EMG SOLUTIONS NEWSLETTER

Edition 6

In this issue:

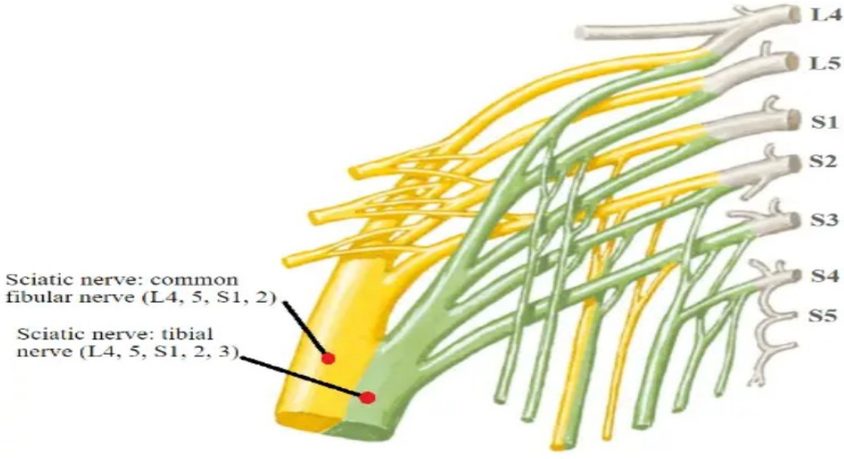
Many patients are told, “You have sciatica.” You have lumbago, a lumbar radiculopathy, you have a pinched nerve at your lower back, a slipped disc, neuralgia, spondylosis… the list seems to go on and on. These injury designations are often used interchangeably and seem to be the same thing but at the same time are incredibly different. While each of these is usually associated with lower back and/or hip pain that may or may not run down the leg, they are hinting at a possible nerve compression. A true nerve compromise whether it is at your back or along the length of the sciatic nerve will present very differently depending upon the location of the problem.

What Do You Expect with a Sciatic Nerve Injury?

Many patients are told “you have sciatica.”

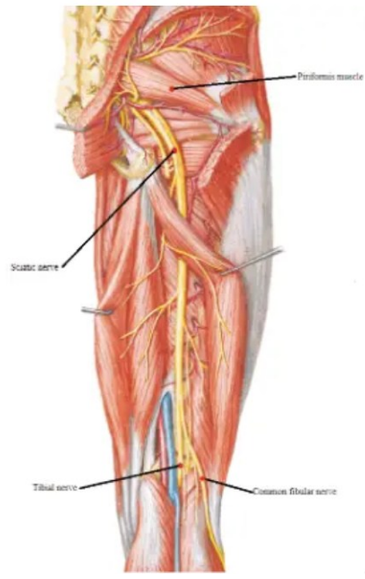
According to the Mayo Clinic, “Sciatica refers to pain that radiates along the path of the sciatic nerve, which branches from your lower back through your hips and buttocks and down each leg. Typically, sciatica affects only one side of your body.”[1] The sciatic nerve is the largest nerve in the body that stems from the L4 through S3 nerve roots.[2] After the anterior rami leave the nerve root levels, they coalesce into one nerve and descend through the greater sciatic foramen passing underneath the piriformis muscle. As the nerve continues down the leg it branches out into the tibial and fibular nerves just before the back of the knee. The tibial nerve innervates the more posterior leg musculature down into the foot, while the fibular nerve innervates the anterior and lateral lower leg musculature. This means there are a lot of areas of potential

A true sciatic nerve compromise typically occurs anywhere after the sciatic nerve first arises from the lumbosacral plexus to just proximal to the back of the knee where the fibular and tibial nerves branch out. Tumors, trauma, traction, radiation therapy, compression injuries, muscular entrapment, and intramuscular injections can cause sciatic nerve issues, just to name a few.[3] The location of the exact area of compromise will affect what kind of symptoms and deficits will make up each patient’s complaints. However, no matter where the sciatic nerve is injured similar findings will be seen in the lower leg.



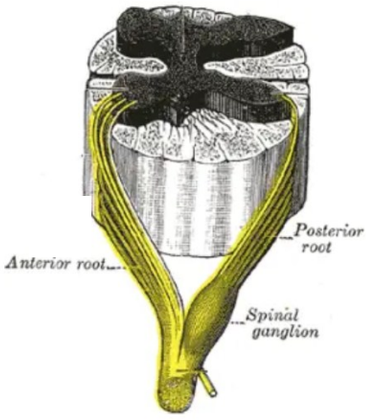
Sciatic nerve from lumbosacral plexus. Image source: Netter’s Atlas of Human Anatomy 7th edition

An injury to the sciatic nerve in the upper leg will affect the tibial and fibular nerve branches which are oriented more distally. For example, if the compromise is closer to the posterior knee, the patient will have preservation of the hamstring musculature, but will have foot drop, ankle plantar flexion weakness, as well as paresthesia of the entire foot and lateral lower leg. While a nerve injury more proximally located around the piriformis muscle will have all the same abnormal previous findings, but with the added weakness of the hamstring muscles.



Sciatic nerve. Image source: Netter's Atlas of Human Anatomy 7th edition

Now if the problem is in fact a pinched nerve at the L5 and S1 nerve root levels at the lower back and not the sciatic nerve, clinically the patient will present very similarly. Most patient complaints will include leg weakness, numbness and tingling of the lower leg, and radiating symptoms. Yet, a pinched nerve at the lower back and a sciatic nerve compromise should be treated very differently. So how can one tease out the difference between a pinched nerve at the lower back versus a sciatic nerve compromise?



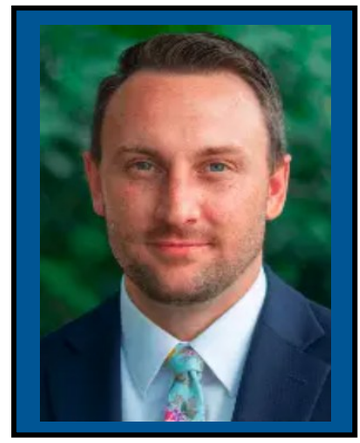
Dorsal root ganglion. Image source: Wikimedia Commons.

This is where further testing is needed, imaging alongside nerve conduction studies (NCS) combined with electromyography (EMG) can help locate a nerve compromise more definitively. Making the distinction between these two specific ailments revolves around the fact that the sensory nerve cell bodies lie outside of the spine in the dorsal root ganglion (or spinal ganglion). This means that if the problem is a compressed nerve root (at the spine) the sensory nerve cell body and its connection to the nerve fibers will be preserved, and the sural and superficial fibular sensory nerve studies will be normal with NCS testing. However, if the problem is the sciatic nerve, one or both of these sensory nerves will also be abnormal.

A good clinical history and physical exam alongside other diagnostic tests, such as EMG/NCS can help to rule in or rule out a nerve compromise. If you, a friend, a family member, or your patients are in need of expert evaluation, we here at EMG Solutions are happy to help.

- Mayo Clinic Staff. (2020, August 1). *Sciatica*. Mayo Clinic. Retrieved April 6, 2022, from https://www.mayoclinic.org/diseases-conditions/sciatica/symptoms-causes/syc-20377435
- Giuffre BA, Jeanmonod R. Anatomy, Sciatic Nerve. [Updated 2021 Jul 29]. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from:
- Leis, A. A., & Trapani, V. C. (2000). *Atlas of electromyography*. Oxford: Oxford University Press.

Thank you to our author and fellow clinician Kyle J. Martinos PT, DPT, ECS. Kyle is our VP of operations and serves as one of our Mentors for the residency program. Kyle has been with EMG Solutions since March of 2018, received his ECS in 2020, and worked outpatient PT prior to that time. Kyle is married with 3 sons, is fluent in Norwegian and learning to speak Hindi. He plays guitar and alto saxophone. Kyle spoke at the APTA CSM 2024 and will be speaking at the 2025 CSM in February. Thank you for your commitment to excellence, Kyle!



MEET THE MENTORS

Quinn Millington, PT, DPT, ECS, OCS

CEO/Founder

- **How did you become interested in EMG.NCSs?**

  I was first introduced to electrodiagnostic testing as a student at the University of Alabama at Birmingham. The idea of being able to understand the nerve function, the interaction between the nerve of the muscle, and use that to work backward and identify pathology was absolutely fascinating to me.

- **What was your learning process to become certified in Clinical Electrophysiology? How long did this take you?**

  There was no residency programs. Mine was entirely based on a combination of self-study and mentorship. Fortunately I will had access to some talented electromyography was early in my career who helped me along the way. Most of the work, however, was done by self-study. It took me about five years of diligent effort to complete the requirements to sit for the exam.

- **How many years of experience do you have as an ECS Physical Therapist?**

  I have been doing electrodiagnostic testing since 1992 – I guess that makes it 33 years.

- **What do you love most about this practice?**

  We deal in objective data. While there is some gray area at times, most of our data is very absolute and points us in a very definitive direction. We also provide data and draw conclusions that significantly influenced surgical decisions and medical care.

- **If there is one thing that you would change, what would that be in the specialty of EMG?**

  On one hand, I am adamant that significant training, mentorship, and preferably a residency is a critical component of being absolutely qualified to do electrodiagnostic testing. On the other hand, insurance requirements are such that it's difficult for an individual who's working on becoming board-certified to get the number of tests required without a mentor who is board-certified working very closely with them.

- **Do you see Physical Therapists in the specialty of EMG as a growing need?**

  Absolutely. Physical Therapy training places us in a unique position. We have an in-depth understanding of anatomy, physiology, pathology, and critical thinking. Physical therapist is trained to look for and identify patterns. We are very good in our clinical assessment. For the most part, physical therapists are also very good communicators.

- **What would be your words of advice/wisdom/inspiration to PTs that are interested in becoming certified in clinical electrophysiology?**

  A residency is absolutely the best solution. A residency in my mind means that you basically reside within that discipline for a period of time while developing appropriate competencies. It is not meant to be easy, it is meant to help one become exceptional in that discipline. Be diligent and is worth the journey.

- **Any additional thoughts/comments?**

  If you're curious about the practice of electrodiagnostic testing and physical therapy, let us know. We can arrange time for a student or other interested party to shadow one of our providers. We can also take a phone call or schedule a video call and answer any questions you may have. It is a growing part of the physical therapy practice. We are at the forefront. We foresee this continuing to expand.

RESIDENT SPOTLIGHT

Colby Kunkle, PT, DPT
Resident

Residency Spotlight Questionnaire

- Where did you receive your DPT degree and what led you to the PT profession?

I received my degree from the University of Alabama at Birmingham. Growing up, my dad worked as a podiatrist at UAB, so I have fond memories of him taking me to UAB football, basketball, and soccer games as a child. Each year my dad was asked to give a guest lecture to the UAB DPT students on the foot and ankle as part of their orthopedic class. He became good friends with Dr. Perez over there, and that is how I was introduced to physical therapy. I investigated the profession more over time, prayed about it, and ultimately felt that it was a good fit for me. I loved my PT school experience and am excited to be a part of the profession!

- When did you first learn about clinical electrophysiology offered as a specialty for Physical Therapists?

I first learned about electrophysiology in the first semester of PT school. One of my professors was sharing a little bit about each of the specialties. He didn't have much experience with electrophysiologists, but he said something about them traveling around with their computers doing this mysterious thing called nerve testing. Well, what he said got me curious, so I started looking into it and thought it sounded interesting.

- At what point did you become interested in EMG and NCSs?

I became seriously interested in EMG/NCS In my third semester of school. During our modalities class we did a short section on electrophysiology, and I loved it. I've always been a little bit nerdy, so I was drawn in by the technicality, physiology, and anatomy involved in the testing. From there I was fortunate to have a few of my professors share with EMG Solutions that I was interested in electrophysiology. This allowed me to shadow some clinicians and then progressed to doing one of my clinical rotations with EMG Solutions. Needless to say, I'm very grateful to be a resident here and to be participating with so many fine clinicians in a very fascinating and exciting area of PT practice.

- What made you decide to go the Residency route vs. independently completing study and earning mentor hours?

I decided to pursue the residency route primarily because I loved my clinical experience here and knew this was an area of practice I wanted to participate in. Additionally, from that experience I knew that there was no other place in the country I could go that would prepare more thoroughly for the ECS examination and allow me to be able to perform 2,000+ studies in a little over a year. If you're serious about learning how to perform EMG and NCS, this is the best place to be!

- What have you loved most about the residency?

I have loved the one-on-one opportunities to learn from multiple mentors that the residency provides. It is so beneficial to be able to work with mentors who are so accessible and so willing to help me grow as a clinician. Additionally, it is great to learn from a variety of mentors as each one's unique view and way of practicing ultimately informs my practice and makes me a better clinician. I have found the amount of collective experience here at EMG solutions to be incredibly beneficial to my growth as an electromyographer.

- Is there anything you have disliked about the residency?

While it is a great benefit to work with different mentors, it can also be challenging to match each one's testing practices and report preferences. There can be a little inconsistency between the expectations and requirements of each mentor which can be frustrating at times.

- What is the most interesting case you have tested and what did you learn?

About a week or two into my residency, Austin and I performed a study on a patient with an anterior interosseous nerve injury. During his history his primary complaint was that he was dropping his phone frequently with his thumb slipping while holding it. We asked him to perform an "OK" sign which he was unable to do. This led to testing the anterior interosseous nerve which we found to be compromised. We also found a median nerve compromise at the wrist. However, had we not listened carefully to his history and added to our clinical examination we may have missed the AIN injury and attributed his symptoms to carpal tunnel syndrome only. This experience taught me the importance of a thorough, yet efficient, patient history and clinical examination and how it informs good EDX testing.

- What are words of advice you would like to share with potential or future residents?

If you feel drawn to electrophysiology, apply to the residency. Come join us. Get ready to work and reap the rewards. If you are a recent graduate and are worried about not having enough clinic experience before becoming a resident, know that you will gain plenty of experience here. You will see a variety of patients, and you will grow as an overall clinician not just as an electrophysiologist. Additionally, there are many ways to maintain and continue to hone skills for other areas of practice while being a resident. PRN work on the weekends is great for further developing other clinical skills. Also, many of the mentors and other residents practiced in other areas before focusing on EMG. They are happy to practice other techniques and share that knowledge as well.

- Has the residency met your expectations? How?

The residency has definitely met my expectations. I am very happy with the training I am receiving, and I eagerly look forward to improving each day. I feel that I am growing as a physical therapist and as a person. I have the utmost confidence that the residency will prepare me for the ECS exam, and I feel that I am well on my way toward reaching my goal of becoming an ECS physical therapist.

- Is there anything else you would like to share with potential residents or those considering the EMG Solutions Residency?

If you are interested in clinical electrophysiology, go for it. There is a need for more electromyographers. This residency provides great experience that will not only train you in EDX testing but will also serve to improve your practice as a clinician in other settings. Come and be a part of this great group. Become one of the relatively few ECS physical therapists in the country and be ready to grow as a clinician!

Thank you, Colby for taking the time to answer these questions. We appreciate having you in the EGMS family and grateful for your hard work and dedication to excellence!

Colby is a 2024 December graduate from the University of Alabama at Birmingham. You may recognize him from one of our previous newsletters highlighting him as our first clinical affiliate student. Colby completed one of his final clinical rotations with us last year and fell in love with the practice of clinical electrophysiology. He has been an asset to our team and we are looking forward to watching him grow and helping him reach his goals!

If you have any specific questions for our mentors or residents, please feel free to email me at cathy.digiacomo@emgsolutions and I will be happy to have those questions answered or connect you directly.

If there is a particular content question that we can present here in this Newsletter, again, please contact me at the email address above. I appreciate your suggestions and feedback!

NOW OFFERING RESIDENCY MENTORSHIP AVAILABILITY IN ATLANTA!

Nashville, TN

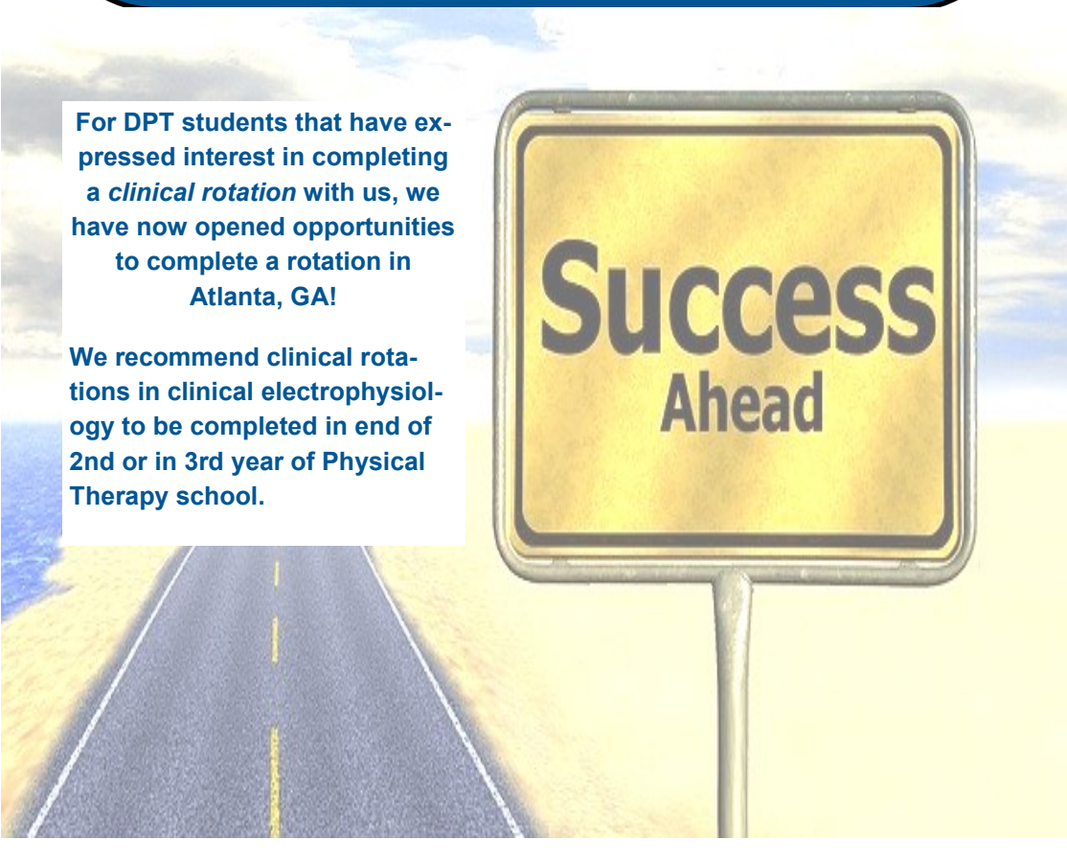
Huntsville, Auburn, and Mobile, AL

Columbus, GA and ATLANTA, GA

IMPORTANT!!!

FOR THOSE INTERESTED IN JOINING THE APRIL 2025

COHORT PLEASE BEGIN SUBMITTING YOUR APPLICATIONS WITHIN 3 MONTHS OF THE DESIRED COHORT START!!



For DPT students that have expressed interest in completing a *clinical rotation* with us, we have now opened opportunities to complete a rotation in Atlanta, GA!

We recommend clinical rotations in clinical electrophysiology to be completed in end of 2nd or in 3rd year of Physical Therapy school.

PHYSICAL THERAPY CLINICAL AFFILIATIONS

We are excited about accepting Doctoral Physical Therapy Students for clinical rotations that may consider the residency for clinical electrophysiology as a future path. We have completed up to 20 affiliate contracts with Physical Therapy programs throughout the US. If you are interested in completing a clinical rotation, speak to your DCE first to assure readiness. Our clinical rotation will provide clearer insight to the specialty practice of EMG and most certainly boost your differential diagnosis skills!!

Not sure if you are ready to commit to full clinical rotation? *Shadowing* with one of our clinicians is a perfect way to learn how we operate on a daily basis, learn more about the practice of EMG/NCS, and have the ability to "pick the brain" of our practicing clinicians. Please contact me at cathy.digiacomo@emgsolutions.com if you are interested in setting a time/s to shadow. There are multiple locations across the southeast to choose for this opportunity.

Please contact us if your school is interested in guest lectures and/or labs for EMG/NCS!

Come see us in HOUSTON, TEXAS for the 50th Annual APTA CSM!!

February 13-15th 2025!

Don't miss our own

Austin Andrus, PT, DPT, ECS and **Kyle Martinos**, PT, DPT speaking on Friday, February 14th, at 3:00 p.m. - 5:00 p.m. on ***MSK vs. Nerve Damage: Everything I Wish I Knew in my First Clinical Exam.***

We look forward to seeing you there!

Booth 2639!

ABPTS American Board of Physical Therapy Specialties | Board-Certified Clinical Specialist

EMG Solutions is committed to research and continuing education for professional development. Check out our BLOG posts at: emgsolutions.com/blog/ OR use the QR code here!

If you have any questions or need direction for submitting your application, please contact me at cathy.digiacomo@emgsolution.com

I am here to help you reach your goals!

Eufaula Physical Therapy + Wellness is HIRING!

Eufaula Physical Therapy + Wellness

A sister company of EMG Solutions is hiring for an Outpatient Physical Therapist position in beautiful Eufaula, Alabama. If you love the outdoors and lake living, this is the place for you! This outpatient clinic is the physical therapy hub of this great community and provides quality services from Sports Medicine to Certified Hand Therapy. Other services include: Vestibular Care, Amputee care, MSK US, EMG/NCS, manual therapy, and more!

Contact me if you or someone you know may be interested in this position. My email: cathy.digiacomo@emgsolutions.com