

clinical conduit

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Clinical Testing for Carpal Tunnel Syndrome



Phalen's Test

Carpal tunnel syndrome is a very common pathology seen by physical therapists. It is often seen in middle age women (although men are susceptible as well) who have an occupational predisposition. Obesity, diabetes, rheumatoid arthritis, and pregnancy are additional recognized risk factors. The typical presentation is pain, tingling, and numbness in the distribution of the median nerve. The complaint of the "hand going to sleep" is usually most noticeable at night.

Chronic symptoms often result in weakness and clumsiness of the thumb, index, and middle fingers with notable atrophy of the muscles of the thenar eminence. At least 15 different special tests have been described in the literature to confirm the diagnosis in the presence of these common physical and subjective history findings. Special tests for the condition have been studied extensively however the lack of a true gold standard limits the validity of accurately identifying the condition. Additionally, many of the studies have inherent design flaws and/or biased by confounding variables.

The classic test for the condition is the Phalen's test. In this test the patient holds their wrists in extreme flexion for up to one minute. A positive test is one in which there is reproduction of the patient's concordant sign

(paraesthesia in the sensory distribution of the median nerve). This test is considered to be more specific than sensitive with a positive likelihood ratio (pooled value from a number systematic reviews) of about 2.0. This value only represents a mild shift in the probability of the condition's existence in the presence of a positive test. The relatively low sensitivity of the test renders negative likelihood ratios to high to be used as an accurate means to rule out the condition when the test is negative.

Tinel's Test

A Tinel's test (tapping over the median nerve at the level of the flexor retinaculum covering the carpal tunnel to reproduce the tingling complaint) has similar limitations in sensitivity and specificity.



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Upcoming Courses in 2012

Advanced Manual Therapy Series
Clinical Orthopedic Rehab Education

2012 Dates

- Part 3: The Upper Quarter -Jun 2-3 (Shoulder-Elbow-Wrist-Hand)
- Part 4: Lumbopelvic Spine-Jul 14-15
- Part 5: Hip/Knee-Aug 25-26
- Part 6: The Lower Quarter-Oct 13-14 (Leg, Ankle, and Foot)

A detailed description of the course content and learning objectives is available at our web site — www.continuing-ed.cc

Single course attendance is allowed on a space-available basis

Importance of Palpation at the Shoulder

Palpation is an important part of the physical examination. We use it to determine the size, shape, firmness, tone, texture, and tenderness of a variety of soft tissue and bony landmarks. From a diagnostic standpoint we often use palpation to determine spatial relationships or provoke the sign concordant to the patient's complaint.

A recent article in the literature compared the ability of palpation to diagnose stage I or II subacromial impingement syndrome as compared to the Neer and Hawkins tests using sonographic findings to confirm the pathology. An experienced physiotherapist used a standardized finger pressure (approximately 2 kg) to score the degree of tenderness at four anatomical landmarks. The areas palpated (supraspinatus, infraspinatus, subscapularis, and bicipital tendon) were scored on an ordinal scale ranging from 0 to 3 representing no, mild, moderated, and severe tenderness. Surprisingly, the palpation tests showed a slightly higher level of accuracy than did the impingement tests. A particularly salient finding was the perfect sensitivity when palpating the supraspinatus tendon. Complete absence of pain on palpation correlated perfectly with no evidence of tendinosis or tearing of the tendon. A chart reviewing the specific statistical results of impingement and palpation tests is provided on page 3. The high sensitivity and suspect specificity of the Hawkins and Neer tests are consistent with a number of systematic reviews.



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Carpal Tunnel Testing continued ...

REFERENCES

Boyer K, Wies J, Turkelson CM. Effects of bias on the results of diagnostic studies of carpal tunnel syndrome. *J Hand Surg Am.* 2009 Jul-Aug;34(6):1006-13.

Ferd E, Wober C, Zeithofer J. The carpal tunnel syndrome: diagnostic utility of the history and physical examination findings. *Acta Neurol Scand.* 1998; 98:328-332

Kuhlman K, Hennessey WJ. Sensitivity and specificity of carpal tunnel syndrome signs. *Am J Phys Med Rehabil.* 1997. 76(6):451-57.

MacDermid JC, Wessel J. Clinical diagnosis of carpal tunnel syndrome: a systematic review. *J Hand Ther.* 2004 Apr-Jun; 17(2):309-319.

Massy-Westropp N, Grimmer K, Bain G. A systematic review of the clinical diagnostic tests for carpal tunnel syndrome. *J Hand Surg.* 2000. 25A(1):120-27.

McCabe SJ. Diagnosis of carpal tunnel syndrome. *J Hand Surg Am.* 2010 Apr;35(4):646-8.

Tetro AM, Evanoff BA, Hollstein SB, Gelberman RH. A new provocative test for carpal tunnel syndrome. *J Bone Joint Surg.* 1998 80-B (3):493-498



Another provocative maneuver to elicit carpal tunnel symptoms is the carpal compression test. Digital pressure over the median nerve at the level of the wrist will reproduce the subjective complaint within 30 seconds. Tetro described a modification of the test in which the pressure is applied over the carpal tunnel with the wrist flexed to 60° - essentially combining the provocative nature of both the Phalen and carpal compression test. In one study this was shown to increase the diagnostic likelihood of the condition's presence or absence. A recent report showed that the use of the upper limb tension test with a median nerve bias is a sensitive test if elbow flexion is limited and symptoms are impacted by contralateral neck flexion. Specificity of the ULTT I was elevated if symptom reproduction was created in the first three digits. As the table below illustrates, special testing for carpal tunnel has not been shown to dramatically change the probability of CTS to an extent that is clinically relevant. Even electrodiagnostic confirmation (EMG/NCV) does not significantly alter the probability of the condition's existence. My advice is to rely on common exam findings such as nocturnal numbness, decreased 2-pt discrimination, thenar atrophy, and temporary symptom alleviation by gently "shaking" the hand as the criteria for making the diagnosis.

Test/Sign	Pooled SN	Pooled SP	+ LR	- LR
Phalen's *	45 (10-80)	77 (55-86)	1.96	0.71
Tinel's *	41 (9-63)	73 (55-86)	1.52	0.82
Hyperparaesthesias *	43 (15-70)	79 (59-93)	2.04	0.72
ABP Weakness *	52 (39-66)	73 (66-80)	1.92	0.66
Carpal Compression *	40 (5-87)	86 (74-94)	2.86	0.70
Reverse Phalen's **	55	100		
Modified Phalen's **	85	100		
Tetro Provocation **	82	99	5.5	0.17
CTS Clinical Prediction Rule	99	18	1.20	0.06
Phalen/Carpal Compression Combination **	92	92	12	0.09

* pooled data from multiple systematic reviews; ** based on single low quality trial



Question of the Month: Active Release Therapy

What is A.R.T. therapy?
J.V., PT



I must qualify this response with the caveat that I have not been formally trained or certified to be an active release practitioner. Active release technique (ART) is a soft tissue-movement based massage technique that was developed by a chiropractor. It is billed on their web site (www.activerelease.com) as the "gold-standard" of soft tissue treatment without any high-quality evidence in the literature to support this contention. As I understand it, the technique is designed to treat myofascial dysfunctions (adhesions, scar tissue, etc) by providing digital pressure to dysfunctional areas followed by the patient's active motion in

a vector parallel to the muscle's orientation.

The majority of research on this technique has been presented in the form of case studies. Active release therapy was utilized (in addition to more traditional interventions) for a variety of pathologies showing an improvement in pain, mobility, and/or function. Unfortunately these studies only suggest the need for a elevated level of scrutiny in higher quality trials.

The results from a few low-quality, higher level studies (pre-post interventions) have suggested a possible benefit in improving mobility but no impact on contractile capabili-

ties (inhibition or facilitation). I'm not surprised that any soft-tissue based technique would have the ability to improve tissue mobility – the bigger question would be if this specific technique is superior to other soft-tissue massage techniques or has a unique ability for soft-tissue impairments in a specific injury condition.

For now my conclusion is that this technique is just another form of soft-tissue mobilization that may be of some value in patients with soft-tissue dysfunction. There is no evidence to support this intervention as a standalone treatment.

Questions you would like addressed in a future issue can be sent to mulliganpt@tx.rr.com

References

Gazillo GP, et al. Accuracy of palpating the long head of the biceps tendon: an ultrasonographic study. *PMR*. 2011Nov; 3(11):1035-40.

Gill HS, et al. Physical examination for partial tears of the biceps tendon. *Am J Sports Med*. 2007. 35(8):1334-40.

Hughes PC, et al. Most clinical tests cannot accurately diagnose rotator cuff pathology: a systematic review. *Aust J Physiother*. 2008;54(3):159-70.



"Featured Internet Link"
www.ecptote.state.tx.us/



The Executive Council of Physical Therapy and Occupational Therapy Examiners has updated their web site. You'll still find much of the same content as before such as licensing instructions and applications, practice act and rules, board minutes, and PT forms and newsletters. The biggest change other than the cosmetic update is that beginning last month all licensed PTs and PTAs must now report their continuing competence activities on-line as a part of the renewal process. Remember that only TPTA pre-approved education programs are eligible for point accumulation. The continuing competency activity report will require you to provide the TPTA approval number the provider should have placed on your course certificate. There is a nice FAQ tab you can review to provide more detailed information as your time for renewal draws closer. The web site is at <http://www.ecptote.state.tx.us/>



Palpation Testing continued -

chart modified from:
 Toprak U, et al. Palpation tests vs. impingement tests in Neer stage I and II SAIS. *Knee Surg Sports Traumatol Arthrosc*. 2012 Mar 28. [Epub ahead of print]



Variable	SN	SP	Accuracy
Neer Test	80	52	74
Hawkins Test	67	47	62
Supraspinatus Palpation	92	41	79
Infraspinatus Palpation	33	66	65
Subscapularis Palpation	60	0	10
Biceps Palpation	85	48	62

In another similar study the authors found (Gill SG, et al, *Am J Sports Med*, 2007) that the diagnosis of a partial bicep tendon tear could not be reliably made based on palpation or physical exam and suggested that surgeon's should be prepared to treat pathologies of the long head of the biceps at the time of surgical intervention. In their study they found similar specificity as the previously mentioned study at 54% but a much lower sensitivity score of 53% rendering a positive and negative likelihood ratio that would be incapable of significantly shifting the probability of bicep tendon disorders. Additionally, Speed's test showed similar sensitivity and only moderately better specificity.

The problem with using bicep tendon palpation may be partially explained by our inability to consistently and accurately palpate its location. A study last year in *Physical Medicine Rehabilitation* found that only 5% of physician residents and fellows could accurately palpate the tendon using needle placement while blinded to real-time ultrasonographic visualization. All missed palpations were medial to the intertubercular groove suggesting that the tendon may be more lateral than expected.

In support of the diagnostic value of palpation was a systematic review in the *Australian Journal of Physiotherapy* in 2008. This study concluded that most clinical tests cannot accurately diagnose rotator cuff pathology. However, the authors cited two studies that reported relatively high sensitivity and specificity using palpation of the supraspinatus tendon to identify full-thickness rotator cuff tears or differentiate massive tears from healthy tendons.

These studies remind us of an important principle in diagnostic physical examinations. Rarely, are single findings capable of conclusively identifying specific lesions and that it is a combination of findings from both the patient's history and objective examination that will render more accurate labels by which to justify some of our treatment decisions. These studies also remind us of the potential value of palpatory findings in coming to these conclusions.

50 most cited shoulder articles



When you look at a bibliography or reference list from a continuing education course what do you think when you see a lot of references that are more than 5-10 years old? It could mean a couple of things – the author/presenter

has not recently reviewed the literature for updates or that questions regarding the content have been asked and answered to the satisfaction of the medical community. It could be argued that often older citations remain relevant and important because of their classic nature. There is a reason why some papers are constantly referenced and should be used as the definitive standard by which to guide our thought process.

To support my contention I noticed that in the most recent *Journal of Shoulder and Elbow Surgery* there was an article on the 50 most cited articles relevant to orthopedic shoulder surgery. The ranking criteria were based on the total number of times the article has been cited in the literature. The most recent article in the top 10 citations is now over 20 years old. In fact, only 4 of the top 50 have been published in the past decade. Now there is an obvious advantage to the older articles as they've had more opportunities to be referenced but I think it also speaks to their clinical importance. Other interesting descriptive features of the article were that the *Journal of Bone and Surgery* accounted for almost 60% of the articles with the *American Journal of Sports Medicine* a distant second at about 15%. It appears that if you're a "shoulder" therapist these two journals should be on your bookshelf.

The most common type of article introduced or evaluated common classification systems or outcome tools. The most common pathological theme was labrum/instability followed by the rotator cuff, impingement, arthroplasty, and fractures. Maybe the biggest concern was the nature of the articles as categorized by their position on the evidence hierarchy. None of the top 50 was a randomized controlled trial with nearly 50 % of the case series variety. One could argue that these types of papers are the genesis for future research in which their findings and concepts can be subjected to a higher degree of scientific rigor. If you want to review the "Top 50" list the reference is:

Namdari S, Baldwin K, Kovatch K, Huffman GR, Glaser D. Fifty most cited articles in orthopedic shoulder surgery. *J Shoulder Elbow Surg*. 2012 Apr 6. [Epub ahead of print]

Previous issues are archived at
www.continuing-ed.cc/newsletter.htm



If I didn't have mirrors or a memory I wouldn't know that I'm 55.

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Upcoming Educational Events

Please consider joining us for one our advanced manual therapy courses this year. The next two programs are scheduled for June and July. In June the topic will be orthopedic management of the upper extremity including the shoulder, elbow, and wrist/hand. In July we'll turn our attention to the management of the lumbopelvic spine. These courses are designed to provide a comprehensive and evidence-based review of orthopedic physical therapy based on the APTA's definition of advanced specialty practice. If you'd like a mechanism by which to prepare for the OCS exam or would simply benefit from advanced coursework with expert colleagues, we hope you'll consider attending. These courses are taught by the orthopedic faculty at UT Southwestern. All of the material is based on current evidence with over 50% of the on-site course work devoted to lab demonstration and practice. For more information on the 2012 advanced clinical orthopedic education series please visit our web site at www.continuing-ed.cc/residencycourse.htm. The courses are designed as a series but attendance at singular courses is allowed on a space available basis.



Orthopedic Management of the Upper Extremity
 June 2-3, 2012 - Plano, TX



Orthopedic Management of the Lumbopelvic Spine
 July 14-15, 2012 - Plano, TX



Emergency Responder Course
 September 21-23, 2012
 Dallas, TX

Also, UT Southwestern is sponsoring an emergency responder course. This course is a requirement to sit for the APTA's sports PT specialty examination unless you are certified as an athletic trainer. This program will be held at the PT school in Dallas and additional information can be found at <http://www.spts.org/education/emr-courses/upcoming-emr-courses>



Featured Home Study Program Achilles Tendinopathy

Many pathologies of the triceps surae complex require restoration of contractile capability. A recent article in *Sports Health* studied the electromyographic activity of common rehabilitation exercises to establish a logical progression of muscular challenge. The authors looked at eight common rehab activities and evaluated the force generated by the gastroc and soleus by comparing the EMG activity during the exercise to that of the peak maximal voluntary isometric torque produced during a plantarflexion isometric. The chart below shows the EMG activity for each exercise.

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Exercise Activity	EMG Activity (% MVIC)
Seated heel raise	11%
Single leg balance on wobble board	25%
Prone ankle pumps	38%
Red theraband resisted plantarflexion	45%
Walking	47%
Lateral step up	60%
Standing single leg heel raise	112%
Single leg jump	129%



This information should guide the clinician in a rationale to introduce a gradual stress to the plantarflexors during post-operative management of Achilles tendon disorders. If you'd like more information on how to manage Achilles Tendinopathies we have a TPTA approved home study that should shed light on the current concepts regarding the appropriate rehabilitative management of this common overuse injury. This inservice can be read and/or viewed free of charge. A post-test for CEU credit is available at <http://www.continuing-ed.cc/homestudy.htm> for a reasonable fee.

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