

SCIENTIFIC

PHYSICAL THERAPY

Patient with right wrist pain and stiffness following fracture

CASE STUDY

By Sam Betts, P.T.

HISTORY:

The patient is an otherwise healthy 34 year old male carpenter who complains of pain across the dorsum of the right wrist and hand. The pain is described as “burning” in nature and is reproduced only with active wrist extension and relieved immediately when bringing the hand back to neutral position. The pain will linger after having had physical therapy in the same location for approximately 15 minutes. He equates this to performing repetitive wrist extension using a dumbbell.

The stiffness in his wrist was apparent after having had his above elbow cast removed 3 weeks ago, following distal radius fracture; however, the pain has only been apparent in the last two weeks since starting physical therapy. He equates this pain as coming from “having to use the hand.” He injured himself at work on 10/26/97 falling from a ladder about 14 feet on to his wrist in an extended position. He fractured the distal radius and the surgeon fixated the radius using two pins, one through the distal aspect of the shaft of the 2nd metacarpal and the second through the proximal radius, 2 cm distal to the radial head. After 7 ½ weeks with the pins, the surgeon decided to fixate further using a heavy plaster of Paris cast, moulded around the pins, above the elbow joint. At his last doctor appointment, he was given prescriptions for carbomezapine and indomethacin for a suspected reflex sympathetic dystrophy.

He is currently not working due to his problem and is concerned with his prolonged period of disability, as he is married with a wife and two children to support.

In this issue:

Patient with right wrist pain and stiffness

Sam Betts, P.T.

Is increased quadriceps strength beneficial or detrimental in the progression of osteoarthritis of the knee?

Didrik J Sopler, Ph.D., L.Ac.

Chief Complaint:

Stiffness, with pain when using the wrist and hand.

OBSERVATION

Upon initial introduction he greeted the therapist with a firm handshake with no pain behaviors. He undressed to his shorts with no limitation apparent, nor pain behaviors. He has full motion of the shoulder girdle with Apley's scratch test and reverse scratch. He is able to make a full fist, able to pinch, lateral pinch of the fingers without pain. He has decreased opposition of the thumb without pain.

INSPECTION

On gross inspection there is a slight increase of elbow flexion to the right elbow, the forearm is slightly pronated. Local inspection reveals mild diffuse swelling with loss of dorsal and palmar wrist creases. There is a slight purple color to both dorsal and palmar wrist and hand with mottling of the palmar skin. There is good hydration to the skin of the palm. A well-healed pink incision mark is apparent in the pin locations described in the subjective portion. No abnormality in size, shape or texture is noted in the scar.

FUNCTION

Motion Testing

Active wrist extension is painful in the inner range across the wrist joint dorsally, described as a deep ache.

Motion is limited. Passive wrist extension reproduces the same pain as active. Wrist flexion, both actively and passively, does not provoke symptoms, with mild motion loss noted. Radial deviation is limited, with no symptoms passively nor actively as is ulnar deviation. No difference noted in symptoms in both flexed and extended positions of the elbow.

Extension of the MCP joints reproduces the burning pain across the dorsum of the hand actively but not passively. Thumb movement is restricted in extension, with no pain noted actively and passively. All motions were tested with elbow flexed and extended, with no difference noted in symptoms. A mild decrease in flexion and ulnar deviation of an extended elbow noted.

Resisted Testing

Pain is provoked across the dorsum of the wrist joint with resisted wrist extension in the inner range of tension, again described as a deep ache. Burning pain was reproduced with resistance to extension of the PIP joints in both neutral, inner and outer ranges of tension, worse with outer range testing.

Palpation

The right hand is slightly warmer than the left. Both hands are slightly sweaty with equal hydrosis noted.

Kneibler's test is positive for skin rolling over the dorsum of the hand and wrist. Tenderness is noted over the 4th and 5th extensor tunnels and with burning described to palpate the 4th tunnel tendons. There is decreased tone to palpation to the wrist flexors and extensors in the forearm. Extensor digitorum communis is in spasm. Tenderness is noted to the 4th and 5th dorsal interossei. Tightness in the palmar plates is noted.

Neurology

Light touch and pinprick is equal bilaterally. A slight increase in the C7 reflex is noted. There is mild weakness of the C5 dermatome (deltoid) and the C7 dermatome (triceps). A slight weakness to wrist extension is noted (C6), grade 4+/5.

Special Testing

Allen's tests of the radial and ulnar arteries are negative. Modified Allen's testing of the digital arteries are negative. A positive Bunnel-Littler test of the long finger is noted. Froment's sign is negative. Compression and distraction of the wrist is negative. Tightness of interossei is noted.

Specific Mobility Testing

Grade I dorsal glides of proximal carpals on radius is noted. Triquetrum on ulna,

scaphoid on radius and lunate on radius was noted specifically. Grade 2 motion is noted in the volar direction of the same articulations. Grade 2 ulnar glide of proximal row on radius and distal row on proximal row was evident. Grade 2 ulnar glide of the same articulations was also noted. Grade 2 joint play between the intermetacarpal joints was noted. Grade 2 glide into extension/abduction/flexion and adduction of the trapezium on the 1 metacarpal was noted. Grade 2 glide dorsally and volarly of the MCP joints was evident.

Assessment/Correlation

The medical diagnosis was given of an early reflex sympathetic dystrophy of the wrist and hand following immobilization after traumatic wrist fracture. X-rays did show a well healed distal radius fracture in good alignment.

The primary tissue in lesion was concluded to be the extensor digitorum communis following thorough evaluation of all tissues of the wrist, hand and forearm. It was thought that hyperactivity of the sympathetics would cause dehydration of the skin rather than the sweating found on palpation. Also the pain was provokable in an anatomical location and a clinical correlation was able to be

made to a specific tissue in lesion. Therefore, it was felt that a RSD could be ruled out.

The secondary tissue in lesion was found to be arthrogenic in nature of the wrist joint, with pain into extension actively, passively and with resistance of extension in the inner range, close-packing the joint.

DISCUSSION

It was felt that as the wrist joint had many hypomobile articulations that the individual carpal bones would be moving around a non-physiological axis, due to a loss of translatory glide, as described under "specific mobility testing." This was felt to be the primary cause of the tendonitis. The mechanism proposed for involvement of the tendon is that the patient is contracting the extensor tendon in a position of a position of length/tension not optimal to create maximal torque as depicted by a stress / strain curve. This states that a muscle is able to produce the most tension when contracting at 20% from resting length, as the patient has a grade 1 hypomobility of the wrist joint in dorsal glide, or restricted extension, effort towards inner range to assist in gaining wrist extension, where there should be less tension in the muscle. This would create microtrauma in the tendon due to their inability of the muscletendinous unit to sustain this activity repeatedly. This causes a cascade of

inflammatory events within the tendon sheath and tendon, leading to the clinical presentation of a tendonitis. The cause of the pain is beyond the scope of this case study.

What Is More Effective, Physical Therapy Or Steroid Injection?

by Didrik J. Sople, Ph.D., L.Ac.

A study in England compared physical therapy treatments with steroid injections for shoulder pain.¹ The participants were 207 adults with shoulder pain. They were randomly divided into either a group which got steroid injections or a group which received physical therapy.

After 6 weeks, the mean improvements in disability scores were 2.56-5.4 for the physical therapy group and 3.03-6.3 for the steroid injection group. These patients were also followed up after 6 months and their scores were at that time 5.97-5.4 for the physical

therapy group and 4.55-5.9 for the injection group.

A successful outcome was defined as at least a 50% drop in the disability score from baseline. 59 patients (60% out of 99 in the physical therapy group and 51 patients (53%) out of 97 patients in the injection group had a successful outcome after 6 months.

The author stated physical therapy and local steroid injections were similar in effectiveness for the treatment of unilateral shoulder pain. They also stated that the patient in the physical therapy group had fewer co-interventions which reduced their workload with no

change in overall patient outcome. The reasons for why these patients had a lower reconsultation rate during the follow-up were not known.

If we look at the percentage of patients with a successful outcome after 6 months, physical therapy came out a little bit better than steroid injection, 60% versus 53%. Physical therapy would certainly have a lower risk for side effects compared to steroid injections.

References:

1. Hay, E.M. et al. A pragmatic randomized controlled trial of local corticosteroid injection and physiotherapy for the treatment of new episodes of unilateral shoulder pain in primary care. *Ann Rheum Dis.* 2003; 62: 394-399

Any Proof That Exercise Is Effective For Chronic Neck Pain?

by
Didrik J. Sople, Ph.D.,L.Ac.

Effects of two different exercise approaches for chronic pain were recently studied in Finland. The trial was published in May this year in JAMA.¹ It included 180 female office workers with nonspecific chronic neck pain for a duration of more than 6 months. The participants were between 25 and 53 years of age and were motivated for rehabilitation.

They were divided in three equal groups, 60 women in each group. All the groups were asked to do home aerobic exercises and stretching three times per week. Participants in one group were assigned to endurance training consisting of dynamic neck exercises, which included lifting the head up from supine and prone positions. The other exercise group was assigned to high-intensity isometric neck strengthening and stabilization exercises with an elastic band. The third group was used as a control group. Both of the exercise groups performed dynamic exercises for the shoulder and upper extremities with dumbbells.

Pain and disability were assessed by a visual analog scale, the shoulder pain and disability index and the Vernon neck disability index. Mood was assessed by a short depression inventory and maximal isometric strength and range of motion were measured.

At follow-up 12 months later, they found that neck pain and disability were significantly less in both of the training groups, when compared with the control group. Range of motion in rotation was also significantly better in both of the training groups. Flexion, extension and side-bending had however only improved significantly in the strength training group.

The improvement in isometric strength for the strength training group was 110% in flexion, 76% in rotation and 69% in extension. The endurance training group improved 25% in flexion, 29% in rotation and 16% in extension compared with the control group which improved 10% in flexion, 10% in rotation and 7% in extension. It would have been interesting to have more detailed information on how the different exercises were performed, especially for the strength training group. Information regarding repetitions and resistance as

well as frequency, time for recovery, would be helpful to know.

In this study, all of the groups participated in some form of physical activity and all groups made some improvements. This indicates that some form of physical activity is better than nothing, which is really no surprise, as long as the activity does not stress the involved tissue too much causing aggravation of pain and injury.

It is no surprise that isometric strength improved the most in the strength training group since this group trained isometric strength specifically. The strength training group improved more in mobility as well, which may also make sense if there had been more information provided regarding the specifics of the exercises.

The approach to exercise outlined in Scientific Therapeutic Exercise Progression (S.T.E.P.) should be excellent for treating the type of the problems this article relates to.

References:

1. Ylinen, J. et al. Active neck muscle training in the treatment of chronic neck pain in women. A randomized controlled trial JAMA. 2003; 289: 2509-2516

A Pioneer has passed away. - In memory of Erik Hansen

I first met Erik Hansen at manual therapy courses in Scandinavia in 1970. As an instructor he made a positive and deep impression on my young physical therapy mind. He displayed an attitude and a compassion for the profession that has influenced my work ever since.

When James Cyriax's approach reached Norway in 1954, Erik became a member of the first study group. His concern for the profession, his outgoing personality and personable manner made him an outstanding clinician and instructor. He was an admired member of the national Board of Examiners in manual therapy, and as a private practitioner he offered clinical supervision to numerous residents in the national manual therapy certification program.

For numerous years he served as chair or executive member of the Norwegian Physical Therapy Association's Section for Manual Therapy as well as of the Nordic Group of Specialists in Manual Therapy, which also made him an honorary member for his contributions. He was the first Chairman at the Nordic Forum for Scandinavian special interest groups in manual therapy, and served as a Vice President for the Board of Directors at the Norwegian Physical Therapy Association

This man's ability to evaluate and define problems, as well as create diplomatic solutions made him a central person in debates. Erik was admired by his supporters for both his high level of integrity as well as his ability to receive negative criticism from his opponents. The respect he gained was well deserved and made him an extremely successful negotiator representing our national association concerning reimbursements from the governmental insurance company in Norway.

Erik's services to the Norwegian Physical Therapy Association also included membership in several taskforces, which were established to structure continuing education and postgraduate programs in special interest groups within the association. He was also an appointed member of the Governmental Social Department's Commission for evaluation of authorization of chiropractors in Norway. In 1974 Erik was the official representative of the Norwegian Physical Therapy Association in Montreal, Canada at the foundation of the International Federation of Orthopedic Manipulative Therapists. (IFOMT)

In March 2002, he received an honorary doctoral degree for his outstanding contributions to the profession. Although Erik Hansen is not with us today, his spirit will live on. His dedication and compassion for his profession has influenced physical therapists and patients alike, and will continue to do so for many generations. We are deeply grateful for all that you gave, and will always honor what you left behind.

In appreciation.
Ola Grimsby

Congratulations to Dr. Sayson!

Most of us know Dr. Sayson as Jo Jo, a hard working, competent manual therapist with a good sense of humor.

Not long ago the Illinois Secretary of State, Jesse White, presented Jo Jo with a prestigious award as an “Outstanding Filipino American”. The beautiful plaque was for “Professional Achievement-Orthopedic Manual Therapy”. Jo Jo is the first Filipino American Doctor of Manual Therapy.

There is however more to Jo Jo’s life than being an outstanding professional. Some of us also know him as “Superman”. This came about in 1996, when he, together with some friends, established the “Super Heroes Club” for the purpose of bringing joy and hope to the lives of sick and abused children. Jo Jo is a family oriented man. His widowed mother lives with him, his wife and their young children.

Of the recent award, Jo Jo’s reaction was that it was a humbling experience. “Personally you don’t feel you’re doing that much”. We at Scientific Physical Therapy think the award was well deserved.

Congradulations!

New Research On Tennis Elbow

At the 29th annual meeting of the American Orthopedic Society for Sports Medicine held in San Diego, some interesting research on the use of nitric oxide was presented.

The study was done on 86 patients with extensor tendinosus of the elbow. All of the subjects participated in home based tendon rehabilitation exercises. Half of the subjects received nitric oxide patches continuously and the other half received placebo patches.

The subjects with the nitric oxide patches had reduced elbow pain with activity at two weeks and felt better than the placebo group. The treatment group also experienced reduced epicondylar tenderness at 6 and 12 weeks. After 24 weeks, the treatment group showed increased wrist extensor mean peak force and total work. When they were in follow-up 6 months later, 81% of the subjects receiving the nitric oxide patches were pain-free in activities of daily living compared with 60% of the subjects in the placebo group. Currently however, there is no product like the one used in this study available on the market.

Looking for direction?

The Ola Grimsby Institute can show you the way!

- Earn your DPT in one year.
- Boost your skill level through our ongoing continuing education courses.
- Advance your career in manual physical therapy.
- Attend the best physical therapy postgraduate school with the lowest per credit tuition fees.

Find it at the Ola Grimsby Institute

"I graduated from part I (the DPT program) in 1995," writes an OGI graduate. "Partly due to my OGI education, I now own my own practice, which is doing very well. Thank you!"

The Ola Grimsby Institute
4420 Hotel Circle Court . Ste 210 . San Diego, CA 92108

Choose from part time residency & independent study programs.
Visit our web site to learn about tuition discounts: OlaGrimsby.com/Ad.
Call us toll free: 800.646.6128. Reserve your space today!

To sign up for classes, please download our [Registration Form](#) (requires [Adobe Acrobat Reader](#)). To apply for our degree or certificate programs, please download our [Application Form](#). Please fax your completed registration form to (619) 298-4225 or mail it to The Ola Grimsby Institute, 4420 Hotel Circle Court, Ste. 210, San Diego, CA 92108.

Please visit our [Continuing Education](#) section for course descriptions; visit our [Degrees](#) section for more information about our degree programs. Thank you for your interest in Ola Grimsby Institute. We look forward to helping you further your career in manual physical therapy!

**If you, by making a simple recommendation,
could improve treatment outcome,
would you be interested?**

The website www.tissuerecovery.com was set up to make it easy for your patients to get access to nutritional information and supplements supporting the treatment you do.

E-books with just the important facts, quick and easy to read, can be downloaded immediately. We can also print and mail these books to people who prefer that.

The e-books based on the latest research and sound physiology, are:

Facts You Need to Know About Carbohydrates, but No One Told You

Facts You Need to Know About Fat, but No One Told You

Facts You Need to Know About Protein, but No One Told You

We also have a **new anti-inflammatory formula**, giving quick and effective pain relief, without the side effects of anti-inflammatory drugs.

As a physical therapist we have a special offer for you. Give us a call at 1-800-883-1252 or 1-619-299-8346 and we will explain it to you. You will not find this offer on the website.

Your patients are of course also welcome to call us if they are more comfortable with the phone than the computer.

The easiest way to incorporate nutrition is for patients to start taking the BMJ Formula. The BMJ supplies specific nutrients in an easy absorbable form targeted to support bone and joint cartilage as well as other connective tissue.



Log on to www.tissuerecovery.com and read what some of the latest research reveals about inflammation. Check out our website and call us at 1-800-883-1252 or 619-299-8346

Review Of Research

Is increased quadriceps strength beneficial or detrimental in the progression of osteoarthritis of the knee?

by Didrik J. Soplér, Ph.D., L.Ac.

Sharma, et al, published a study this year in the journal *Annals of Internal Medicine* with the objective of determining if greater quadriceps strength is associated with greater risk for tibiofemoral osteoarthritis progression.¹ They measured quadriceps strength at baseline for both knees with a computer-driven isokinetic dynamometer. Of the 237 individuals, 230 completed the 18 month evaluation.

All participants were diagnosed with primary knee osteoarthritis and had definite tibiofemoral osteophytes and at least some difficulty with knee requiring activities. Knee radiographs were taken at baseline and at 18 months, assessing joint space narrowing.

Alignment was measured by a single anteroposterior radiograph of both knees. Varus-valgus laxity was also measured with a reliable device.

What did they find?

They found and concluded that there was an increased likelihood of tibiofemoral

osteoarthritis progression in malaligned knees and lax knees with greater quadriceps strength at baseline. Strength was not associated with either, increased or decreased likelihood of progression in knees with low laxity and more neutral alignment. Patellofemoral progression did not differ either between high and low strength knees.

This can be interpreted as evidence that exercise is not beneficial in patients who have osteoarthritis, especially if the exercise results in increased strength in muscles which can cause compression of a joint with degeneration. This study however has some limitations and we need to be cautious with the interpretation. The study only measured strength at baseline and not at the follow-up at 18 months later. It did not mention what kind of activities these people participated in, which might have resulted in greater quadriceps strength. Strength does not necessarily hurt anyone; it is some of the activities that may lead to an increase in strength that could be damaging to a degenerative joint. Almost any exercise of a muscle will lead to some strength increase

compared to very little activity at all, even if the goal of exercising was not specifically to build strength. The author of this article states that it is unclear what constitutes high versus low quadriceps strength in persons with established mild to moderate knee osteoarthritis. For that reason, they applied the sample median in their study. It may very well be possible to increase quadriceps strength without having a damaging effect on the joint.

Both, the type of exercise and in what range of motion it is performed, as well as resistance and repetitions are important factors. Other factors are recovery time, and the type of medication these individuals may have taken.

This study does not mention anything about medications the participant may have been taking. Some medications, in themselves, may be destructive to the connective tissue when taken long term. They could also inhibit pain so a patient with osteoarthritis may perform activities that are destructive because the medication masks the pain.

In an editorial to the article by Sharma, et al, Brandt is addressing some of the limitations of this study.² He said based on other studies, periarticular muscle weakness may be a risk factor for, as well as the consequence of, knee osteoarthritis. He comments on that quadriceps strength was only assessed at baseline and therefore it is not clear that the greater quadriceps strength caused radiographic progression of osteoarthritis. He goes on to say that patients with the greatest strength at baseline may instead have lost strength during the follow-up. This could perhaps be as a result of reduced loading of the arthritic extremity. An unrecognized loss of strength rather than greater strength at baseline may therefore have contributed to the progression of damage. Brandt also mentions the lack of information regarding symptoms like pain and also function. He says it is unclear how the presence of knee pain affected the results of strength testing. He questions if the patients with the greatest quadriceps strength had the least amount of knee pain during testing. Did these patients use fewer analgesics, psychotropic drugs and muscle relaxants which could have affected the results of strength testing?

Late 1999, Brandt and colleagues published a study where they looked at quadriceps strength in 79 elderly women with osteoarthritis of the knees.³ Their objective was to explore the relationship between lower extremity weakness and the progression of established radiographic changes of knee osteoarthritis. A radiographic baseline was established at the beginning of the study and follow-up radiographs were graded 2.5 years later. Knee pain was also evaluated. The strength of the knee extensors and flexors were measured by isokinetic dynamometry. Lower extremity muscle mass was measured by dual energy x-ray absorptiometry. They found that the knee exterior strength of the women with progressive osteoarthritis was about 9% lower than those with stable radiographic changes. This was before and after adjustment for lower extremity muscle mass. The difference was however not statistically significant. There was no difference in hamstring flexor strength between the two groups. The lower quadriceps strength among the women with progressive osteoarthritis did not seem to be attributable to knee pain. The researchers concluded that they previously had shown that quadriceps weakness may be of etiological importance in development of osteoarthritis of the knee. They also stated that since this study did not find any significant

difference between quadriceps strength in subjects with radiographically stable osteoarthritis versus those with progressive osteoarthritis, it was suggested that it was other factors more important than quadriceps weakness determining the progression of osteoarthritis.

Are there any clinical insights to be drawn from these three articles?

It is clearly more than quadriceps strength which is important when treating patients with osteoarthritis. Strength per se is probably not an important factor; it seems to be more important to put the patient on an exercise program to stimulate proprioception as well as stressing the joint enough to stimulate cartilage regeneration, at least to help slow down the degenerative process. Since Sharma, et al, found that it was an increased likelihood of osteoarthritis progression in malaligned and lax knees, it would be helpful if proprioception could be improved. That should at least theoretically help to improve the function of the joint.

It would be nice to see a well designed study which evaluated the effects of different types of exercises as well as comparing different grades of resistance and repetitions for osteoarthritis.

References

1. Sharma L., et al. Quadriceps strength and osteoarthritis progression in malaligned and lax knees. Ann Intern Med., 2003; 138 (8): 613-19.
2. Brandt K.D., et al. Is a strong quadriceps muscle bad for a patient with knee osteoarthritis? Ann Intern Med. 2003; 138 (8): 678-79.
3. Brandt K.D. et al. Quadriceps strength in women with radiographically progressive osteoarthritis of the knee and those with stable radiographic changes. T. Rheumatol 1999; 26 (11) 2431-7

Advertise here with SPT

- Do you own new or gently-used equipment you would like to sell?
- Do you provide a service physical therapists and orthopedic professionals need?
- Would you like to advertise to professionals like yourself?

If you answered yes to any of these questions, call us! We have reasonable prices and advertising for 1/4 page, 1/2 page and full page.

Scientific Physical Therapy
4420 Hotel Circle Court Suite 210
San Diego, CA 92108-3423
Phone: [800] 883-1252
E-mail: scientificpt@sbcglobal.net

Scientific Physical Therapy

a peer-reviewed publication on the internet

Editorial Board

- Ola Grimsby, PT, MNFF, MNSMT, FAAOMPT
- Scott Olsen, PT, MOMT, FAAOMPT
- Bill Hinson, PT, MOMT, FAAOMPT
- Rick Hobusch, PT, MOMT, MNSMT
- Brad Jordan, PT, MOMT, MNSMT
- Brian Power, PT, MOMT, FAAOMPT
- Jim Rivard, PT, MOMT, OCS, FAAOMPT

Editor

Didrik Soplér, PhD, LAc

- Scientific Physical Therapy is a peer reviewed journal published on the internet four times yearly
- Please visit our web site: www.scientificphysicaltherapy.com

For a free subscription, contact us at scientificpt@sbcglobal.net

Scientific Physical Therapy
4420 Hotel Circle Court Suite 210
San Diego, CA 92108-3423 USA

Material to be considered for publication can be submitted as articles, case studies, research reviews or clinical pearls related to the practice of manual therapy. The material can be e-mailed to scientificpt@sbcglobal.net or mailed on a PC formatted disk or cd to Scientific Physical Therapy 4420 Hotel Circle Court Suite 210 San Diego, CA 92108-3423 USA