

Raising the Standard:

Competency of Physical Therapist Residency Training in Clinical Electrophysiology and Opportunities for PT-Physician Collaboration

by

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Abstract

Physical therapists (PTs) who complete accredited residencies in clinical electrophysiology gain extensive training depth, clinical exposure, and validated competency. The Hands-On Diagnostics (HODS) Clinical Electrophysiology Residency exemplifies this model, providing over 2,000 hours of training, more than 300 supervised EMG/NCS cases before program graduation, structured one-on-one mentorship, and rigorous competency validation culminating in ABPTS board certification as Electrophysiologic Clinical Specialists (ECS). Evidence demonstrates that PTs produce EMG/NCS reports with high compliance to practice guidelines. Surveys of physician residency programs indicate variability in EMG exposure, underscoring opportunities for collaboration in training models. PT-led diagnostics have been shown to inform management decisions, improve diagnostic accuracy, and achieve high patient satisfaction. CMS formally recognizes ECS-certified PTs as independent providers of EMG/NCS, supporting their role as part of a collaborative care framework with neurologists and physiatrists (Centers for Medicare & Medicaid Services [CMS], 2019).





1. Background & Context

Electrodiagnostic (EDX) testing, including electromyography (EMG) and nerve conduction studies (NCS), is a critical component of diagnosing neuromuscular disorders. For decades, EDX was considered primarily within the purview of neurologists and physiatrists. However, beginning in the late 20th century, physical therapists began incorporating EDX into their scope of practice in states where it was legally permitted. The recognition by the Centers for Medicare & Medicaid Services (CMS) of PTs with board certification as qualified providers solidified their role in this specialized area (Centers for Medicare & Medicaid Services [CMS], 2019).

The American Board of Physical Therapy Specialties (ABPTS) created the Electrophysiologic Clinical Specialist (ECS) credential to ensure a high level of clinical competence. This credential requires extensive clinical hours, successful completion of a rigorous examination, and continuous professional development. The ECS pathway mirrors or exceeds expectations in physician training programs, particularly in terms of hands-on exposure and competency verification.

At the same time, professional organizations such as the Academy of Clinical Electrophysiology and Wound Management (ACEWM) created laboratory accreditation standards to safeguard quality. This accreditation

is analogous to the American Association of Neuromuscular & Electrodiagnostic Medicine (AANEM) Accreditation of Electrodiagnostic Medicine (ABEM) for physician laboratories. The presence of parallel structures demonstrates recognition of PT-led diagnostics as a credible and standardized discipline.

The growing demand for diagnostic services, coupled with shortages in neurology and PM&R residency graduates proficient in EMG/NCS, underscores the importance of PT residency pathways such as HODS. As neurology and PM&R residencies struggle to ensure consistency in training, the structured and competency-driven PT residency model provides an evidence-based solution for meeting patient needs.

2. Training Comparisons: PT Residency vs. Physician Residencies

Training in electrodiagnostic medicine varies widely between physicians and PTs. Surveys by Donofrio & Govindarajan (2020) and Daniello & Weber (2018) revealed significant gaps in physician residency training. Neurology residencies typically dedicate only 4–8 weeks to EMG/NCS, and many programs report that residents complete as few as 0–10 needle EMG exams during their training. In PM&R, the average exposure is greater, at approximately 22 weeks, with 101–200 needle exams required in most programs. Only a small minority of PM&R programs reported training beyond 200 cases.

Recent survey data from CAPTE-accredited DPT programs (Naglaa, 2025) found that EMG content is inconsistently taught, with most programs lacking dedicated coursework. Over 80% of faculty felt EMG should be included, yet students graduate underprepared. This underscores the importance of structured post-professional residencies, such as those accredited by ABPTRFE, to ensure PT competency in electrodiagnostics.

By contrast, the Hands-On Diagnostics Clinical Electrophysiology Residency offers a comprehensive three-year curriculum. Residents complete over 2,000 total training hours, including 1,500+ hours of direct patient care, more than 300 EMG/NCS cases of graded mentored reports (Table 1). In addition, residents participate in weekly clinical rounds, didactic coursework, and practical laboratories. This structured training far exceeds the volume and intensity of EMG/NCS exposure in most physician residencies.

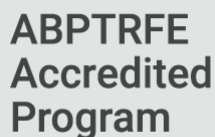


Table 1. Training Exposure: PT Residency vs. Physician Residencies

Criteria	Physical Therapists (HODS Residency)	Physicians (Neurology / PM&R)
Training Duration	3 years; >2000 total hours	4–22 weeks of EMG exposure
Direct Patient Contact Hours	1500+ hours	Variable, often minimal
EMG/NCS Graded Exams Completed	300 - 500 graded exams	0–200 total (majority <200)
Certification	ECS Board Certification	ABEM/AANEM Certification

The HODS Clinical Electrophysiology Residency is accredited by the American Board of Physical Therapy Residency and Fellowship Education (ABPTRFE), ensuring compliance with nationally recognized standards for residency education.

Perhaps most importantly, most PT residents in the HODS program complete the ECS certification by ABPTS, a process requiring thousands of hours of clinical practice and successful completion of a multi-part examination. By comparison, most neurology and PM&R residents do not complete the optional American Board of Electrodiagnostic Medicine (ABEM) certification. This discrepancy illustrates the rigorous competency verification built into PT training pathways.



MISSION STATEMENT

The Residency Program in Clinical Electrophysiology at Hands On Diagnostics is dedicated to advancing clinical excellence in electrophysiology for physical therapists interested in this specialty.

Our program inspires lifelong learning through an updated, advanced, evidence-based curriculum, emphasizing an enhanced patient-centered approach and ethical practice. We are committed to continuous improvement, supported by strategic initiatives that enhance the program's success. By fostering a dynamic learning environment, our program ensures graduates are evidence-based practitioners, exceeding industry standards in Clinical Electrophysiology.

3. Quantitative Outcomes of HODS Graduates

Quantitative benchmarks from the HODS residency, fellowship, and diplomate programs demonstrate robust training outcomes:

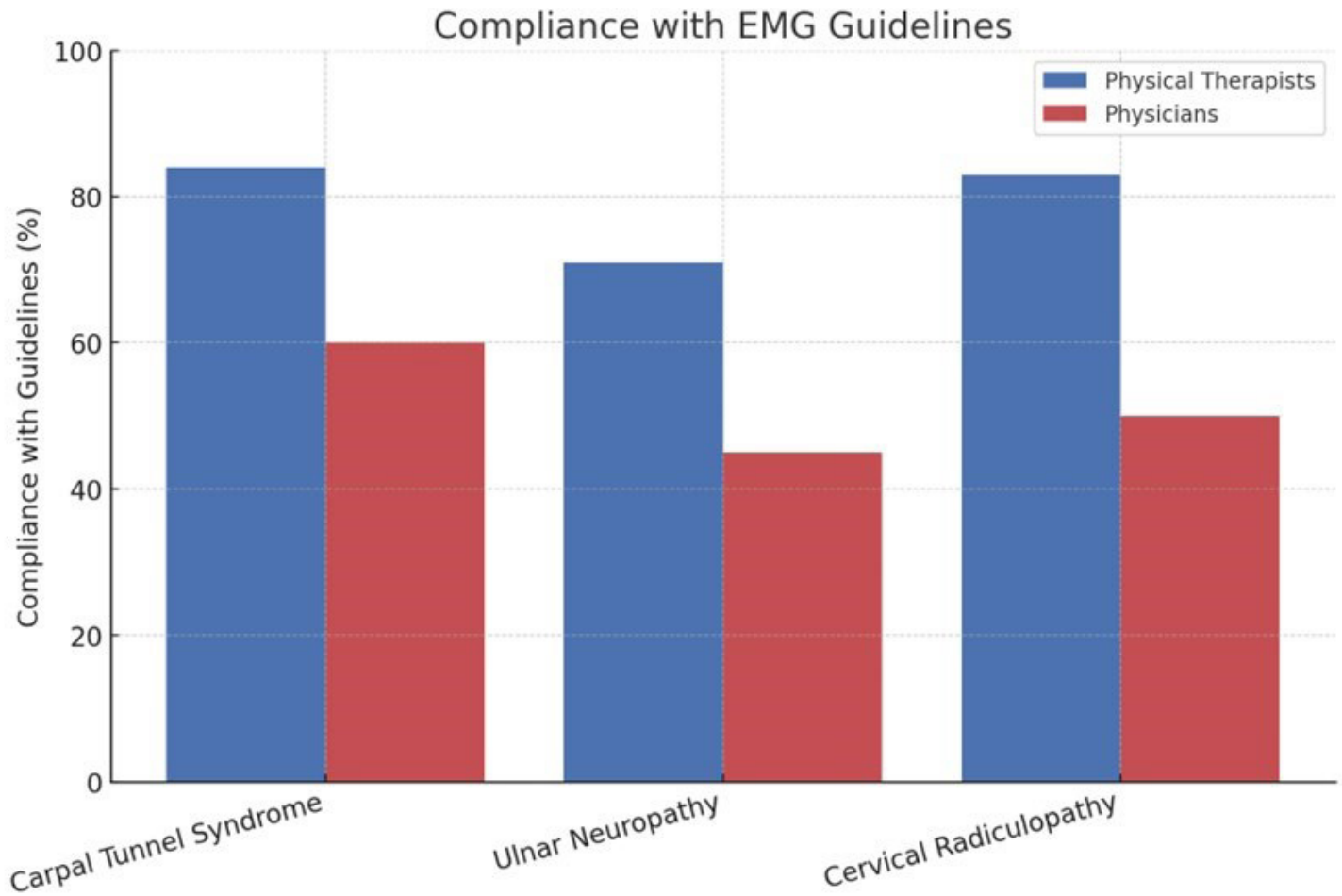
- Residency graduates complete more than 300 supervised EMG/NCS cases before program graduation, while fellowship graduates complete more than 500 supervised cases. This level of experience provides substantial clinical exposure that complements the broader medical training neurologists and physiatrists receive during residency.
- ECS board pass rates among HODS program graduates consistently exceed 90%, which is above national averages.
- Patient satisfaction consistently exceeds 96% in HODS-affiliated clinics, reflecting confidence in PT-led diagnostics.

In addition to these outcomes, graduates actively contribute to research and present at national and international conferences, further advancing the field of electrodiagnostics and establishing credibility for PT-led contributions.

4. Evidence of Clinical Competency

Evidence supports the high quality of PT-performed electrodiagnostic testing. Armantrout et al. (2008) found that PT-performed EMG reports demonstrated high levels of compliance with published practice guidelines—84% for carpal tunnel syndrome, 71% for ulnar neuropathy, and 83% for cervical radiculopathy. These results demonstrate alignment with established standards, complementing the work of neurologists and physiatrists (Corwin & Kasdan, 1998; Storm et al., 2005; Thibault et al., 2005). In collaboration with neurologists and physiatrists, PTs can help ensure patients receive accurate and timely diagnostic services that meet established standards.

Figure 1. Compliance with EMG Guidelines: PT vs Physician



Rawat et al. (2020) further demonstrated the impact of PT-led diagnostics on clinical decision-making. EMG/NCS performed by PTs changed management in 60.6% of patients and altered diagnosis in 39%. Over 90% of patients reported feeling more reassured about their condition following testing. These findings demonstrate both objective and subjective value in PT-led diagnostics.

Collectively, these studies demonstrate that PT-led EMG/NCS not only meets technical standards but also contributes significantly to improved patient care, clinical accuracy, and healthcare decision-making.

5. Case Vignettes: PT-Led Diagnostics Supporting Collaborative Care

The following case examples come directly from patients evaluated by graduates of the HODS Clinical Electrophysiology Residency and related programs. They illustrate the real-world impact of PT-led electrodiagnostic testing on diagnosis, treatment decisions, and patient outcomes.

Post-MVA L5 Radiculopathy

A patient presented after a motor vehicle accident with severe low back pain and right leg symptoms. An MRI request was initially denied by insurance. EMG confirmed moderate axonopathy affecting the L5 nerve root, consistent with the accident's timeframe. These findings supported MRI authorization, provided the physician with the objective evidence needed to proceed with imaging, and validated the PT treatment plan. This interdisciplinary approach improved patient compliance and confidence.

Carpal Tunnel vs. Cervical Radiculopathy

A 52-year-old office worker with nocturnal paresthesia was presumed to have isolated carpal tunnel syndrome. EMG clarified a dual diagnosis—mild carpal tunnel syndrome and C6 radiculopathy—leading to targeted PT, workstation modifications, and a physician specialist referral that helped avoid unnecessary surgery.

Suprascapular Neuropathy in an Overhead Athlete

A young athlete with persistent shoulder pain failed conservative therapy for presumed impingement. EMG identified suprascapular nerve entrapment (Kostopoulos & Rawat, 2017). The PT's electrodiagnostic findings guided referral to orthopedics for surgical decompression, followed by focused PT rehabilitation, enabling full return to sport.

Diabetic Polyneuropathy with Superimposed L4 Radiculopathy

A diabetic patient with progressive leg weakness was being evaluated for spine surgery. EMG revealed diffuse diabetic neuropathy with superimposed L4 radiculopathy. Collaborative management between endocrinology, the referring physician, and the PT's targeted rehabilitation plan prevented unnecessary surgery and improved outcomes.

Post-ACL Repair Femoral Neuropathy

Persistent quadriceps weakness after ACL reconstruction was initially attributed to poor effort. EMG confirmed femoral neuropathy, prompting discussion with the surgical team and initiation of targeted neurorehabilitation strategies that accelerated recovery and prevented chronic dysfunction.

6. Impact on Patient Care & Society

PT–Physician Collaboration in Electrodiagnostics

Electrodiagnostic medicine is most effective when practiced in an interdisciplinary model that combines the strengths of both physical therapists and physician specialists. Residency- or fellowship-trained PTs bring extensive hands-on experience and structured competency validation in EMG/NCS, while neurologists and physiatrists (PM&R) contribute advanced knowledge of systemic disease, neurological disorders, pharmacology, and surgical decision-making.

Complementary Expertise

Physical Therapists: Provide broad access to patients who need electrodiagnostic testing, delivering evidence-based, guideline-driven evaluations integrated with musculoskeletal and functional assessment.

Neurologists and Physiatrists (PM&R): Offer expertise in complex systemic and neurological conditions, medication management, and surgical pathways.

Shared Decision-Making

Collaborative use of EMG/NCS results enhances clinical decision-making. For example, a PT's confirmation of radiculopathy may support a neurologist's or physiatrist's decision to pursue advanced imaging or surgical referral, while the physician specialist's insights can refine the PT's rehabilitation strategy.

Clinical Pathways

Joint PT–physician specialist pathways reduce duplication of services, improve efficiency, and ensure patients receive the most appropriate care in a timely manner. PT-led diagnostics in outpatient and inpatient settings can rapidly triage patients, while more complex



cases can be escalated to neurologists or physiatrists for medical or surgical intervention.

Research and Professional Development

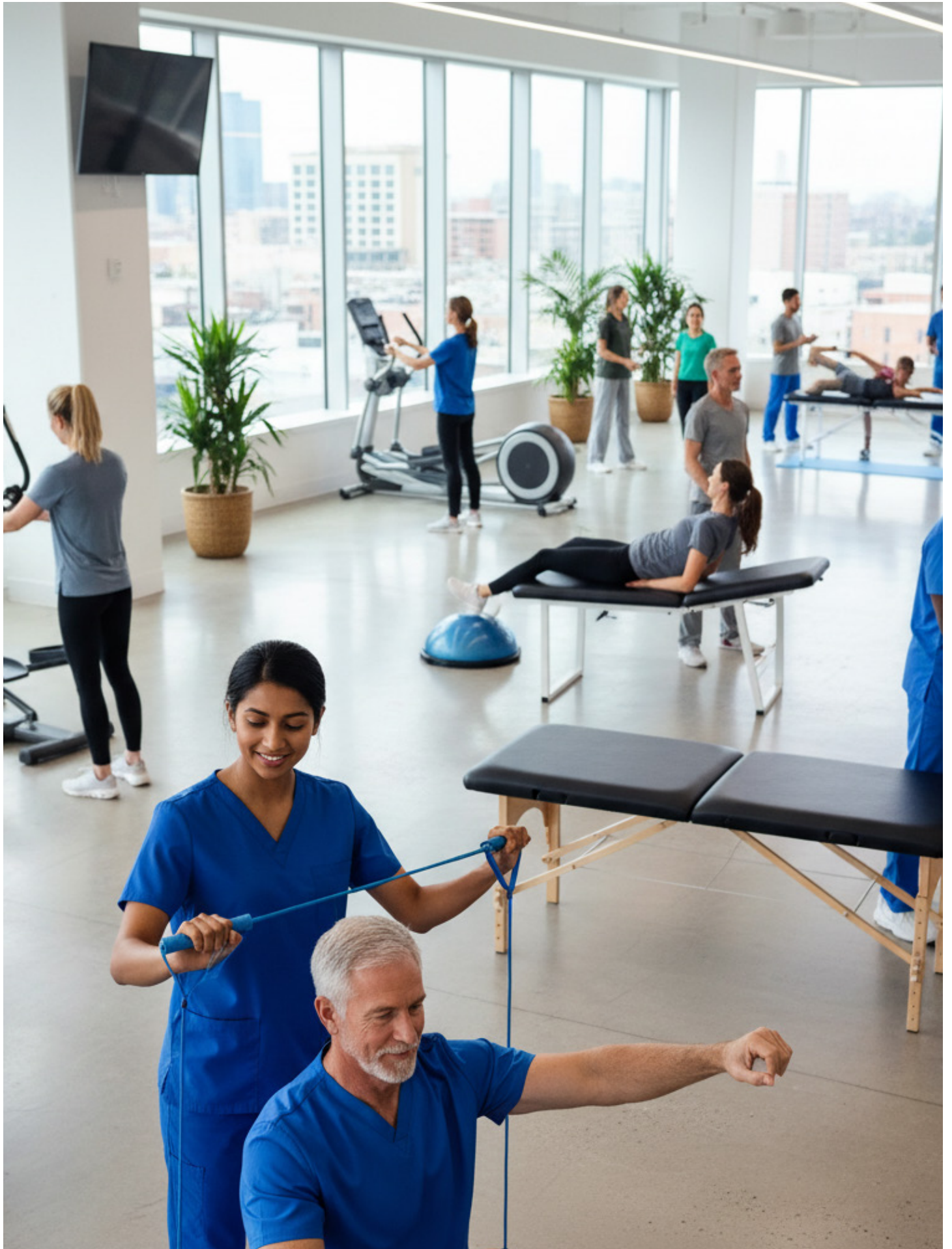
PTs and physician specialists frequently collaborate in research, co-author publications, and present findings at national meetings. These joint efforts elevate standards across both professions and encourage mutual respect and shared learning.

Benefits to Patients and Health Systems

- Faster access to accurate diagnostics.
- Coordinated treatment with reduced fragmentation.
- Enhanced trust among patients, payers, and referring providers (Rawat et al., 2020).
- Stronger alignment with value-based care initiatives.
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PT-led diagnostics provide broader societal benefits. Accurate EMG/NCS decreases misdiagnosis, expedites correct treatment, and reduces exposure to unnecessary opioids. By clarifying etiology, PTs help avoid trial-and-error prescriptions and inappropriate imaging. Kostopoulos (2019) argued that PT-led diagnostics play a role in combating the opioid crisis by ensuring patients receive precise, non-opioid rehabilitation strategies aligned with their true pathology.

Additionally, access to PT-led diagnostics expands service availability in underserved areas. With shortages of neurologists and physiatrists trained in EMG, PT residency graduates provide critical workforce capacity, ensuring patients have timely access to evidence-based diagnostic testing.



7. Accreditation & Professional Standards

The Academy of Clinical Electrophysiology and Wound Management (ACEWM) offers laboratory accreditation for PT-run EMG/NCS facilities. These standards ensure quality assurance, equipment calibration, and competency validation. In parallel, AANEM provides ABEM accreditation for physician-run laboratories. HODSaffiliated laboratories adhere to ACEWM standards, ensuring external oversight and high-quality patient care (ACEWM 2023, AANEM 2023, ABPTS 2023). This emphasis on accreditation illustrates the profession's commitment to patient safety and evidence-based practice.



8. Research Engagement & Professional Visibility

HODS graduates and trainees contribute to the scientific community through publications and presentations at major conferences, including Orthopedic Surgery symposia, the APTA Combined Sections Meeting (CSM), and the annual HODS Symposium. Their research spans diagnostic accuracy, clinical decision-making, and patient-centered outcomes. This scholarly engagement demonstrates that PTs are not only competent practitioners but also knowledge producers advancing the field of electrodiagnostic medicine.



9. Future Directions & Policy Implications

Scaling residency programs such as HODS is critical for meeting national needs in electrodiagnostic care. Policy alignment from insurers and regulators will facilitate broader access, reduce healthcare costs, and support value-based care models. Collaboration across disciplines—neurology, PM&R, orthopedics, and physical therapy—can create integrated care pathways in which PT-led diagnostics play a central role.

Future collaborations between the Academy of Clinical Electrophysiology and Wound Management (ACEWM) and the American Association of Neuromuscular & Electrodiagnostic Medicine (AANEM) can play a vital role in establishing shared ethical standards, promoting interprofessional respect, and expanding access to high-quality care. These two organizations are driving forces in the electrodiagnostic professions, and their joint efforts can help ensure consistency in training, certification, and ethical practice. Aligning ACEWM's expertise in PT-led electrodiagnostics with AANEM's leadership in physician practice offers opportunities to enhance interdisciplinary respect and ensure that electrodiagnostic care continues to prioritize patient outcomes above professional boundaries.

In addition, given the well-documented gaps in EMG education at the entry-level DPT stage (Naglaa, 2025), collaboration between ACEWM, AANEM, and ABPTRFE should focus on developing national standards for electrodiagnostic education across professions. Establishing consistent expectations for training and competency will support both PTs and physicians in delivering safe, evidence-based, and patient-centered diagnostic services.

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10. Conclusion

Graduates of the HODS Clinical Electrophysiology Residency and related programs demonstrate rigorous preparation and high competency in EMG/NCS. The evidence base—training exposure, compliance with guidelines, decision impact, and patient satisfaction—demonstrates that residency-trained PTs can make a meaningful contribution to electrodiagnostic services. When combined with the expertise of neurologists and physiatrists, this collaboration has the potential to set a higher standard for patient-centered diagnostic care. Expanding recognition and integration of PT-led diagnostics will enhance patient care, address provider shortages, and contribute to value-based healthcare.



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