

# Complex regional pain syndrome type one: guidelines, practice and evidence

By Anne Daly

I have had an interest in complex regional pain syndrome type one (CRPS-1) for about 15 years, since I started working in the Austin Pain Service at the Austin Hospital, a tertiary level public hospital in suburban Melbourne.

In 1998, as part of a Masters degree, I undertook a literature review and research project examining the diagnostic criteria for CRPS-1. In 2008, along with my co-author Dr Andrea Bialocerkowski, I had a systematic review on evidence-based physiotherapy and CRPS-1 accepted for publication in the *European Journal of Pain*. As part of my Doctorate in Clinical Physiotherapy, I am intending to research the use of functional outcome measurement in upper limb CRPS-1 in 2009.

In this update, I will present information on definition and diagnosis, an interdisciplinary clinical pathway for CRPS-1, clinical practice at Austin Health, and evidence for physiotherapy. I will not specifically discuss CRPS-2, which is similar to CRPS-1 but also involves nerve damage. However, many of the diagnostic and management principles are the same.

## Definition of CRPS-1

Merskey and Bogduk (1994) define CRPS-1 as: *A syndrome that usually develops after a noxious event, is not limited to the distribution of a single peripheral nerve, and is apparently disproportionate to the inciting event.*

*It is associated at some point with evidence of oedema, changes in skin blood flow, abnormal sudomotor activity in the region of the pain, or allodynia or hyperalgesia.*

## Revised diagnostic criteria

The original diagnostic criteria of 1994 (Merskey and Bogduk) were found to have high sensitivity but unacceptably low specificity. Clinically, this resulted in many cases being diagnosed with CRPS-1 when actually they didn't have CRPS-1. As clinicians, we are keen to positively diagnose all or most of the cases that we see with a particular condition and are prepared to include a few false positives. But researchers are keen to recruit only true cases of a particular condition and to avoid false positives in order to improve the homogeneity or sameness of a group of research subjects. More recent diagnostic criteria (Baron & Janig

2004; Wilson 2005) are improving the situation for both clinicians and researchers by producing two subtly different sets of diagnostic criteria (Table 1).

## Interdisciplinary Clinical Pathway (guideline)

This guideline (Stanton Hicks et al. 2002) was published by the International Association for the Study of Pain (IASP) and provided a cohesive, interdisciplinary, time contingent framework for the management of CRPS-1. The key messages in the guideline are:

- The mainstay of CRPS-1 treatment is concurrent implementation of physical

### For clinical use:

1 or more symptoms in 3 or more categories and  
1 or more signs in 2 or more categories  
sensitivity 0.85, specificity 0.60

### For research use:

1 or more symptoms from each category and  
1 or more signs from 2 or more categories  
sensitivity 0.70, specificity 0.96

1. Positive sensory abnormalities	2. Vascular abnormalities	3. Oedema and sweating abnormalities	4. Motor or trophic changes	
Spontaneous pain	Vasodilation	Swelling	Motor weakness	Nail, hair changes
Mechanical hyperalgesia	Vasoconstriction	Hyperhidrosis	Tremor	Skin atrophy
Thermal hyperalgesia	Skin temperature asymmetries	Hypohidrosis	Dystonia	Joint stiffness
Deep somatic hyperalgesia	Skin colour changes		Coordination deficits	Soft tissue changes

Table 1. Revised diagnostic criteria for CRPS-1

therapy with pain management and psychological therapies to facilitate sequential progression through the pathway

- Failure to progress will require stronger drugs, more intensive psychotherapy or the use of more aggressive pain management techniques.

On reviewing the guideline, I was immediately struck by the importance placed on physical rehabilitation and the central role of physiotherapists in the management of CRPS-1. This has shaped both my approach to treating CRPS-1 and that of my medical and psychology colleagues. We work as an interdisciplinary team, frequently crossing into each other's traditional roles, facilitating each other's treatment strategies and reinforcing the team's messages with our patients.

### Physiotherapy at Austin Health

The IASP guideline describes several time contingent stages in the rehabilitation process. I interpret these stages as follows:

#### 1. Reactivation, engage with the patient:

- Develop an effective therapeutic alliance: CRPS-1 patients often have a tough time with healthcare providers who don't understand their condition; trust will be important
- Assess patient's motivations and fears: it's not hard to develop fear avoidance when pain is so significant and uncontrollable
- Set short-term goals, make them winners: usually CRPS-1 patients have experienced a number of treatment failures which is demoralising and anxiety-provoking
- Reframe the timeline to recovery: CRPS-1 will at least double the expected recovery time and a significant number of patients will not fully recover
- Provide education and explanation: both written and verbal

#### 2. Desensitisation, get the patient feeling:

- Graded exposure to touch, temperature, pressure, movement
- Weaning of braces, splints and other support garments whenever possible
- Repeat the education and explanation

#### 3. Early mobilisation, get the patient moving:

- Oedema control through massage, exercise, immersion (hydrostatic pressure), aquatic exercise, pressure garment
- Active range of movement
- Isometric exercise
- Aquatic physiotherapy
- Gait re-education
- Graded motor imagery

- More education and more explanation
- #### 4. Progression of mobilisation, get the patient moving functionally:
- Active range of movement with gentle over pressure
  - Gait re-education and functional exercise
  - Weight bearing for upper and lower limb
  - Normalisation of posture and movement
  - Graded motor imagery
  - Even more education and explanation
- #### 5. Normalisation of function, stop the 'patient' process, return to community:
- Modification to home, car and workplace
  - Footwear and orthotics
  - Functional and work-related exercise
  - Sport and leisure: adjusting technique or activity
  - Commonwealth Rehabilitation Service for non-compensable patients.

### Secondary myofascial pain and deconditioning

Secondary pains are inevitable in CRPS-1 due to abnormal postures and movement patterns. Rarely does this indicate a 'spread' of the CRPS-1. I manage these pains concurrently with the CRPS-1 using a broad spectrum of physiotherapy tools. It is worthwhile noting that these secondary pains are usually nociceptive pains as compared to the CRPS-1 pain, which will be mainly neuropathic. These differences can result in some medications as well as some treatment techniques such as dry needling and TENS being useful for one pain but not another.

Because CRPS-1 and these secondary pains have a high likelihood of becoming persistent, I am wary of developing a dependency in my patients on passive treatments and on me. In the short to medium term, my patients will see me regularly (weekly to fortnightly). I make them aware that their longer term management will depend on them. I remain available to my patients by phone, email and occasional review over the longer term. I have found that this availability can act as a potent driver of successful self management.

### Evidence for physiotherapy

Research presents its own challenges to us as physiotherapists. We need high-quality clinical trials that adequately describe and examine our interventions, and to come up with both a statistically significant and a clinically relevant answer. I would not underestimate the difficulty of achieving this. CRPS-1 research also has its difficulties. A lack of universal and rigorous diagnostic criteria has been at the heart of these difficulties. Despite prodigious amounts of

research into the fields of physiotherapy and CRPS-1 being produced, only small slices of this research are evaluated by systematic reviewers as being scientifically rigorous enough to include in their systematic reviews.

Our systematic review (Daly & Bialocerkowski 2008) deliberately evaluated different approaches to research such as randomised controlled trials as well as case series. We felt that this may identify emerging clinical trends in CRPS-1 management as well as those with strong evidence to support their utility. We used a quality assessment tool, calculations of effect sizes as well as levels of evidence to describe the interventions. Space does not permit much discussion on the findings of our systematic review, but the paper is available online (Daly & Bialocerkowski 2008). The treatments reviewed include stress loading (Carlson & Watson 1987, 1988), TENS (Robaina et al. 1989), graded exposure in vivo (de Jong et al. 2005), sensorimotor exercise (Pleger et al. 2005), 'pain management physiotherapy' (Oerlemans et al. 2000), mirror visual feedback (McCabe et al. 2002) and graded motor imagery (Moseley 2004, 2005, 2006). Methodological quality was dependent on study type, with the randomised controlled trials being higher in quality. We found there was good to very good quality level II evidence that graded motor imagery as effective in reducing pain in adults with CRPS-1.

### Conclusions

The role of the physiotherapist in the management of CRPS-1 is a pivotal and influential one. Clinical guidelines can provide directions for treatment, but also need to be interpreted by the physiotherapist within an evidence informed framework. The evidence base for physiotherapy in the rehabilitation of CRPS-1 is growing. Physiotherapists should strongly consider incorporating graded motor imagery into their management as well as utilising a pain management approach promoting self management during the transition between acute and chronic CRPS-1.



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