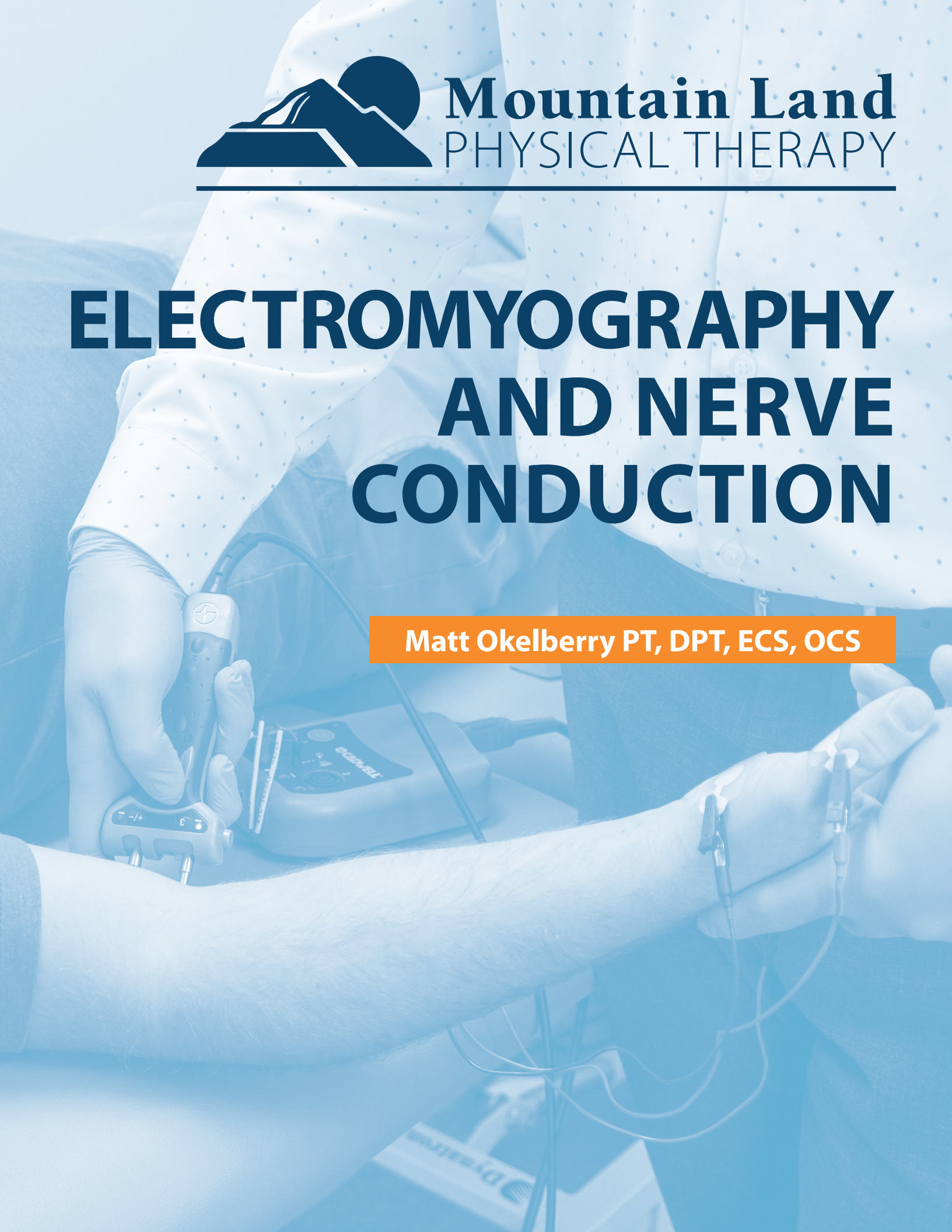
Mountain Land
PHYSICAL THERAPY

ELECTROMYOGRAPHY AND NERVE CONDUCTION

Matt Okelberry PT, DPT, ECS, OCS



EMG AND NERVE CONDUCTION

Electromyography (EMG) and Nerve Conduction (NCV), serve as a diagnostic procedure employed to assess the well-being of muscles and their associated nerves. Through EMG testing, medical professionals can identify potential muscle dysfunction, nerve abnormalities, or any disruptions in the signal transmission between muscles and nerves, providing valuable insights into your overall neuromuscular health.

WHY USE EMG

EMG and nerve conduction testing can help physicians diagnose various conditions including, but not limited to:

- Disorders affecting nerve roots, such as herniated discs in the spine.
- Peripheral nerve compressions such as carpal tunnel or cubital tunnel syndrome.
- Peripheral neuropathies such as diabetic neuropathy or inherited neuropathy conditions.
- Muscle disorders such as muscular dystrophy or polymyositis.
- Diseases affecting the connection between nerves and muscles, like myasthenia gravis.
- Motor neuron disorders in the brain or spinal cord, such as amyotrophic lateral sclerosis or spinal muscular atrophy.

Mountain Land
PHYSICAL THERAPY

EMG AND NERVE CONDUCTION AT MOUNTAIN LAND

WHY CHOOSE MOUNTAIN LAND

- **Performed by our residency-trained, board-certified electrophysiologic clinical specialist:** Matt Okelberry, PT, DPT, ECS, OCS
- **Clear and concise reports (see next page)**
- **Timely scheduling at convenient locations**
- **Reports available by the end of the next business day**

MEET OUR EMG & NERVE CONDUCTION SPECIALIST

Matt Okelberry PT, DPT, ECS, OCS

Clinic Director, Physical Therapist

Matt graduated with an Exercise Science degree from Brigham Young University in 2016. He went on to earn his Doctor of Physical Therapy degree from South College in 2018. He later went on to complete a residency with EMG Solutions in Nashville, TN.

Matt, a residency-trained Electrophysiologic Clinical Specialist (ECS) and an Orthopedic Clinical Specialist (OCS), is an expert in nerve testing, excelling in nerve conduction (NCV) and electromyography (EMG). He provides essential information to physicians, aiding in pain source identification and recommending suitable medical interventions and physical therapy options. Matt's therapy philosophy centers on the belief that "movement is medicine and you can't go wrong getting strong." He takes delight in unraveling each patient's unique puzzle by combining their story, symptoms, and objective data from nerve tests to help them get the best treatment.

PHONE: (801) 435-7218
FAX: (801) 495-5301
EMAIL: care@mlpt.com
URL: www.mlpt.com/EMG

Mountain Land PHYSICAL THERAPY

WHAT THE EMG DATA TELLS US

Electromyography (EMG) and nerve conduction studies (NCS) are diagnostic tests of the neuromuscular system. They provide a detailed assessment of peripheral nerve damage involving myelin and axons as well as the presence of other underlying neurologic or muscle disorders. This diagnostic test is valuable in determining:

IF THERE IS NERVE DAMAGE (MYELIN OR AXON DISRUPTION)

- Is this a focal peripheral nerve compromise, generalized neuropathy, muscle disease, or a more serious underlying neurologic condition such as Lou Gehrig's disease?
- Often EMG and nerve conduction testing results are negative and have normal findings. This is still valuable information and may suggest nerve irritation without nerve damage. Patients with this presentation would be excellent candidates for conservative management such as physical therapy to help resolve their symptoms.

WHERE THE COMPROMISE IS COMING FROM

- Are numbness and tingling in the hands from a compressive neuropathy of the median nerve, ulnar nerve, a nerve root compromise at the spine (radiculopathy), or a combination of these neuropathies?
- Is drop foot coming from compression at the knee, radiculopathy from the back, or severe polyneuropathy?

SEVERITY OF THE COMPROMISE

- Is this a mild focal demyelination likely to respond well to education and conservative management? Or does this involve serious axonal disruption that requires more invasive treatment?

PROGNOSIS OF HEALING POTENTIAL

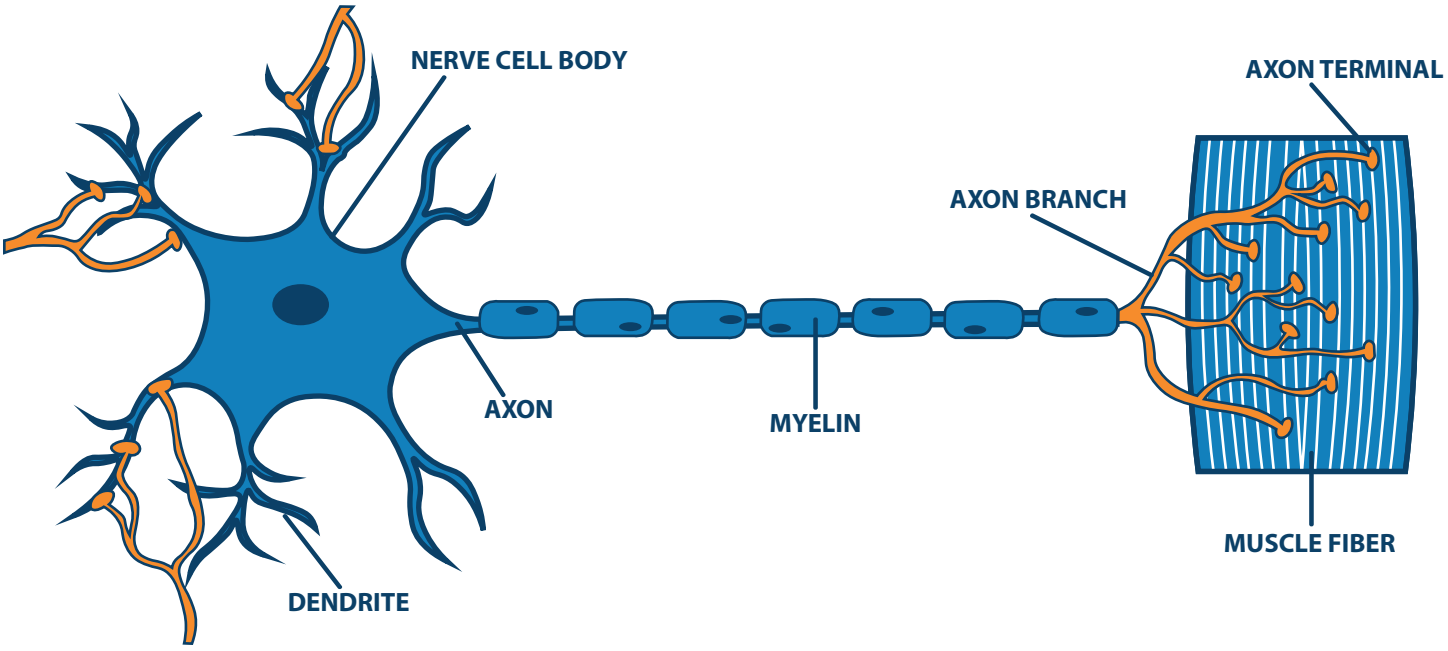
- Is there focal demyelination that has the potential to heal quickly? Is there a documented conduction block that is very likely to resolve with surgical decompression? In the case of axonal injury, is there partial or complete denervation? Follow-up studies can be performed to assess for healing changes in the nerve.

CHRONICITY OF THE PROBLEM

- Is this a new and ongoing problem, or is this an old nerve injury that has healed and adapted already?

UTILITY OF EMG/NCS WHEN THE CLINICAL DIAGNOSIS SEEMS CLEAR

- Knowing the type of nerve damage (myelin vs axon involvement) helps to determine the best treatments and inform recovery times.
- A significant number of electrodiagnostic (EDx) studies discover different or additional nerve issues than the referring diagnosis. This may be as high as 1 in 6 patients with clinically diagnosed carpal tunnel syndrome.
- The severity of compressive neuropathies such as carpal and cubital tunnel syndromes can be graded using established literature based on EDx data.
- Pre-operative EDx data and severity ratings have been correlated with post-operative prognosis.
- In the case of unfavorable surgical outcomes, post-operative EDx testing can be compared to pre-operative EDx data.



WHAT WILL THE REPORT LOOK LIKE

WHAT YOU WILL SEE ON THE FINALIZED EMG/NCS REPORT

Patient Complaints and Clinical Examination
This will detail the patient's subjective report of symptoms and relevant history and the hands-on neurologic assessment including strength, sensation, and reflex testing among other clinical tests.

Impressions/Conclusions
Most importantly, the report will answer the referring clinical question clearly and concisely. These conclusions will provide key information on the characteristics of nerve damage.

Summary of Normal Findings
This will help you see at a glance which nerve conditions and pathology may be ruled out.

Comments
This section will describe the objective data that defends the findings in Impressions/Conclusions.

Data and Waveforms
The data tables and waveforms will always be included for completeness. Referring or consulted providers can analyze the data independently and use it for comparison in case follow-up studies are performed.

WHAT WILL THE REPORT LOOK LIKE

IMPRESSIONS/CONCLUSIONS

This is an **ABNORMAL NCV** study with **ABNORMAL EMG** findings of the **right upper extremity.**

1. Electrophysiologic evidence was recorded consistent with a **SEVERE (R) MEDIAN NERVE COMPROMISE at or near the wrist** involving both motor and sensory nerve fibers which is characterized by demyelination and axon loss. See Comment #1 for detail.

2. Electrophysiologic evidence was recorded consistent with a **MILD (R) ULNAR NERVE COMPROMISE at or near the elbow** involving both motor and sensory nerve fibers which is characterized by demyelination with no evidence of axon involvement at this time. See Comment #2 for detail.

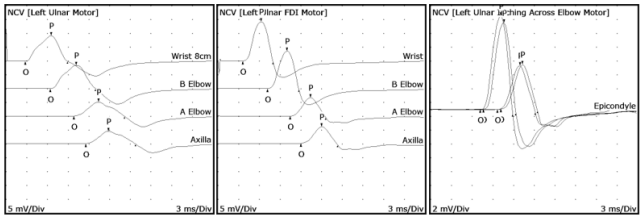
SUMMARY OF NORMAL FINDINGS

1. No electrodiagnostic evidence was recorded suggestive of a cervical radiculopathic process involving the C5-T1 nerve roots on the right.
2. No electrodiagnostic evidence was recorded suggestive of a myopathic disease process.
3. No electrodiagnostic evidence was recorded suggestive of a motor neuron disease process.
4. EMG/NCV testing cannot rule out small-fiber neuropathic changes, central disorders, or transient conduction phenomena.

Example 1: The first page of the Report will present clear, concise Conclusions and a list of Normal Findings, making it easy to see pathology that may be ruled in and ruled out.

Motor Summary Table

Stim Site	NR	Onset (ms)	Norm Onset (ms)	O-P* Amp (mV)	Norm O-P Amp	Neg Dur (ms)	Site1	Site2	Delta-0 (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Left Median Motor (Abd Poll Brev)												
Palm		1.9		5.6		5.16	Wrist 8cm	Palm	2.5	5.0	*20	>29
Wrist 8cm		*4.4	<4.2	5.3	>2.8	5.94	Elbow	Wrist 8cm	4.2	21.0	50	>50
Elbow		8.6		5.4		6.09						
Left Ulnar Motor (Abd Dig Minimi)												
Wrist 8cm		2.8	<3.6	9.2	>4.2	6.09	B Elbow	Wrist 8cm	3.6	19.0	53	>49
B Elbow		6.4		8.4		6.56	A Elbow	B Elbow	3.4	10.0	*29	>47
A Elbow		9.8		5.1		7.34	Axilla	A Elbow	1.8	10.0	56	>50
Axilla		11.6		4.5		7.19						
Left Ulnar FDI Motor (FDI)												
Wrist		3.6	<4.5	14.2		4.38	B Elbow	Wrist	3.6	19.0	53	>49
B Elbow		7.2		13.6		4.53	A Elbow	B Elbow	3.3	10.0	*30	>47
A Elbow		10.5		6.6		5.16	Axilla	A Elbow	1.5	10.0	67	>50
Axilla		12.0		6.0		5.31						
Left Ulnar Inching Across Elbow Motor (FDI)												
-2.5		7.2		13.5		4.69	-2.5	Epicondyle	0.5	2.5	50	
Epicondyle		7.7		12.5		4.69	Epicondyle	2.5	2.0	2.5	13	
2.5		9.7		6.3		5.47	2.5	5 cm prox	0.5	2.5	50	
5 cm prox		10.2		6.4		5.31						



Example 2: Snapshot of the Motor Summary Table with associated Waveforms, demonstrating a demyelinating conduction block at the elbow. Ulnar inching technique can be used to more precisely describe the location of compromise.

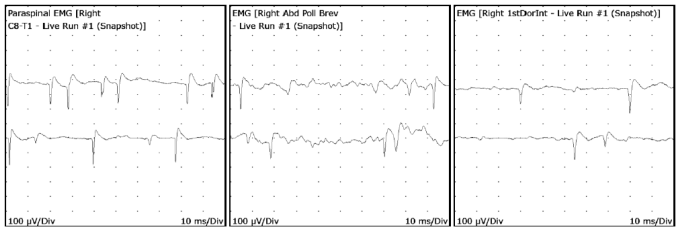
EMG

Side	Muscle	Nerve	Root	Ins Act	Fibs	Psw	Other	Amp	Dur	Poly	Recrt	Int Pat	Comment
Right	Deltoid	Axillary	C5-6	Nml	Nml	Nml	Nml	Nml	Nml	0	Nml	Nml	
Right	Biceps	Musculocut	C5-6	Nml	Nml	Nml	Nml	Nml	Nml	0	Nml	Nml	
Right	Triceps	Radial	C6-7-8	Nml	Nml	Nml	Nml	Nml	Nml	0	Nml	Nml	
Right	ExtDigCom	Radial (Post Int)	C7-8	Nml	Nml	Nml	Nml	Nml	Nml	0	Nml	Nml	
Right	PronatorTeres	Median	C6-7	Nml	Nml	Nml	Nml	Nml	Nml	0	Nml	Nml	
Right	FlexCarpiUln	Ulnar	C8,T1	Nml	Nml	Nml	Nml	Nml	Nml	0	Nml	Nml	
Right	1stDorInt	Ulnar	C8-T1	*Incr	Nml	*1+	Nml	Nml	Nml	0	Nml	Nml	
Right	Abd Poll Brev	Median	C8-T1	*Incr	Nml	*1+	Nml	Nml	Nml	0	Nml	Nml	
Right	FlexPolLong	Median (Ant Int)	C7-8	Nml	Nml	Nml	Nml	Nml	Nml	0	Nml	Nml	
Right	ExtIndicis	Radial (Post Int)	C7-8	Nml	Nml	Nml	Nml	Nml	Nml	0	Nml	Nml	

Paraspinal EMG

Side	Muscle	Nerve	Root	Ins Act	Fibs	Psw	Other	Amp	Dur	Poly	Recrt	Int Pat	Comment
Right	C3-5	DPR	C3-5	Nml	Nml	Nml	Nml	NT'd	NT'd	NT'd	NT'd	NT'd	
Right	C6-7	DPR	C6-7	Nml	Nml	Nml	Nml	NT'd	NT'd	NT'd	NT'd	NT'd	
Right	C8-T1	DPR	C8,T1	*Incr	Nml	*2+	Nml	NT'd	NT'd	NT'd	NT'd	NT'd	

Waveforms:



Example 3: Snapshot of the EMG matrix and associated snapshots of abnormalities, in this case demonstrating a (R) C8/T1 cervical radiculopathic process.

Mountain Land PHYSICAL THERAPY

FREQUENTLY ASKED QUESTIONS

Q: What is an EMG test? What kind of information does it provide?

A: Electromyography (EMG) is a diagnostic test of your neuromuscular system, including the nerves that exit from your spinal cord to the muscles they supply. It provides detailed information on the conductivity of your nerves such as the speed and strength of the signal from end to end. This information can be synthesized to create a picture of your neuromuscular health and uncover problems such as nerve damage or diseases of nerves and muscles.

Q: What to expect with an EMG?

A: Your nerve test will take about 30-60 minutes. During the EMG procedure, a small electrical current is applied to the skin to measure the conductivity of nerves. Next, a needle electrode will be inserted into the affected muscle, causing minimal discomfort without significant pain. You may be asked to perform specific movements or contract the affected muscle to identify signals and areas of inactivity.

Q: Is it painful?

A:

- We make every effort to provide a pleasant experience and minimize discomfort during the test.
- Most people report the procedure to be uncomfortable at times, but rarely painful. Any discomfort from the needle's removal should quickly subside.
- Following the EMG, you might experience some soreness, but it should resolve soon. The physical therapist can suggest remedies to alleviate any discomfort at home.

Q: When will I learn about my results?

A: The finalized EMG Report will be sent to the referring provider by the end of the next business day from the day the test was performed. You will receive results from your referring provider.

Mountain Land
PHYSICAL THERAPY

HOW TO PREPARE FOR MY APPOINTMENT

- **Please wear loose fitting clothing. We will need to be able to access the legs just above the knees for lower extremity testing, and up to the shoulder for upper extremity testing.**
- **Keep your skin clean of any lotions, creams, or Vasoline on the limbs being tested**
- **No restrictions of eating/drinking or taking medications (except for Mestonin or muscle relaxers)**
- **The EMG specialist will address any concerns you have prior to beginning the test.**

Mountain Land
PHYSICAL THERAPY

SCAN OR VISIT TO LEARN MORE

www.mlpt.com/EMG

Phone: (801) 435-7218
Fax: (801) 495-5301
Email: care@mlpt.com