

Adapted T'ai Chi Exercises for Complex Regional Pain Syndrome 1 & a 10 year history of Chronic Neck and Shoulder pain

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Case History 2

In February 2008 a colleague referred Mary a 63-year-old female 13 weeks post left wrist fracture (distal radius and ulna styloid) with a suspected case of Complex Regional Pain Syndrome 1 (CRPS 1). Despite 5 weekly sessions of physiotherapy which included advice to use a warm hot water bottle for pain relief, exercises for the hand in warm water, a home exercise programme of passive stretches, active, resisted and functional exercises there was no improvement.

Past History

A complicating factor was that Mary also had a 10 year history of chronic neck and left sided shoulder pain. An MRI scan at the time had shown a prolapsed cervical disc and she had declined surgery. In the past she had received physiotherapy for her neck (advice, exercises and acupuncture), pain clinic referral including a pain management programme, a TENS trial and 2 spinal injections. None of these treatments had helped lessen her pain but she had 'learnt to live with it' and had been able to do all her Activities of daily living (ADL) prior to this recent wrist fracture. She was right handed and otherwise fit and well apart from suffering with a peptic ulcer. She also smoked and was taking the maximum dose of 'Paracetamol Plus' for her pain.

Assessment

Mary reported that the left wrist had been painful ever since the fracture and the visual analogue scale (VAS) pain score was 7/10. Her whole posture was very tense, she held her left arm protectively as though the left wrist was still immobilised in a cast and the hand exhibited the classic signs of CRPS 1, being swollen with a reddish discolouration. The active range of movement at the wrist was flexion 35 degrees and extension 35 – 40 degrees. Subjectively she reported symptoms consistent with sensory abnormality including numbness in the tips of her

fingers and increased temperature at the affected hand. She was concerned about a swelling over the ulna side of the wrist and her perception of why the wrist was so painful was that the fracture hadn't healed properly. She was understandably very upset because she couldn't use her left hand when her expectation was to have less pain and to be able to use the left arm again in her daily life. Referral to Occupational Therapy was discussed but Mary declined as she had a lot of family support and preferred to cope independently

Intervention

On the first visit it was explained to Mary that the most likely reason for the severe pain and lack of improvement in her hand was that she had CRPS 1. This condition along with chronic neuropathic pain was explained using the 'Explain Pain' book (Moseley & Butler 2003) and the CRPS & RSD Patient Information Booklet (The Neuroscience Research Group, Royal National Hospital for Rheumatic Diseases). A decision was made to implement a new approach based on modern pain theory and using exercises adapted from T'ai Chi. This approach had been successful in helping a previous severe case of CRPS 1 (Smith 2008) and in patients with more generalised chronic pain states. Mary was keen to try a different approach specifically because traditional physiotherapy had not helped to reduce the pain at her neck and left shoulder in the past. She was taught how to relax the affected arm and then instructed how to maintain this reduced, efficient muscle tone whilst performing a small range of active-assisted movements of the shoulder, elbow and wrist while holding a light plastic football – the adapted 'Chi football' exercise (Smith 2008). She was encouraged to exercise daily, 'little and often' below the baseline of her pain and visualisations from T'ai Chi, such as imagining her arm was 'floating through the air' or 'moving through a thick viscous liquid' were used to facilitate relaxed movement. She continued with contrast baths and kept using the hand normally during ADL as long as it was below the pain baseline.

At the second visit the following week she had seen the orthopaedic surgeon and been reassured that the fracture had completely healed. He confirmed that she had CRPS 1 and was going to refer her to the pain clinic. She explained that she "did not want to attend" the pain clinic again

because it hadn't helped her pain in the past and she "didn't want any more needles"! She explained that she was happy with both her current treatment and progress. The VAS pain score was now 5/10 and the colour of the left hand was more normal with only a slight redness remaining. The swelling had decreased in her hand and fingers and she was moving the arm more normally. She reported that her husband had told her off as he felt she was doing too much when she tried to do her ironing and then clean her windows! Stereognosis was tested with the 'feely' bag and found to be reduced therefore sensory re-education was started. The patient was advised to continue with the adapted 'Chi football' exercise and avoid heavy housework such as ironing and window cleaning for the present.

On the third visit 2 weeks later her improvement continued with a VAS scale pain score of 4/10 and Mary reported that she was able to wash and dry her dishes. It was decided to progress the exercises and encourage increased range of movement at her wrist with the 'Chi football' by using her fingers to move the ball around with the intention of progressing to active exercises at the next session. However, one week later at her next visit, Mary's pain was much worse and she had stopped her exercise programme. She had only been able to restart the adapted 'Chi football' shoulder movements one day earlier. When re-assessed the VAS pain score was 4 – 5/10, while behaviourally she displayed a return of the CRPS 1 symptoms with the left arm and hand being held protectively. It was observed that the left hand once again had a reddened discolouration. It was reasoned that Mary's exercises had been progressed too quickly. After discussing her situation the decision was made to stop pushing for an increase of range of movement at the left wrist which appeared to have triggered a return of the CRPS 1 symptoms. Instead it was agreed to concentrate on reducing pain and focussing on re-educating more normal relaxed, efficient movement with the adapted 'Chi football' exercise as previously described. Mary was reassured that once her pain and CRPS 1 symptoms were reduced, the movement in the left wrist would increase and function should return. It was observed that whilst performing this exercise Mary still did not appear to be moving in a relaxed fashion. She moved the football faster than had been demonstrated to her and did not appear to be paying any attention to her movements. T'ai Chi is

an internal martial art, which involves exercising with the mind in a calm meditative state. This meditative state is facilitated by concentrating on the internal sensations of the moving body (Kelly 2007). It was postulated that if Mary was taught how to focus on the sensations in her moving body and not pain when performing the exercises it could help her to move the affected limb in a more relaxed fashion. It might even be possible to 'switch off the pain' and facilitate remodelling of the somato-sensory cortex.

A new T'ai Chi partner work exercise called 'following' was commenced to see if this could help to achieve more relaxed movement. This was carried out with the therapist sitting directly in front of Mary holding the light plastic football. Mary was invited to place her hands gently on top of the therapists hands on the football while she 'quietened her mind down as if she was just about to go to sleep' (Kelly 2007) before following very slowly side to side movements of the football made by the therapist. Mary was encouraged to 'focus on and mirror the movement' made by the therapist's body. She was then asked to 'feel the movement in her own body', to 'notice the stretch in her side trunk muscles' (trunk side flexion) when gently moving her weight from side to side. Whenever, the therapist felt Mary tense up or her muscle tone increase, the movement was stopped and Mary was asked to 'relax' and 'let go'. The movement was changed so that the ball was moved forward and back (trunk flexion/extension) and then in small circles (adding in trunk rotation) all the time asking Mary to relax and concentrate on the internal sensations of her moving body. Next the Mary was invited to lead the exercise moving the adapted 'Chi football' whilst the therapist followed Mary's movement.

The 'following' exercise was aimed at teaching Mary how to focus internally, distract her mind from the pain, move slowly, and relax. It also mobilised her trunk so that she could move her whole body in a more normal efficient manner. Mary really enjoyed doing the 'following' exercise which she felt was very calming and did not increase her baseline pain. At this same visit the therapist also asked her to see if she could use mental imagery to shut off the pain. The therapist had learnt these techniques from the late Brian Cookman, former chairman of the T'ai Chi and Chi Kung Forum for Health, who was the first T'ai Chi teacher to work in an NHS pain clinic at the

Kent and Canterbury Hospital. These techniques had been used previously with patients experiencing chronic pain and were found to be helpful. Mary was encouraged to practice one of the following visualisations and to imagine:

1. Sending light, warmth and awareness to help heal the wrist.
2. Lying on a beach or in a pleasant garden (whichever she preferred) and to feel the warmth of the sun healing the wrist and dissolving the pain away!
3. The pain as an 'ice cube' and to send light, warmth and awareness to melt the ice into water. When the ice had been melted into water keep sending the light etc until the water had evaporated into steam...evaporating the pain away!

On her next visit, she reported that she'd had a much better week, the VAS pain scale was 4/10, after completing 6 sessions of exercises each day. She had been greatly encouraged by her granddaughter with whom she practiced the 'following' exercise. She had also started wearing a tubigrip stockingette over the wrist and hand which she felt was helping.

Two weeks later Mary was continuing to improve but noted that when she made pastry the pain in her left hand increased and the VAS pain score was again 5/10. She was subsequently asked to squeeze a comic relief 'red nose' which was the softest sponge ball available but was unable to compress it at all without severe pain. It was explained that this was a resisted exercise and the same squeezing action was used in making pastry. It was suggested that she used a multi-practic food processor or perhaps avoid making pastry until she could manage to squeeze the 'red nose' without pain! It then emerged that she was dusting with the sound right hand and lifting heavy objects such as vases with her affected hand. It was explained that lifting was also a resisted exercise and a suggestion was made that it might be better to dust with her affected hand and lift objects with the unaffected arm. After some further discussion about which ADL tasks involved resisted movements and could be avoided for the present, she had no more flare-ups and continued to slowly and steadily improve. At this visit the therapist decided to progress Mary to active exercises involving the whole arm. Mary was very anxious about doing any active lifting using her left shoulder and she reminded the therapist that she had had constant neck and left

shoulder pain for 10 years and was apprehensive about exacerbating this. Mary was reassured that the adapted T'ai Chi exercises would be performed below the baseline of her pain and should not make her pain worse, if anything they might even help. If Mary was not happy with any of the exercises she did not have to do them. Firstly, Mary was taught how to do the imaginary Chi ball (Smith 2008) which had previously been done without increasing her pain. She was also commenced on a home programme using some of the adapted T'ai Chi exercises (also known as 'Chi Kung') called 'Shibashi'. This set of 18 exercises said to enhance health and longevity were developed in China in the early 1980's by Dr Chan a traditional Chinese medical practitioner and modified by Gary Khor (Khor,1993). Mary was taught the first exercise known as 'Raising the arms', a movement likened to putting a towel on the beach. It involves imagining that the arms are floating up as though they are being drawn up by two balloons attached to the wrists (Khor 1993). She was able to do a very small version of 'Raising the Arms' without provoking any increase in her pain. Mary was then encouraged to continue exercising daily, 'little and often' below her pain baseline, '. As she gained confidence she was encouraged to increase the movement until her hands reached shoulder height. At her next visit she was keen to learn more 'Shibashi as she had found the exercises to be very relaxing and enjoyable.

Results

3 months into treatment Mary came to her appointment in apparent shock , eager to report that she had woken up for the first time in 10 years without any pain! This was unexpected because treatment had been focussed on her left wrist (CRPS 1) rather than her chronic neck and left shoulder pain. Although anecdotally adapted T'ai Chi exercises had been found to be very beneficial for many patients, this relatively sudden dramatic resolution of such long standing constant pain was unexpected. The surprise was so great that a colleague was invited to come and witness the event. Mary stood up and demonstrated the 'Shibashi' exercise called 'Rowing the boat' which involves moving both arms simultaneously in circles (shoulder circumduction) like the oars of a boat. She did this with beautiful, relaxed fluid motion stating she had no pain in her

neck or left shoulder. My colleague enquired how it felt to wake up and have no pain after 10 years, commenting that it must have felt very strange, to which Mary agreed.

At 3 ½ months Mary was exercising 7 – 8 times a day, left wrist VAS pain score was 1/10 in the day and 3/10 at night and she could squeeze the 'comic relief red nose' sponge ball ¼" depth without pain. She remarked how pleased she was that she had been able to fasten her bra and wash her own hair for the first time since the injury. Stereognosis was retested and the patient could now identify objects although it took longer and they still felt different. The swelling had decreased over the ulna and her fingers and hand had a normal appearance.

At 4 ½ months she could iron, peel potatoes and even give her husband a haircut and had been pain free for the previous 3 days. The pain had returned intermittently for a few days the previous week but she found that when she wore her tubigrip and regularly did her exercises that it was abolished. On examination the left hand and wrist continued to have normal colouration and there was no residual swelling. Left wrist range of motion measured 60 degrees into flexion and 65 degrees into extension, radial and ulna deviation were full and painless. She was happy to continue independently and was given an open appointment. Telephone contact was made with Mary 3 ½ months after the cessation of treatment. She reported that she was doing very well and had not experienced any further pain at her neck or left shoulder since the morning she had awoken pain free! The left wrist was still occasionally painful and became swollen when she did 'too much' housework. If this occurred she quickly resumed her exercises and the pain and symptoms settled down fairly quickly so she hadn't needed to re-attend the physiotherapy department.

Discussion

This case again illustrates the importance of enquiring about the patient's own perception of their condition, educating the patient about CRPS 1, modern pain neurobiology and empowering the patient so that they are completely involved in their treatment, thus fostering a positive attitude towards rehabilitation, which in turn can promote healing and recovery.

A complicating factor was the 10 year history of chronic neck and left shoulder pain on the same side as the CRPS 1. Mary had tried traditional physiotherapy in the past without any benefit and had spent 10 years of her life in constant pain. Would it be possible to rehabilitate the affected left wrist and hand when abnormal neurological changes had been present in the Central Nervous System (CNS) for so long?

The approach used was as described in the case study presented by Smith (2008). Using principles and exercises adapted from T'ai Chi the patient was taught how to move in a more relaxed manner below the baseline of her pain. This involved using active-assisted exercises in the form of the adapted 'Chi football' starting with a small range of movement moving from proximal to distal. Mary was encouraged to move the trunk then shoulder, elbow and wrist gradually increasing the range of pain free movement. The 'following' partner work was extremely useful in teaching Mary ways to reduce her muscle tone and promote functional movement.

It took 2 months of working below the pain baseline with the active-assisted adapted 'Chi football' exercises before Mary could progress to active exercises ('Shibashi'). Then a further two weeks before very gentle resisted work such as squeezing a soft 'comic relief red nose' sponge ball could be performed. Progressing too quickly, pushing into pain, or concentrating on wrist joint exercises in the early stages (as in traditional orthopaedic physiotherapy) worsened the CRPS 1 symptoms and delayed rehabilitation. With CRPS 1 it can take time for cortical re-organisation to occur and sometimes it is necessary 'to go slow, in order to progress faster'. The adapted T'ai Chi and Chi Kung 'Shibashi' exercises are simple repetitive functional movements which are performed without pain and exercise the body and the mind (Khor, G 1993). They employ visualisations and mental imagery such as 'imagining the limbs are floating' or 'moving through a thick viscous liquid' to encourage relaxed, flowing movements. Anecdotally the author believes this makes them ideal for re-educating normal efficient movement in CRPS 1 and chronic pain patients and may help to remodel the somato-sensory cortex.

Using meditative techniques from T'ai Chi such as quietening the mind whilst focusing on the internal sensations of the moving body (Kelly 2007) rather than pain and teaching patients how

to use 'healing' visualisations to distract the mind from pain may also retrain the somato-sensory cortex. The unexpected abolition of 10 years of neck and left shoulder pain may have occurred because remodelling of the left hand may have stimulated a similar reorganisation of the affected neck and left shoulder which is in very close proximity to the hand in the somato-sensory cortex (personal communication with Steve Robson, Editor).

It is important for a patient to have lots of support and encouragement from their family and daily practice, 'little and often' (up to 7 - 8 times a day) with lots of repetition helps to develop cortical re-organisation. The other important point is that the adapted T'ai Chi exercises were novel and completely different from anything the patient had previously experienced in traditional physiotherapy. She enjoyed the exercises and believed that they were going to help.

Conclusion

This case report indicates that Adapted Tai Chi exercises might be beneficial in the rehabilitation of patients with CRPS 1. The patient was enthusiastic and enjoyed her exercises, which were well tolerated. This study also seems to suggest that these same exercises not only helped to rehabilitate trunk and upper limb function but also facilitated the resolution of 10 years chronic neck and left shoulder pain for this woman.

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