

Background

- Differentiating lumbosacral radiculopathy from primary lower extremity pain can be challenging for even the most astute clinician.
- Radiculopathy is classically taught as pain radiating down a classic dermatomal distribution with motor weakness, sensory loss, and/or diminished reflexes.
- Localized pain is typically associated with primary lower extremity pathology such as articular, myofascial, or vascular-related etiologies.

Case Description

- A 75-year-old male with chronic back pain status post L5/S1 microdiscectomy (2022) and C4-C6 ACDF (2002) followed by C3-C4 ACDF (2014) with removal of previous plate presented to EMG clinic with left lower extremity heel pain.
- Before microdiscectomy, patient had classic radicular pain from his back to his left foot, but current pain was a constant sharp pain in left heel without radiation.
- He was previously seen by podiatry for plantar fasciitis and had trialed bracing, stretching, and medications unsuccessfully. Multiple x-rays had been taken without local pathology noted.
- Current medications included pregabalin 150 mg BID and weekly applications of a fentanyl patch (75 mcg/hour).

Physical Exam

Inspection

- Well healed surgical scar along the lumbar spine, no muscle atrophy or swelling in the bilateral lower extremities

Range of Motion

- Full PROM in the left lower extremity at the ankle in dorsiflexion, plantarflexion, eversion, and inversion without pain

Palpation

- Minimal tenderness along the left lower extremity including at the Achilles insertion site and plantar fascia

Neurologic Exam:

- **Sensory:** Patchy decreased sensation to light touch over the lateral left ankle and foot

- Manual Muscle Testing - Left Lower Extremity:

- Hip Flexion 5/5
- Hip Adduction 5/5
- Hip Abduction 5/5
- Knee Extension 5/5
- Knee Flexion 5/5
- **Ankle Dorsiflexion 4/5**
- Ankle Plantarflexion 5/5

Reflexes:

- Patella 3+ bilaterally, RLE Achilles 2+, LLE Achilles 1+, Biceps 3+ bilaterally

Provocative Maneuvers:

- Slump test positive with decreased pain during lumbar extension

EMG Results

Sensory Nerve Conduction Study

Nerve / Sites	Rec. Site	Onset Lat ms	Peak Lat ms	NP Amp ?V	Distance cm	Velocity m/s

L Sural - (Antidromic)						
Calf	Ankle	3.6	4.4	6.1	14	39

Motor Nerve Conduction Study

Nerve /	Muscle	Latency	Amplitude	Area	Rel Am	Dur.	Dist	Lat Di	Vel
		ms	mV	mVms	%	ms	cm	ms	m/s
L Peroneal - EDB									
Ankle	EDB	6.0	0.5	1.0	100	3.9	8		
B. Fi	EDB	13.0	0.5	1.0	110	4.8	28	7.1	40

L Tibial - AH										
Ankle	AH	4.5	9.5	27.2	100	6.1	8			
Knee	AH	13.6	6.1	22.2	64.5	7.1	36.5	9.0	40	

EMG Summary Table

Muscle	IA	Fib/PSW	Fasc	H.F.	Amp	Dur.	PPP	Pat
L. Gastroc (MH)	N	N	None	None	N	N	N	N
L. Tibialis Ant	N	N	None	None	N	N	N	N
L. Peroneus L	N	N	None	None	1+ 7K	N	1+	N
L. VMO	N	N	None	None	N	N	N	N
L. TFL	N	N	None	None	1+ 7K	N	N	N
L. Lumbar ps	inc	1+ 600 uV	None	None				

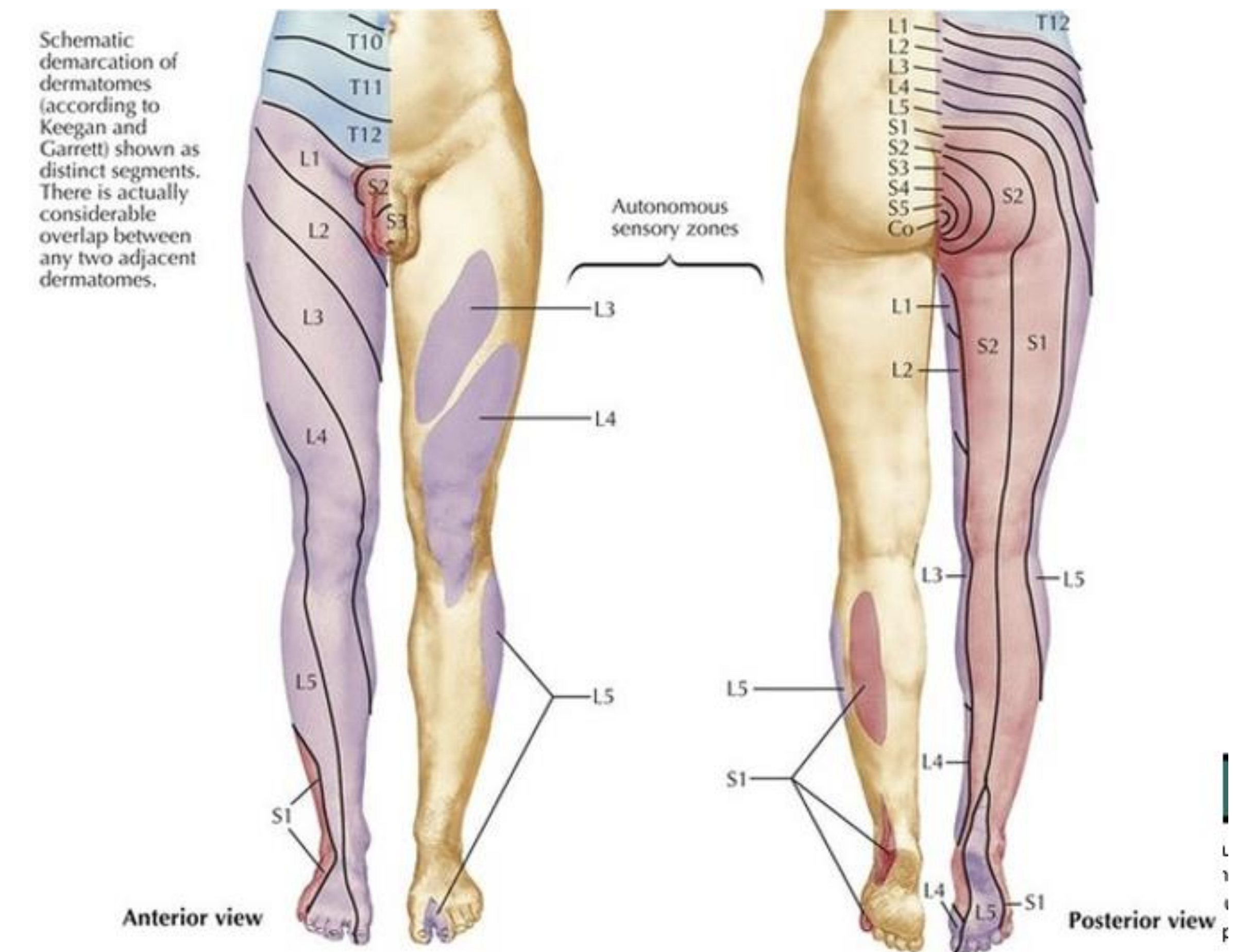
Impression: History, Physical Exam, and Electrodiagnostic findings are suggestive of:

1. There is electrodiagnostic evidence of mild chronic and ongoing neurogenic changes in the left L5/S1 nerve root distribution, consistent with mild chronic and ongoing L5/S1 radiculopathy.
2. There is no electrodiagnostic evidence of peripheral neuropathy affecting the LLE.

Treatment

- Following EMG, patient was treated with an oral steroid burst and prescribed a home exercise program focusing on lumbar flexion exercises without improvement.
- MRI was ordered for further evaluation and revealed scar tissue surrounding the left S1 nerve root.
- Referral was made to interventional pain service where patient underwent caudal epidural steroid injection with 100% relief for 4 days.
- He subsequently underwent a left S1 transforaminal epidural steroid injection 2 months later with 7 months of > 90% relief.

Dermatome Distribution



Discussion

- This case describes a patient with localized left heel pain found to be secondary to L5/S1 radiculopathy.
- This challenges classic teaching that radiculopathies present with pain following an entire dermatome. It's likely nerve fascicles referring to the patient's left heel suffered preferential compression/damage leading to incomplete radiculopathy.
- In patients with localized lower extremity pain failing to respond to appropriate treatment, especially with documented spinal pathology, incomplete radiculopathy should be considered in the differential diagnosis.

References

1. Wolfe F. Determinants of WOMAC function, pain and stiffness scores: evidence for the role of low back pain, symptom counts, fatigue and depression in osteoarthritis, rheumatoid arthritis and fibromyalgia. *Rheumatology (Oxford)*. 1999 Apr;38(4):355-61. doi: 10.1093/rheumatology/38.4.355. PMID: 10378714
2. DeFroda SF, Daniels AH, Deren ME. Differentiating Radiculopathy from Lower Extremity Arthropathy. *Am J Med*. 2016 Oct;129(10):1124.e1-7. doi: 10.1016/j.amjmed.2016.06.019. Epub 2016 Jul 9. PMID: 27401953