Fingerprints

June 2021

HAND THERAPY NEW ZEALAND
Ringaromi Aotearoa

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Editors’ Note

Kia Ora Colleagues,

We are back with another edition of fingerprints. In this edition, we shine the spotlight on our occupational therapists colleagues. The latest issue of the occupational therapy newsletter OTInsight had a hand therapy focus. Selected articles will be showcased in this and coming editions. We would like to remind our colleagues of the Hand Therapy Conference in Dunedin, September 2021. See you there!!!

Last and certainly not least, we would like to beseech you, our readers, to utilise this platform. It is with your help that we can further improve upon the content in subsequent editions. The success of the newsletter is tied to the contributions of the hand therapy community. Nico and myself would be delighted to hear from you and to showcase articles, splinting and clinical pearls which will enrichen the discourse. We can be contacted at fingerprints@handtherapy.org.nz.

What about radial tunnel syndrome?

Radial tunnel syndrome: definition, distinction and treatments.

Bo Tang, J. (2020)

Level of Evidence: 5

Follow recommendation: 👍

Type of study: Diagnostic, Therapeutic

Topic: Posterior interosseous nerve entrapment - Radial tunnel syndrome vs PIN syndrome

This is a narrative review on radial tunnel syndrome (RTS) and posterior interosseous nerve syndrome (PINS). These two presentations are both entrapment neuropathies of the posterior interosseous nerve, however, RTS is a mild entrapment neuropathy while PIN is a severe entrapment neuropathy (similar to mild vs severe carpal tunnel syndrome). The clinical presentations of RTS and PINS are different. RTS presents with pain in the lateral aspect of forearm 4-5 cm distal from the lateral epicondyle. PINS presents with no pain but with palsy of the wrist, finger, and thumb extensors, except for extensor carpi radialis longus. Clients with PINS will therefore present with painless weak wrist extension associated with radial deviation. Investigations for people with RTS or PINS may include x-rays and US, which will be able to exclude the presence of radiocapitellar joint osteoarthritis or space invading lesions which may be responsible for the entrapment. The differential diagnosis includes lateral epicondylalgia, cervical radiculopathy, high radial nerve palsy (e.g. Saturday night palsy), and extensive tendon ruptures of the extensors compartment. If a diagnosis of RTS is made, conservative treatment should be trialed for at least 6 months before surgery is considered. Overall, entrapment of the posterior interosseous nerve, especially severe entrapment, appears to be rare compared to median and ulnar nerve entrapment neuropathies (e.g. carpal tunnel syndrome, cubital tunnel syndrome).

Clinical Take Home Message: A mild (RTS) or severe (PINS) entrapment neuropathy of the posterior interosseous nerve is rare. A mild entrapment neuropathy (RTS) usually presents with pain 4-5 cm distal to the lateral epicondyle. A severe entrapment neuropathy (PINS) presents with no forearm pain but significant motor weakness of the extensors compartment of the forearm. The key characteristic discriminating PINS from a higher nerve palsy (e.g. Saturday night palsy) or cervical radiculopathy with motor impairments, is that PINS will present with weak wrist extension associated with radial deviation (ECRL is intact). In addition, cervical radiculopathies present with neck pain in 80% of cases and often present with pain above the elbow. When differentiating between RTS and lateral epicondylalgia, the location of pain is the most useful indicator, with lateral epicondylalgia presenting with more proximal symptoms.

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Available through EBSCO Health Databases for PNZ members.

Abstract

Radial tunnel syndrome (RTS) is a disease causing lateral elbow and proximal dorsolateral forearm pain that may radiate to the wrist and dorsum of the fingers without obvious extensor muscle weakness. An epidemiological study shows an incidence of nine new cases of radial neuropathy per 100,000 population for men and six per 100,000 for women in a 10-year period (Hulkkonen et al., 2020). These incidences are far less than entrapments of the median and ulnar nerves. There are ambiguous descriptions of RTS in relation to posterior

interosseous nerve (PIN) compression. This article intends to discuss the anatomy of the radial tunnel and the clinical distinctions between two entities.

Poster: Counterforce brace for tennis elbow (by Nico Magni)

Counterforce brace for lateral epicondylalgia

Nico Magni

What is lateral epicondylalgia

Lateral epicondylalgia (LE) describes a condition presenting with pain at the lateral epicondyle of the elbow. This is often due to a symptomatic common extensor tendon origin tendinopathy and a counterforce brace can play a role in its management (See Figure 1).

Figure 1

Counterforce brace for lateral epicondylalgia

Note. This figure shows the placement of a counterforce brace on the proximal forearm. Adapted from *Essentials of Physical Medicine and Rehabilitation* (4th ed., p.125), by L. D. Weiss, 2019. Elsevier. Copyright © 2019 by Elsevier, Inc.

Assessment and clinical reasoning for LE:

- Lateral epicondylalgia presents with localised pain at the lateral epicondyle of the humerus, and it is often accompanied by pain with gripping (Heales et al., 2014).
- The odds of this condition affecting the dominant hand is eight times greater compared to the non dominant hand (OR: 7.65; 95%CI: 4.8 to 12.2) and females are 1.3 times more likely to present with the condition compared to males (OR: 1.3; 95%CI: 1.12 to 1.5). Current or past smoking history increases the odds of clients presenting with LE (OR: 1.5; 95%CI: 1.2 to 1.9) (Sayampanathan et al., 2020).
- Clients with LE often report a recent change in manual workload or sport activity (Cook et al., 2016). However, this condition may present insidiously (Bisset & Vicenzino, 2015).
- Objective assessment should include active and passive range of movement of wrist, forearm, and elbow (Bisset & Vicenzino, 2015). It has also been suggested that cervical, shoulder, and radial neurodynamic assessment may be useful in making a differential diagnosis (Coombes et al., 2014). Special test for LE include Cozen's test (extensor carpi radialis brevis-ECRB, extensor carpi ulnaris-ECU), Maudsley's test (Extensor digitorum communis - EDC), Mill's test (ECRB/ECU/EDC/Extensor digiti minimi - EDM), and pain-free grip strength (PFG) measured with a handheld dynamometer (Heales et al., 2020).
- The differential diagnosis for LE includes somatic referred pain from the cervical spine, cervical radiculopathy, posterior interosseous nerve syndrome, elbow instability, and common extensor tendon origin tendinopathy at the lateral epicondyle of the humerus (Bisset & Vicenzino, 2015). As mentioned previously, if LE is due to a common extensor tendinopathy, a counterforce brace can play a role in its management (Bisset & Vicenzino, 2015) (See Figure 1).
- Self reported measures of function include the patient related tennis elbow evaluation (PRTEE) questionnaire (condition-specific) and the Disability of the Arm Shoulder and Hand (DASH) questionnaire (generic upper limb functional questionnaire) (Bisset & Vicenzino, 2015).

Anatomy-Pathology-Injury

Anatomy:

- Lateral epicondylalgia is a pathology of the common extensor tendon origin at the lateral epicondyle (See Figure 2) (ECRB, ECU, EDC, EDM) (Cook et al., 2016).
- The wrist and finger extensors may act as mobilisers (i.e. finger or wrist extension), or stabilisers of the wrist during gripping activities (Caumes et al., 2019).

Pathology:

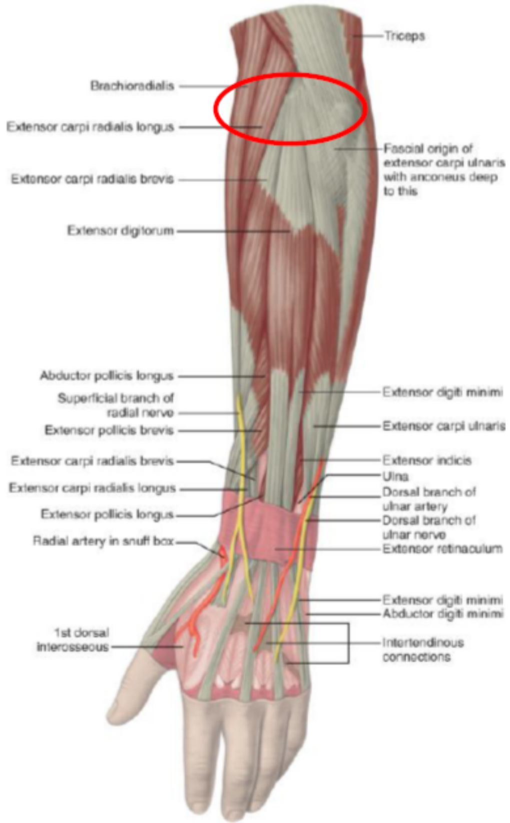
- With tendinopathy, there is an increase in tendon cross sectional area (Alakhdar Mohmara et al., 2020). The lay down of additional collagen has the purpose of improving load capacity of the tendon, and compensating for areas of the tendon that have reduced tensile capability due to disrepair (Cook et al., 2016).
- Tendinopathy is also associated with an increase in tendon vascularity (Matthews et al., 2020). Neovascularity may be due to an increased metabolic demand of tenocytes (Matthews et al., 2020). Nervi vasorum may contribute to an increase in nociceptive stimuli during the acute phase of LE (Cook et al., 2016).

Pathomechanics:

- Three main models explaining the pathomechanics of LE have been proposed. These are the microtear, tendon cell response, and inflammatory models (Cook et al., 2016).
- Microtears have been suggested to develop due to tendon overload. These microtears have been suggested to activate nociceptors (Cook et al., 2016).
- The tendon cell response model suggests that an increase in tensile loading of the tendon, beyond its capacity, increases the metabolic activity of tenocytes which leads to tendon disrepair. This would also lead to neovessels infiltration in the tendon, which may be responsible for increase in nociceptive stimuli (Cook et al., 2016).
- The inflammatory model can partially explain LE as it has been shown that in the acute phase there is an increase in inflammatory markers locally. This phase is however short lived and is unlikely to explain the ongoing pain that some patients experience (Cook et al., 2016).
- Lateral epicondylalgia may also presents with sensory and motor impairments (Heales et al., 2014). These include reduction in pain-pressure thresholds, and heat and cold pain thresholds (Heales et al., 2014). These impairments have been identified on the non affected side of participants with LE compared to participants without LE. These findings suggest that involvement of the central nervous system may play a role in the persistence of pain in a subgroup of clients with LE.

Figure 2

Common extensors tendon origin at the lateral epicondyle



Note. The figure shows the common extensor tendon origin which includes extensor carpi radialis brevis, extensor digitorum communis, extensor digiti minimi, and extensor carpi ulnaris. Adapted from *Fundamentals of Musculoskeletal Ultrasound* (3rd ed., p.170), by J. A. Jacobson, 2018. Elsevier. Copyright © 2018 by Elsevier, Inc.

Intervention and prescription

Overall treatment plan:

Bisset and Vicenzino (2015) suggest treatment stratification based on clients' level of disability. For clients with a mild to moderate disability (PRTEE<54/100), the initial treatment should consist of:
- Education and advice
- Reduction in tendon loading
- Ergonomics
- Advice on injections

If this approach does not improve the clinical presentation within six weeks, an eight week trial of exercise and general upper limb strengthening should be encouraged. For clients presenting with severe disability and chronic pain (PRTEE>54/100), a multidisciplinary approach may be required.

Figure 3

Counterforce brace for lateral epicondylalgia

Note. This figure shows the placement of a counterforce brace on the proximal forearm. Adapted from *Essentials of Physical Medicine and Rehabilitation* (4th ed., p.125), by L. D. Weiss, 2019. Elsevier. Copyright © 2019 by Elsevier, Inc.

Rationale for the Application of the counterforce splint – Controlled stress

By applying a counterforce brace, there is up to 50% reduction in common extensor tendon strain, which has the potential to reduce nociceptive messages in clients with LE (Takasaki et al., 2008).

It has also been shown that greater pressure applied through the counterforce brace is associated with greater reduction in tendon strain (Meyer et al., 2003). Resting tension provided by the counterforce brace can double during a maximum grip strength effort (Meyer et al., 2003). This is due to an increase in the forearm's muscles cross sectional area during contraction (Meyer et al., 2003).

How to assess whether the counterforce splint is appropriate

The counterforce brace should improve PFG immediately (Heales et al., 2020).

Pain-free grip is measured through a handheld dynamometer (See Figure 4) and clients are asked to stop at the first onset of pain (Bisset & Vicenzino, 2015). This test should be repeated three times at one-minute interval (Bisset & Vicenzino, 2015)

It has been shown that counterforce braces improve pain-free grip (PFG) strength compared to placebo straps or no brace (Heales et al., 2020).

Improvements on PFG are on average small (mean difference between experimental and control groups 2.5 kg; 95%CI: 0.4 to 4.5kg) but statistically significant.

Figure 4

Hand-held dynamometer

Note. From "Quantification of hand function by power grip and pinch strength force measurements in ulnar nerve lesion simulated by ulnar nerve block", N. J. Watcher, 2018, *Journal of Hand Therapy, 31*(4), p. 525. Copyright © 2017 by Elsevier, Inc.

Application of the splint

Application of the counterforce brace 5 cm distal to the lateral epicondyle (See Figure 3) has been shown to provide the greatest reduction in common extensors tendon strain compared to more distal positions (Takasaki et al., 2008).

The tension applied to the counterforce splint varies across studies. Biomechanical studies have shown its effectiveness when a tension of 2kg was applied to brace (Takasaki et al., 2008) or when a pressure of 40 mmHg was delivered to the forearm by the brace (Meyer et al., 2003).

Clients should not wear the counterforce splint as night or when at rest. This could result in a compression of the posterior or anterior interosseous nerve.

Figure 5

Wrist splint.

Note. From "The effects of below-elbow immobilization on driving performance", E. M. Jones, 2017, *Injury - International Journal of the Care of the Injured, 48*(2), p. 328. Copyright © 2017 by Injury.

Reflection

Clinically, the tension or pressure delivered by the brace is hard to quantify. Anecdotally, the counterforce brace can be applied with a tension that is comfortable and avoids pins and needles or numbness distally. In addition, the counterforce brace tension can be increased for high intensity gripping tasks and released for lighter tasks.

Splinting alternatives to the counterforce brace include wrist splinting (Heales et al., 2020) or diamond taping (George et al., 2019). The wrist splinting (see Figure 5) may help reduce loading on the tendons by reducing extreme wrist positions which increase ECRB recruitment (Caumes et al., 2019). Diamond taping may reduce symptoms by limiting full elbow extension, which has been shown to increase strain on the common extensor tendon (Takasaki et al., 2007).

Progression of controlled stress and overall treatment plan for LE :

Following the acute phase of LE, a progressive resistance training for the upper limb should be encouraged if symptoms do not resolve (Bisset & Vicenzino, 2015; Cook et al., 2016). Additional information on available treatments is reported in Table 1 below.

Table 1

Treatments and Approaches Useful in the Management of Lateral Epicondylalgia and Their Level of Evidence classified according to the Centre for Evidence-Based Medicine (CEBM) (Lehane et el., 2019)

Level of evidence	Treatments and additional factors
Level of evidence 1a-	Following the acute stage of LE, resistance training of the wrist extensors and upper limb has been shown to reduce pain, improve function and upper limb strength in clients with this condition. Heavy eccentric training of the wrist extensors has been shown to provide the greatest pain-relief compared to other resistance training modalities in LE (Chen & Baker, in press). However, eccentric training does not appear to provide greater improvements in function and strength when compared to other forms of strength training (e.g. concentric, mixed concentric and eccentric) (Chen & Baker, in press).
Level of evidence 1b	Clinician's empathy and positive attitude boost endogenous analgesia in LE (Muhsen et al., 2020).
Level of evidence 1b	Cortisone injections have been shown to present with greater recurrence compared to placebo injections in LE (Coombes et al., 2013). The number needed to harm with cortisone injections compared to placebo injections is 2.4 [95% CI: 4.3 to 1.8] at one year. This suggests that for every ten people treated with a cortisone injection there will be five who will present with a recurrence at one year, compared to two in the placebo injection group. Platelet-rich-plasma (PRP) injections provide similar pain relief when compared to placebo injections in LE (Simental-Mendía et al., 2020). Both PRP and placebo injections provided a large reduction in pain. The median change in pain is reported to be 5 points out of 10 on numerical rating scale for both interventions (Simental-Mendía et al., 2020).
Level of evidence 3b	Overweight clients appear to have a greater chance of presenting with symptomatic LE compared to clients who are not overweight, given the same tendinopathy presentation on ultrasound imaging, (Alakhdar Mohmara et al., 2020). This correlation does not suggest causation, although it is possible that improving the metabolic status of clients may lead to reduction of LE symptoms.

References

Alakhdar Mohmara, Y., Cook, J., Benítez-Martínez, J. C., McPeek, E. R., Aguilar, A. A., Olivas, E. S., & Hernandez-Sanchez, S. (2020). Influence of genetic factors in elbow tendon pathology: A case-control study. *Scientific Reports, 10*(1), 6503-6509. https://doi.org/10.1038/s41598-020-63030-7

Bisset, L. M., & Vicenzino, B. (2015). Physiotherapy management of lateral epicondylalgia. *Journal of Physiotherapy, 61*(4), 174-181. https://doi.org/10.1016/j.jphys.2015.07.015

Caumes, M., Goislard de Monsabert, B., Hauraix, H., Berton, E., & Vigouroux, L. (2019). Complex couplings between joints, muscles and performance: The role of the wrist in grasping. *Scientific Reports, 9*(1), 19357-19368. https://doi.org/10.1038/s41598-019-55443-w

Chen, Z., & Baker, N. A. (in press). Effectiveness of eccentric strengthening in the treatment of lateral elbow tendinopathy: A systematic review with meta-analysis. *Journal of Hand Therapy*. https://doi.org/10.1016/j.jht.2020.02.002

Cook, J. L., Rio, E., Purdam, C. R., & Docking, S. I. (2016). Revisiting the continuum model of tendon pathology: What is its merit in clinical practice and research? *, 50*, 1187-1191. https://doi.org/10.1136/bjsports-2015-095422

Coombes, B. K., Bisset, L., Brooks, P., Khan, A., & Vicenzino, B. (2013). Effect of corticosteroid injection, physiotherapy, or both on clinical outcomes in patients with unilateral lateral epicondylalgia: A randomized controlled trial. *The Journal of the American Medical Association, 309*(5), 461-469. https://doi.org/10.1001/jama.2013.129

Coombes, B. K., Bisset, L., & Vicenzino, B. (2014). Bilateral cervical dysfunction in patients with unilateral lateral epicondylalgia without concomitant cervical or upper limb symptoms: A cross-sectional case-control study. *Journal of Manipulative and Physiological Therapeutics, 37*(2), 79-86. https://doi.org/10.1016/j.jmpt.2013.12.005

Frontera, W. R., Silver, J. K., & Rizzo, T. D. (2019). *Essentials of physical medicine and rehabilitation: Musculoskeletal disorders, pain, and rehabilitation* (Fourth edition. ed.). Elsevier.

George, C. E., Heales, L. J., Stanton, R., Wintour, S.-A., & Kean, C. O. (2019). Sticking to the facts: A systematic review of the effects of therapeutic tape in lateral epicondylalgia. *Physical Therapy in Sport, 40*, 117-127. https://doi.org/10.1016/j.ptsp.2019.08.011

Heales, L. J., Lim, E. C. W., Hodges, P., & Vicenzino, B. (2014). Sensory and motor deficits exist on the non-injured side of patients with unilateral tendon pain and disability - implications for central nervous system involvement: A systematic review with meta-analysis. *British Journal of Sports Medicine*(19), 1400-1406. https://doi.org/10.1136/bjsports-2013-092535

Heales, L. J., McClintock, S. R., Maynard, S., Lems, C. J., Rose, J. A., Hill, C., Kean, C. O., & Obst, S. (2020). Evaluating the immediate effect of forearm and wrist orthoses on pain and function in individuals with lateral elbow tendinopathy: A systematic review. *Musculoskeletal Science and Practice, 47*, 102147-102158. https://doi.org/10.1016/j.msksp.2020.102147

Jacobson, J. A. (2018). *Fundamentals of musculoskeletal ultrasound* (3rd ed.). Elsevier.

Jones, E. M., Barrow, A. E., Skordas, N. J., Green, D. P., & Cho, M. S. (2017, Feb). The effects of below-elbow immobilization on driving performance. *Injury, 48*(2), 327-331. https://doi.org/10.1016/j.injury.2016.12.024

Lehane, E., Leahy-Warren, P., O'Riordan, C., Savage, E., Drennan, J., O'Tuathaigh, C., O'Connor, M., Corrigan, M., Burke, F., Hayes, M., Lynch, H., Sahm, L., Heffernan, E., O'Keeffe, E., Blake, C., Horgan, F., & Hegarty, J. (2019). Evidence-based practice education for healthcare professions: An expert view. *BMJ Evidence-Based Medicine, 24*(3), 103-108. https://doi.org/10.1136/bmjebm-2018-111019

Matthews, W., Ellis, R., Furness, J. W., Rathbone, E., & Hing, W. (2020). Staging achilles tendinopathy using ultrasound imaging: The development and investigation of a new ultrasound imaging criteria based on the continuum model of tendon pathology. *BMJ Open Sport & Exercise Medicine, 6*(1), 1-10. https://doi.org/10.1136/bmjsem-2019-000699

Meyer, N. J., Walter, F., Haines, B., Orton, D., & Daley, R. A. (2003). Modeled evidence of force reduction at the extensor carpi radialis brevis origin with the forearm support band. *The Journal of Hand Surgery, 28*(2), 279-287. https://doi.org/10.1053/jhsu.2003.50045

Muhsen, A., Moss, P., Gibson, W., Walker, B., Jacques, A., Schug, S., & Wright, A. (2020). The influence of a positive empathetic interaction on conditioned pain modulation and manipulation induced analgesia in people with lateral epicondylalgia. *The Clinical Journal of Pain, 36*(6), 411-419 . https://doi.org/10.1097/ajp.0000000000000822

Sayampanathan, A. A., Basha, M., & Mitra, A. K. (2020). Risk factors of lateral epicondylitis: A meta-analysis. *The Surgeon, 18*(2), 122-128. https://doi.org/10.1016/j.surge.2019.08.003

Simental-Mendía, M., Vilchez-Cavazos, F., Álvarez-Villalobos, N., Blázquez-Saldaña, J., Peña-Martínez, V., Villarreal-Villarreal, G., & Acosta-Olivo, C. (2020). Clinical efficacy of platelet-rich plasma in the treatment of lateral epicondylitis: A systematic review and meta-analysis of randomized placebo-controlled clinical trials. *Clinical Rheumatology*. https://doi.org/10.1007/s10067-020-05000-y

Takasaki, H., Aoki, M., Muraki, T., Uchiyama, E., Murakami, G., & Yamashita, T. (2007). Muscle strain on the radial wrist extensors during motion-simulating stretching exercises for lateral epicondylitis: A cadaveric study. *Journal of Shoulder and Elbow Surgery, 16*(6), 854-858. https://doi.org/10.1016/j.jse.2007.03.022

Takasaki, H., Aoki, M., Oshiro, S., Izumi, T., Hidaka, E., Fujii, M., & Tatsumi, H. (2008). Strain reduction of the extensor carpi radialis brevis tendon proximal origin following the application of a forearm support band. *Journal of Orthopaedic and Sports Physical Therapy, 38*(5), 257-261. https://doi.org/10.2519/jospt.2008.2672

Wachter, N. J., Mentzel, M., Krischak, G. D., & Gülke, J. (2018). Quantification of hand function by power grip and pinch strength force measurements in ulnar nerve lesion simulated by ulnar nerve block. *Journal of Hand Therapy, 31*(4), 524-529. https://doi.org/10.1016/j.jht.2017.05.016

Featured Article - Thumbelina - a case study (By Leigh Law)

Leigh Law is a New Zealand registered hand therapist currently working in private practice, predominantly in North Canterbury. Upon graduating as an occupational therapist in 1991 from Glasgow's Queen's College in Scotland, she worked in orthopaedics and then paediatrics. Both of these fields of practice included elements of hand therapy and orthotic fabrication. After immigrating to New Zealand in 2004 with her family, Leigh decided to focus on hand therapy and became a registered hand therapist in 2009. She has continued in this role over the last13 years.

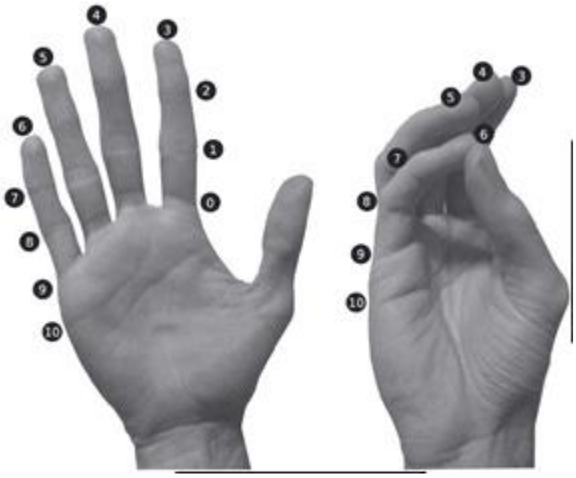
Thumbs are essential to the functional hand, particularly the ability to oppose the thumb to the fingertips. Without this pinch grasp, all those everyday tasks we take for granted become significantly impaired. Imagine trying to zip up your jacket or tie your shoelaces without an opposable thumb ... it's close to impossible. When Thumbelina (pseudonym), a 51-year-old publican from North Canterbury presented with this very problem involving her dominant, right thumb, she was eager to get function restored as soon as possible so that she could return to her active lifestyle. She was referred to Ram Chandru, a specialist hand surgeon, who noted that Thumbelina had significant wasting of the thenar muscles but no sensory loss, and he suspected a low median nerve palsy. Ram had all the necessary tests done to check his diagnosis, including an advanced technique known as magnetic resonance imaging (MRI) neurography. This technique is used to diagnose disorders of peripheral nerves beyond the spinal canal. The images showed that there was denervation (an interruption in the transmission of nerve signals) to the recurrent motor branch of the median nerve, and this was affecting the thenar muscles - abductor pollicis brevis (APB), opponens pollicis (OP) and the superficial head of the flexor pollicis brevis (FPB). These muscles make complex functional movements of the thumb possible.

Ram advised Thumbelina that this recurrent branch of the median nerve may not recover spontaneously or even after neurolysis (a surgical procedure that explores and removes any adhesions that surround the nerve tissue). He recommended an operation known as an opponensplasty (an established surgical procedure that restores thumb opposition by replacing the intrinsic muscle that can no longer carry out this movement, with another "spare" tendon or muscle). There are various options, but in Thumbelina's case, the extensor indicis (EI) tendon on the posterior side of her forearm was transferred to the APB. To ensure the best outcome, Ram also performed neurolysis and surgical release of her carpal tunnel.

Knowing a hand therapist would be crucial to Thumbelina's post-operative rehabilitation, I was invited to observe the surgery. This was a valuable opportunity to increase my understanding and knowledge of this procedure. I feel very fortunate that within my role, as a private practice hand therapist, I work alongside hand surgeons such as Ram who encourage and support development and collaboration.

Assessment

In my initial assessment, I asked Thumbelina about the functional difficulties she had been experiencing pre-surgery. Unsurprisingly, there were a lot. For instance, she had difficulty with basic activities of daily living, such as getting dressed or tying her shoe laces; difficulty with writing, which was essential to maintain her business; turning pages of a book; and even using her keys to open doors. These tasks were all an important part of Thumbelina's daily routine. We then completed a standardised questionnaire called the "Nelson Hospital Score" (Citron et al., 2007) to assess pain and weakness as well as function. This particular outcome measure was originally designed to evaluate function and pain levels of people with osteoarthritis at the base of the thumb. Although Thumbelina didn't have pain, the questionnaire did consider relevant areas, such as weakness, and rated functional limitations, which would give an excellent measure of pre- and post-operative outcomes. For example, pre-operatively, Thumbelina's Nelson Hospital Score was 54/100 (100 being fully functioning). We also took a Kapandji score. This is a tool used to assess the person’s ability to touch the tip of other fingers with the tip of their thumb on the same hand. A score of 0 indicates no opposition, while a score of 10 indicates maximal opposition. Thumbelina’s standard Kapandji score was 0/10.



Kapandji thumb opposition scores. (Kapandji, 1986)

One week post-surgery, Thumbelina was seen by Ram and me to remove all the surgical dressings and remove the plaster of Paris support that had been applied after the operation. The wounds were checked and her stitches removed. I then fitted a fibreglass thumb spica cast to hold Thumbelina's thumb in as much abduction as was comfortable and to take the load off the transferred tendon while it healed and got stronger. A thumb spica cast is an orthopaedic casting material used to immobilise the thumb and wrist while allowing the other digits freedom to move. The cast stayed on for three more weeks, making a total of four weeks immobilisation, including post-operative plaster of Paris back slab. The cast was then changed to a removable thermoplastic thumb post splint, which would leave the wrist free and allow us to move on to the next phase.

Activating the Transfer

To encourage the thumb to abduct and oppose toward the fingertips, the brain must ‘reassign’ the function of the EI, index finger extension, to thumb abduction. This would normally require Thumbelina to extend her index finger while abducting the thumb to help consolidate this action. These two muscles work synergistically and are very compatible when working together, a fact Ram had taken into consideration when choosing the most appropriate transfer. This synergistic action was evident when Thumbelina’s cast was removed, as she was immediately able to oppose her thumb to her fingertips, achieving a Kapandji score of 7/10. This was a very exciting moment, and due to the thumb and index finger overlapping in the motor cortex within a pre-existing neural network (Moriya, et al. 2016), there was no need for re-education.Thumbelina was given a home exercise programme that included lots of heat and massage, particularly to the scars, thumb range of motion (RoM), including flexion, extension and opposition, along with wrist RoM, and some fun occupations to coordinate and encourage light functional pinch. For example, jigsaw puzzles and Connect 4. Thumbelina had been very diligent about working on finger extension whilst in the cast, so she already had good movement there.

At six weeks post-operative, Ram gave the go-ahead to begin gentle strengthening of the thumb, with a view towards getting Thumbelina’s hand back to optimal function. Thumbelina was very happy to be able to carry out thumb opposition actively and with enough force to produce a functional pinch grasp. As a result, over the subsequent weeks she was describing her many occupational achievements, such as writing, pegging out the washing, tying her shoelaces – tightly – and even gardening.

Nine weeks after her surgery, I discharged Thumbelina from occupational therapy services as she had made so much progress that she was only using her splint for heavier tasks. Her final standardised outcome measures told the true story of her hard work and determination to restore her thumbs' opposition. Her Nelson Hospital Score was now 96/100 and her Kapandji Score was 9/10 (her left thumb was 10/10). This outcome was very impressive when coupled with a 23kg power grip strength in comparison to the left hand at 25kg!! It was a fabulous outcome and I know Thumbelina is extremely happy with the result. Just recently, nearly a year since surgery, she commented: “My goodness, my thumb is just perfect. I often think of all the things I couldn't do and appreciate every day that all is well again. From that you can gather that I've had no more problems at all, and I am so pleased to say that my hand writing is back to normal, and with that, everything else. As if it never happened.” As a hand therapist, I feel privileged to have been part of this collaborative team effort.

Acknowledgement

Special thanks to Thumbelina who has allowed me to share her story. She also provided me with an awesome and appropriately themed pseudonym “Thumbelina Oopseydaisy.” Thumbs up must also go to Ram Chandru, whose skill, knowledge and experience produced a superb outcome.

References

Citron, N., Hulme, C. E., & Wardle, N. (2007). A self-administered questionnaire [The Nelson Score] for basal osteoarthritis of the thumb. Journal of Hand Surgery (European Volume), 32(5), 524-8.

Kapandji, A. [1986] A clinical test of opposition and counter opposition of the thumb. Annales de Chirurgie de la Main, 5, 67-73.

Moriya, K., Yoshizu, T., & Maki, Y. (2016) Immediate thumb opposition following extensor indicis proprius opponensplasty using the wide-awake approach. Plastic Surgery Case Studies, 2(2), 27-30.

Educational opportunities

Below are a series of resources for educational purposes that the educational committee and us have identified in the last period:

Hand Rehabilitation Foundation

This Foundation holds several events every year and the next conference is coming up towards the end of March. For further information access their website.

Hand Therapy New Zealand Conference 2021

The conference theme is "Tendonitis and Tendinopathy". Lock in the dates from the 3rd to the 5th of September (Dunedin). If you want to submit an abstract, you can do so at this link.

Keeping Connected Webinars

These are webinars on a series of different topics related to Hand Therapy run by Hands On. Keep an eye on your emails as we periodically receive invitations to register to these webinars through emails from HTNZ administration.

handSPARK

HandSPARK has provided HTNZ with a free webinar on anatomy, treatment, and post-surgical guidelines for clients with thumb cmcj OA. You can access this resource at this link.

The International Federation of Societies for Hand Therapy (IFSHT)

This organisation provides some resources related to Hand Therapy and technologies applicable (e.g. apps) to hand therapy. Have a look at their resource page.

HandyEvidence

Nico's website reviews and assesses three clinically relevant scientific articles on Hand Therapy every week. In addition, it contains a database of over 190 previous synopses searchable by topic and level of evidence. It has been sponsored by HTNZ in 2021 for all the New Zealand Hand Therapists. Get the one week free subscription and Nico will grant you full access.

Consent for clients' information and images

HAND THERAPY NEW ZEALAND
Ringaromi Aotearoa

Consent form – use of clinical case information and images

I, (*patient's name:* ______________________________) consent to the use of information and images including photographs or videos from my hand therapy assessment and treatment to be used for (*mark agreement by clicking on box or print and tick*)

- ☐ Educating clinicians relevant to hand therapy
- ☐ Educating clinical students
- ☐ Service audit
- ☐ Publication in professional or scientific journal

I understand that the information and images will not have my name attached to them and will not obviously identify me in any way.

Patient Details:

Name: ______________________________ Tel: ________________

Email: ____

Signed: ____________________________ Date: Click or tap to enter a date.

Clinician Details:

Name: ______________________________ Tel: ________________

Email: ____

Organisation: ____

Hand Therapy New Zealand membership ☐Full ☐Associate Membership No. ________

Signed: ____________________________ Date: Click or tap to enter a date.

Consent form case study final 15/02/2021

You can download the original document on HTNZ webpage.