

Beliefs and Clinical Practice for Complex Regional Pain Syndrome (CRPS) Managed by Physiotherapists on the South Island of New Zealand

Tracey Pons^{1*}, Edward A. Shipton¹, Roger T. Mulder²

¹Department of Anaesthesia, University of Otago, Christchurch, New Zealand

²Department of Psychological Medicine, University of Otago, Christchurch, New Zealand

Email: *tracey@paintherapy.co.nz, shiptonea@xtra.co.nz, roger.mulder@otago.ac.nz

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Abstract

On the South Island of New Zealand, Anaesthetists and other Medical Professionals, frequently refer their patients with Complex Regional Pain Syndrome (CRPS) for physiotherapy management. Beliefs about what is important for the management of patients with CRPS are lacking across all medical and allied health disciplines. Difficulties are no gold standard for diagnosis and evidence for intervention methods is moderate or can be conflicting. This paper explores what Physiotherapists believe to be important in a clinical setting for their management of CRPS, as well as documenting and evaluating their interventional methods used in everyday clinical practice across the region of the South Island of New Zealand. This has not been recorded before. Eighty-one Physiotherapists replied to questions on their usual treatment interventions for the management of CRPS, their frequency of use of these treatment interventions, and what they believed to be important in the management of pain and improvement of function. The results demonstrated that CRPS is not a common condition seen regularly by Physiotherapists; that there is a high level of variation between the physiotherapy interventions used and that Physiotherapists' beliefs regarding interventions used for pain management and functional restoration differ. Education was reported as the most frequently used intervention method. Those physiotherapists seeing CRPS patients more frequently are more likely to use evidence based intervention methods like graded motor imagery or sensory motor training.

Keywords

Physiotherapy, Anaesthetists in Pain Management, Complex Regional Pain Syndrome (CRPS), Beliefs, Management, Intervention Methods, Outcomes

1. Introduction

Complex Regional Pain Syndrome (CRPS) is a persistent pain syndrome with a low prevalence [1] [2] which exhibits abnormal sensory, motor, sudomotor, vasomotor, and/or trophic findings and shows variable progression over time [3] [4] [5] [6]. It is evaluated by anaesthetists in Pain Management or by physiotherapists. It can be argued that it is both under-diagnosed [7] and over-diagnosed [8] [9]. Early diagnosis and referral by anaesthetists in Pain Management or by other medical disciplines to physiotherapists is regarded as essential [10]. Unresolved issues remain. There is no gold standard for the management of CRPS. Contrasting interventional methods exist in the literature around improving functional ability or controlling the pain experience. Beliefs about what is important or not for the management of CRPS remain unknown.

In other domains, beliefs held by Medical Practitioners and Allied Health Professionals are shown to affect practice, for example, as follows: the pain experienced in the elderly can be minimised [11]; physiotherapists will continue to treat low back despite any evidence of improvement [12]; and beliefs about opioid medication affect prescription practice [13] [14].

Amongst physiotherapists two opposing beliefs exist regarding pain modulation or pain exposure. Pain modulation is supported by the evidence for Graded Motor Imagery (GMI) [15] [16], mirror exercise [17], Sensory-Motor Training (SMT) [18], Graded Exposure (GEXP) [19], relaxation [20], psychological techniques [21] and Transcutaneous Nerve Stimulation (TENS) [22]. Pain Exposure (PEXP) is supported by the evidence for progressive exercise loading without analgesia moving towards restoration of function [15] [23] [24]. The beliefs of Medical Practitioners or Allied Health Professionals on the management of CRPS are not documented.

2. Purpose

Beliefs about what Physiotherapists in a clinical setting regard as important for their management of CRPS, as well as their beliefs about the interventional methods used in everyday clinical practice across the region of the South Island of New Zealand were evaluated.

3. Method

There are 150 private practices and hospital outpatient departments listed across the South Island of New Zealand by the New Zealand Physiotherapy Society (PNZ). Physiotherapy staff numbers in these practices or clinics vary from solo practitioners to those with high staff numbers. Each individual practice or clinic was contacted to find out whether they accepted CRPS patients or not. Those accepting CRPS patients were asked to fill in a paper-based questionnaire about their usual physiotherapy management for CRPS, and what they believed to be important in the management of pain and for the function in these patients. Ethical approval for this study was provided by the University of Otago Ethics

committee (Reference number H13/103). Inclusion criteria were a registered Physiotherapist currently working in any setting on the South Island of New Zealand who also accepted treating CRPS patients. Exclusion criteria were a registered Physiotherapist who never saw CRPS patients.

The questionnaire given to the Physiotherapist contained four sections. The first section asked how frequently CRPS patients were treated by them. A Likert Scale containing the following information was used: never; seldom (2 - 5 times per year); occasionally (5 - 10 times a year); regularly (2 - 3 times per month); or often (more than 5 times per month. The second section asked about the precise interventions carried out and their frequency of use. A Likert scale containing the following information was used, such as: never use this; occasionally use this; often use this; or most often use this. The third section enquired about what unlisted interventions the Physiotherapist used and their frequency of use. The fourth section looked at the beliefs the Physiotherapist held about the management of CRPS. The belief choice was as follows: reducing the pain is essential to improve the function; improving the function is essential to reduce the pain; exercising and increasing pain is contra-indicated; and exercising and increasing pain is indicated.

4. Statistical Analysis

Standard descriptive statistics (Statistica 7, Microsoft Excel for windows PC) was used to compare categorical variables. Data analysis used ANOVA tests for significance between categorical variables and frequency of consultations with Physiotherapists.

5. Results

The 64 clinics and hospital outpatient departments who accepted patients with CRPS employed a total of 141 Physiotherapists. The 84 clinics and hospital outpatient departments who did not accept CRPS patients were excluded from the sample. Questionnaires were posted in self-addressed and pre-stamped envelopes (one for each Physiotherapist), or personally delivered. Eighty-one Physiotherapists answered the questionnaire and returned it either personally (n = 5) or by mail (n = 76). This provided a response rate of 57%. Participation rate in the physiotherapy intervention questionnaire is shown in **Figure 1**.

Eighty six (57.3%) of the 150 physiotherapy practices or outpatient clinics contacted never accepted any CRPS patients and were not asked to participate in the study. The 81 Physiotherapists who treated patients with CRPS came from 64 (or 43%) of the clinics and hospital outpatient departments across the South Island of New Zealand. Seven (or 4%) of the 150 clinics contacted accepted patients with CRPS declined to answer the questionnaire. Reasons given were as follows: no reason given (n = 1); about to retire (n = 1); staff shortages (n = 1); unwilling to have practice scrutinised (n = 2); too busy (n = 1); or an assessment only service (n = 1).

Sixty-three per cent of this sample of Physiotherapists on the South Island

who accepted patients with CRPS treated them infrequently (2 to 5 times annually). Twenty per cent treated 5 to 10 CRPS patients annually. Only 1% of Physiotherapists treated more than 5 CRPS patients in a month; 9% of Physiotherapists treated 2 - 3 CRPS patients each month. These data were simplified into two categories. Ninety per cent of Physiotherapists were categorised as seldom treating CRPS patients (less than 2 CRPS patients per month). Ten per cent of Physiotherapists were categorised as more frequently treating CRPS patients (more than 2 CRPS patients per month).

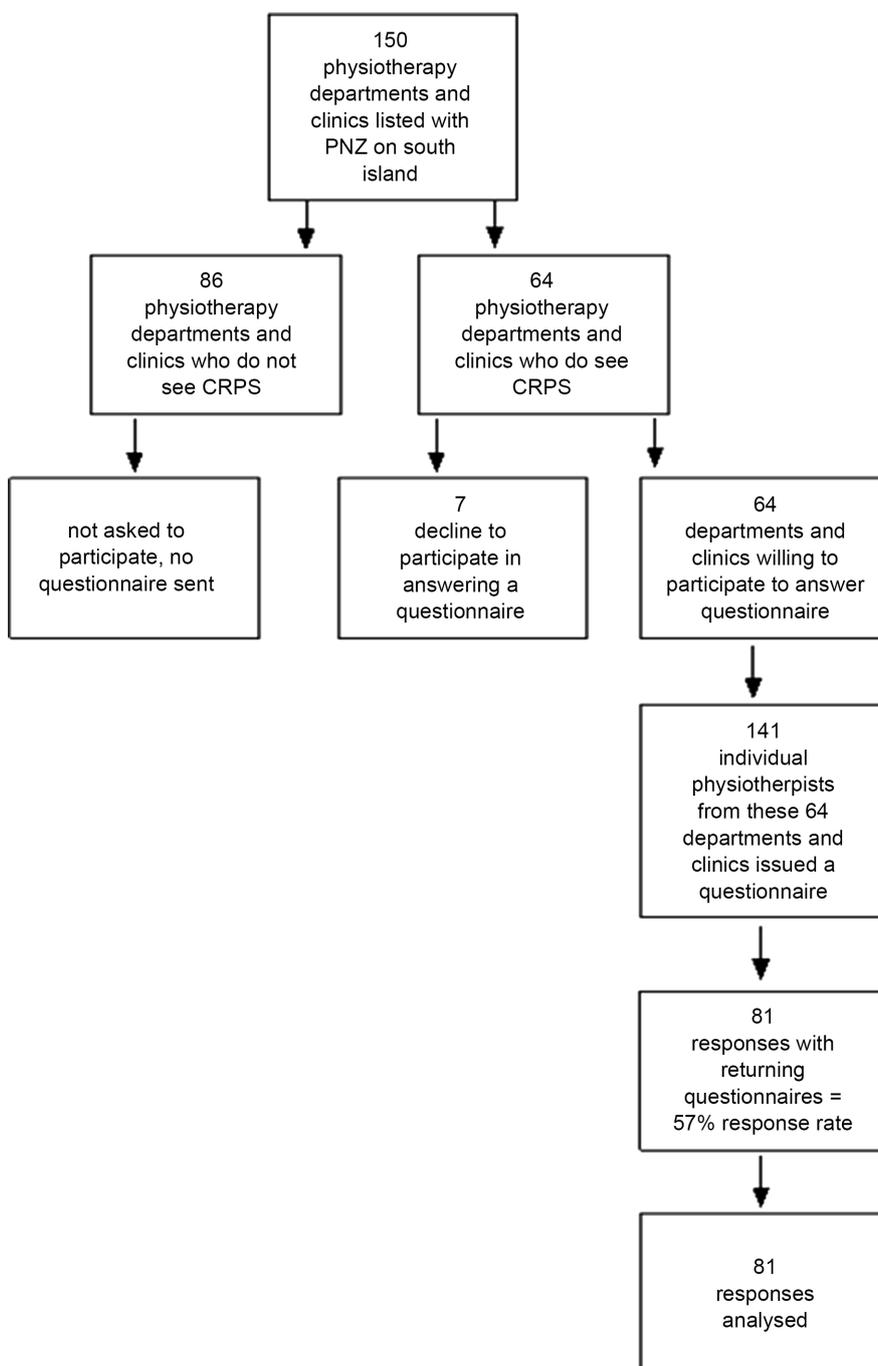


Figure 1. Participation with the physiotherapy intervention questionnaire.

The routine physiotherapy interventions examined were as follows: active exercises within pain limits; active exercises despite pain; resisted exercises despite pain; eccentric exercises; pain exposure exercises; graded exposure exercises; education; passive exercises within pain limits; passive exercises despite pain; pool exercises; neural stretches; tendon glides; balance exercises; proprioceptive exercises; lymphoedema massage; oedema massage; prescribed homework; scheduled as time contingent or pain contingent; sensory mapping training; discrimination training; desensitising training; GMI in classic order; GMI in ad hoc order; mirror exercises; prism exercises; relaxation exercises; breathing control; cognitive techniques for pain control; problem solving techniques for pain control; cognitive behavioural therapy (CBT); acceptance and commitment therapy (ACT); iontophoresis; soft tissue mobilisation; trigger point release; and other interventions (not listed). Fifteen Physiotherapists used acupuncture.

Education was the modality most commonly used as an intervention for CRPS (83% of Physiotherapists). Proprioceptive training and desensitising were often used (58% of the Physiotherapists). Forty nine percent of physiotherapists applied active exercise despite pain occasionally; active and resisted exercises within pain limits were used by 41% and 42% of the Physiotherapists, respectively. The types of interventions listed as occasionally used by the largest groups were trigger points release (53%), active exercise despite pain (49%), pool exercise (44%), and soft tissue mobilisation (41%). On the other hand, Physiotherapists (88%) seldom used iontophoresis, acupuncture (81%), prism exercise (78%), or acceptance and commitment therapy (70%).

The frequency of use of all interventions used is listed in **Table 1**.

In the group who mostly used GMI, 10% used it in the classic order versus 2% who used it in an ad hoc sequence. However, 43% never used a GMI classic sequence at all. Twenty per cent occasionally used the GMI classic sequence. Fifteen percent of the GMI users often applied the classic sequence. Ten percent of Physiotherapists used the classic sequence of GMI as the most common intervention. Those who used the ad hoc sequence showed similar figures. This is shown in **Figure 2**.

These data were further analysed using ANOVA tests for significance to determine if the frequency of seeing CRPS patients affected the type of intervention used. The more frequently a Physiotherapist evaluated CRPS patients, the following occurred, namely: 1) they used GMI more often rather than occasionally in the classic order of the 3 phases, $p = 0.017$; 2) the more they used relaxation techniques often rather than occasionally, $p = 0.021$; 3) the more likely they were to use SMT, and sensory mapping or discrimination occasionally rather than never, $p < 0.001$ and; 4) the more often they used oedema massage rather than seldom, $p = 0.029$. **Table 2** outlines the significant differences between those Physiotherapists who evaluated CRPS patients frequently compared to those who seldom saw CRPS patients.

Table 1. Physiotherapy interventions for CRPS and frequency of use.

Intervention method	Answered question	Frequency of use by Physiotherapist (% valid answers)			
	N (%)	Never	Occasionally	Often	Mostly
Active exercise within pain limit	77 (95%)	0%	14%	41%	41%
Active exercise despite pain	76 (94%)	20%	49%	20%	5%
Resisted exercise within pain limit	74 (91%)	2%	33%	42%	14%
Resisted exercise despite pain	73 (89%)	38%	40%	11%	0%
Eccentric exercise	72 (89%)	38%	40%	11%	0%
Pain exposure exercise	65 (80%)	30%	32%	11%	7%
Graded exposure exercise	69 (85%)	11%	20%	33%	21%
Education	79 (98%)	0%	1%	14%	83%
Passive exercise within pain limits	71 (88%)	9%	32%	30%	17%
Passive exercise despite pain	71 (88%)	36%	37%	11%	2%
Pool exercise	76 (94%)	22%	44%	20%	7%
Neural stretches	72 (91%)	11%	43%	33%	4%
Tendon glides	72 (91%)	19%	36%	32%	2%
Balance exercise	73 (89%)	9%	22%	51%	9%
Proprioceptive Exc	86 (94%)	2%	20%	58%	14%
Lymphoedema massage	73 (90%)	48%	36%	5%	1%
Oedema massage	86 (95%)	25%	42%	20%	9%
Prescribed Homework: Scheduled as time contingent	85 (93%)	6%	22%	48%	16%
Prescribed Homework: Scheduled as pain contingent	85 (93%)	25%	36%	19%	14%
Sensory mapping training	70 (86%)	42%	32%	12%	1%
Discrimination training	74 (91%)	40%	28%	19%	5%
Desensitising training	76 (94%)	2%	20%	58%	14%
Graded Motor Imagery (GMI) in classic order	71 (90%)	43%	20%	15%	10%
GMI in your own order or ad hoc	73 (90%)	44%	27%	16%	2%
Mirror exercise	78 (96%)	21%	31%	35%	10%
Prism exercise	69 (85%)	78%	7%	0%	0%
Relaxation exercises	73 (90%)	11%	33%	33%	12%
Breathing control	75 (93%)	12%	33%	33%	14%
Cognitive techniques for pain control	73 (90%)	22%	33%	26%	9%
Problem solving techniques for pain control	74 (91%)	20%	31%	25%	16%
Cognitive Behavioural Therapy (CBT)	72 (89%)	48%	15%	22%	4%
Acceptance and Commitment Therapy (ACT)	68 (84%)	70%	9%	4%	1%
Transcutaneous Electrical Nerve Stimulation (TENS)	73 (90%)	21%	44%	23%	1%
Iontophoresis	71 (90%)	86%	0%	1%	0%
Soft tissue mobilisation	74 (91%)	9%	41%	37%	5%
Trigger point release	73 (90%)	11%	53%	26%	0%
Acupuncture	81 (100%)	81%	9%	11%	0%

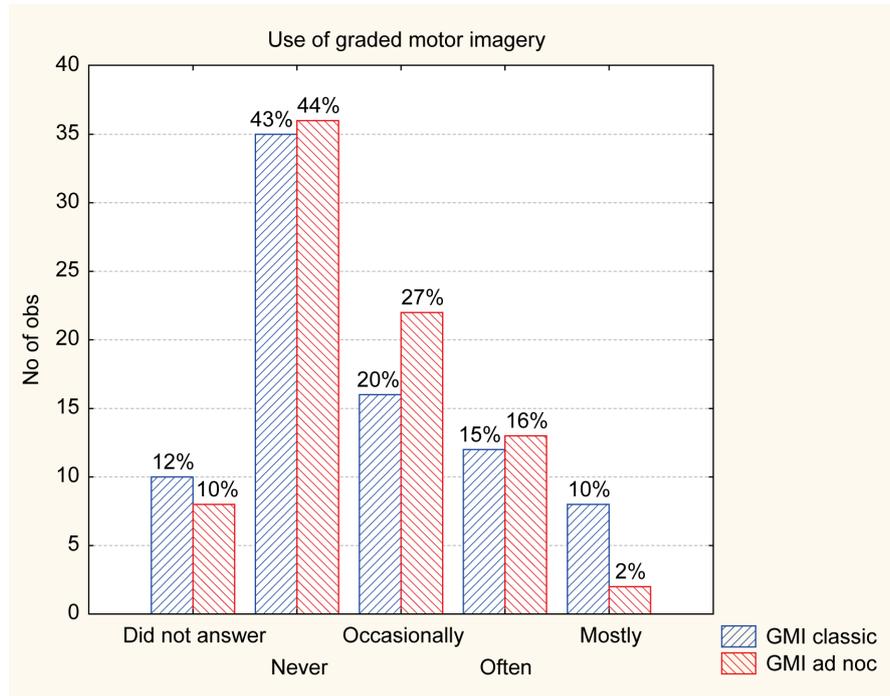


Figure 2. Use of graded motor imagery in clinical physiotherapy practice.

Table 2. Significant differences between those Physiotherapists who saw CRPS seldom versus those who saw CRPS patients often.

Physiotherapy intervention method more likely to be used by the physio who sees CRPS patients more often	Frequency of use more likely	P value
Graded Motor Imagery (GMI)	From occasional to often	0.017
Relaxation techniques	From occasional to often	0.021
Sensory-Motor training (SMT)		
• Sensory mapping	• From never to occasional	0.007
• Discrimination	• From never to occasional	0.007
• Desensitising	• From occasional to often	0.007
Oedema massage	From seldom to often	0.029

Beliefs about what was considered most effective for the management of CRPS patients proved highly variable. Physiotherapists were almost equally divided about whether or not reducing the pain experience was essential to improve the functioning (51% and 43%, respectively). This is shown in **Figure 3**.

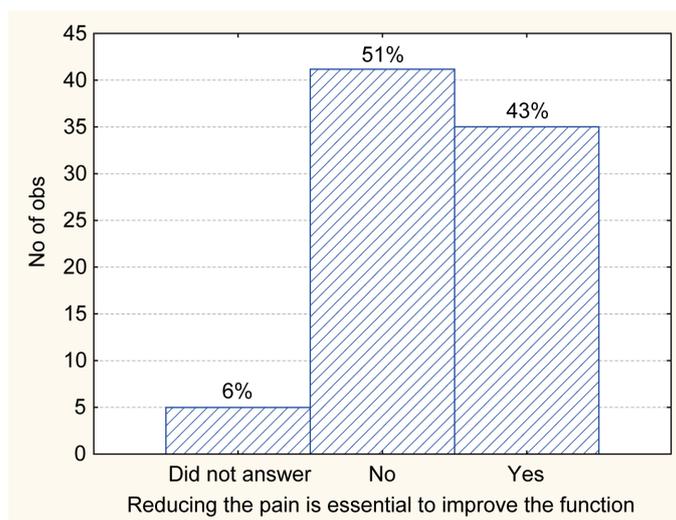
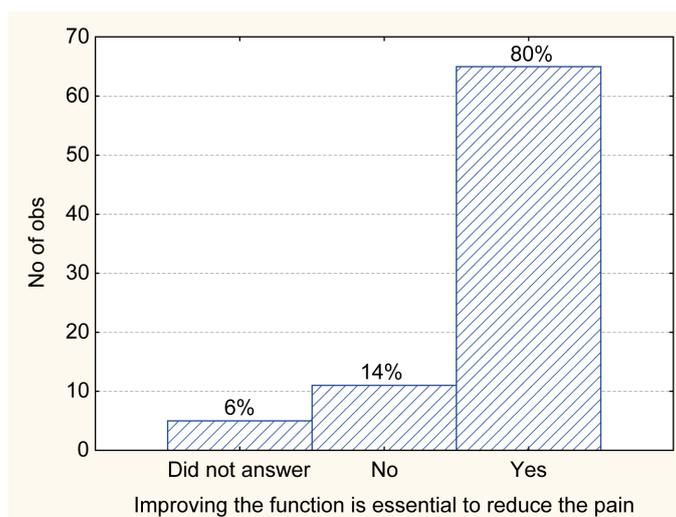
Eighty per cent believed that improving the function was essential to reduce pain; 14% believed that it was not essential. This is shown in **Figure 4**.

Physiotherapists were equally divided on their beliefs about exercise and pain being either indicated or contraindicated in CRPS. These beliefs are shown in **Figure 5**.

The beliefs were summarised and are represented in **Table 3**.

Table 3. Summary of Physiotherapist beliefs about what is best for CRPS intervention method.

Physiotherapist beliefs about what is best for CRPS intervention method			
	Did not answer	Yes	No
	n (%)	n (%)	n (%)
Reducing the pain is essential to improve the function	5 (6%)	35 (43%)	41 (52%)
Improving the function is essential to reduce the pain	5 (6%)	65 (80%)	11 (14%)
Exercising and increasing the pain is contraindicated	6 (7%)	17 (21%)	58 (72%)
Exercising and increasing the pain is indicated	6 (7%)	14 (17%)	61 (75%)

**Figure 3.** The belief about reducing the pain being essential in CRPS to improve the functioning.**Figure 4.** Improving the function is essential in order to reduce the pain experience.

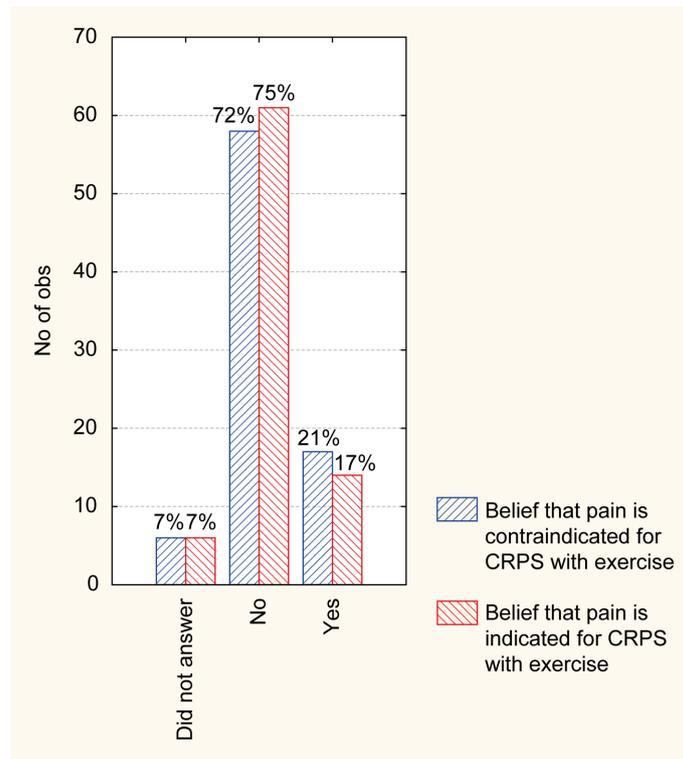


Figure 5. Beliefs about exercise and increasing pain being indicated or not for CRPS.

6. Discussion

These data provide the first contribution to literature about a systematic survey of physiotherapy and CRPS management in everyday clinical practice. Half of all New Zealand South Island physiotherapy practices do not manage CRPS patients. Only 10% of the Physiotherapists that manage CRPS patients treat more than two CRPS patients per month. Education was most often used as an intervention for CRPS. This was recorded by 83% of the Physiotherapists who together with Anaesthetists play an important role in education as CRPS patients possess a sub-minimum standard of basic knowledge about the syndrome [25]. Similar to diseases like diabetes, education enables behavioural change as well [26].

The data showed that the more frequently Physiotherapists evaluated CRPS patients, the more likely they were to use interventions with moderate based evidence, such as GMI and SMT. However, GMI and SMT were not used by many other Physiotherapists who evaluate CRPS patients less frequently. It is not possible to determine the reasons for these differences. This clearly needs further investigation. It has been suggested that physiotherapy management for CRPS needs to be specifically personalised [27]. This can be particularly difficult, as CRPS presentations, progression and outcome are variable. There is little specific evidence about what intervention to apply and when [28]?

These data illuminated the inconsistency with which physiotherapy interventions (other than education that is mostly used) are practised by those managing CRPS patients. A third of the sample often used cognitive techniques and

breathing control with relaxation techniques; another third used them occasionally. Those treating more CRPS patients are more likely to use the above technique rather than occasionally. Less than 15% are most likely to use these techniques. Eighty per cent are familiar with these interventions but do not apply them regularly.

Beliefs were divided about pain reduction being essential or not for improving the function of the affected CRPS limb. Eighty per cent believed that by improving function, the pain is reduced. Exercising and increasing the pain was a belief supported by 17%. It was found that 49% applied active exercises despite pain, but then only occasionally. When asked whether pain was contra-indicated or not for CRPS exercises, the groups were almost equally divided. Half believed that it was inevitable to have some pain with exercise; only 17% of this group believed that pain with exercise was really necessary.

Holding different beliefs influences the interventional modalities chosen for pain reduction or improvement in function for the treatment of CRPS patients. It influences the relationship the Physiotherapist has with the referring Anaesthetist. Applying any intervention by one half of Physiotherapists can become potentially difficult, if pain exacerbation is thought to be contraindicated, as pain forms the hallmark of CRPS. There are CRPS patients who present with reasonable function, but suffer severe pain [29]. The clinical presentation of CRPS remains inconsistent [1] [2] [30] [31] [32] [33]. Resolving how beliefs influence CRPS management is essential.

A weakness of the study is the relatively small sample size with potential bias being represented by the 57% response rate. Another weakness of the study is the use of Likert scale for measuring the frequency of the physiotherapy interventions that is not formally validated.

The strength is that this study provides the first evidence to represent data across a region, about Physiotherapist beliefs and usual interventions for CRPS patients. The use of self-reporting questionnaires as a valid measure is supported [34]. Future studies should be undertaken to develop validated questionnaires about beliefs around CRPS for Anaesthetists in Pain Management, Physiotherapists, and other health care providers, as well as for patients suffering from CRPS. It is important to determine how these beliefs influence referral, intervention method(s) and patient outcomes.

7. Conclusion

CRPS is not common on the South Island of New Zealand. Usual physiotherapy interventions vary widely. Different beliefs exist about the importance of managing the pain experience and the importance of improving function. These reflect the dichotomy seen in current evidence. Education is the most commonly used intervention. Those treating more CRPS patients are more likely to use interventions such as GMI and SMT often (rather than seldom, or not at all). How Anaesthetists in Pain Management and Physiotherapy beliefs about pain management and functional restoration affect CRPS outcomes requires closer scrutiny.

Conflict of Interest

The authors declare no conflict of interests regarding the publication of this paper. No funding contribution was received towards selection, extraction or analysis of the data from any source.

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