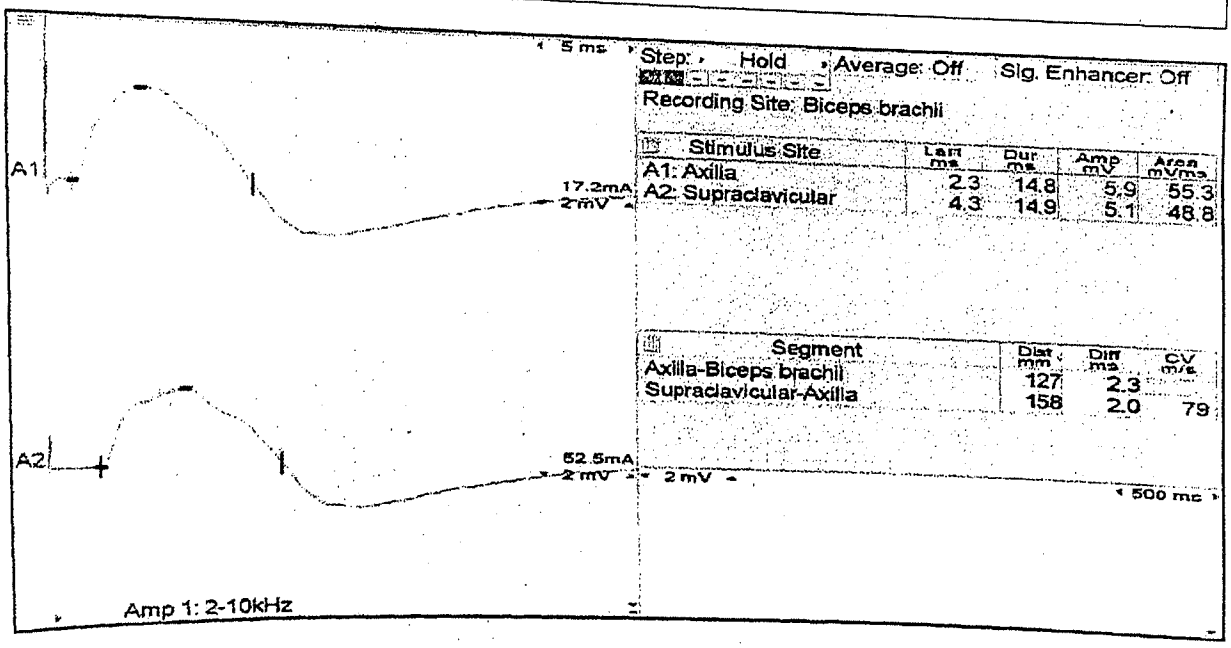
Key Points:
Amplitudes are compared side to side. Conduction times as opposed to conduction velocities are preferred as it is difficult to accurately measure the neural segment.

Author	Distal distance (cm)	Recording	Amplitude (B-N) (mV)	Distal Latency (ms)	Conduction Velocity (m/s)
Kraft		Biceps	Side-to-side	4.5 + 0.6	-
Shapiro	23-29	Biceps	Side-to-side	$\geq$ 5.7	-

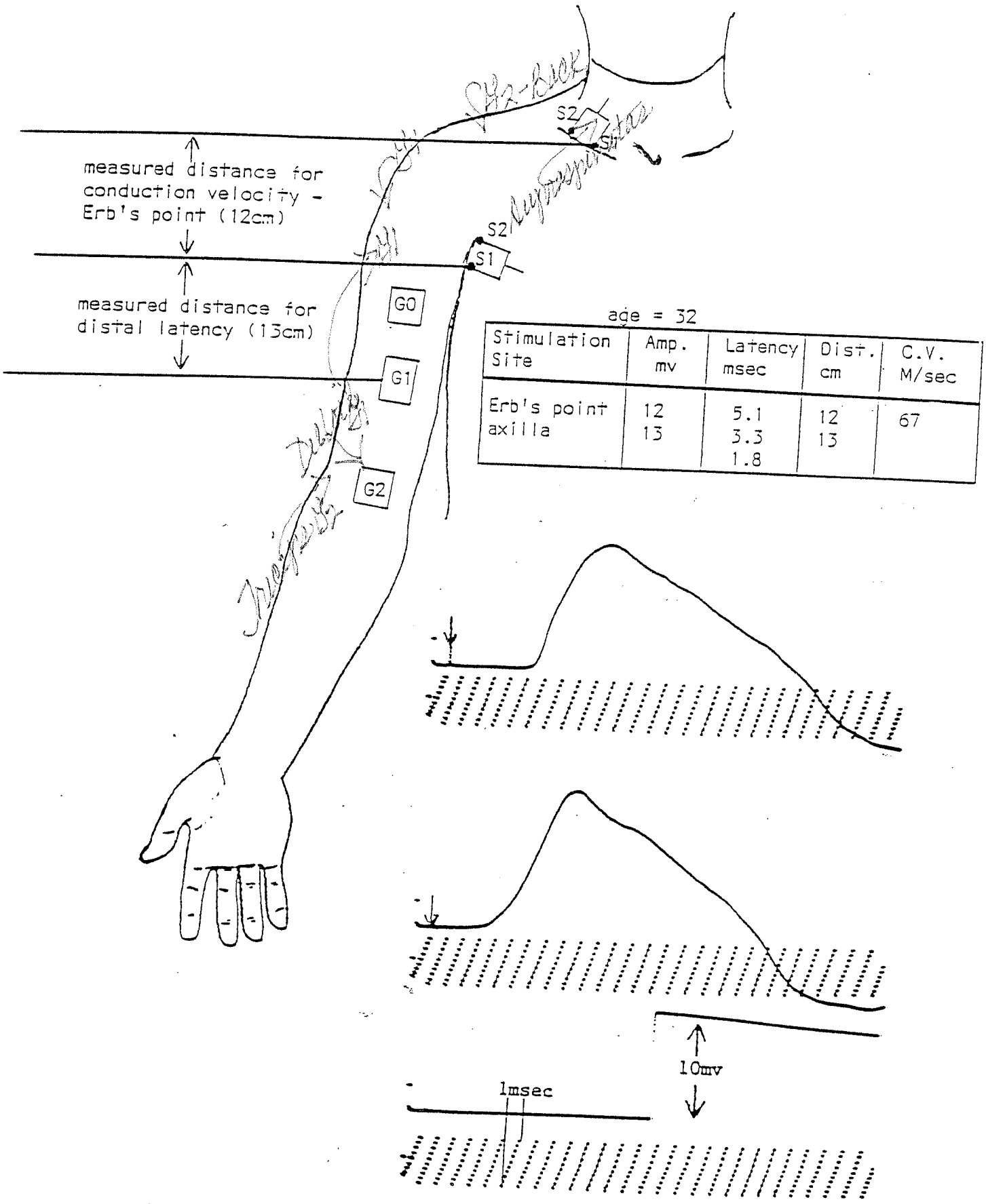
* *Prepared by Vaso Obradovic, R.T.EMG, R.E.T. and Maureen MacNeil, R.T.EMG, R.NCST, CNCT*

Musculocutaneous Motor – Biceps Recording – Erb's Point Stimulation
(Testing: C5-C6 Roots, Upper Trunk, Lateral Cord, Musculocutaneous Nerve)





MUSCULOCUTANEOUS (motor) / biceps brachii



age = 32

Stimulation Site	Amp. mv	Latency msec	Dist. cm	C.V. M/sec
Erb's point	12	5.1	12	67
axilla	13	3.3	13	
		1.8		

C. G2 reference)—at the elbow crease over the biceps tendon.

V. Stimulation Sites and Measurements

A. Axilla (distal):

1. Stimulate—S1, in the axilla beneath the tendon of the short head of the biceps near its insertion on the coracoid process.
2. Measure—distance from S1 to G1 in a straight line.

B. Erb's point (proximal):

1. Stimulate—S1, behind and deep to the clavicle, one-half the distance from the sternum to the acromion.
2. Measure—distance from Erb's point S1 to axilla-S1 with calipers.

VI. Calculations

A. Distal Latency—Calculate from shock artifact to the takeoff of the negative deflection of the distal response.

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 of response may vary depending on the placement of G1.

B. Because multiple nerves are being stimulated at Erb's point, the configuration of the response may be slightly different between the Erb's point and axilla stimulation sites. Check to be sure biceps movement is being obtained at both stimulation sites.

C. If amplitude drops more than 2 mv from between stimulation sites:

1. Check for maximal stimulation at both stimulation sites.
2. Check for volume conduction from other muscle.

D. If an increased stimulus artifact occurs with axilla stimulation, move G0 closer to G1.

E. Because of short distances, the conduction velocity will frequently be spuriously fast.

VIII. Normal Values (48)

AGE	AMPLITUDE mv	DISTAL LATENCY msec	CONDUCTION VELOCITY m/sec
18-65 yrs	4-16	1.5 to 3.3	53-85

Musculocutaneous (sensory-antidromic)/forearm (48, 54, 56)

I. Position of Patient

A. Patient is supine with upper extremity supinated and extended at side.

B. Upper 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)—1 to 2

B. Gain (μv)—5 to 20

C. Filters—32(Hz), 1.6(KHz)

IV. Electrode Placement

A. G0 (ground)—forearm between G1 and S1.

B. G1 (active)—on the forearm, 12 cm from the elbow crease on a line drawn between the elbow crease lateral to the biceps tendon and the radial artery at the wrist.

C. G2 (reference)—On the forearm, 3 cm distal to G1.

V. Stimulation Sites and Measurements

A. Elbow:

1. Stimulate—S1, on the elbow crease just lateral to the biceps tendon.

2. Measure—

a. distance from S1 to G1 in a straight line. On adults use a distance of 12 cm.

b. distance from S1 to the radial artery at the wrist. This measurement is taken to insure proper amplitude comparisons to the contralateral side and to future studies on the ipsilateral side.

VI. Calculations

A. Distal Latency—Calculate from the shock artifact to the peak of the negative deflection of the distal response.

B. Amplitude—Calculate from baseline to the peak of the negative deflection.

VII. Variations and Pitfalls

A. Occasionally difficult to obtain due to motor artifact (usually indicates the cathode is too radial).

B. Sometimes hard to obtain on patients with very large arms.

VIII. Normal Values (54)

AMPLITUDE μv	DISTAL LATENCY msec
12-31	2.2-2.6

MUSCULOCUTANEOUS (sensory-antidromic) / forearm

age = 35

Stimulation Site	Amp. μv	Latency msec	Dist. cm
elbow	20	2.4	12