Erik's EMG Quiz

EMG at full activation

Give a few words of argument why each of these TERMS are less than optimal

Interference pattern
Summation pattern
Pattern at strong contraction
Recruitment pattern

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Interference pattern 50,60Hz
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Interference pattern 50,60Hz
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Interference pattern	50,60Hz
Summation pattern	not much summation, equally much subtraction
Pattern at strong contraction	neutral but complicated term
Recruitment pattern	

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Interference pattern	50,60Hz
Summation pattern	not much summation, equally much subtraction
Pattern at strong contraction	neutral but complicated term
Recruitment pattern	leads thoughts to the way MU are orderly recruited

Can a MUP have a longer total duration than the interval between discharges of this MUP

Is it possible to decide whether a recorded EMG signal originates in the nerve or in the muscle

Is there any difference in MUP parameters if the recording is obtained 2 cm or 5 cm from the end-plate?

We sometimes record double discharges (extra discharges) in voluntary EMG. Do we require that the two discharges are identical in shape, to separate them from occasional occurrence of discharges from 2 different MUPs

Critical illness: are fibrillations usually a sign of denervation in critical illness?

Critical illness: is the myosin content lower in CIM than in CIP

Critical illness: is sural amplitude different in CIM and CIP

Can an A-wave appear after the F-waves

Can an A-wave and an F-response be generated in the same axon by a given stimulus (SFEMG necessary to identify that we record from the same axon)

Is there any difference in amplitudes between A-waves and individual F-responses

Monopolar recording. Is there any difference in the pattern at voluntary contraction if the distance between the two recording monopolar electrodes (“active” and “reference”) is 1 cm or 10 cm?

Can you detect the “size principle” with conventional needle electrodes?

Concentric electrode has an oval recording surface: are the MUP parameters different for transversal or longitudinal insertion of the electrode (in relation to the fiber direction).

Which is the concentric needle electrode recording uptake radius (180 or 360 degree) for the duration parameter in a MUP
Which is the concentric needle electrode recording uptake radius (180 or 360 degree) for the spiky part of the MUP

Is it possible to make sure that you are stimulating muscle fibers directly and not intramuscular nerves in so called direct muscle stimulation (critical illness tests)

You may stimulate one or very few axons at two different sites (prox and dist) and record a SFEMG response from corresponding muscle and so measure the conduction in a single axon. How do you ascertain that you have stimulated exactly the same axon?

SFEMG: how many spikes do you need to record simultaneously to detect neurogenic blocking

SFEMG: how many spikes do you need to record simultaneously to detect neurogenic jitter?

Reinnervation. In the early stage of reinnervation (20 days) after a partial nerve lesion, you start to see MUPs with some jittering spikes. In general is the MUP "small" or "large"?

In monopolar EMG recording you often see a small positive going signal on the end slope of the signal. What is this, and why do you not see that in concentric needle EMG

With increasing force, the EMG amplitude (envelope amplitude) increases. Why?

In concentric needle electrode recordings, one can sometimes obtain low amplitude MUP that looks "upside down". Explanation?

50 Neurography: Low ampl CMAP

Normal sensibility, strong muscles: If the CMAP of APB has an amplitude < 4mV and CMAP from ADM is normal, and the SNAP from dig III is normal which is a likely reason

1. CTS
2. LEM
3. Technical problem
4. Polyneuropathy

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LEM is very rare and technical problems common. Answer on these grounds

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53 Neurography: Root or plexus

Patient 80 yo, weakness and numbness in the right leg.
Low sensory amplitude in right fibularis superficialis but normal on the left side.
Reduced CMAP ampl in right EDB
EMG in Tib ant show denervation. EMG in lumbar paraspinals normal

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2. plexopathy
3. central lesion
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Normal sensory and paraspinal EMG favors plexus lesion

54 EMG: Myasthenia?

Patient with ptosis but no arm or leg weakness. RNS in nasalis and deltoid normal.
SFEMG in orb oculi shows jitter and some blocking. Jitter abnormal in Ext dig.

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2. Generalized MG
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Normal SFEMG findings are strong indications that symptoms are NOT MG. In this case, it may be a myopathy, often with very little of jitter abnormalities

Q 17. In a slight CTS the palm stimulation (wrist recording) may have normal orthodromic latency but abnormal ortho from dig 3 stimulation. Why?

1

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Pure sensory CTS. Palm stim includes motor nerve fibers, which now give normal latency

1

Fib and pws

Which alternative(s) is (are) correct?

1. generated in the axon
2. generated in individual muscle fibers
3. usually appear with irregular firing rhythm
4. always sign of axonal pathology
5. PSW more significant in the EDX interpretation

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EDX in demyelinating neuropathy with conduction block

Which alternative is expected EDX finding in these conditions

1. Reduced MUP amplitudes
2. Reduced CMAP amplitudes
3. Reduced fullness of interference pattern at strong contractions
4. Interference pattern at strong contraction most pronounced proximally
5. Abundant fibs in distal muscles

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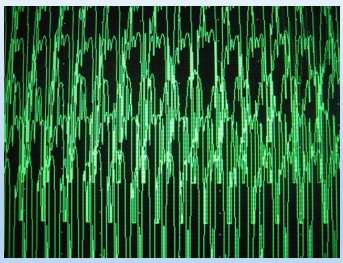
What do you call this phenomenon?

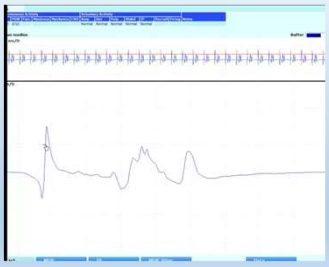


What do you call this phenomenon?

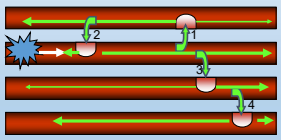
This is CRD, complex repetitive discharges, not myotonia

Abrupt start and stop.
No waxing and waning

Mechanism



CRD (M gluteus) Abrupt start and stop, complex. No jitter between components



EMG: acute weakness

Patients with acute weakness since 2 days.
If this is GBS, which combination of findings do we get

1. normal CMAP and CV – normal MUPs and firing
2. normal CMAP , reduced CV – early reinnervation
3. Reduced CMAP ampl - first signs of denervation
4. normal CMAP, normal CV, reduced # F waves, presence of A waves
   - abnormal interference pattern

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CMAP and CV changes and denervation signs have not yes developed.
Weakness may be due to proximal conduction block; thus reduced F persistence and reduced EMG pattern at effort

Acute weakness

History:
Formerly healthy man with acute weakness from 7 days ago,
progressive symptoms.
the patient reports double vision and an unsteady gait.

Clinic:
external ophthalmoplegia, ataxia and areflexia weak facial muscles, ptosis and reduced mobility of the tongue general mild muscle weakness. Sensory diffusely affected.

EDX findings con´t and QUESTION

Acute weakness, EDX and Questions

Neurography, MCS
- general slightly decreased MCV
- F latencies extended
- DLAT extended
- distal amplitude reduced, ssk In the facial muscles

- Neurography SCS
- abnormal response with low amplitudes, more than reduced CVEMG
- reduced interference pattern, 0 fib
- autonomous tests slightly abnormal
- abnormal Blink reflex
- prolonged latency to R1 and R2

Question Likely diagnosis?
GBS
Lyme disease
brainstem involvement
Miller Fischer
MG

Question What is your next step
RNS
outpatient CFS analysis
test for antibodies against cholinergic receptor
SFEMG
admission for diagnosis and treatment

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Discrepancies

70. Good CMAP in weak muscle, no twitch at nerve stimulation.
Normal F response.

Explanation?
conduction block
recent axonotmesis
tendon rupture
pnp
MG
myopathy

71.Good finger SNAP but no sensation at stimulation
Why?

pnp
conduction block
myelopathy
the wrong digital nerve is stimulated
GBS

72. Clear sensory experience with digital nerve stimulation but no SNAP from the wrist

Explanation?
proximal conduction block
wrong recording position
cold hand
bipolar stim pulse has been used
the stimulus too short

73. Normal MUP and low MCV
What?

axonal pnp
conduction block
demyelination
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posttraumatic reinnervation

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59 Methods of choice

Which is the EDX method of choice for the following diagnostic questions

MG	RNS SFEMG
CTS	EMG of APB and ADM antidromic sensory neurography
GBS	EMG neurography thermotest
Root	EMG neurography evoked potentials
ALS	EMG neurography Motor unit counting

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Congratuations

You passed

Reference List

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