

Neurophysiology for neurology SpRs

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The Newcastle upon Tyne Hospitals 
NHS Foundation Trust


The Institute of Neuroscience

Outline

- What you need to tell the patient
- What you need to tell us
- Basic techniques
- Case studies
- Conclusion

What you need to tell the patient

- It hurts!



What you need to tell us

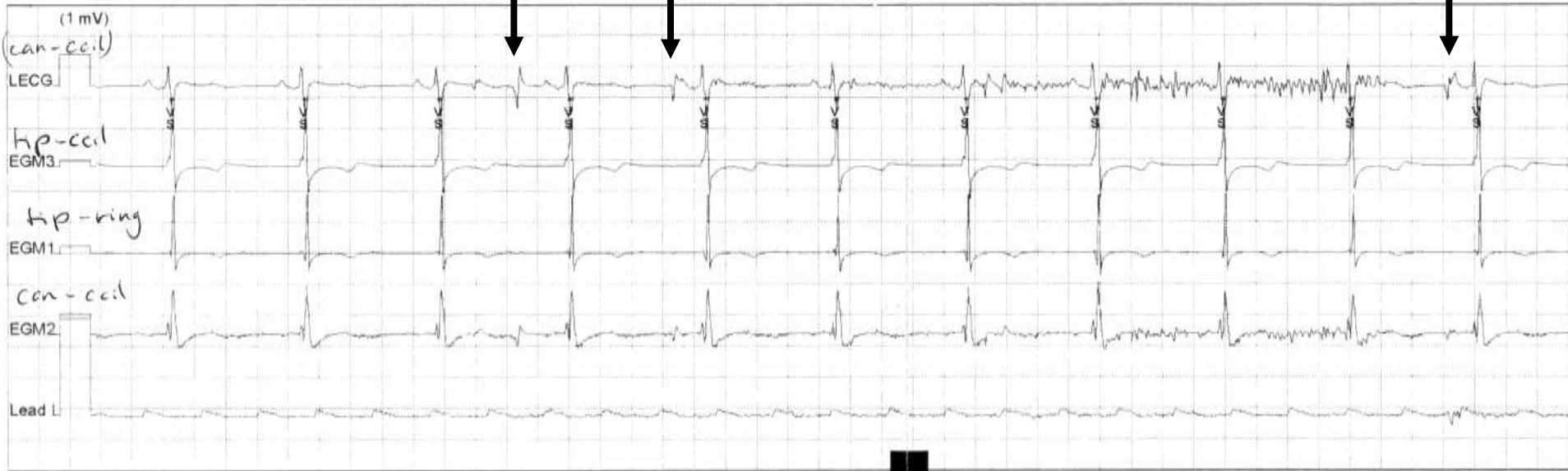
- History!
- Infection risks
- Cardiac implants
- Warfarin / clotting

Mary ARCHER 2015179B
Device: Protecta XT VR D354VRG
Serial Number: PSG601344S

Unsaved Frozen Strip

25.0 mm/sec

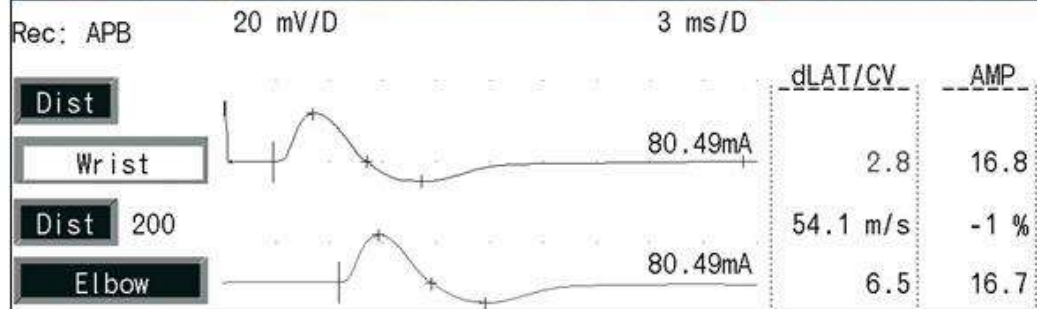
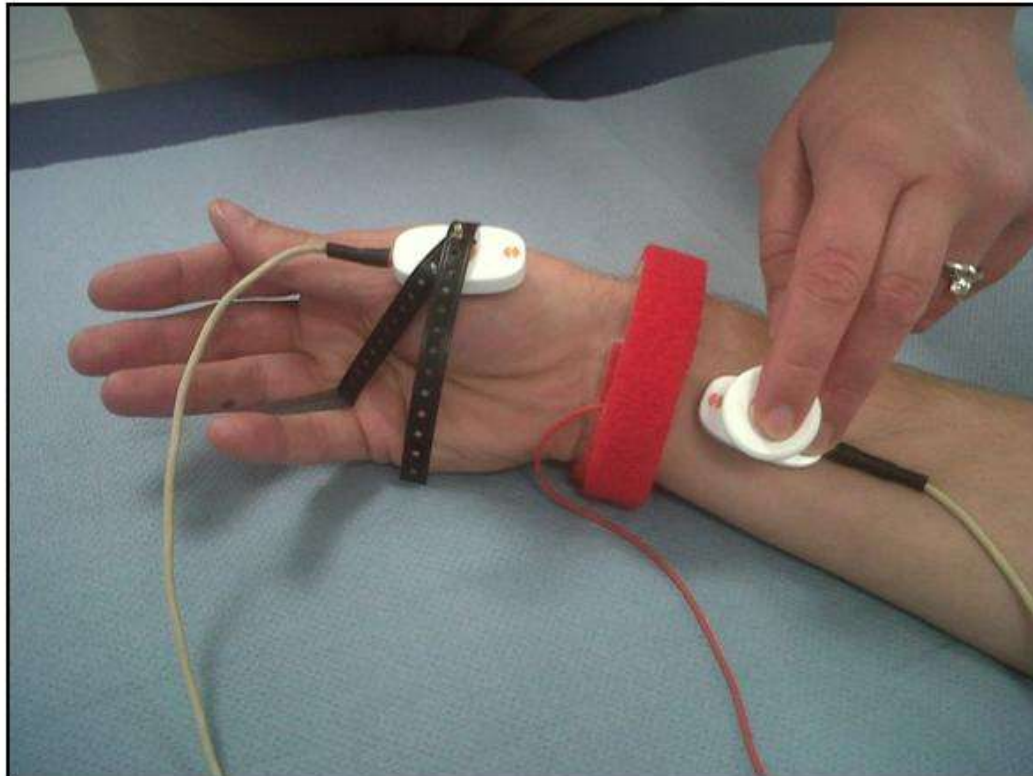
Collected: 15-Jul-2011 11:32:54



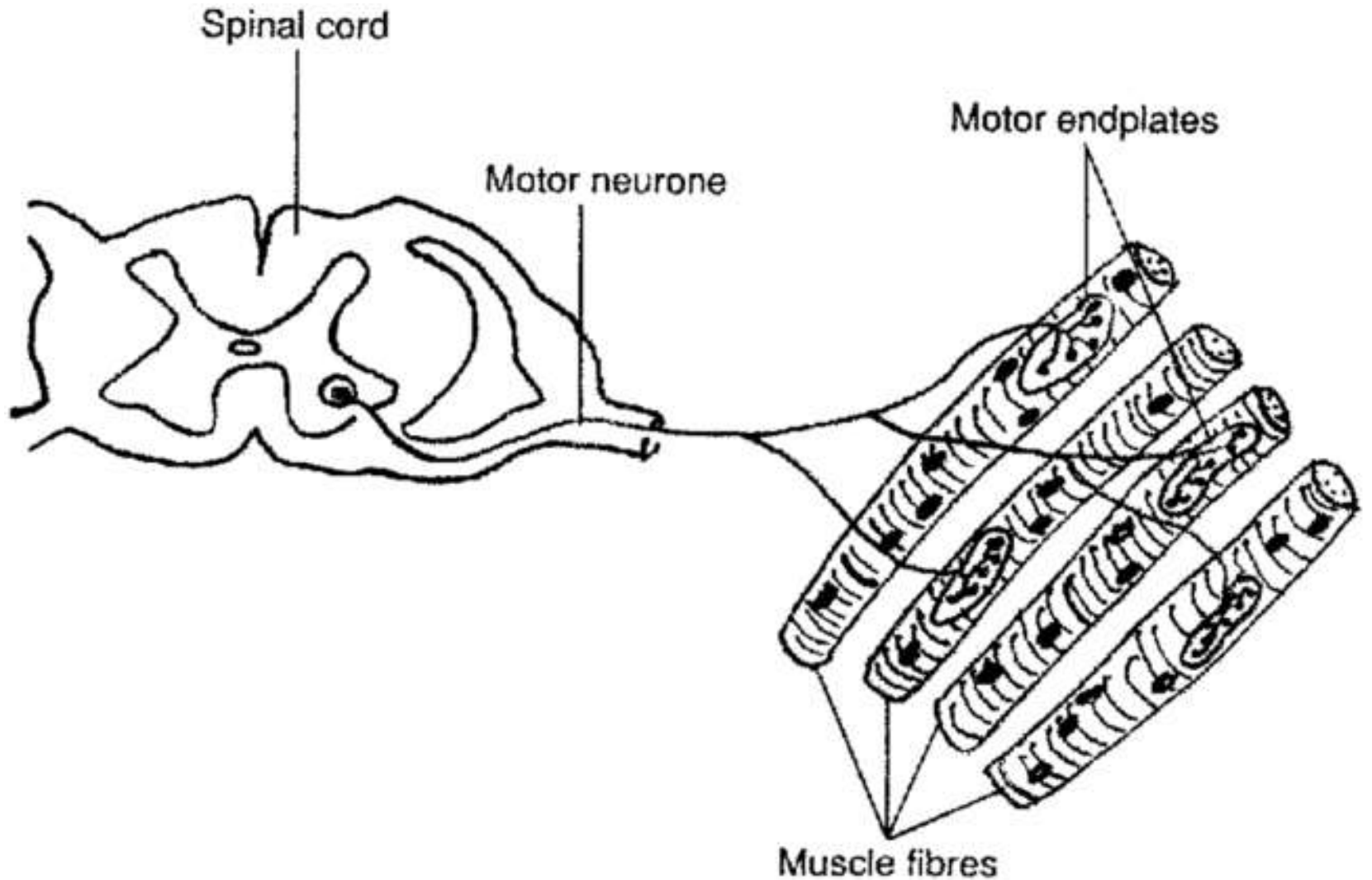
40mA/0.2ms Right median nerve, cubital fossa



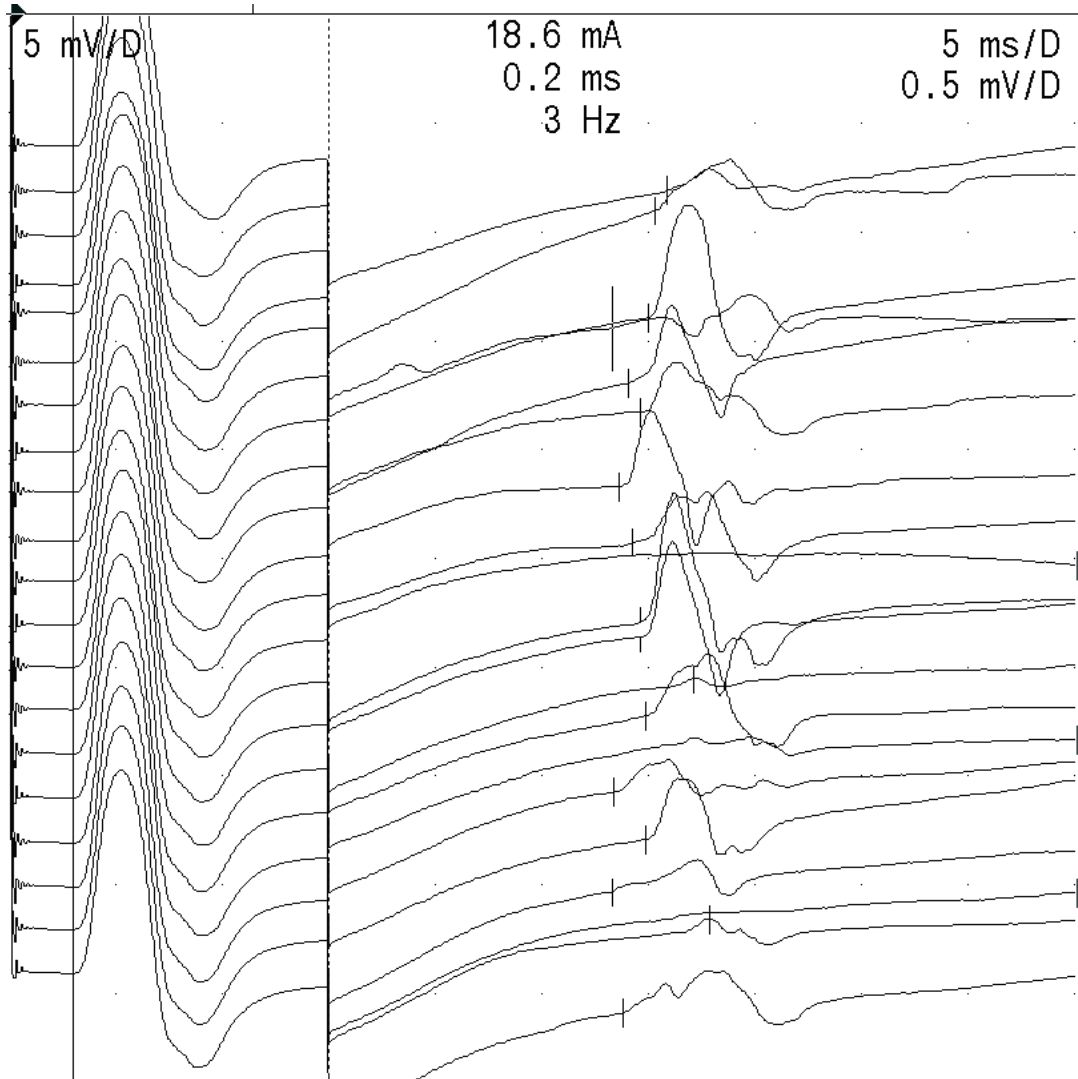
Motor studies



Motor studies



F- waves



Stim pos :

Rec. pos. : APB

#Stim : 20

F : 17

M-lat : 3.0 [ms]

F lat min : 28.3 [ms]

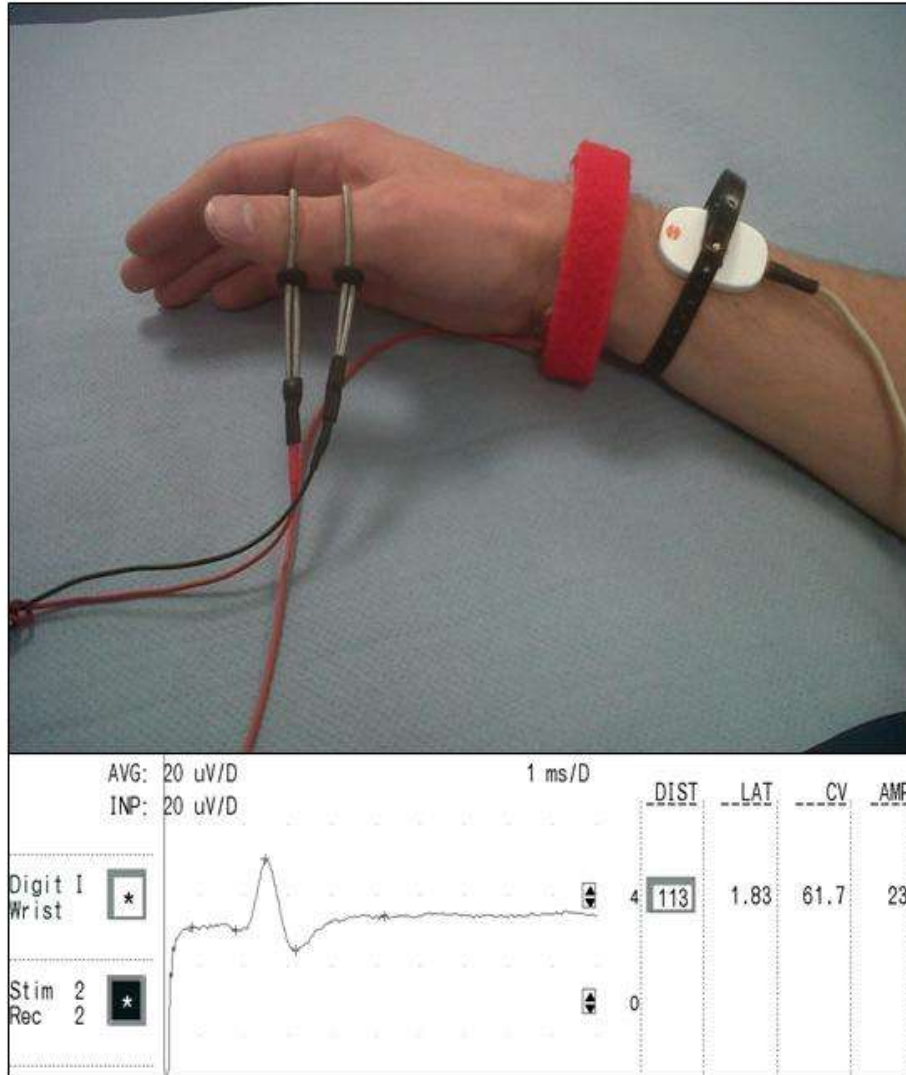
max: 32.9 [ms]

mean: 29.8 [ms]

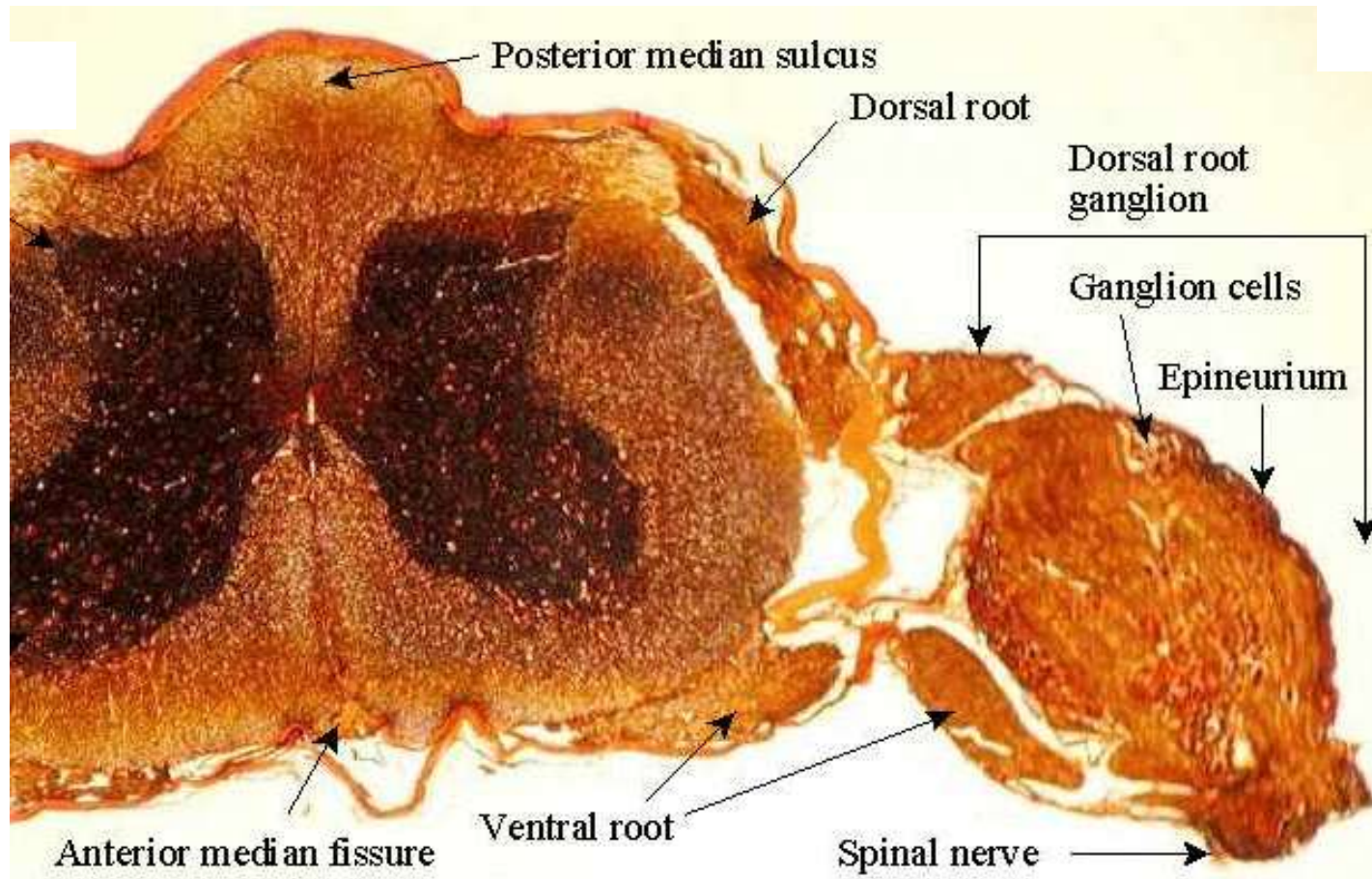
Spine-Wrist mm

Sens. M F

Sensory studies



Sensory studies



Case 1

- Tingly medial hand / arm
- Weak hand
- ? Ulnar
- ? Radicular

Case 1

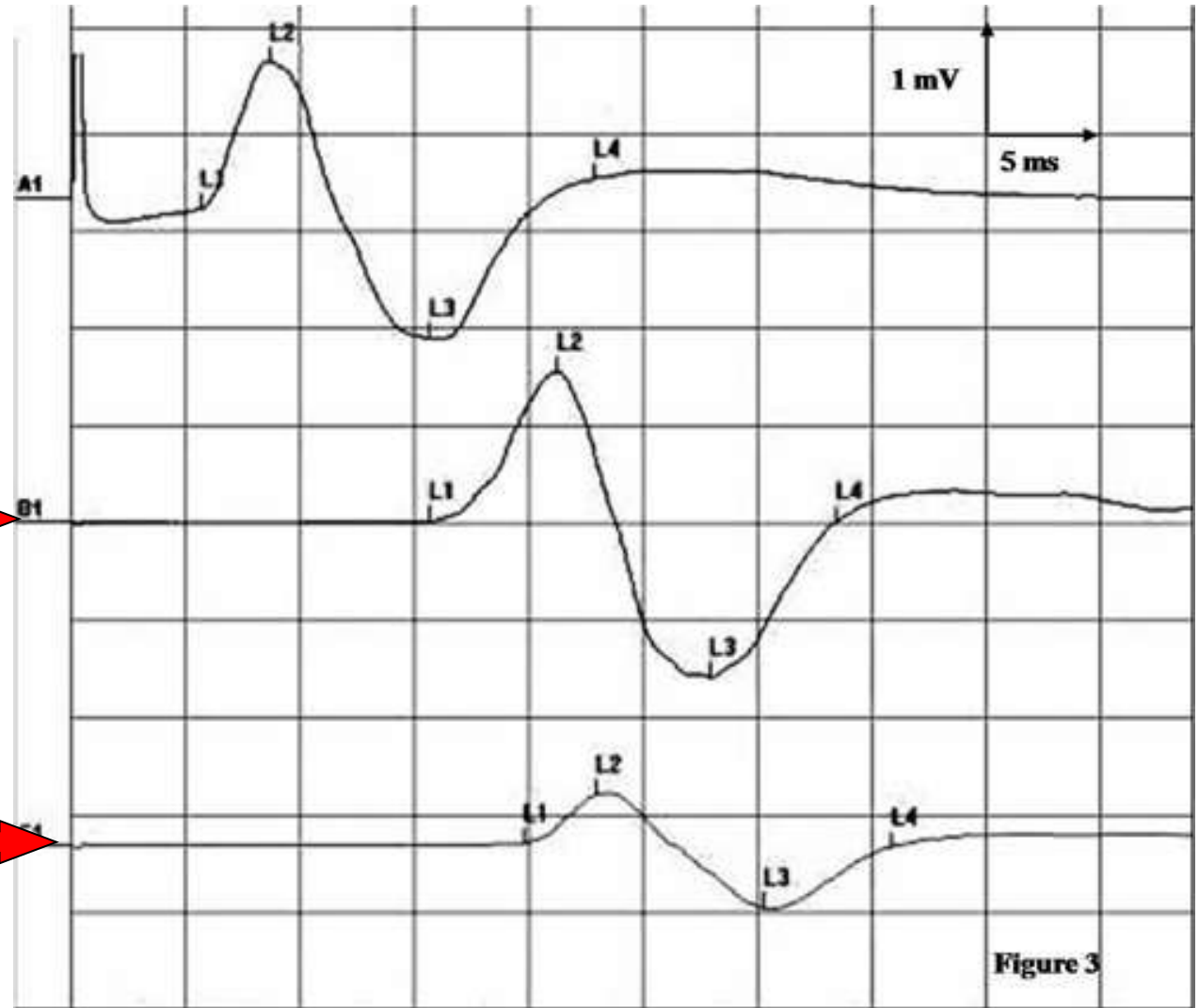
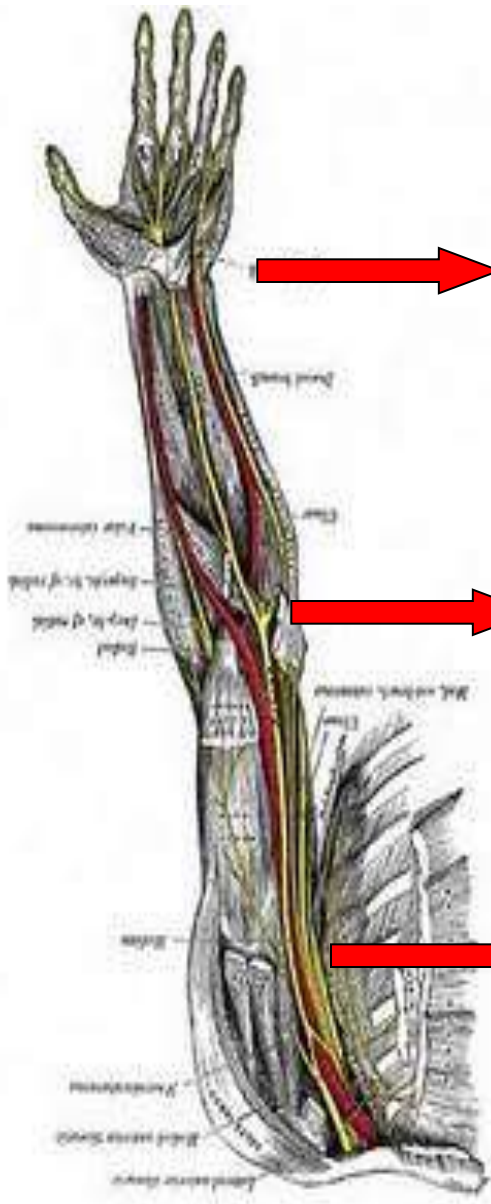
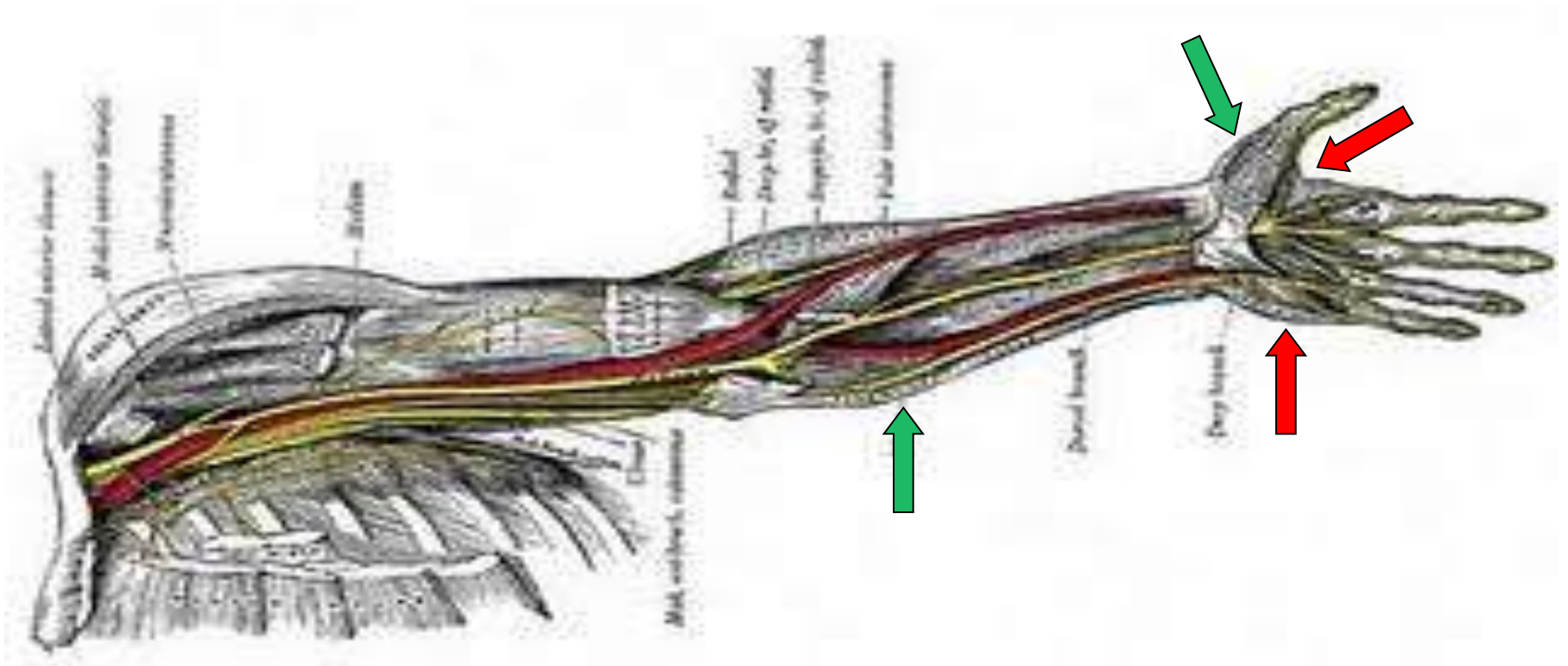


Figure 3

Case 1



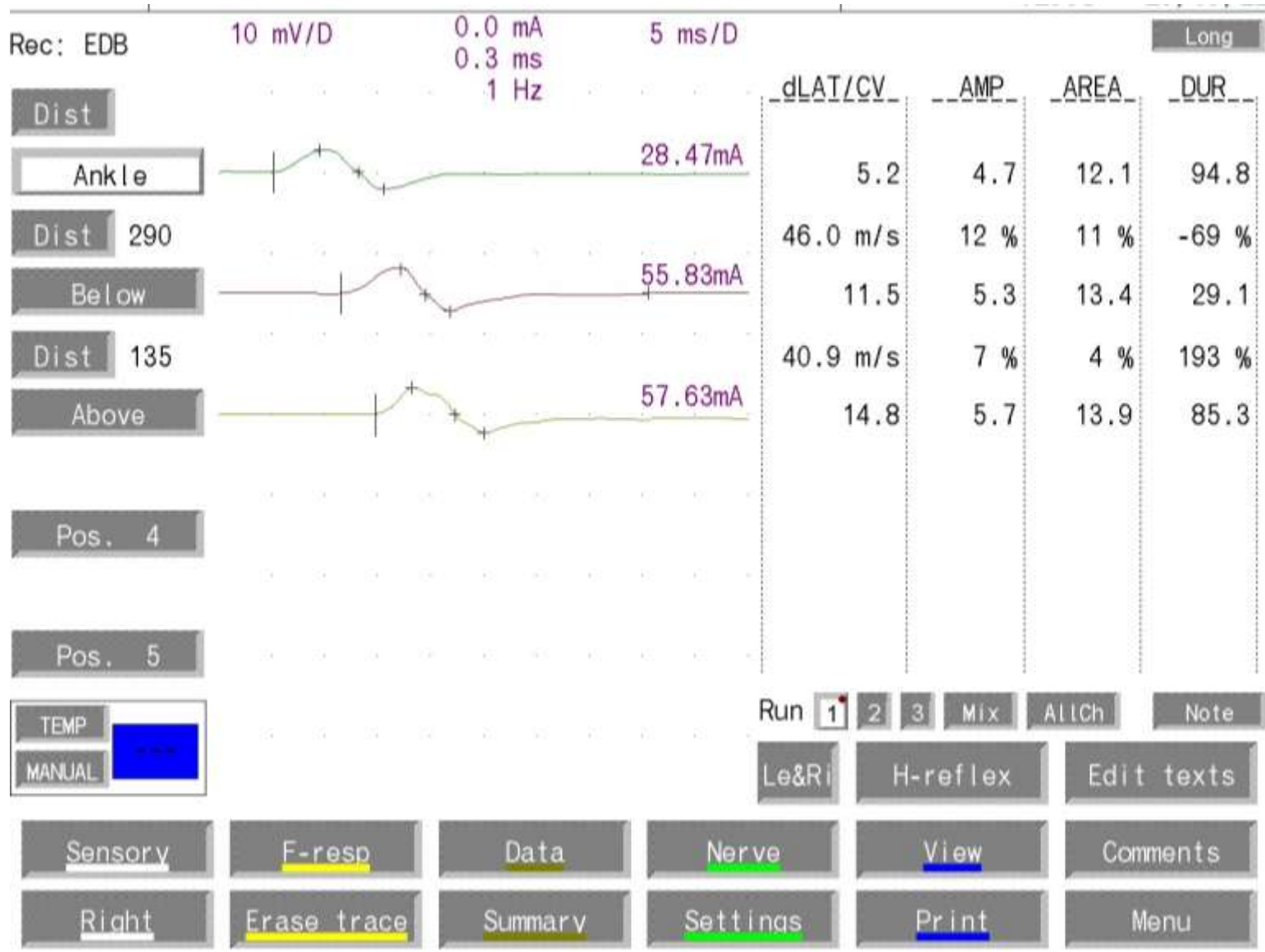
L General Muscle



Case 2

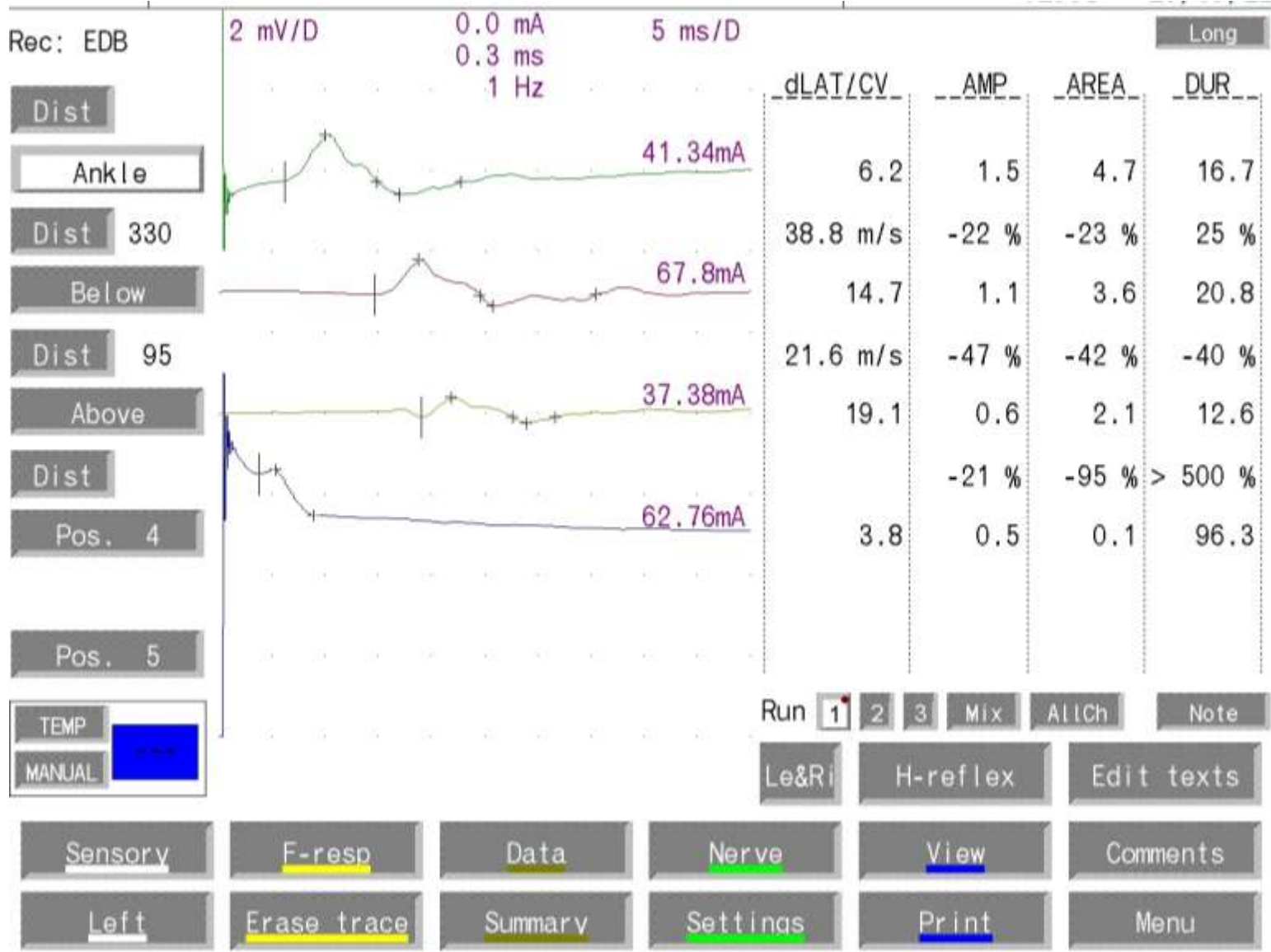
- Long history of lower back pain
- Sudden onset coldness anterior aspect of right leg when sat in chair
- Weakness of dorsiflexion and eversion R ankle
- ? Peroneal nerve / ? radiculopathy

Case 2



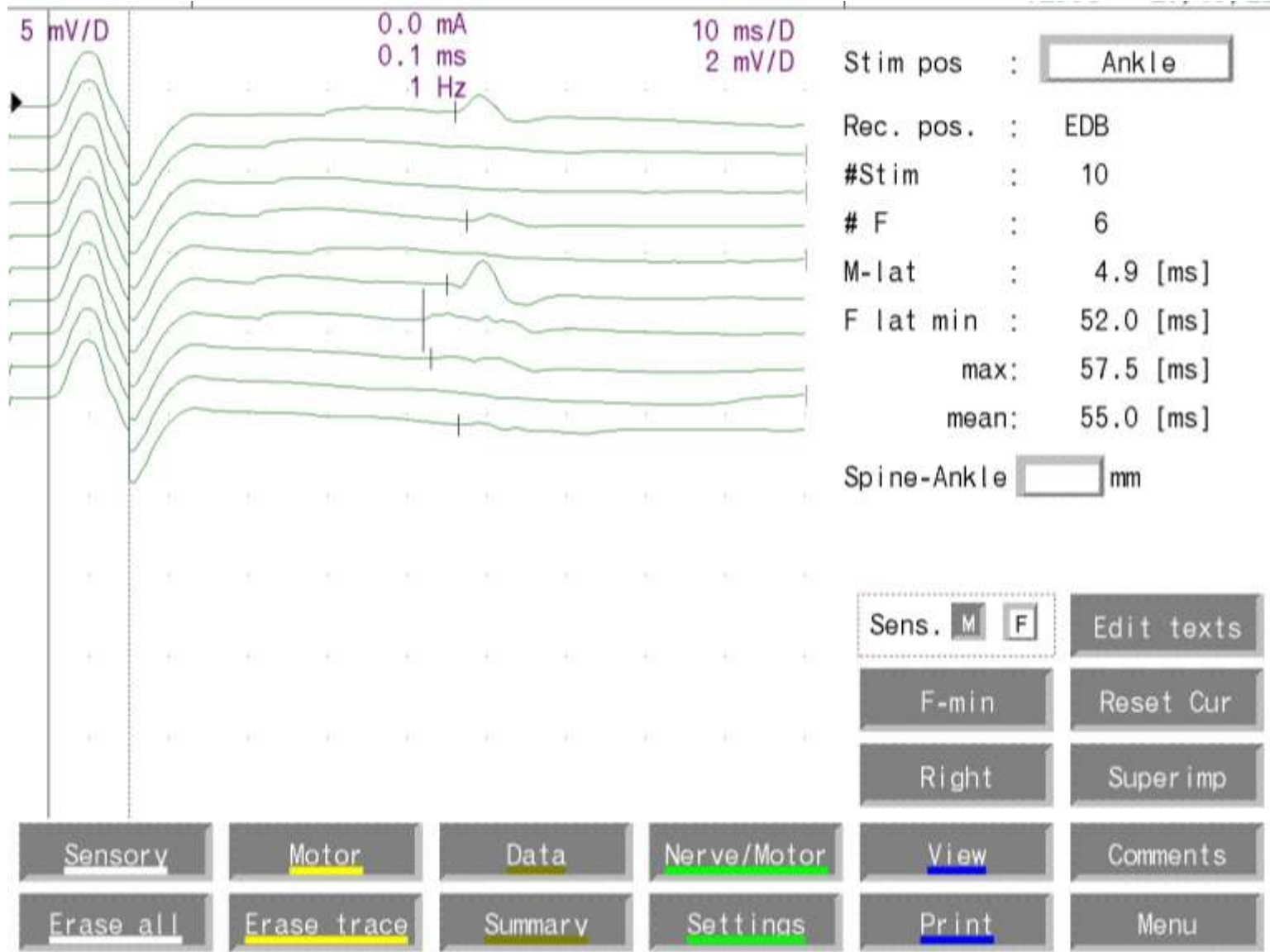
Case 2

R



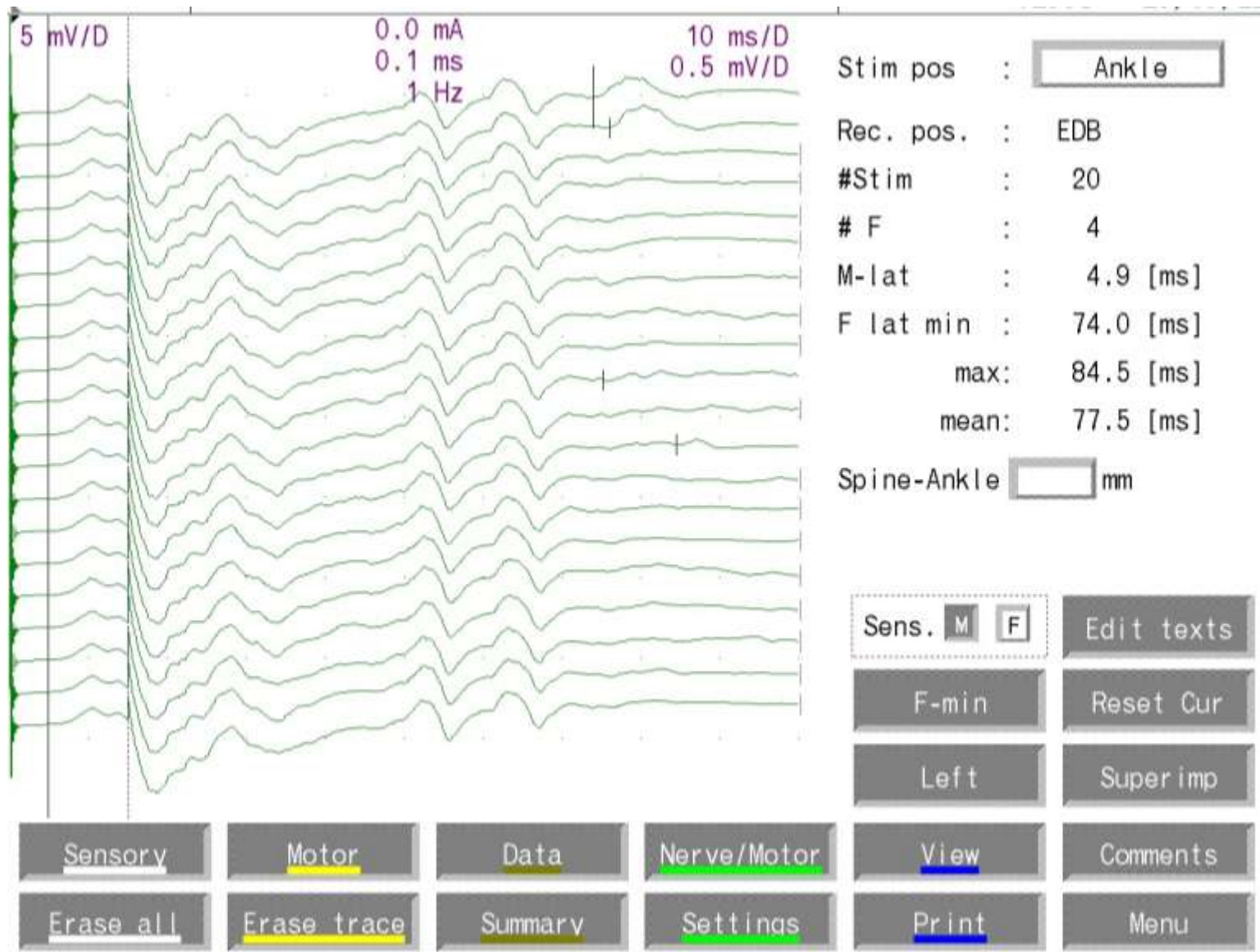
Case 2

L



Case 2

R



Case 2

R

Insertion act.	Spontaneous act.	Voluntary act.	Interpretation
Ins.act. <input type="text"/>	Fib 7/10	Amp Normal	Pron Myopathy
	PSW 7/10	Dur Normal	Myopathy
	Fasc <input type="text"/>	Poly Normal	Normal
	Myotonia <input type="text"/>	Stabil. Normal	SI inact Neur
	Myokymia <input type="text"/>	IP ---	Mod inact Neur
	CRD <input type="text"/>	Recruit. <input type="text"/>	Pron inact Neur
		Firing <input type="text"/>	SI subac Neur
			Mod subac Neur
			Pron subac Neur
			Acute part den
			Complete denerv
			Loss of MU
			Myasthenic cond
			Central weakness
			<input type="text"/>
			<input type="text"/>

Investigated muscles	
▶ Right AT	: Pron subac Neur
Right Medial Gastroc	: Normal
Right Vastus lateralis	: Normal
Right Tensor fascia latae	: Normal
Right Tibialis anterior	: Normal
Right EDB	: Mod subac Neur
Right Abd hallucis	: Normal

Other:

Note :

MUP Data

Copy Find.

Muscle

View

Comments

Analysis

Erase

Print

Menu

Case 3

- Dull ache right arm
- Global weakness R hand
- ? Median / ? Ulnar / ? radicular

Nerve	Stim/Rec	Lat.	Dur.	Amp.	Dst.	Vel.	F/H-Waves
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Motor Nerve Conduction studies

Right:

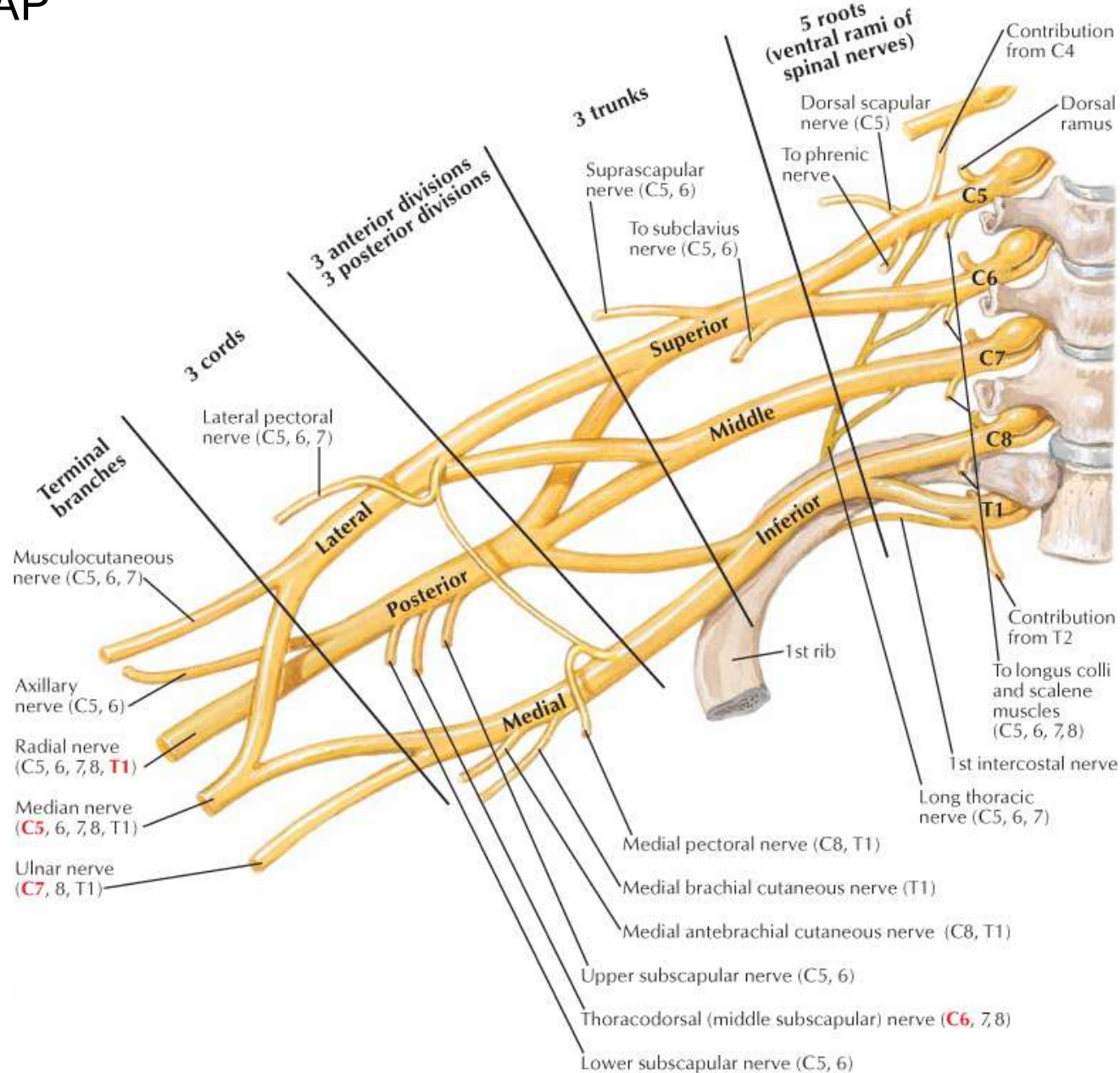
Median	APB	NR	-	-	-	-	NR-
Ulnar	ADM	4.2	13.2	1,497	-	-	NR-
Ulnar	ADM	11.8	14.3	1,499	26.0	34	-
Left:							
Median	APB	3.3	5.0	7,647	-	-	26.1-29.4
Median	APB	7.2	4.8	7,085	21.0	54	-

Sensory Nerve Conduction Studies

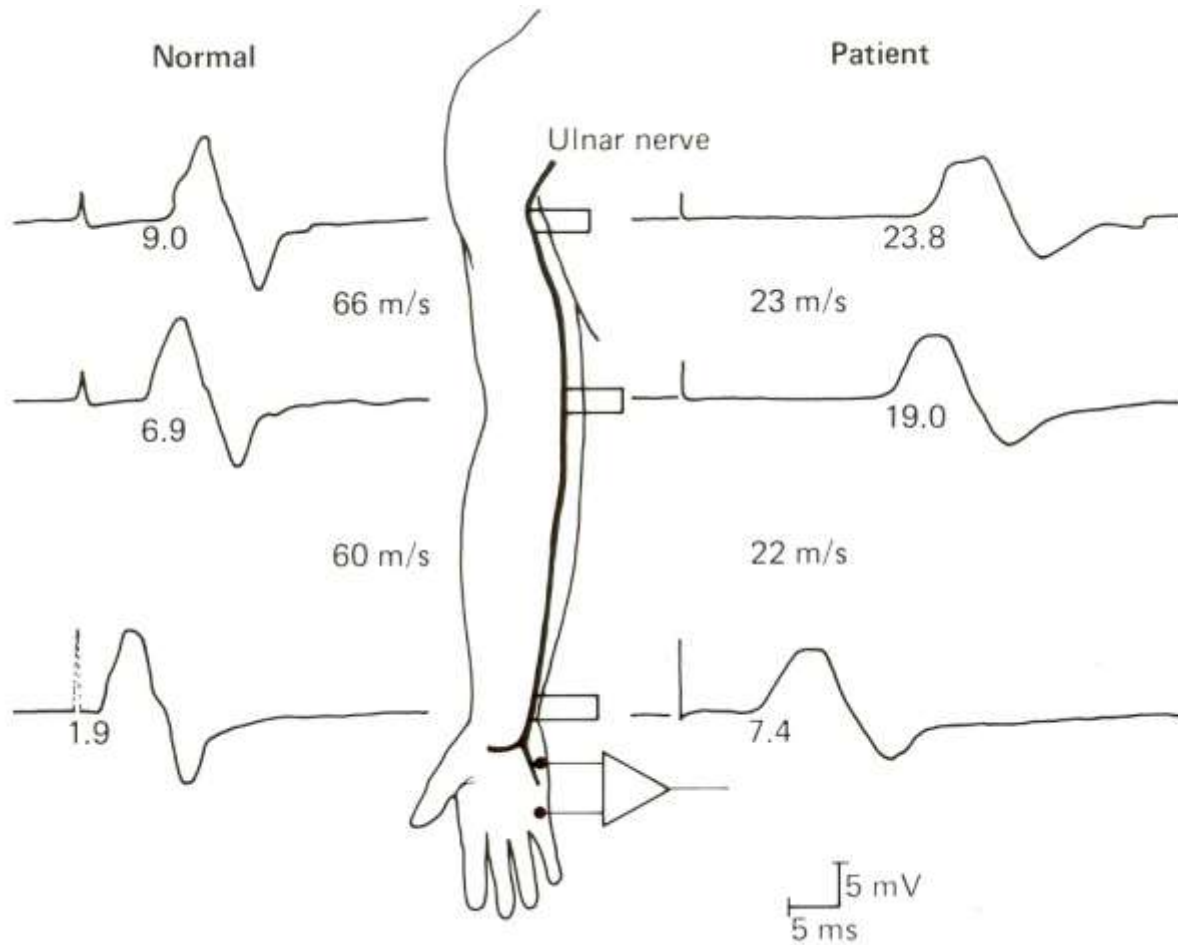
Right:

Median	Digit I	3.0	1.7	13	12.0	40	-
Median	Digit III	3.7	2.0	2	14.0	38	-
Ulnar	Digit V	NR	-	-	11.0	-	-
Median	Digit IV	NR	-	-	13.0	-	-
Ulnar	Digit IV	NR	-	-	13.0	-	-
Ulnar	MAB	NR	-	-	6.0	-	-
Median	Mixed	3.7	1.5	7	21.0	56	-
Ulnar	Mixed	NR	-	-	27.0	-	-
Radial	Sup. Rad.	1.8	1.5	29	6.0	34	-
Musct.	LAB	1.3	0.8	6	6.0	47	-
Left:							
Median	Digit I	2.1	1.1	17	11.0	53	-
Median	Digit III	2.5	1.4	16	14.0	57	-
Ulnar	Digit V	1.9	1.0	22	10.0	53	-
Ulnar	MAB	1.2	1.0	8	6.0	51	-
Median	Mixed	3.0	1.6	16	21.0	70	-

- Absent median CMAP
- Small ulnar CMAP
- Absent ulnar SNAP
- Small median III
- Normal median I
- Normal radial



Case 4



Case 5

- Ataxia
- Partial ptosis
- Complete external ophthalmoplegia
- Myoclonus

MOTOR	Latency m.Sec	Duration m.Sec	Amplitude uV	Velocity M/Sec	F-Waves m.Sec
Rt Median:					
Wrist	3.5	10.6	17,000		29.0-31.6
Elbow	8.2		18,600	53	
Rt Com Peroneal:					
Foot	5.2	14.9	2,100		58.5-64.4
Knee	12.1		3,300	56	
Rt Tib:					
Foot	6.5	13.2	1,400		68.4-70.8
Knee	16.6		1,000	48	(30%)

SENSORY	Latency m.Sec	Amplitude uV	Velocity M/Sec
Rt Radial trunk	NR		
Rt Radial I	2.9	1	46
Rt Median I	NR		
Rt Median III	NR		
Rt Ulnar V	NR		
Rt Sup Peroneal	NR		
Rt Sural	NR		

EMG Study: The following muscles were examined using a concentric needle

EMG electrode:

Right tibialis anterior (TA)

Right extensor digitorum brevis (EDB)

Right vastus lateralis

Right biceps

Fibrillation potentials and positive sharp waves were seen in TA and EDB.

Interference pattern (IP) was reduced in TA, EDB and to a lesser extent VL. IP was full and early in biceps. In TA, EDB and to a lesser extent VL there was an excess of large polyphasic motor unit potentials (MUPs) which were unstable up to 3-4mv in amplitude. In biceps and also VL, stable short duration polyphasic MUPs were seen up to 1mv in amplitude.

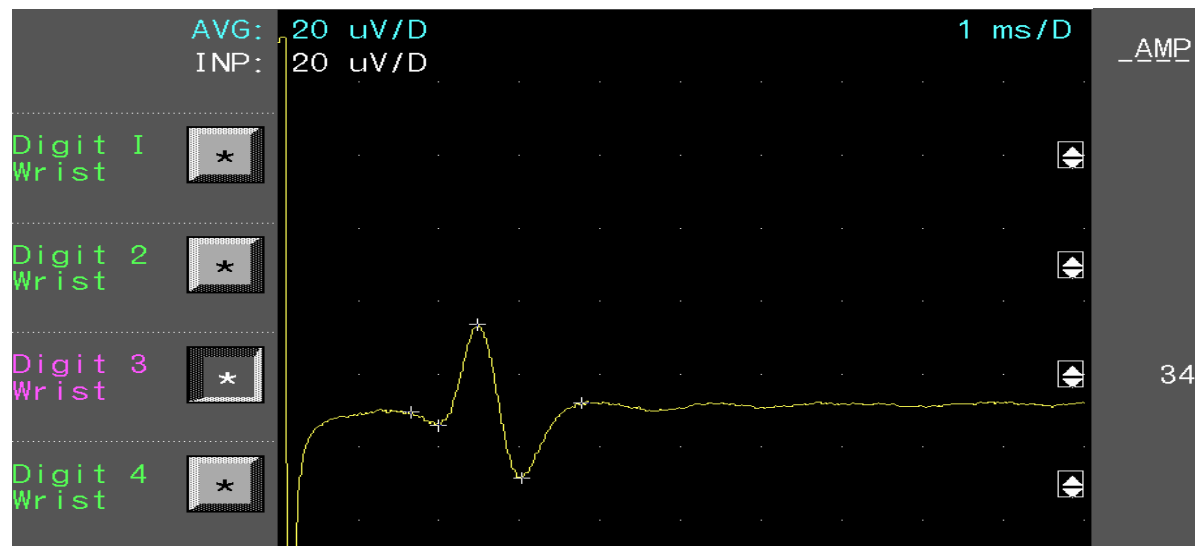
Case 6

- 38 year old male admitted via ENT.
- 1 week difficulty swallowing, visual disturbance, change in voice quality, generalised weakness.

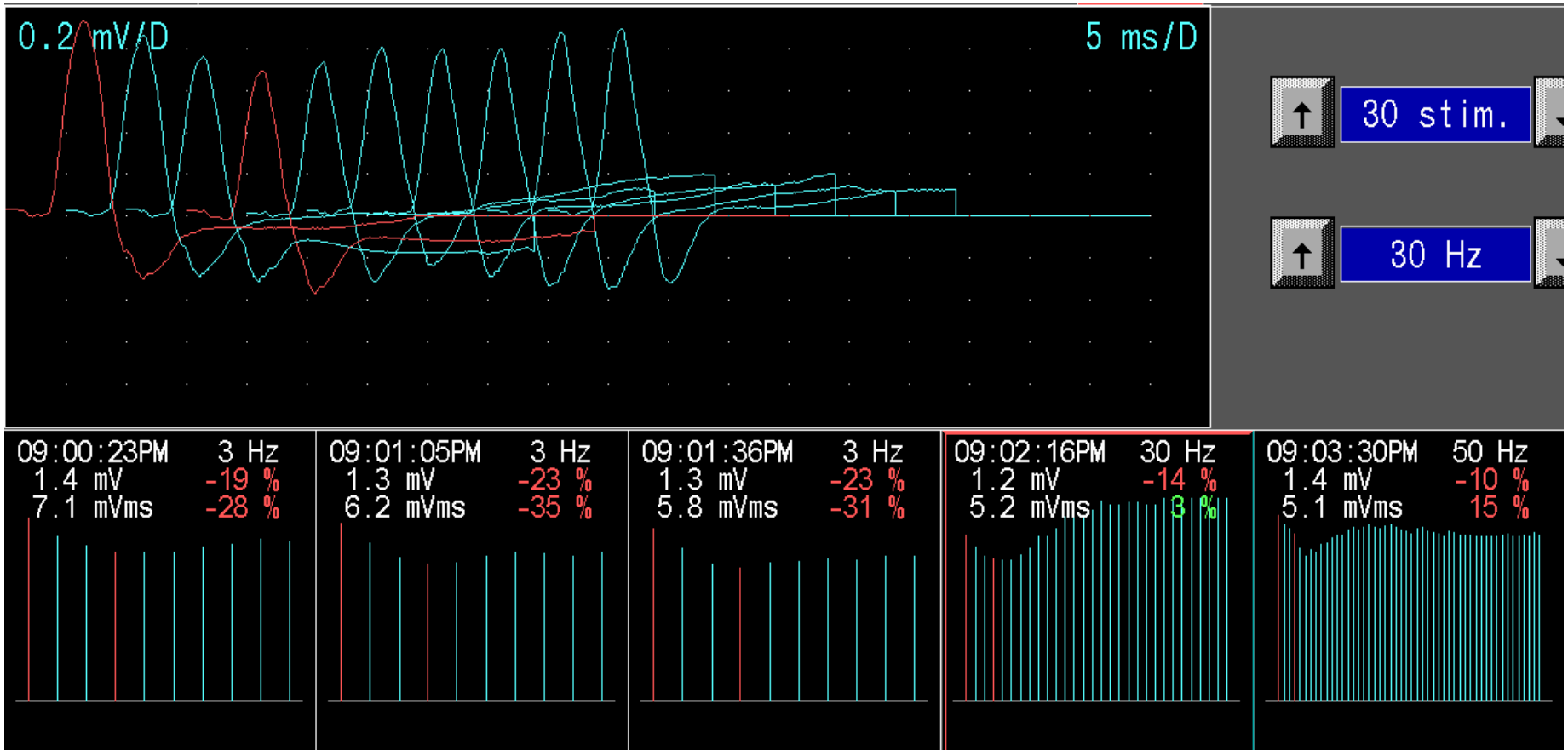
Case 6

- Deteriorated within 24 hrs.
- Bulbar voice, bilateral ptosis, tachypnoeic (RR 24-28/min), poor chest expansion, hypoxic (O2 sats 91% on air).
- GCS 15 with full power in all limbs.

Nerve conduction studies



Repetitive stimulation R APB



Case 6

- Received botulinum antitoxin 2 X 250ml.
- Intravenous benzylpenicillin and clindamycin.
- Intubated and ventilated for 10 days.
- Discharged one week later.

What we can tell you

- Anatomical location of the lesion
- Type of lesion / likely aetiology
- Severity / rate of progression / prognosis

What we can't tell you

- ? Multiple sclerosis
- ? Small fibre neuropathy
- ? Very early GBS
- ? Organic sensory symptoms

Conclusion

- NCS/EMG can investigate function from anterior horn cell to muscle
- It hurts and has risks attached
- Be patient
- Please ask

Thankyou

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