Diagnostics for PT

ISSUE 01

THE FIGHT FOR OUR FUTURE

A CURIOUS CASE IN PATHOLOGY

New Revenue Streams for PTs

The new profit breakthrough

Intro

There's nothing like being apart of something special… and that's exactly what's going on here at Hands-On Diagnostics! Moreover, that's what's happening with this wonderful publication– Diagnostics For PT. Under the direction of the HODS Board, our team has created a publication that will inform you on this "new paradigm" for Physical Therapy. This publication is made with the private practice Physical Therapy owner in mind. The opportunity with HODS helps your patients (as you'll see in our articles) and it opens up major new revenue streams for your practice. If there was ever something that was "too good to be true," this would be it. Welcome to the revolution!

If you have any questions or comments, don't hesitate to reach out to us via email or by phone. Our team is dedicated and committed to helping the private practice owner experience the benefits of professional autonomy. We' re here to help.

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Diagnostics for PT

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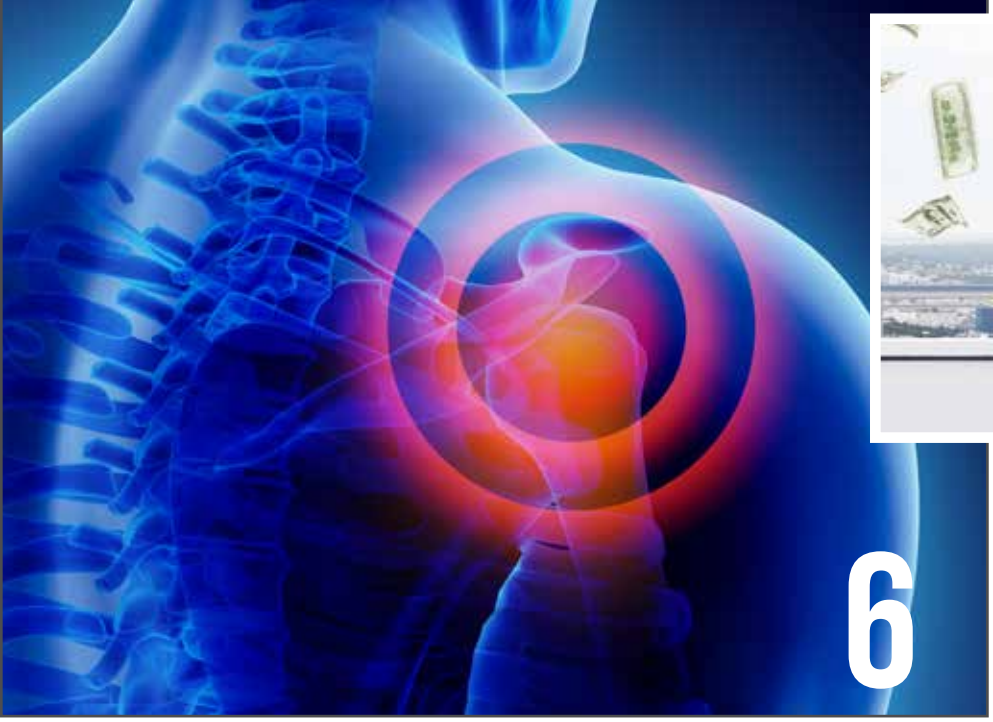
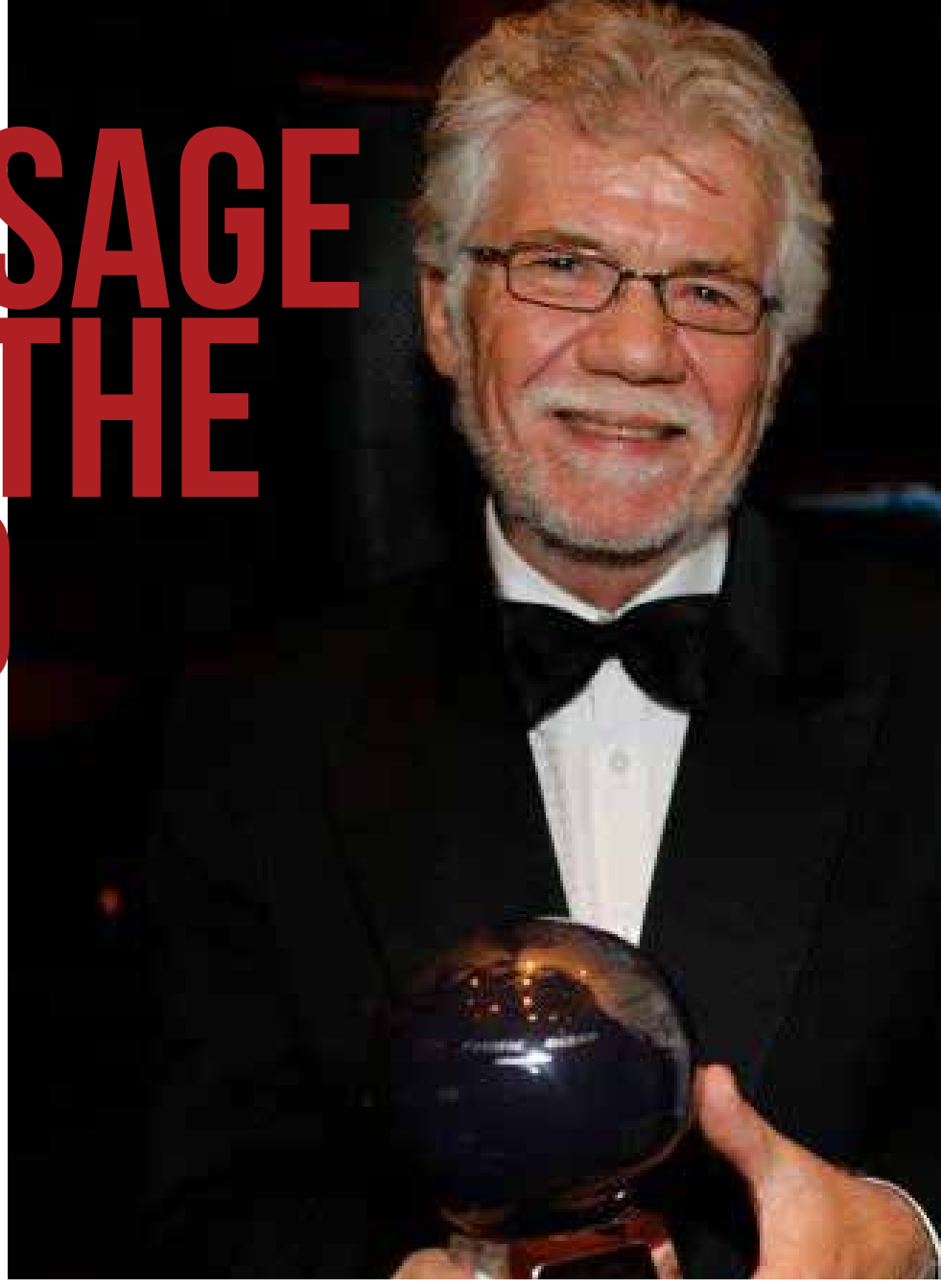
Questions and feedback:

Address: 32-44 31st Street
Astoria, New York 11106
Phone: (888) 447-6014
Email: info@DiagnosticsForPT.com
Online: www.DiagnosticsForPT.com



FEATURES

A MESSAGE FROM THE BOARD



As we begin to reflect on the past few years and the growth that has transpired, we feel an extreme sense of pride and gratefulness. Working directly with the HODS Partners and their staff has given us more than enough reasons to be proud. We have HODS Partners in over 100 facilities in 17 states who are doing outstanding work servicing their patients and giving back to their communities in so many ways.

We have the privilege of serving private practice Physical Therapy owners and as you can imagine, so much has changed over time. Our organization has grown and prospered, bringing in new programs, partners, mentors, and creating a variety of tools to assist the physical therapist in an ever-changing environment. From our weekly webinars all the way to our annual Symposium event (which only gets bigger and better every year), our Partners are positioned for sustained impact and success. The underlying focus of HODS has always been to provide autonomous physical therapy practices by advancing the Physical Therapist as the provider of choice for Electrophysiological, Neuro-Musculoskeletal Ultrasound Imaging, and Vestibular Testing technologies. As we begin to help more and more physical therapists make the leap into this new paradigm, we discovered that we were actually doing so much more for them and their practice.

Not only are we introducing them to a new model for physical therapy, we are introducing them to a new paradigm for living. The average private practice physical therapist is working 50-60 hours per week, juggling multiple hats in their practice and desperate to escape the rat race. It's a big sacrifice to own your own practice and put your financial and career future into your own hands. It means early mornings, late nights and all-kinds-of anxiety and stress. It often means missing out on times with family and loved ones.

The HODS Board - Pictured Left to Right: Craig Ferreira (CEO), Dimitrios Kostopoulos (Founder), Konstantine Rizopoulos (Co-Founder)

That's why we have such a tremendous amount of pride and joy when we see our HODS Partners doing well and really taking advantage of this revolutionary opportunity. We are providing them with more than technology, training, and mentorship– we are giving them a new lease on life. We are showing them how they can work fewer hours and make twice the amount of money. We are showing them how they can reclaim their time and their lives, allowing them to do what's best for them and their families.

Our aim in this publication is to show the many facets of this great family of partners, their staff, and what being apart of HODS truly means. We hope throughout the pages you'll be inspired, educated, and motivated to further your training, to continue perfecting your techniques and to take advantage of a plethora of the ways to monetize this advanced technology.

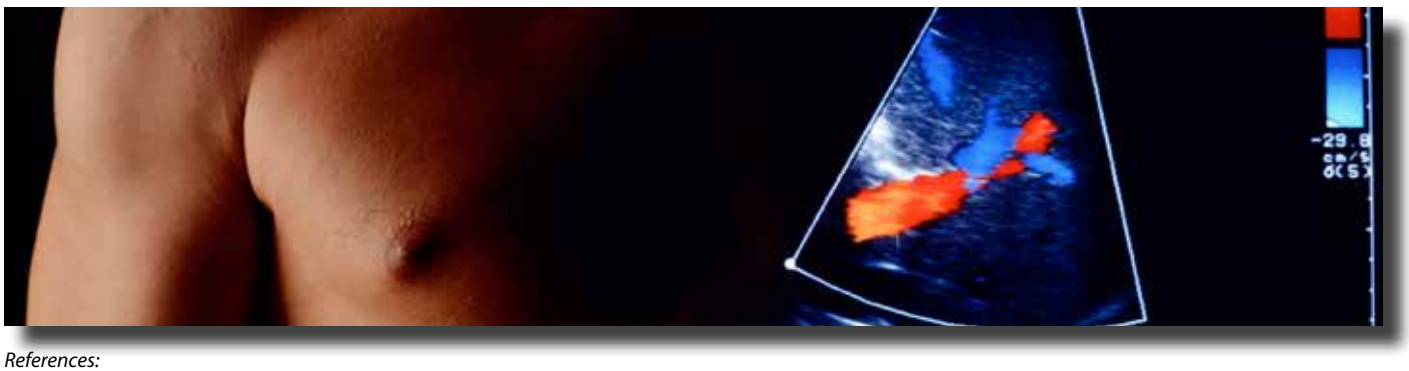
If you ever need us for anything, we're always only a phone call or email away and ready to point you in the right direction. The future of physical therapy is contained within these pages. We hope you find your way to achieving the outcomes you want for your patients along with the outcomes you want for your own life.

DEMYSTIFYING SHOULDER PAIN
MUSCULOSKELETAL ULTRASOUN

Mohini Rawat, DPT, MS, ECS, OCS, RMSK
Director MSKUS Training of HODS

Shoulder pain is one of the most common problems that physical therapists treat in clinical practice. Prevalence of one month of shoulder and arm pain was reported to be about 30% [1]. Most commonly, patients with shoulder symptoms are broadly categorized into a single diagnosis of shoulder pain without knowledge of specific structures causing the symptoms. Clinical tests are not enough to differentiate the wide range of pathology related to shoulder-neck area which often can be confusing because of their similar presentation [2]. List of possible shoulder pathology is shown on page 7. The possible causes are divided into two categories, neural and non-neural.

Physical examination, history taking, and special tests may not provide complete information about the cause of shoulder complaints. Appropriate use of Electrodiagnosis and Ultrasound imaging can provide gainful insight into specific pathology and therefore improve clinical decision-making and management of the patient. High levels of patient satisfaction and patient perceived value has been reported when clinic-based ultrasound imaging was used in outpatient facilities [3] since it helps the patient understand their problem and improves their confidence in the provider.



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WITH ELECTRODIAGNOSIS AND D IMAGING

NEURAL PATHOLOGY

Differentiating cervical radiculopathy, thoracic outlet syndrome, or other neural pathology from primary shoulder disease can present a difficulty owing to the close proximity and overlap of symptomatology [4]. Appropriate use of EMG/NCS studies can tease out the neural component of the shoulder pain. EMG/NCS studies can distinguish possible neural pathologies contributing to shoulder pain, weakness and abnormal dynamics. These abnormalities are seen as abnormal responses in nerve conduction studies and positive needle EMG findings from the selected muscles of the affected myotome.

Neural Causes of Shoulder Pain

C5 C6 Radiculopathy

Suprascapular neuropathy

Axillary neuropathy

Long thoracic neuropathy

Thoracic outlet syndrome

Parsonage-Turner Syndrome

NON- NEURAL PATHOLOGY

Adding ultrasound imaging to the physical examination provides gainful insight into the localization of pathology and also points towards the temporal component of the disease. For full-thickness rotator cuff tear, ultrasound imaging has been reported to have sensitivity of 60%; specificity of 100%, positive predictive value of 100%, negative predictive value of 78% and accuracy of 84% [5]. Ultrasound imaging is considered equally effective as MRI in pathology related to the rotator cuff [6] and has an added advantage of real time evaluation and use of dynamic imaging– which is not possible with MRI.

Some of the examples of shoulder pathologies have been shown in Figure 1-6.

Non-Neural Causes of Shoulder Pain

Rotator cuff tendinosis/ tendinopathy
Subacromial impingement syndrome
Partial tear of rotator cuff tendons
Full thickness tears of rotator cuff tendons
Tenosynovitis of long head of biceps
Subacromial Subdeltoid bursitis
Calcific tendinitis
Joint effusion
Arthritis with or without loose bodies
Adhesive capsulitis
Soft tissue mass/tumor (rare)

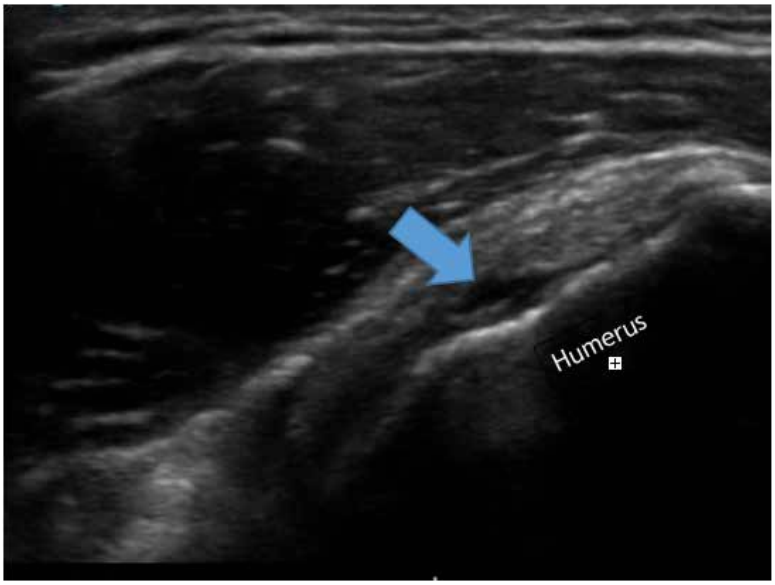

Figure 1

Partial tear of Subscapularis tendon seen as a focal anechoic (black) defect (arrow)

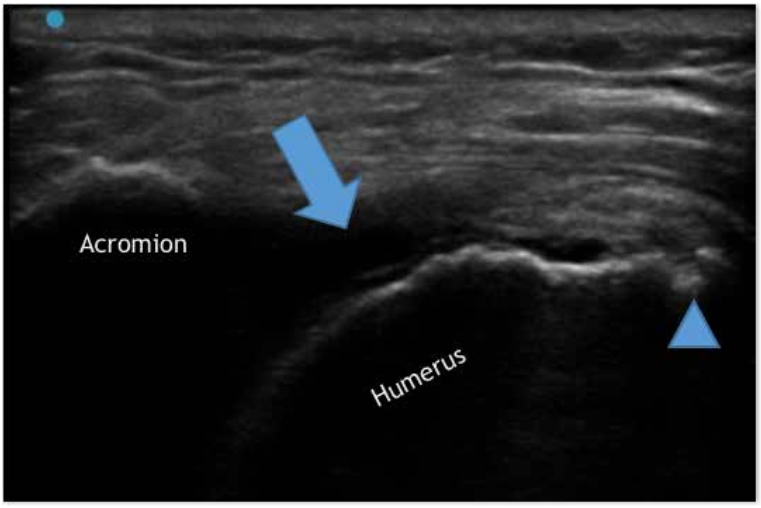

Figure 2

Full thickness complete tear of supraspinatus tendon. Non-visualization of tendon with anechoic signal (arrow) and cortical irregularities noted at humerus and Greater tubercle (triangle).

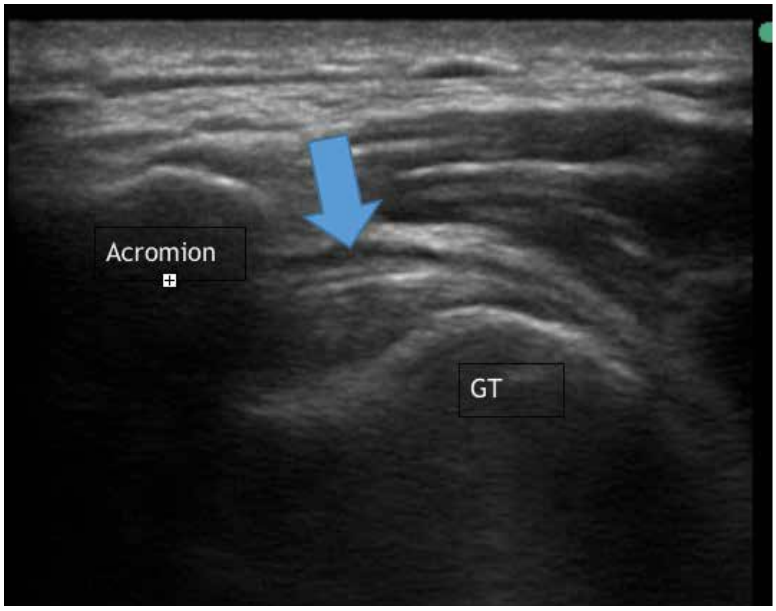

Figure 3

Subacromial bursitis seen as hypoechoic (dark) signal (arrow) over supraspinatus tendon causing impingement at subacromial space. GT- Greater Tubercle

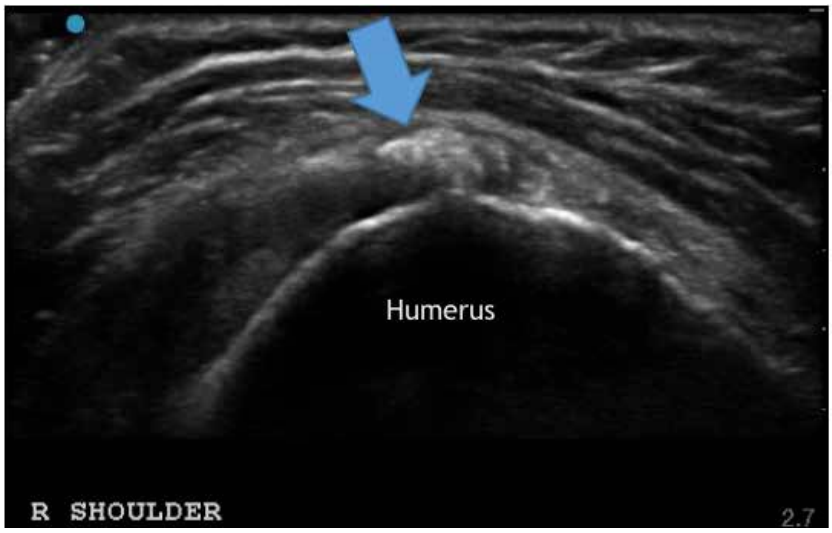

Figure 4

Calcific tendinitis of supraspinatus. Calcific deposit is seen as hyperechoic signal (arrow)

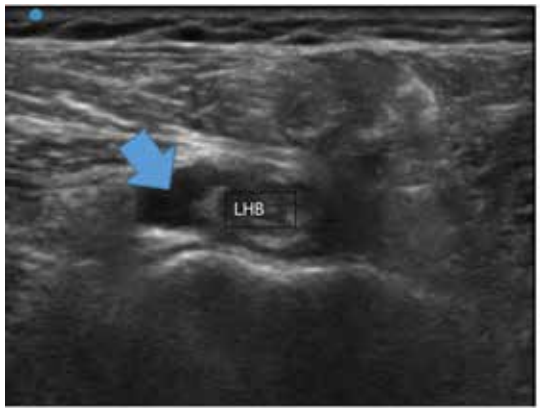

Figure 5 A

Tenosynovitis of long head of Biceps tendon. Tenosynovitis seen as hypoechoic (dark) halo around the tendon (arrow)

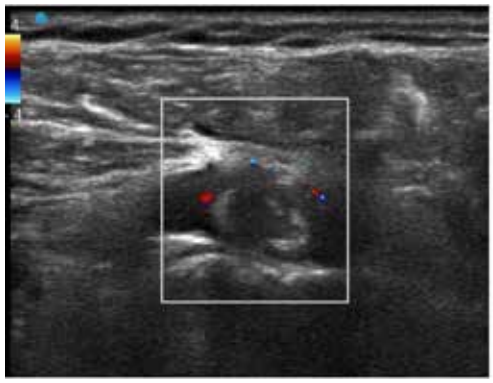

Figure 5B

With color Doppler Ultrasound increased vascularity is noted (seen as color dots inside the box) around the Long head of biceps.

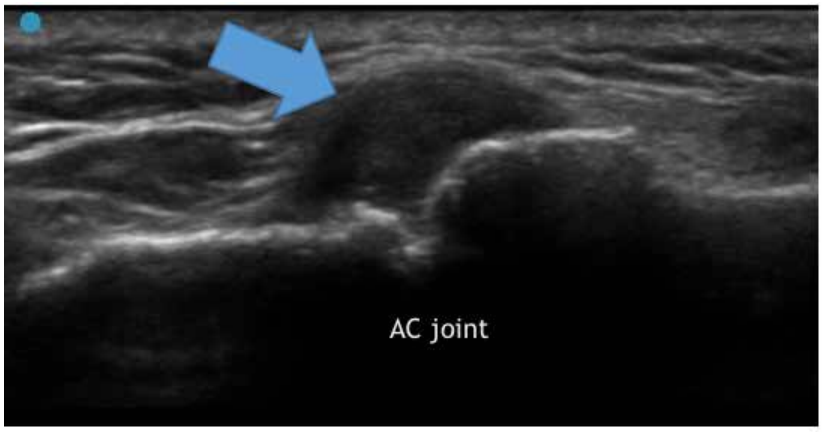

Figure 6

AC joint effusion seen as hypoechoic (dark) signal (arrow) around the joint

A FUTURE WE CAN BELIEVE IN

Dimitrios Kostopoulos,
DPT, MD, PhD, DSc, ECS

We are at a unique time as a Physical Therapy profession– especially as private practitioners. We are at the crossroads of making the decision to totally transform our profession to the most powerful one among the healthcare professions or to give up and succumb to the financial challenges of our time.

Seemingly, our industry has been under attack from drastic insurance policy changes time and time again, essentially leaving us with the short end of the stick.

Quite frankly, these trends aren't going to be ending anytime in the near future. The data I've read from trusted industry sources are saying we can expect continued decreasing reimbursement rates at least up until the year 2022*. Information like this paints a bleak outlook for private practice owners. The trend of these god-awful changes by the insurance companies has always felt as if it could lead to the extinction of the physical therapy private practice.

On paper, it doesn't seem to be getting any better. Meanwhile, opioid use and invasive procedures for musculoskeletal problems are at an all time high. Is this arbitrary? I do not believe so. The pharmaceutical and insurance industries, the surgical instrumentation companies along with large hospital organizations have created a strong alliance with the purpose to absorb the largest piece of health care funding.

However, I've always believed that something can be done about it!
From the very beginning I've been on the front lines of this fight. I was (and still am) committed to doing whatever it takes to fight for us. I've written letters, made videos, protested and rallied… all for the cause of protecting our industry and for the survival of private practice Physical Therapy. That fight is what keeps me going and it is the biggest "why" for us here at Hands-On Diagnostics.

Hands-On Diagnostics is not just the greatest opportunity for private practice– it's more!

Not only can private practice owners and physical therapists provide unparalleled diagnosis and treatment for their patients with the use of our advanced technology– there's more. Nor is it just the means to wildly increase your profits and reclaim your time. What we do at Hands-On Diagnostics is a way we can stand our ground and fight back this "attack" on our profession.

We are equipping physical therapists not only with advanced knowledge, but also with advanced tools to put them back into the driver's seat of their practice. We are providing opportunities and ways for our physical therapists to have true professional autonomy. We are not only providing a new model for patient treatment, we are providing a new paradigm.

As one who has devoted the past 30 years of his life to the advancement of physical therapy, I find this somewhat bitter-sweet. It's sad because of the challenges and difficulties it presents for practice owners. Due to the many "hats" I wear, I am in constant communication with practice owners all across the country. From consulting and coaching PTs from large practices (with multiple locations in multiple states) to coaching PTs with single locations– they all pretty much have the same concerns for their organizations. They're racking their minds to figure out how to successfully treat their patients while running a profitable business. We stand at the leading edge of a revolution in physical therapy, boldly proclaiming a more excellent and lucrative way for physical therapists. No longer do they have to be held hostage to the same limiting codes and restrictions for treating patients. No longer do they have to settle for substandard averages for their per visit reimbursement rates. No longer do they have to try and survive from the crumbs insurance companies leave us.

We have the answers they want; the answers they need. We have the advanced technology, mentorship and systems that allow for true, professional autonomy and unparalleled patient care. We are positioning ourselves to be the advocates for the private practice owner.

Very briefly, here's how our solution works…

To treat a problem, we must know the cause of the problem. The wrong diagnosis in treatment can not only prolong the patient's suffering, worry, and disability, but it can also be costly– even dangerous to our patients. There are the usual tests that can be done– all of the X-rays, MRI's, and the blood tests. What if all of those tests come back normal and we don't have enough information to provide a good diagnosis. In many cases, there is a quick easy and reliable test that helps us to pinpoint the cause of the patient's problem and begin proper, effective treatment.

Electromyography, nerve conduction studies and musculoskeletal ultrasound provide doctors and physical therapists with viable information about the integrity of joints, nerves, and muscles. These tests can help you reach the correct diagnosis and achieve the appropriate management or treatment for your patient's condition.

Listening to a patient's problem, obtaining a good history, and a careful physical examination is extremely important for getting the correct diagnosis. Adding diagnostic testing helps to confirm the diagnosis and get to the root of the problem quickly. This helps the physical therapist to help his/her patients quickly and effectively.

With each new partner that joins HODS, we are making a larger dent in the physical therapy universe. With each new partner, our cause gains another set of voices for fairness and dignity within our profession. When we first started HODS, it was just me, my partner (Dr. Kostas Rizopoulos) along with our CEO, Craig Ferreira. Now, we have dozens and dozens of physical therapists in over 17 states and over 100 facilities taking the HODS revolution to their states. As a company and as a family of partners, we're only just getting started. The best is yet to come and I'm glad you're here with us for the ride.■

SURPRISE PATHOLOGIES

E. Braden Brasfield, MSPT
Owner, Telegraph Road Physical Therapy
HODS Partner in St. Louis

We have all treated them– a patient who presents with a typical pattern of signs and symptoms, a patient we have seen so many times we are almost automatic in our treatment techniques. We still put them through a vigorous musculoskeletal and neurologic exam just in case, but all the expected findings are present, and we proceed with treatment. Sometimes these patients do not respond to treatment, but sometimes, they get a lot better - but not fully resolved. This case study focuses on such an occurrence.

Last year was an interesting year for me clinically. I just started learning a skill I had not practiced for almost 20 years when I was a student in Boston. I started to take on the challenge of learning how to accurately administer Electromyography (EMG) including Nerve Conduction Testing and Diagnostic Neuro-Musculoskeletal Ultrasound (MSKUS). I have always had a heavy interest in the neurological side of Physical Therapy and especially how it pertains to keeping my geriatric patients healthy, so they can age successfully at home instead of a nursing facility. I also have a deep interest in getting the diagnostic portion of our trade accurate. The more accurate the understanding of pathology, the more we can help those who seek our expertise. I was searching for a way to have a more scientific proof for my hypothesis on various ailments afflicting those I treat. Just as I returned home having enough early training to start performing these tests on my own, I had one of these patients who ticked every box for the cervical radiculopathy pattern. He returned to my office after successfully self-managing his symptoms for over 8 months. After a full exam, I determined that I should do diagnostic testing to determine the severity of his cervical ® foraminal radiculopathy. While going through the test it became evident that he had electrophysiologic evidence suggestive of a severe sensorimotor demyelinating and axonal neuropathic process affecting bilateral median nerves at or about the wrists (Carpal Tunnel). He also tested positive for cervical radiculopathic process on the right. A diagnostic Ultrasound of his carpal tunnel revealed decreased space and a poor ratio of height to width indicating a flattened tunnel.

Since this patient had responded well to the cervical treatment I prescribed, his signs and symptoms were produced and worsened with neck motions - most notably extension and ® lateral flexion - I ASSUMED I had an accurate diagnosis. In reality, I only had half the story. He had a double crush on the median nerve at his neck and even worse, he had severe sensorimotor loss at his wrists. He was recommended to a surgeon and underwent right carpal tunnel release. The surgeon stated that he had only a matter of weeks before the damage would have been irreversible. He is now managing his symptoms quite well and is back to doing his normal construction job duties.

I always encourage my students to understand the limits of our orthopedic and neurologic tests and to know the specificity and sensitivity of our testing. This objective data is better than our Tinel's Sign and Phalen's Maneuvers - it not only helps us determine where the patient has a problem, but to what degree. As I continue to learn and master these new skills, I have a new goal of trying to understand how many of my patients have comorbidities that were undetected.

How much better can we impact our patients' lives and truly intervene early enough to prevent disease processes from progressing by implementing these types of diagnostic testing? How many surgeries can we prevent? How many patients will "Try P.T. First," as one of my colleagues has coined? In fact, HODS is starting a research project to investigate some of these questions, and you can be a part of finding out these answers. Get trained, participate in the study, and become involved in progressing our profession. More importantly, help your patients prevent and avoid worsening conditions. You can have a profound impact on your community! ■

GRADING SEVERITY IN FOCAL NEUROPATHY

Rick McKibben, PT, DSc, ECS

It is well understood that electrodiagnostic testing (EDX) can be applied to patients with suspected focal neuropathies such as carpal tunnel (CTS), ulnar neuropathy at the elbow (UNE), and peroneal neuropathy at the knee. As electrodiagnosticians, we utilize EDX to identify the presence of lesion, estimate severity of lesions, estimate prognosis for recovery and identify whether or not there are other neuropathic processes that might be present along with the suspected condition. There are a host of 'severity scales' in the literature that focus on specific conditions and range in stratification of severity that are largely dependent on specific nerve conduction findings in order to reach a particular level of severity grade. Scales are typically Likert grading schemes ranging from 0-3 to 0-6 or normal to very severe. Use of a single scale in many cases requires adopting specific test procedures and acceptance of arbitrary laboratory normal values or testing protocols predetermined by the author of the scale. Some scales may also offer a 'point total' derived from the assignment of points based on which specific nerve conduction criteria are met. At the end of the day, these scales provide inherent variability amongst one another and can frankly be confusing to a referring provide. For example, one scale might reference a 0-3 point scale where a '3' reflects severe neuropathy vs another using a 0-6 point scale could assign a '6' for the same data set.

Therefore, Dr. Brooks and I developed a universal grading scale similar to Padua and colleagues CTS/UNE and Bland et al scales. This scale is independent of condition, NCS techniques or laboratory normative values. Our scale offers 'descriptions' of severity (Very Mild to Very Severe) instead of a numeric scale that we believe could be potentially misinterpreted as well as a less stringent criteria moving from the severe- to very severe classifications. If you look closely at published scales of severity for focal neuropathy, you'll notice that there is a natural progression of severity based on reaching specific thresholds of sensory vs. motor slowing and reduced to non-recordable sensory vs. motor amplitudes.

Focal Neuropathy Grading Scale "FaNGS" (Brooks & McKibben 2011)

Normal	All NCS tests are within laboratory limits of normal.
Very Mild	Abnormal NCS with only the most sensitive tests. • Short-segment testing of ≤ 8 cm • Adjacent segmental or ipsilateral/ contralateral nerve to nerve comparisons.
Mild	Preserved distal SNAP, and Abnormal SDL or SNCV, and/or MDL of < 110% above ULN or MNCV > 90% below LLN.
Moderate	Preserved but low amplitude distal SNAPs, and/or MDL > 110% above the ULN or MNCV < 90% below the LLN.
Severe	Absent distal SNAP and preserved CMAP amplitude > 25% of the LLN.
Very Severe	Absent SNAP and CMAP amplitude < 25% of the LLN.

NCS = Nerve Conduction Study, SNAP = Sensory Nerve Action Potential, CMAP = Compound Motor Action Potential, SDL = Sensory Distal Latency, SNCV = Sensory Nerve Conduction Velocity, MDL = Motor Distal Latency, MNCV = Motor Nerve Conduction Velocity, ULN – Upper Limit of Normal, LLN = Lower Limit of Normal

In an agreement study, we formally surveyed 31 physical therapist EDX providers and asked to identify their level of experience in years, whether or not they were board certified, if they rated severity in focal neuropathy and if they rated using a formal scale. Thirty One (31) therapists responded to the questionnaire. The mean level of experience was 15.5 (SD 11.2, range 3-40) with 74% of EDX providers holding American Board of Physical Therapist Specialties (ABPTS) certification in Clinical Electrophysiologic Physical Therapy. Of respondents, all but one admitted to 'grading severity' in focal neuropathy, but only 55% utilized a formal scale.

These providers were then provided one of two randomized groups of data reflecting varying degrees of severity in CTS and UNE with predetermined agreed level of severity using the FaNGS, Padua and Bland scales. We then asked providers to rate the severity of each case. Of a total of 155 data sets, 115 (74.2%) were in complete agreement. Of those respondents using a formal grading scale, 71/85 (83.5%) were in complete agreement (regardless of scale used) versus only 44/70 (62.9%) that did not use any formal grading scale. This met statistical significance between groups ($p<0.05$). There was no statistical difference noted in ECS vs. non-ECS providers as ABPTS board certification agreed 75.7% while those non-ECS examiners agreed 70.0% of the time.

The breakdown of agreement by formal scale was investigated post-hoc and those using the Focal Neuropathy Grading Scale (FaNGS) agreed in 92% of cases. Those using the Bland scale agreed 90% of the time. Two other scales agreed in 80% of cases and those employing their own scales agreed in 73% of cases. Within 1 grade of mode, overall agreement increased to over 98% regardless of the scale utilized.

To Summarize:

1 The majority of EDX providers polled grade severity in focal neuropathy.

2 There is a high level of agreement amongst providers when a formal scale is employed, regardless of experience level.

3 There is statistically less agreement in providers who grade severity without using a formal scale as compared to those that do.

4 There is some application of 'what determines' severity amongst providers as even those who don't employ formal criteria, obviously have predetermined mindset as to what constitutes mild from severe neuropathy.

5 If you're going to grade severity, then use a formal scale.

We believe that the adherence to specific threshold criteria when assessing one grade to the next with assignment of severity by description from very mild to very severe will provide an increased level of agreement amongst providers and improve communication to our referring providers. We've offered FaNGS as what we believe to be a very useful tool to achieve consistency and agreement. It is our responsibility to ensure reliability in the interpretation o.f data so that we and our customers can make appropriate medical decisions for our patients.

Using the scenarios on the following page, assign the appropriate grade of severity using FaNGS.

Compare your answers to those on page 17 of this magazine.

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Example 1.

Nerve Conduction Studies

Anti Sensory Summary Table

Site	NR	Peak (ms)	Norm Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Left Median Anti Sensory (3rd Digit)											
Palm		1.7	<2.2	53.0	>10	Palm	3rd Digit	1.7	7.0	41	
Wrist		3.3	<3.6	39.0		Wrist	Palm	1.6	7.0	44	>39
Left Ulnar Anti Sensory (5th Digit)											
Wrist		3.3	<3.4	6.8	>10	Wrist	5th Digit	3.3	12.0	36	

Motor Summary Table

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)												
Wrist 8cm		3.4	<4.2	8.3	>2.8	5.16	Elbow	Wrist 8cm	4.6	25.0	54	>50
Elbow		8.0		8.2		5.16	Axilla	Elbow	1.7	10.0	59	
Axilla		9.7		8.1		5.16						
Left Ulnar Motor (Abd Dig Minimi)												
Wrist 8cm		3.3	<3.6	7.1	>4.2	6.25	B Elbow	Wrist 8cm	3.9	20.0	51	>49
B Elbow		7.2		6.1		6.25	A Elbow	B Elbow	3.0	10.0	33	>47
A Elbow		10.2		5.8		6.25	Axilla	A Elbow	1.8	10.0	56	>50
Axilla		12.0		5.9		3.75						
Left Ulnar Inching Motor (ADM)												
-8cm		6.9		7.1		6.41	-8cm	-2.5	0.4	2.5	63	
-2.5		7.3		7.0		6.25	-2.5	0	0.5	2.5	50	
0		7.8		7.1		6.25	0	2.5	1.4	2.5	18	
2.5		9.2		6.5		6.41	2.5	5	0.5	2.5	50	
5		9.7		6.2		6.56						

Comparison Summary Table

Site	NR	Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)
Left Median/Radial Comparison (Digit 1)							
Median 10cm		2.6	30.2	>%uV	Median 10cm	Radial 10cm	0.0
Radial 10 cm		2.6	7.3				

Example 1:

Example 2.

Nerve Conduction Studies

Anti Sensory Summary Table

Site	NR	Peak (ms)	Norm Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Left Median Anti Sensory (3rd Digit)											
Palm		2.0	<2.2	28.6	>10	Palm	3rd Digit	2.0	7.0	35	
Wrist		4.2	<3.6	18.0		Wrist	Palm	2.2	7.0	32	>39
Left Ulnar Anti Sensory (5th Digit)											
Wrist		3.3	<3.4	13.1	>10	Wrist	5th Digit	3.3	12.0	36	

Motor Summary Table

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)				50% motor conduction block at wrist								
Wrist 8cm		6.0	<4.2	3.7	>2.8	5.94	Elbow	Wrist 8cm	4.8	24.0	50	>50
Elbow		9.8		4.2		6.88	Palm	Wrist 8cm	3.3	5.0	15	>29
Palm		1.7		8.2		6.56						
Left Ulnar Motor (Abd Dig Minimi)												
Wrist 8cm		3.1	<3.6	7.7	>4.2	5.47	B Elbow	Wrist 8cm	4.1	21.0	51	>49
B Elbow		7.2		6.6		5.63	A Elbow	B Elbow	2.3	12.0	52	>47
A Elbow		9.5		6.5		5.63						

Comparison Summary Table

Site	NR	Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)
Left Median/Radial Comparison (Digit 1)							
Median 10cm		3.4	10.3	>%uV	Median 10cm	Radial 10cm	0.8
Radial 10 cm		2.6	8.0				

Example 2:

Example 3.

Nerve Conduction Studies

Anti Sensory Summary Table

Site	NR	Peak (ms)	Norm Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Right Median Anti Sensory (3rd Digit)											
Palm		1.6	<2.2	36.7	>10	Palm	3rd Digit	1.6	7.0	44	
Wrist		3.5	<3.6	38.2		Wrist	Palm	1.9	7.0	37	>39
Right Ulnar Anti Sensory (5th Digit)											
Wrist		2.7	<3.4	42.8	>10	Wrist	5th Digit	2.7	12.0	44	

Motor Summary Table

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)
Right Median Motor (Abd Poll Brev)												
Wrist 8cm		3.8	<4.2	7.4	>2.8	5.78	Elbow	Wrist 8cm	3.9	23.0	59	>50
Elbow		7.7		6.7		6.09	Palm	Wrist 8cm	2.2	5.0	23	>29
Palm		1.6		7.7		5.63						
Right Ulnar Motor (Abd Dig Minimi)												
Wrist 8cm		3.1	<3.6	8.8	>4.2	6.09	B Elbow	Wrist 8cm	2.7	17.0	63	>49
B Elbow		5.8		8.8		6.25	A Elbow	B Elbow	1.5	10.0	67	>47
A Elbow		7.3		8.8		6.56						

Comparison Summary Table

Site	NR	Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)
Right Median/Radial Comparison (Digit 1)							
Median 10cm		2.9	40.2	>%uV	Median 10cm	Radial 10cm	0.6
Radial 10 cm		2.3	12.7				

Example 3:

Example 4.

Nerve Conduction Studies

Anti Sensory Summary Table

Site	NR	Peak (ms)	Norm Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Right Median Anti Sensory (3rd Digit)											
Palm		1.8	<2.2	24.9	>10	Palm	3rd Digit	1.8	7.0	39	
Wrist		3.5	<3.6	17.3		Wrist	Palm	1.7	7.0	41	>39
Right Ulnar Anti Sensory (5th Digit)											
Wrist		3.2	<3.4	24.7	>10	Wrist	5th Digit	3.2	12.0	38	

Motor Summary Table

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)
Right Median Motor (Abd Poll Brev)												
Wrist 8cm		3.8	<4.2	5.4	>2.8	5.47	Elbow	Wrist 8cm	4.6	25.0	54	>50
Elbow		8.4		5.5		5.63	Axilla	Elbow	1.9	10.0	53	>50
Axilla		10.3		5.3		5.78						
Right Ulnar Motor (Abd Dig Minimi)												
Wrist 8cm		3.1	<3.6	9.9	>4.2	5.00	B Elbow	Wrist 8cm	3.5	19.0	54	>49
B Elbow		6.6		9.5		5.16	A Elbow	B Elbow	2.4	10.0	42	>47
A Elbow		9.1		9.2		5.47	Axilla	A Elbow	1.8	10.0	56	>50
Axilla		10.8		8.8		5.47						
Right Ulnar Inching Motor (ADM)												
-5cm		6.4		9.7		5.63	-5cm	-2.5	0.5	2.5	50	
-2.5		6.9		9.7		5.47	-2.5	0	0.4	2.5	63	
0		7.3		9.7		5.31	0	2.5	1.0	2.5	25	
2.5		8.3		9.3		5.63	2.5	5	0.6	2.5	42	
5		8.9		9.1		5.47						

Comparison Summary Table

Site	NR	Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)
Right Median/Radial Comparison (Digit 1)							
Median 10cm		2.7	16.0	>7uV	Median 10cm	Radial 10 cm	0.0
Radial 10 cm		2.7	5.1				

Example 4:

Example 5.

Nerve Conduction Studies

Anti Sensory Summary Table

Site	NR	Peak (ms)	Norm Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Left Median Anti Sensory (3rd Digit)											
Palm	NR		<2.2		>10	Palm	3rd Digit		7.0		
Wrist	NR		<3.6			Wrist	Palm		7.0		>39
Left Ulnar Anti Sensory (5th Digit)											
Wrist		2.8	<3.4	16.4	>10	Wrist	5th Digit	2.8	12.0	43	

Motor Summary Table

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) complete motor conduction block at wrist												
Wrist 8cm	NR		<4.2				Elbow	Wrist 8cm				>50
Elbow	NR						Palm	Wrist 8cm				>29
Palm		2.2		.25	>2.8	4.69						
Left Radial Motor (Ext Ind Prop)												
Forearm 8cm		2.5	<3.0	4.6		7.03	Brachium	Forearm 8cm	4.2	24.0	57	>50
Brachium		6.7		4.9		6.88						
Left Ulnar Motor (Abd Dig Minimi)												
Wrist 8cm		2.8	<3.6	5.6	>4.2	4.38	B Elbow	Wrist 8cm	3.3	18.0	55	>49
B Elbow		6.1		5.2		5.00	A Elbow	B Elbow	1.9	10.0	53	>47
A Elbow		8.0		5.2		5.00						

Comparison Summary Table

Site	NR	Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)
Left Median/Radial Comparison (Digit 1)							
Median 10cm	NR			>7uV	Median 10cm	Radial 10 cm	
Radial 10 cm		2.7	12.0				

Example 5:

Example 6.

Nerve Conduction Studies

Anti Sensory Summary Table

Site	NR	Peak (ms)	Norm Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Left Median Anti Sensory (3rd Digit)											
Palm	NR		<2.2		>10	Palm	3rd Digit		7.0		
Wrist	NR		<3.6			Wrist	Palm		7.0		>39
Left Ulnar Anti Sensory (5th Digit)											
Wrist		3.3	<3.4	28.0	>10	Wrist	5th Digit	3.3	12.0	36	

Motor Summary Table

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) 50% motor conduction block at wrist												
Wrist 8cm		3.9	<4.2	2.8	>2.8	5.31	Elbow	Wrist 8cm	4.5	26.0	58	>50
Elbow		13.4		2.7		4.38	Palm	Wrist 8cm	6.7	8.0	7	>29
Axilla		15.2		2.8		7.03	Axilla	Elbow	1.8	10.0	56	
Palm		2.2		5.6		4.69						
Left Radial Motor (Ext Ind Prop)												
Forearm 8cm		2.8	<3.0	5.1		7.97	Brachium	Forearm 8cm	4.7	24.0	51	>50
Brachium		7.5		5.5		7.81						
Left Ulnar Motor (Abd Dig Minimi)												
Wrist 8cm		3.5	<3.6	7.5	>4.2	5.63	B Elbow	Wrist 8cm	4.4	22.0	50	>49
B Elbow		7.9		5.7		5.63	A Elbow	B Elbow	1.8	10.0	56	>47
A Elbow		9.7		5.2		5.78	Axilla	A Elbow	1.7	10.0	59	>50
Axilla		11.4		5.4		3.44						

Comparison Summary Table

Site	NR	Peak (ms)	O-P* Amp (µV)	Norm O-P Amp	Site1	Site2	Delta-P (ms)
Left Median/Radial Comparison (Digit 1)							
Median 10cm	NR			>7uV	Median 10cm	Radial 10 cm	
Radial 10 cm		2.6	7.3				

Example 6:

Answers
Example 1: **Moderate** - Example 2: **Moderate** - Example 3: **Very Mild** - Example 4: **Mild** - Example 5: **Very Severe** - Example 6: **Severe**

IN-HOUSE DIAGNOSTIC TESTING OPENS UP NEW REVENUE STREAMS

By training to deliver established diagnostic tests within the clinic, physical therapists are increasing net profit margins and improving patient outcomes

Bryson G. Baylor
Editor-In-Chief

In the traditional approach, physical therapists evaluate patients by conducting a physical therapy and orthopedic physical examination to derive the ideal treatment plan. When more sophisticated diagnostic tests are required, the patient is typically referred to a small universe of specialists in a process that can take several weeks to receive results.

Today, however, physical therapists are increasingly bringing this diagnostic testing into the clinic, investing in the equipment and training designed to reduce the learning curve and produce more immediate income. By doing so, clinics are able to expand the scope of their practice by tapping into a lucrative new universe of CPT codes while also deriving more effective treatment plans that improve patient outcomes.

"With declining reimbursements, we are always looking for new avenues in which to pursue greater revenue, particularly net profit margins," says Nathan Shields, co-owner of Rise Rehabilitation Specialists with 18 years as an orthopedic physical therapist. "We also want to differentiate our clinic by providing a service within PTt."

BETTER DIAGNOSIS THROUGH OBJECTIVE TESTING

Physical therapists have long sought more objective methods of diagnosis to supplement the normal physical evaluation. "As physical therapists, a lot of what we do is relatively subjective testing," explains Shields. "Many of the tests are scientifically proven, but are still based upon the skill level and experience of the therapist." In many cases, orthopedic evaluation tests may also miss pathologies and lead to ineffective treatment. More objective diagnostic tests allow physical therapists to troubleshoot issues with challenging patients quickly and accurately.

This leads to better outcomes, with patients experiencing faster, more effective results.

"We're excited about the opportunity to diagnose patients with greater certainty. This is the only thing physical therapists can do to get some really objective diagnostic testing," adds Shields.

Among the tests that physical therapists can be trained on include electromyography (EMG) nerve conduction testing, musculoskeletal and neuro ultrasound, vestibular testing to treat patients with vertigo and balance problems and Evoked Potential tests.

> "Many of the tests are scientifically proven, but are still based upon the skill level and experience of the therapist."
> - Nathan Shields

EMG TESTING

EMG/NCS testing is one of the most reliable diagnostic tools for many dysfunctions of the Neuromuscular System. An EMG measures the electrical activity of muscles at rest and during contraction. Nerve Conduction Studies (NCS) measure the health of the nerves.

Measuring the electrical activity in muscles and nerves can help identify diseases that damage muscle tissue (such as myopathy, radiculopathy and muscular dystrophy) or nerves (such as amyotrophic lateral sclerosis or peripheral neuropathies). For symptoms such as numbness, weakness or tingling in an arm or leg, or conditions like sciatica and carpal tunnel syndrome, an EMG/NCS is a way to assess muscle and nerve function and is often used with other tests such as MRI and CT scan. Physical therapists have been able to perform EMG and nerve conduction tests for more than 45 years. In 1978, the American Physical Therapy Association established a specialty program through the American Board of Physical Therapist Specialties for certification in clinical electrophysiology. Yet today there are only about 177 board certified physical therapists. This is due to the requirements for board certification, which are rigorous and include over 2000 direct clinical hours in the specialty area and completion of 500 EMG/NCS studies along with a vigorous written exam.

Most current educational models also do not offer the opportunity for revenue generation before the completion of the entire program which makes it challenging for the practicing therapist to commit to such program.

EMG training can take between 1.5 to 3 years before the physical therapist can conduct the tests on patients. For most practicing physical therapist, this is not a workable model.

DIAGNOSTIC TESTING TRAINING PROGRAMS

Today, training programs such as Hands-On Diagnostics exist to reduce the learning curve and speed the time to reimbursement.

Hands-On Diagnostics is a national franchise organization that helps physical therapy practices to establish in-house diagnostic services for their patients. To date, the franchise has expanded to 16 different states with over 90 physical therapy facilities.

The program is supported by live and virtual mentorships with board certified experts that allow the physical therapist to be able to perform these tests and get reimbursed almost immediately.

In addition to training, the company provides marketing advice, promotional materials to provide to referring physicians, insight on how to approach other doctors and guidance on how to talk to patients about the tests, and how to bill and collect from insurance for this specialized type of service.

For the diagnostic equipment, the physical therapist must purchase it directly from the manufacturer.

Shields first learned about Hands-On Diagnostics four years ago after his business partner Will Humphreys learned about the program from another therapist conducting the tests.

Of particular interest to Shields was the ability to offer musculoskeletal ultrasound.

> "We are excited about the opportunity to diagnose patients with greater certainty. This is the only thing physical therapists can do to get some really objective diagnostic testing,"
> **Nathan Shields**

Ultrasound imaging uses sound waves to produce pictures of muscles, tendons, ligaments and joints throughout the body. It is used to help diagnose sprains, strains, tears, and other soft tissue conditions. Ultrasound is safe, noninvasive, and does not use ionizing radiation.

According to Shields, his clinic was able to begin testing almost immediately.

"After our first training session, we were able to perform the testing [with the supervision of the mentor]," says Shields. "As we committed ourselves to more and more testing, we experienced a significant increase in revenue."

Perhaps more importantly, patients are experiencing better results.

"We are now able to treat patients with more certainty and, in some cases, we have been able to use the testing to create protocols and get immediate responses on the physical therapy side," says Shields.

The ultimate goal of Hands-On Diagnostics is to provide a clear path for therapists to achieve board certification in clinical electrophysiology testing and certification in musculoskeletal ultrasound. Of the nine physical therapists certified in clinical electrophysiology in 2016, five were franchise members.

Now that Hands-On Diagnostics has received approval as a residency developing program in clinical electrophysiology from the American Board of Physical Therapy Specialists, Shields says he intends to complete his residency and sit for the board certification examination less than 18 months from starting the program.

"As reimbursements decline, a practice either has to increase revenue through more aggressive marketing or finding other ways to make money," says Shields. "Diagnostic testing provides us a way to do that."

For more information about Hands-On Diagnostics visit www.diagnosticsforpt.com or call (888) 447-6014. ■

"50 - 60% PROFIT MARGINS!

PTs do high volume for low reimbursements. HODS changed that for me! A stable PT business model that is ***low volume with higher reimbursements.***"

Hector Melgar, P. T. - Founder, Owner, and Director of Brentwood Physical Therapy, in Long Island New York.

"DIAGNOSTICS is the future

...and this is how I did it!"

My dedication to changing the lives of my patients on a daily basis has never faltered, but I needed to change the way I ran my business.

"I needed to change the game so that I could win... as well as my patients."

Once I discovered Hands-On Diagnostics, I knew I had arrived at the doorway of my dreams.

Like other physical therapists, I want our profession to continue to grow. So, elevating the profession is extremely important to me.

I decided to join HODS because I wanted to change the paradigm of my physical therapy practice.

HODS lets me *do more (and earn more)* as a practice, giving me the ability to treat patients faster and more accurately than ever before.

"Once I discovered I could practice ElectroMyoGraphy Testing and MSK Ultrasound, I found the key to achieving my dream."

My success these days is in moving toward the higher field of sophisticated procedures and interventions of Physical Therapy.

I want to thank HODS for their training and unwavering support. I also want to thank my staff for their courage embracing this vision and taking our practice to the next level.

With the HODS program you will get:

Effective Hands-On Mentoring - Better Patient Outcomes - Higher Reimbursements
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diagnosticsforpt.com/impact

HODS PARTNER DIRECTORY

Bill Wise PT, MPT
Wise Physical Therapy & Rehabilitation
1200 Airport Heights Dr. #170 (Bldg E)
Anchorage AK 99508
http://wisept.com

Nathan Shields, PT, MPT
Rise Diagnostics & Physical Therapy
3066 E. Meridian Park Loop #1
Wasilla, AK 99654
http://riseemgdiagnostics.com

Will Humphreys,PT,MPT
Rise Rehabilitation Specialists
3930 S. Alma School Rd., Suite 3
Chandler, AZ 85248
http://riserehabaz.com

Daniel Sage
OneToOne PT
13550 Jog Rd. Suite 100
Delray Beach, FL 33446
https://pt121.com/

Not Pictured

Joe & Angie McGilvrey
Apex Physical Therapy
15751 San Carlos Blvd Suite 4
Ft Myers , FL 33908
http://apexptflorida.com

Brian Prell
Rehabilitation and Performance Center
117 Harmony Crossing, Ste 4,
Eatonton GA 31024
http://lakeoconeerehab.com

Bart Mac Donald, MPT
Superior Physical Therapy
1800 Flandro Drive, Suite 190
Pocatello, ID 83202

David Jackson, PT
Jackson Physical Therapy & Associates
326 North Indiana Avenue
Sellersburg, IN 47172
http://jacksonptandassoc.com

Not Pictured

Shelley Lewis
Rehab Health and Fitness
5800 W. 180th St.,
Stilwell, KS 66085
http://rehabhealthandfitness.com

Brian Cochran, PT
Care Physical Therapy
129 Corporate Drive,
Covington, LA 70433
http://carephysicaltherapy.net

Brad Brasfield
Telegraph Road Physical Therapy
2716 Telegraph Road, Suite #107
Saint Louis, MO 63125

Timothy McLellan
Northern Physical Therapy
203 State Street
Ogdensburg, NY 13669
http://nptny.com

Craig Reinstein
Advanced Care Physical Therapy
290 Via Foresta Lane
Williamsville NY 14221
http://advancedcarephysicaltherapy.com

Christina Panetta, PT
Panetta Physical Therapy
55 Bryant Avenue – 2nd Fl.
Roslyn, NY 11576
http://panetta.com

Cindi Prentiss, PT
Physical Therapy & Beyond
196 Belle Mead Rd. Ste 2
East Setauket, NY 11733

Jeanine McLellan, PT
Northern Physical Therapy
203 State Street
Ogdensburg, NY 13669
http://nptny.com

HODS PARTNER DIRECTORY (CONT'D)

Hector Melgar,PT
Tri-Motion PT
21 Washington Ave
Brentwood, NY 11717

Nilesh Soni
Dynamic Physical Therapy
43-43 Kissena Blvd #110,
Flushing, NY 11355

Ashish Patel
All Hands on Physical Therapy
12 Coventry Ave.,
Albertson, NY 11507

Graham Webb, MSPT
Summit Physical Therapy
209 Merrick Ave
Merrick, NY 11566
http://summitpt.info

Joseph Simon, DPT
Manhattan Physical Therapy
276 5th Ave, Suite 202,
New York, NY 10001

Paul Ko
Paul Ko Pain Cliinc
35-18 150 PL #1 FL
Flushing, NY 11354
http://panetta.com

Mark Herbrich
Agewell Physical Therapy
1999 Marcus Ave, North
New Hyde Park, NY 11042
http://agewellpt.com

John Dragan
Agewell Physical Therapy
1999 Marcus Ave, North
New Hyde Park, NY 11042
http://agewellpt.com

Vicki Buchanan
Regional Physical Therapy
9309 E Reno Ave
Midwest City, OK 73130

Craig Hawkins
Pinnacle Physical Therapy
4025 Cherry Ave.
Keizer, OR 97303
http://pinnacle-physicaltherapy.com

William Dodson
Paradigm Physical Therapy
701 N Grant Ave,
Odessa, TX 79761
http://paradigmpt.com

Not Pictured

Tony Delagal & Teresa Martinez
Premier Physical Therapy
3115 West Alberta Rd.,
Edinburg, TX 78539

Jeff McMenamy
Teton Therapy PC
820 West Main Street
Riverton, WY 82501

Kathy Blair
Windcity Physical Therapy
1541 Centennial Ct.
Casper, WY 82609
http://windcitypt.com

Julie Bryt
Coal Creek Physical Therapy
315 W. South Boulder Rd #100
Louisville, CO 80027

Benjamin Ray Larsen
Top Therapy PC (DBA Teton Therapy)
1507 Stillwater Avenue, Suite A
Cheyenne, WY 82009-7358

BOARD CERTIFICATIONS & MODULE COMPLETIONS

Congratulations are in order to those who have progressed in their professional development with HDOS.

Board Certified in Clinical Electrophysiology

(In 2016 out of all 9 new ECS professionals, 5 were from the HODS family)

Beshoy Ghaly
Karen Eckardt
Sarah Quintillan
Laura Quirk
Hector Melgar

RMSK Certified From APCA

Beshoy Ghaly
Rebecca Hibner

Module 1

Adam W. Waters
Ashish Patel
Bart McDonald
Becky Hibner
Ben Larsen
Beshoy Ghaly
Bill Dodson
Bill Wise
Bret Maiers
Brian Cochran
Brian Prell
Bruce Falkner
Casey Buckland
Cindi Prentiss
Craig Hawkins
Craig Reinstein
Dani Luna
Daniel Sage
David Jackson
Graham Webb
Jani Kajal
Jeanine McLellan
Jeff McMenamy
Jennifer Allen
Joe Simon
Josh Henderson
Joshua Mannigan
Juhi Jindal
Julie Reinstein
KanchanShenoy
Karen Eckardt

Kathy Blair
Laura Quirk
Mark Ward
Mohini Rawat
Nathan Shields
Nilesh Soni
Oluwaseun Ajifowobaje
Raji Soni
Rinku Kuril
Ryan Boggs
Sarah Gillett
Sarah Quintillan
Shelley Lewis
Therese Panetta
Thomas Welch
Vicki Buchanan
Will Humphreys

Module 2

Andrew Goode
Ashish Patel
Bill Wise
Bart McDonald
Brad Brasfield
Beshoy Ghaly
Bret Maiers
Brian Cochran
Brian Prell
Bruce Faulkner
Casey Buckland
Christina Panetta
Cindi Prentiss
Craig Hawkins
Craig Reinstein
Dani Luna
Daniel Sage
David Jackson
Graham Webb
Jani Kajal
Joe Simon
Kanchan Shenoy
Karen Eckardt
Laura Quirk
Mark Ward
Melissa Merrill
Nathan Shields
Niles Howard
Raji Soni
Rinku Kuril
Ryan Boggs
Sarah Quintillan
Shelley Lewis
Terri Tubolino
Therese Panetta
Vicki Buchanan
Will Humphreys

Module 3

Alex Bryant
Andi Baune
Ashish Patel
Bart Mac Donald
Becky Hibner
Beshoy Ghaly
Bill Wise
Bret Maiers
Brian Cochran
Bruce Faulkner
Casey Buckland
Cindi Prentiss
Craig Reinstein
Daniel Sage
David Jackson
Dustin Arthur
Graham Webb
Heather Abatelli
Hector Melgar,
Jani Kajal
Jeanine McLellan
John Dragan
Kanchan Shenoy
Karen Eckardt

Krista Clarke
Laura Quirk
Mark Brooks
Mark Herbrich
Mark Ward
Mohini Rawat
Nathan Shields
Oluwaseun Ajifowobaje
Paul Ko
Raji Soni
Rinku Kuril
Robyn Hursley
Ryan Boggs
Sarah Quintillan
Shelley Lewis
Thomas Welch
Timothy McLellan
Vicki Buchanan

Module 4

Andi Baune
Beshoy Ghaly
Bill Wise, PT MPT
Bruce Faulkner
Casey Buckland
Christina Panetta, PT
Cindi Prentiss, PT
Craig Hawkins
Craig Reinstein
Daniel Sage
David Jackson
Hector Melgar
Jani Kajal
Jeanine McLellan
KanchanShenoy
Karen Eckardt
Krista Clarke
Laura Quirk
Mark Herbrich
Mark Ward
Nathan Shields
Nilesh Soni
Phillip Caruso
Raji Soni
Rinku Kuril
Sarah Quintillan
Vicki Buchanan

Module 5

Bart McDonald
Bill Wise
Bruce Faulkner
Cindi Prentiss
David Jackson
Karen Eckardt
Nathan Shields
RyanBoggs
Sarah Quintillan

Module 6

Andi Baune
Becky Hibner
Beshoy Ghaly
Brian Cochran
Bruce Faulkner
Craig Hawkins
David Jackson
Hector Melgar
Joe Simon
Joseph Burbige
Kanchan Shenoy
Karen Eckardt
Laura Quirk
Phillip Caruso
Rinku Kuril
Vicki Buchanan

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HANDS-ON DIAGNOSTICS

"50 - 60% PROFIT MARGINS!

Skeptics said we couldn't successfully integrate EMG's and other diagnostics into our practice, but we saw the future and we were right. Big time!

Nathan Shields, P. T. - Co-Owner,
Rise Diagnostics, Wasilla & Anchorage, Alaska
Rise Rehabilitation Specialists, Arizona

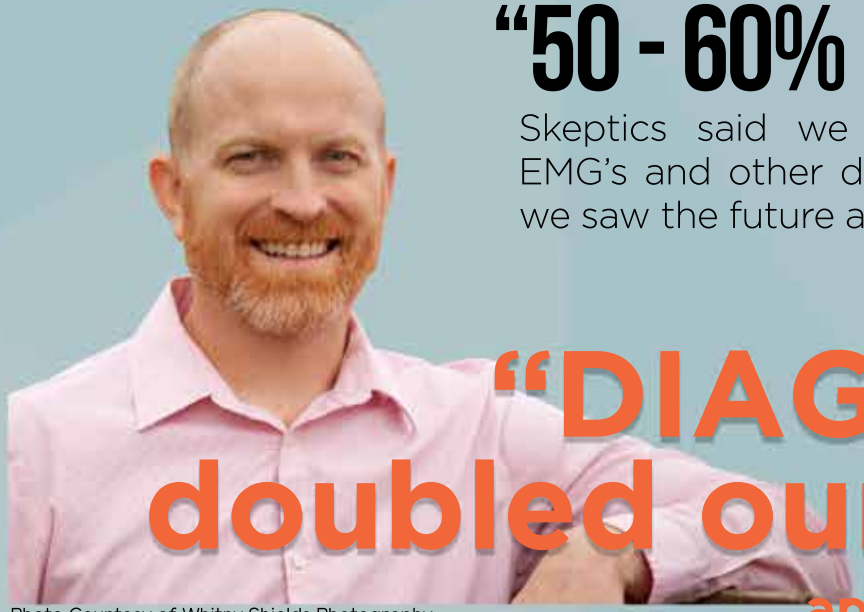

Photo Courtesy of Whitny Shields Photography

"DIAGNOSTICS doubled our practice ...and this is how I did it!"

Before HODS, me and my partner, Will Humphreys, were looking for something different within physical therapy. We were searching for something that would set our clinics apart and make us a little more niche.

"Because physical therapy has become so commoditized, we needed to do something different that could increase revenues but stay within the physical therapy realm."

We mulled over several options that piqued our interest, but nothing really excited us. We even considered a partnership with CrossFit, but since we knew *nothing* about starting a gym nor had the passion, we wanted no parts of it.

Needless To Say... We Were *Stuck*!

That's when a friend introduced Will to Dr. Kostopoulos and his training, *"Diagnostics for PTs,"* and Will "saw the light." He rushed back to share what he learned with me and I was hungry for more- **especially since I always thought (and was taught) "PTs can't do diagnostics!"...**

Boy, Were They Wrong!

We were convinced this was exactly what our practice needed- something with a practically unlimited earning potential, was simple to implement and provided us the distinction we so craved.

Not too long after, Will and I flew out to New York and met with Dr. Kostopoulos to learn more about HODS. **Right away we knew it was a fit for us**, so we decided to make the jump and become a HODS partner.

"The past 3 years with HODS has been game changing for our practice and for me personally!"

Since joining HODS, things have been moving fast for us and we've been growing very rapidly.

About 18 months ago, we considered opening an EMG-based clinic that wasn't dependent upon us providing physical therapy (something new for us) so...

We *Opened Another Practice* Exclusively For EMGs In Alaska (of all places)!

I volunteered to focus on building that new concept in Alaska and it's been a blast. We've been at it now for over a year and we've got a successful business simply doing EMGs and diagnostic ultrasound. **And my family loves it here, too!**

Over the next 3-5 years, we're going to create a new physical therapy business model that incorporates electrodiagnostics and diagnostic ultrasound into everyday physical therapy.

This alone will set us apart from other physical therapists and diagnostics in Arizona *and* Alaska...

"Not to mention how it's going to drastically improve patient care."

So considering the general decline in reimbursements, HODS has been our way to survive. They've made it possible for us to set our clinics apart and embrace a new way of practicing physical therapy. -- **Nathan Shields**

"Discover How Diagnostics Allows PTs To Provide Better Patient Care And *Easily Earn 5 -10 Times More* Per Patient Visit!"

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Effective Hands-On Mentoring - Better Patient Outcomes - Higher Reimbursements
Stand Out from the Competition - Expansion of Your Practice

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