



Equinovarus Deformity: Differentiating Neurological Disorders from Musculoskeletal Problems with Electrodiagnostic Studies

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CASE DIAGNOSIS

- 25F with PMH congenital left foot equinovarus deformity and bilateral developmental dysplasia
- She presents for worsening varus deformity and ankle instability with question of neurological involvement

CASE DESCRIPTION

- HPI
 - Her varus deformity significantly worsened over an unspecified period of time
 - She experienced two ankle sprains
- Physical Exam:
 - Motor (left)
 - TA 2-/5, Gastrocnemius 3/5, Peroneus 2/5, EHL 4/5
 - Limited dorsiflexion ROM
 - Sensation: normal in all dermatomes
- Imaging
 - Radiographs demonstrate varus deformity with pes cavus consistent with previous X-ray
- Electrodiagnostic Testing
 - Normal symmetric amplitude motor response recording from the EDB
 - Left peroneal motor amplitude from the TA is 1/3 of the amplitude recorded from the EDB
 - Sural sensory responses were normal bilaterally
 - TA had increased insertional activity, slightly increased amplitude and less firing motor units
 - EHL had slightly less firing motor units
 - There was no spontaneous activity in the TA or EHL

ELECTRODIAGNOSTIC RESULTS

Stim Site	Onset (ms)	Peak (ms)	P-T Amp (µV)	Dist (cm)	Vel (m/s)
Left Sural Anti Sensory (Lat Mall) 23.6° C					
Calf	2.2	2.9	13.1	10.0	45
Right Sural Anti Sensory (Lat mall) 22.2° C					
Calf	2.3	3.2	12.1	10.0	43

Table 1: Nerve Conduction Study Sensory Summary Table

Stim Site	Onset (ms)	O-P Amp (mV)	Dist (cm)	Vel (m/s)
Right Peroneal Motor (Ext Dig Brev) 22.1° C				
Ankle	4.1	3.8	33.0	52
B Fib	10.5	4.8	28.5	40
Left Peroneal (EDB and TA) 25.7° C				
Ankle EDB	5.5	3.6	28.5	40
B Fib EDB	12.6	2.1		
BFib TA	3.1	0.8		
Left Tibial Motor (Abd Hallucis) 23.8° C				
Ankle	4.1	8.1		
Right Tibial Motor (Abd Hallucis) 22.8° C				
Ankle	4.2	6.9		

Table 2: Nerve Conduction Study Motor Summary Table

Side	Muscle	Nerve	Fibs	Psw	Amp	Dur	Recrct	Effort	CRD
Left	AntTibialis	Dp Br Peron	0	0	Inc	Nml	Discrete	Nml	0
Left	ExtHallLong	Dp Br Peron	0	0	Inc	Nml	Reduced	Nml	0
Left	MedGastroc	Tibial	0	0	Nml	Nml	Reduced	Nml	0
Left	Peroneus Longus	Sup Br Peron	0	0	Nml	Nml	Reduced	Nml	0
Left	PostTibalis	Tibial	0	0	Nml	Nml	Reduced	Nml	0

Table 3: EMG Results

DISCUSSION

- Her lower amplitude recording of the peroneus from the TA and lack of spontaneous activity on needle EMG suggests her issue is most likely due to a tight left heel cord which limits her ability to fire her TA
- The normal amplitude recording from her EDB, normal EHL strength and nonsignificant changes in the EHL suggest a focal issue of muscle atrophy and weakness of the lower left extremity
- Her electrodiagnostic test is most consistent with muscle atrophy due to a structural abnormality
- It was recommended she start with physical therapy for stretching of the left heel cord and strengthening of her lower left extremity.

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