

# PSYCHOSOCIAL FACTORS ASSOCIATED WITH ACUTE CERVICAL RADICULOPATHY

**ABSTRACT:** Pain is an individual multi-dimensional experience, depending on contributions from the sensory, affective and cognitive dimensions. Only a few studies investigated the psychosocial factors associated with cervical radiculopathy (CR). These studies suggested that chronic CR affects functional abilities, emotional and cognitive states. This descriptive study determined (1) whether psychological factors were present, (2) the impact of pain on the ability to perform activities of daily living, and (3) the correlation between pain intensity, emotional state and functional abilities.

The researcher, a physiotherapist, interviewed 21 subjects whose clinical diagnosis of acute CR made by a neurosurgeon [and confirmed with magnetic resonance imaging (MRI)], to determine the cognitive dimension. Three standardized questionnaires, namely the Neck Disability Index (NDI), the Hospital Anxiety and Depression (HAD) Scale and the McGill Pain Questionnaire (MPQ long form) were administered to assess the pain intensity, emotional state, total pain experience and functional abilities. Central tendencies were determined by calculating the mean and median. The Spearman rank order correlation coefficient test was performed to establish correlations between variables.

Results suggested that radicular pain is not only a sensory experience since altered emotional and cognitive states were present, which frequently influenced functional abilities. Correlations existed between functional abilities, emotional state and total pain experience, as well as anxiety and depression levels. Higher anxiety than depression levels were found. Thoughts on beliefs and coping strategies were affected. We concluded that clinicians should also address the psychosocial factors and consider the functional impact of the disease, during the assessment and management of acute CR.

**KEY WORDS:** CERVICAL RADICULOPATHY; PSYCHOSOCIAL FACTORS; FUNCTIONAL ABILITIES; OUTCOME MEASURES; QUALITY OF LIFE.

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## INTRODUCTION

The term cervical radiculopathy (CR) describes the group of clinical symptoms and signs related to any dysfunction of the cervical spinal nerve root(s) due to pathological changes (Dox et al 1979; John 1997). All patients presenting with CR experience some form of pain, which could be radicular (neurogenic or neuropathic) or somatic referred pain.

Historically, pain was viewed as a simple noxious sensation, being directly related to the amount of tissue damage. More recently, pain has been considered to be the result of a dynamic process of perception and interpretation of a wide range of incoming stimuli. Some of these stimuli are associated with actual or potential harm and some are benign but interpreted and described in terms of damage (Main and Watson 1999).

According to the International Association for the Study of Pain (IASP), pain is defined as 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage' (Merskey 1991). The experience of pain is therefore multi-dimensional, depending on the interplay between three interrelated dimensions: (1) the sensory dimension including intensity, distribution, quality and behaviour of pain, (2) the affective dimension being the emotions associated with pain, such as depression, anxiety, fear and anger, and (3) the cognitive dimension representing the thoughts associated with pain, including present and past experiences, beliefs about pain and treatment, expectations and coping abilities (Johnson 1997; Main and Watson 1999;

Farrar 2000; Scudds 2001). The behaviour demonstrated by the individual will be a product of their beliefs and emotional responses to pain and may be reinforced or modulated by the social environment in which the behaviour takes place (Main and Watson 1999). All pain experiences are influenced by the relative contri-

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tribution from each of these dimensions, which will differ between individuals (Johnson 1997).

Considering pain science, a purely biomedical approach to pain assessment and management may be insufficient (Vlaeyen et al 1995). Traditionally the interview focused mainly on the sensory dimension of pain (Maitland 1993). Since the experience of pain is frequently used as an outcome measure, it needs to be assessed quantitatively (Strong 1999). Unfortunately, no matter how quantitative these pain measures appear, they still reflect the individual's subjective perception of the nociceptive experience (Farrar 2000). Thus, the assessment of pain and the impact thereof on a patient's life continues to be difficult and challenging (Persson and Lilja 2001; Pietrobon et al 2002). Previously, it was assumed that the reported pain intensity has a close relationship with underlying nociception. However, research has demonstrated that the experience of pain is also influenced by a wide range of psychological factors such as anxiety, fear and mistaken beliefs about the nature of pain and likely outcome to treatment (Main and Watson 1999). It is therefore important to provide a holistic approach when assessing and managing pain. Main and Watson (1999) suggested that the manual therapist needs to conduct and understand a biomedical assessment within a biopsychosocial framework. Thus, questioning should not only be on the sensory dimension of pain, but also on the psychosocial aspects (Johnson 1997) and the impact of pain on the patient's quality of life (Farrar 2000; Scudds 2001; Pietrobon et al 2002).

Very few studies could be retrieved which investigated the psychosocial factors associated with CR. The Neck Disability Index (NDI, Vernon and Mior 1991) assessing the quality of life, and the Hospital Anxiety and Depression (HAD) Scale (Zigmond and Snaith 1983) assessing the affective dimension, have previously been used on patients with CR. Wainner et al (2003) determined the diagnostic accuracy of the NDI for CR, demonstrating that it was not an acceptable diagnostic tool ( $LR < 2$ ). Moeti and Marchetti (2001) used the NDI as an outcome measure to assess the effect of different management approaches. Their

results suggested that when the NDI is used in conjunction with the numerical pain rating scale (NPRS), a more comprehensive assessment based on clinical relevant outcome measures is provided. This allows clinicians to make a better judgment about the clinical effects of treatment interventions by determining whether altered symptoms had an effect on the perceived functional abilities. The HAD Scale was utilized by Persson and Lilja (2001) to explore the relationship between coping strategies and the emotional state in patients with chronic cervico-brachial pain, treated with either surgery, physiotherapy or a collar. This study demonstrated that the chronic neck-shoulder arm pain influenced both function and mental well-being, including emotional states and coping strategies of patients. Generally, a low emotional state with anxiety, depression and sleep disturbances were found. Anxiety scores on the HAD Scale were high before and after treatment, especially in patients with a high pain intensity after treatment. Many patients used active coping strategies before treatment, but after treatment more passive coping strategies were found. It is evident that results of these few studies suggested that chronic CR has an impact on function, emotional and cognitive states, but would psychosocial factors also be present in acute CR?

The current study was performed on patients whose clinical diagnosis of acute CR by a neurosurgeon, has been confirmed with magnetic resonance imaging (MRI). The aim of the study was to determine the presence of psychological factors, the impact of pain on the ability to perform activities of daily living, and the correlation between pain intensity, emotional state and functional abilities. Findings of this study may suggest that a more holistic approach addressing psychosocial factors and functional abilities, should be followed when assessing and managing CR.

## METHODS

### Subjects and Study design

A prospective descriptive study was performed. The first 21 subjects, whose clinical diagnosis of acute CR by a neurosurgeon was confirmed with MRI, were selected for this study. A sample of

convenience was used due to convenient location of private medical practices which were used for referral purposes. Subjects were excluded if they had: chronic CR (longer than 3-month duration of current symptoms); cervical spine surgery within the last 6 months; cervical myelopathy without any radicular involvement; any of the following underlying pathologies, i.e. cancer currently under treatment, diabetes mellitus or inflammatory joint disease such as rheumatoid arthritis (RA); or if they were unable to participate in an interview in English or were involved in workman's compensation and/or pending litigation.

The study was approved by the Research Ethics Committee of the Faculty of Health Sciences, Stellenbosch University (number 2003/027/N). Informed consent was obtained from all subjects.

### Procedure

All subjects were interviewed by the same researcher, a physiotherapist with six years clinical experience in neuromusculoskeletal disorders. Besides the demographic information, the psychosocial factors associated with acute CR were obtained during the interview and by the administration of three standardized self-report questionnaires. The Neck Disability Index (NDI, Vernon and Mior 1991) was included to determine the average pain intensity experienced during the worst period of the condition, as well as the impact of symptoms on the ability to perform activities of daily living. The Hospital Anxiety and Depression (HAD) Scale (Zigmond and Snaith 1983) was used to assess the affective dimension associated with acute CR, by determining the levels of anxiety and depression. The standard McGill Pain Questionnaire (MPQ long form, Melzack 1975) was selected to establish the multi-dimensional experience of pain by assessing the sensory, affective, evaluative and miscellaneous sub-groups separately. This questionnaire was mainly included in order to determine if any correlations between the pain intensity, emotional state and functional abilities exist. Standardized self-designed questions, based on the suggestions made in the review article by Main and Watson (1999), were used

to obtain the patient's perceptions regarding beliefs and coping strategies, representing the cognitive dimension.

### **Instrumentation**

Subjects' responses to the standardized questions during the interview were recorded on a self-designed data capturing sheet, consisting of two sections. Section A obtained the demographic data including age, gender, side of affected upper extremity and whether subjects were referred for conservative or surgical management. Section B recorded the cognitive dimension of pain, recording the responses of either 'yes' or 'no' to specific self-designed questions on thoughts regarding beliefs and coping mechanisms, due to the presence of pain. Five questions were asked to determine the subject's perceptions regarding beliefs and three questions to assess the perceptions regarding coping strategies (refer to Table 4).

### **Self-report questionnaires**

The three standardized self-report questionnaires were completed according to the accompanying instructions.

**Neck Disability Index (NDI, Vernon and Mior 1991).** The NDI is a 10-item, one-dimensional, self-report disability questionnaire for patients with neck pain. This scale determines the average pain intensity and the occurrence of associated headaches (two items), the impact of pain on activities of daily living like personal care activities, lifting, reading, work-related activities, driving, sleeping and the patient's level of participation in recreational activities (seven items) and concentration (one item). For the purpose of this study the average pain intensity experienced during the worst period of the condition was determined instead of the current pain intensity, by altering the phrasing of the original questionnaire. Each item is followed by six different assertions, constituting a 0 to 5 scale, with low scores being associated with better function and five representing the greatest level of disability. The scores of each section are summated for a composite total score of 50, which are used to determine the level of disability (Vernon and Mior 1991). The following four categories regarding the level of

disability are provided: 'no' (scores 0-4), 'mild' (scores 5-14), 'moderate' (scores 15-24), 'severe' (scores 25-34), 'complete disability' (scores above 35).

The NDI has been shown to be a reliable outcome measure and has been validated among different patient populations (Vernon and Mior 1991; Pietrobon et al 2002).

**Hospital Anxiety and Depression (HAD) Scale (Zigmond and Snaith 1983).** The HAD Scale consists of 14 items measuring the severity of emotional stress in two separate subscales, namely an Anxiety subscale (HADS-A) and a Depression subscale (HADS-D) both containing seven intermingled items. Each question has four response categories, ranging from no symptoms (0) to maximum symptoms of distress (3). This scale was developed to identify states ('possible' and 'probable') of anxiety and depression in the setting of a non-psychiatric hospital medical outpatient clinic. Besides the individual scores obtained for each question, levels of anxiety and depression were determined separately by calculating the composite total scores obtained for each of the two subscales. These total scores were compared to the two cutoff points namely 8 and 11, provided by Zigmond and Snaith (1983) in order to categorize patients into one of the following three presented categories regarding states of anxiety and depression: (1) 'normal' (a score of 7 or less), (2) 'doubtful or possible cases' (scores of 8-10) and (3) 'definite or probable cases' of psychological and psychiatric morbidity (scores of 11 or more).

The HAD Scale has been found a reliable and valid instrument to measure the severity of emotional disorders (Zigmond and Snaith 1983). A literature review by Bjelland et al (2002) established that the HAD Scale is a reliable self-report instrument, has a good internal consistency (Cronbach's coefficient alpha was at least 0.60), and that the concurrent validity is good to very good. It is considered to be a good screening instrument for the identification of anxiety and depression disorders.

**Standard McGill Pain Questionnaire (MPQ long form, Melzack 1975).** In the MPQ long form twenty groups of adjectives have been organized into four

distinct categories describing different aspects of the multi-dimensional pain experience: sensory (groups 1 - 10), affective (groups 11 - 15), evaluative (group 16) and miscellaneous (groups 17 - 20).

For the purpose of this article, analysis was performed using the following three scoring methods: (1) The total number of words (NWC) chosen was calculated; (2) The predetermined scale values allocated for each of the selected adjectives were added to obtain a Pain Rating Index (PRI) for each category, and a total PRI. (3) The average pain intensity was determined by the score obtained on a scale of 0 - 5, ranging from 'no' pain to 'excruciating' pain. The numeric rank placement of each word was used to attain the average pain intensity experienced during the worst period of the condition, by altering the phrasing of the original scale.

The standard MPQ is the most widely used clinical and research tool and has repeatedly demonstrated good internal consistency, test-retest reliability and validity in a variety of patients (Melzack 1975; Reading 1979; Kremer and Atkinson 1981).

### **Statistical analysis**

Descriptive statistics were used for the analysis of the data. The central tendency was determined by calculating the mean and median for the different variables. The distributions of the data were visually depicted by 2D Box Plots. The Spearman rank order correlation coefficient test was used to determine if correlations between different variables, i.e. pain intensity, gender, emotional state and functional abilities, exist.

## **RESULTS**

### **Demographic information**

In this study CR occurred in a wide age distribution, ranging between 33 and 63 years (mean 47.9 years). The sample demonstrated an equal distribution regarding gender (female 11; male 10) and side of affected upper extremity (left 11; right 10). The neurosurgeons suggested conservative management for seven (33%) of the referred subjects and surgical intervention for the remaining 14 subjects (67%).

**Neck Disability Index: Functional abilities**

The composite mean total score obtained by the NDI was 19.8 out of 50 (Table 1). According to the individual total scores, the level of disability ranged between ‘mild’ (8 subjects), ‘moderate’ (7 subjects), ‘severe’ (4 subjects) and ‘complete disability’ (2 subjects). The 2D Box Plot (Figure 1) indicates the median score obtained for each individual question on the NDI. The average pain intensity was ‘very severe’ (median 4/5; mean 3.3) during the worst period of the condition. The functional activities mostly affected were recreation activities, sleeping and lifting (3/5), followed by work-related activities and driving (2/5), and the activities least affected were reading and personal care (1/5). Table 2 provides a description of the option representing the calculated median for each section. Besides the

affected functional activities, the majority of subjects reported that slight headaches occurred infrequently (1/5), and that their concentration was affected slightly (1/5).

**Hospital Anxiety and Depression Scale: Emotional state**

The median scores of each individual question from the HADS-A (HAD-anxiety subscale) and HADS-D (HAD-depression subscale) are presented in Figure 2(a-b). The median for each individual question varied between 0 and 2, out of a maximum of 3. Six of the 7 individual questions regarding anxiety had a median of 1 or more, whereas 4 of the 7 individual questions regarding depression had a median of 1. A description of each question and the option representing the median selected by the 21 subjects is summarized in Table 3.

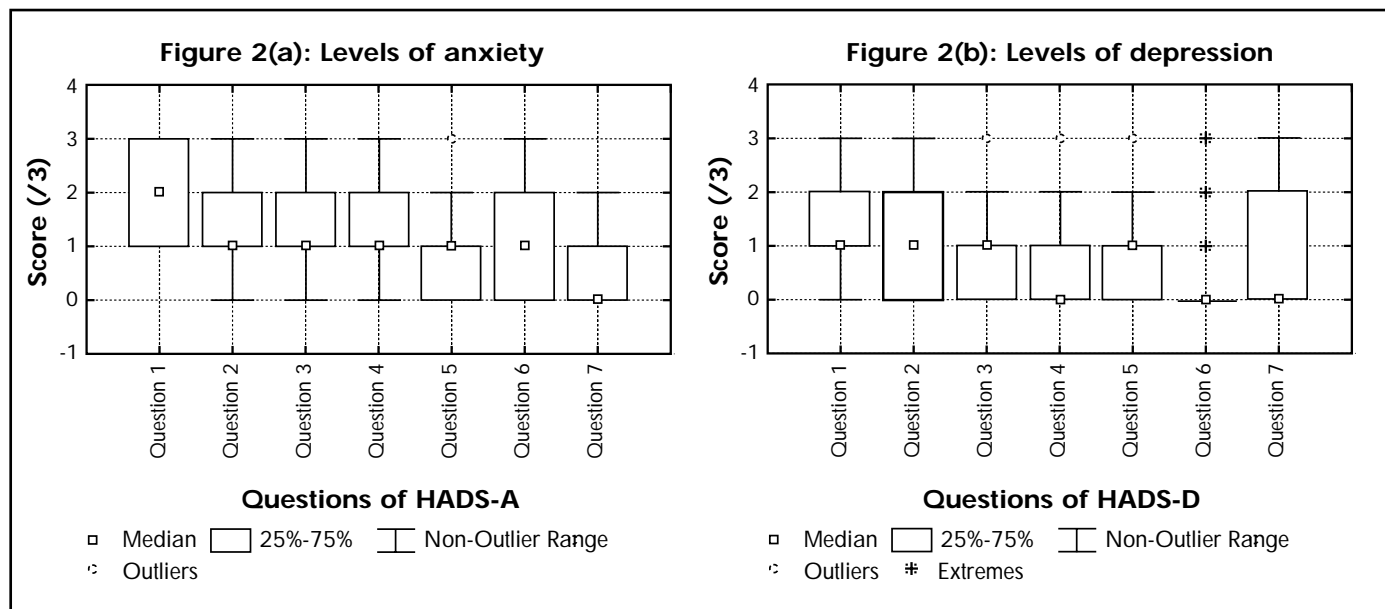
Despite the low median scores obtained for the individual questions, the composite total scores for each subscale were also calculated.

The composite mean total score obtained by all 21 subjects for the HADS-A was 8.6 which is above the cutoff point of 8 provided by Zigmond and Snaith (1983). The mean total score obtained by all 21 for the HADS-D was 6, indicating that it is below the cutoff point of 8 (Table 1 and 3). The females scored slightly higher than the males regarding both anxiety and depression levels when comparing their mean scores. An analysis of the total scores obtained by each individual subject demonstrated that 11 subjects (52%) on the HADS-A and 8 subjects (38%) on the HADS-D scored above the cutoff point of 8, indicating ‘slight’ psychiatric morbidity. According to these individual mean

**Table 1: Composite mean scores obtained by 21 subjects for pain intensity, total NDI, HAD-A and HADS-D subscales, PRI scores for each categories and total PRI of MPQ (long form).**

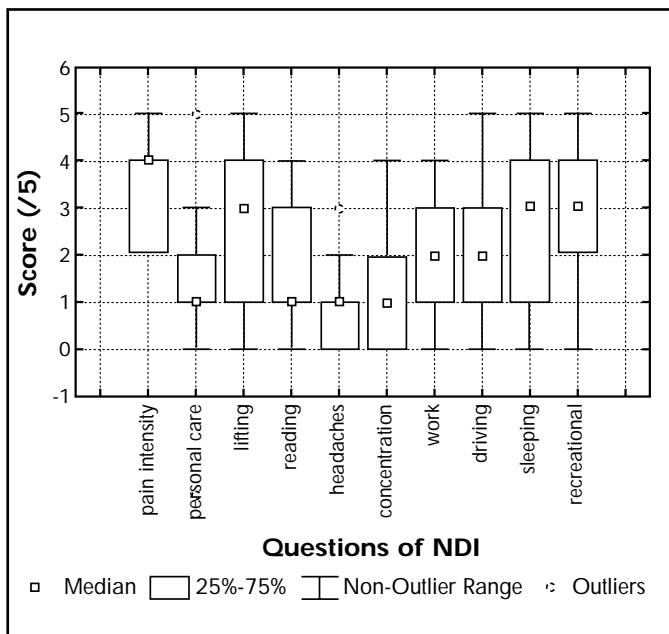
Total scores	NDI & MPQ	NDI	HAD Scale		MPQ (long form) Pain Rating Index (PRI)				
	Pain Intensity	Total	HADS-Anxiety	HADS-Depression	Total (1-20)	Sensory (1-10)	Affective (1-15)	Evaluative (16)	Miscellaneous (17-20)
<b>Maximum score</b>	<b>/5</b>	<b>/50</b>	<b>/24</b>	<b>/24</b>	<b>/92</b>	<b>/42</b>	<b>/14</b>	<b>/5</b>	<b>/31</b>
<b>Mean</b>	3.3	19.8	8.6	6	31.8	18.8	4.2	2.1	6.3
<b>Mean: Female</b>	3.5	22	9.4	7.3	34.4	19.3	4.8	2.1	7.18
<b>Mean: Male</b>	3.1	17.3	7.7	4.7	29.2	18.2	3.6	2.1	5.3

**Figure 2: The scores obtained from the individual questions of the (a) HADS-A and (b) HADS-D (2D Box Plots).**



scores obtained on the HADS-A subscale, 5 subjects scored between 8 and 10, and can be categorized as ‘possible cases’ of anxiety, and 6 subjects scored 11 or more and can be categorized as ‘definite or probable cases’ of anxiety. The individual mean scores obtained on the HADS-D subscale indicated that 4 subjects can be categorized as ‘possible cases’ of depression (scores 8-10), and 4 subjects can be categorized as ‘probable or definite cases’ of depression (scores above 11). From the results it seemed that higher anxiety than depression levels were present in this small sample.

**Figure 1: Impact of CR on ability to perform activities of daily living as indicated by scores obtained from NDI (2D Box Plot).**



### Beliefs and coping strategies

From the responses to the self-designed questions regarding the effects of pain on beliefs and coping strategies, the following trends were demonstrated (refer to Table 4). The majority of subjects believed that they lacked ‘self-control’ (14 subjects, 67%), that ‘hurting equals harm’ (16 subjects, 76%) and that they were avoiding certain activities due to fear of exacerbation, thereby demonstrating ‘fear-avoidance behaviour’ (20 subjects, 95%). The majority of subjects (14 subjects, 67%) believed that they did not constantly fear the worst (‘catastrophizing’) and did not believe that they would be unsuccessful in gaining control over their pain in the future. From these responses it seemed as if some of the perceptions regarding beliefs were affected negatively by pain. Most subjects could ‘cope’ with their circumstances (15 subjects, 71%) by performing both active (15 subjects, 71%) and passive coping strategies (19 subjects, 90%). In this sample, passive coping strategies were more frequently utilized than active coping strategies.

### McGill Pain Questionnaire: Multi-dimensional pain experience

The calculated mean Pain Rating Index (PRI) score obtained by the 21 subjects for each category, as well as the total PRI, on the MPQ long form, is presented in Table 1. The mean total number of words chosen (TWC) was 13.4 from 77 adjectives. For almost all the categories the females scored slightly higher than the males.

### Correlations

No correlations were found between pain intensity, gender, age, or side of involvement and any of the scores obtained in the three standardized questionnaires. Correlations were found between the level of disability as indicated by the NDI score and the total PRI score on the MPQ long form ( $r=0.6$ ), as well

**Table 2: Descriptions of the option representing the calculated median for each section of the NDI by the 21 subjects and the mean total score.**

Neck Disability Index (NDI)		
Section	Description of option representing median / mean	Median /5)
1 - Average Pain Intensity	The average pain intensity was very severe during the worst period of the condition	4
2 - Personal care	I can look after myself normally but it causes extra pain	1
3 - Lifting	Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned	3
4 - Reading	I can read as much as I want to with slight pain	1
5 - Headaches	I have slight headaches that come infrequently	1
6 - Concentration	I can concentrate fully when I want to with slight difficulty	1
7 - Work	I can do most of my usual work, but no more	2
8 - Driving	I can drive my car as long as I want with moderate pain	2
9 - Sleeping	My sleep is moderately disturbed (2-3 hrs sleepless)	3
10 - Recreation	I am able to engage in a few of my usual recreation activities because of pain	3
<b>Total score NDI</b>	<b>Moderate level of disability (Score of 15-24)</b>	<b>Mean = 19.8 / 50</b>

as the HADS-A ( $r=0.52$ ) and HADS-D subscales ( $r=0.86$ ). Subjects with a high anxiety score correlated with a high depression score ( $r=0.56$ ). Relations were found between high scores on the affective category of the MPQ long form and the HADS-D ( $r=0.59$ ), and to a lesser extent the HADS-A ( $r=0.37$ ). The pain intensity measured by the NDI and MPQ (long form) showed a good correlation ( $r=1$ ). No correlation could be calculated between coping strategies or negative thoughts and any of the variables, because no scoring method was available, since the cognitive dimension was assessed with self-compiled questions and not a standardized questionnaire.

### DISCUSSION

Pain is a multi-dimensional experience and is influenced by psychological factors such as anxiety, depression, fear and mistaken beliefs (Main and Watson 1999). A more holistic, biopsychosocial approach has been advocated when assessing and managing pain (Johnson 1997; Main and Watson 1999). However, very few studies investigated the psychosocial factors associated with CR and these studies were all performed on patients with chronic CR. The results of the current study, performed on subjects presenting with acute CR, indicate that the perceived pain is not only a sensory experience, but also influences functional

levels, as well as emotional and cognitive states. It therefore seems that CR is also a multi-dimensional pain condition as been previously recommended for all pain experiences (Johnson 1997; Main and Watson 1999; Strong 1999; Persson and Lilja 2001).

Results of the NDI and MPQ (long form) indicated that the majority of subjects experienced severe pain (median 4/5; mean 3.3) which disturbed sleep moderately (median of 2-3 hours sleeplessness) and interfered with the ability to perform a variety of daily activities such as lifting, driving, reading and personal care. The perceived pain possibly affected the interaction with others,

**Table 3: Descriptions of the option representing the calculated median for each question of the HAD Scale by the 21 subjects and the total score.**

<b>Hospital Anxiety Depression (HAD) Scale</b>		
<b>Anxiety levels (HADS-A)</b>		
<b>Question</b>	<b>Description of question (option representing median in bold)</b>	<b>Median ( /3)</b>
Question 1	I feel tense or "wound up" <b>a lot of the time</b>	2
Question 2	<b>From time to time</b> worrying thoughts go through my mind	1
Question 3	I can <b>usually</b> sit at ease and feel relaxed	1
Question 4	I <b>don't often</b> feel restless as if I have to be on the move	1
Question 5	I <b>don't often</b> get sudden feelings of panic	1
Question 6	I get a sort of frightened feeling as if something awful is about to happen <b>a little but it doesn't worry me</b>	1
Question 7	I <b>don't at all</b> get a sort of frightened feeling like "butterflies" in my stomach	0
<b>Total score HADS-A</b>		<b>Mean 8.6</b>
		<b>Median 9</b>
<b>Depression levels (HADS-D)</b>		
Question 1	I <b>not quite as much</b> enjoy the things I used to enjoy	1
Question 2	I <b>sometimes</b> feel as if I am slowed down	1
Question 3	I can <b>sometimes</b> enjoy a good book, radio- or TV programme	1
Question 4	I can laugh and see the funny side of things <b>as much as I always could</b>	0
Question 5	I <b>sometimes</b> feel cheerful	1
Question 6	I take <b>as much care as ever</b> and have not lost interest in my appearance	0
Question 7	I look forward with enjoyment to things <b>as much as I ever did</b>	0
<b>Total score HADS-D</b>		<b>Mean 6</b>
		<b>Median 4</b>

since the ability to engage in recreational activities was decreased. Concentration and the ability to work were also decreased, possibly interfering with the individual's role in society. These observations support previous suggestions that pain affects the quality of life, by interfering with the ability to perform daily activities, to interact with others and to be a productive member of society (Farrar 2000; Pietrobon et al 2002).

The assessment of the cognitive dimension in this study indicates that some perceptions regarding beliefs and coping strategies were affected. The majority of subjects believed that 'self-control' was lacking and that 'fear-avoidance behaviour' was demonstrated. This was probably as a result of believing that 'hurting equals harm'. According to the majority of subjects they could cope with their circumstances. Coping is the ability to identify, manage and overcome the issues which stress all of us (Butler and Moseley

2003). Coping is divided into two dimensions: emotion-focused (passive) strategies described as activities related to the regulation of affect, and problem-focused (active) strategies attempting to solve, reconceptualize or minimize stress (Lasarus 1966). Individuals utilizing active strategies tend to adapt better to life stressors and display fewer psychological symptoms. In this study, the majority of subjects implemented both passive and active coping strategies, although passive strategies were utilized slightly more frequently. When assessing 81 patients with chronic CR, Persson and Lilja (2001) also demonstrated that both coping strategies were used before treatment, but after treatment more passive coping strategies were utilized. It can be argued that if the acute CR condition becomes chronic, the subjects of this study could also become more dependent on passive coping strategies. This can eventually result in more psychological distress. The researcher

therefore suggests that questioning on the cognitive features should be included as part of the assessment and management of patients with acute CR, in order to recognize and rectify negative thoughts and altered coping strategies as soon as possible. However, further research on the cognitive dimension is required by utilizing standardized questionnaires, in order to determine correlations with other variables.

In this sample, a general low emotional state was found with higher anxiety (52%) than depression levels (38%). The correlation between high anxiety and depression scores obtained in this study supports the findings by Persson and Lilja (2001). Current results demonstrate correlations between decreased functional abilities and increased anxiety and depression levels. In addition, the level of disability correlated with the total perceived pain experience as measured by the MPQ long form. Thus, it seems that if subjects with acute CR

**Table 4: The cognitive dimension obtained from responses to self-designed questions on thoughts regarding beliefs and coping strategies by 21 subjects.**

Description of beliefs or coping strategies	Yes		No	
	No. subjects	%	No. subjects	%
<b>Thoughts regarding beliefs</b> <b>Because of my pain, I believe that ...</b>				
I am lacking the ability to control my pain ('self-control' with self-management skills)	14	67	7	33
I will be unsuccessful in gaining control over my pain ('self-efficacy' beliefs)	7	33	14	67
'hurting' equals 'harm' and pain is an indication of increasing tissue damage	16	76	5	24
I am avoiding activities or movements because of fear that my pain will increase (demonstrating 'fear-avoidance' behaviour)	20	95	1	5
I am constantly fearing the worst ('catastrophizing')	7	33	14	67
<b>Thoughts regarding coping strategies</b> <b>Because of my pain, I ...</b>				
am not coping	6	29	15	71
am relying on someone else (such as the Dr / therapist / health care professional, 'hands on' treatment instead of active exercises) or something else (such as medication / resting / neck brace) to control my pain ('passive coping strategies')	19	90	2	10
am taking a degree of responsibility for the management of my pain ('active coping strategies')	15	71	6	29

perceive a severe experience of pain, functional abilities are decreased and symptoms of anxiety and depression are present. From these results it is evident that acute CR is not only a sensory experience but a multi-dimensional experience which impacts on the patient's quality of life.

Current results could not establish correlations between gender or pain intensity and any of the variables. However, females scored slightly higher than males in most of the categories on the MPQ long form, and most of the subjects with psychological distress were females and reported high pain intensity (Table 1). This supports the findings of Persson and Lilja (2001) which indicated no correlation between scores obtained in the HAD Scale and pain intensity, gender or age before treatment. However, these researchers found a correlation between high anxiety scores and high pain intensity after treatment when pain was not sufficiently reduced. Although no correlation between anxiety and pain intensity seems to be present in acute CR, it can be argued that if the condition becomes chronic a relationship may develop.

The presence of psychosocial factors such as anxiety supports the clinical observations by Gifford (2001) who stated that patients with CR are often distressed, worried and even frightened. Persson and Lilja (2001) also reported that 40% of patients with chronic radicular neck pain had anxiety and 30% had depression, since these subjects obtained a score above 8 on the HAD Scale. Johnson (1996) stated that acute pain patients may have only minor contributions of the affective and cognitive dimensions, whereas chronic pain patients will have significant contributions of negative thoughts and emotions. However, in the current study performed on acute CR an even higher percentage of subjects had anxiety and depression in comparison to the results obtained by Persson and Lilja (2001) on chronic CR, emphasizing the presence of emotional factors.

In summary, from these results it seems as if anxiety levels are frequently higher than depression levels, functional abilities are 'moderately' to 'severely'

decreased, and some thoughts and coping strategies were negatively affected in patients with acute and chronic CR and should not be neglected or ignored. The question arises why psychological factors are present in patients with acute CR.

It has been demonstrated that the majority of subjects with acute CR experienced constant, unrelieving pain with a high average intensity (Conradie et al Unpublished 2004a, b). The nature of the condition is distressing, since radicular pain is frequently associated with one or more neurological signs (Conradie et al Unpublished 2004c). In addition current results indicated that the pain frequently interferes with sleep and the ability to perform daily activities. It is understandable that these patients would be worried and anxious about the condition if severe pain is present constantly, which cannot be controlled and which affects the patient's functional abilities and quality of life. If this behaviour of symptoms is considered, it is understandable that certain beliefs were altered and that certain activities are avoided due to fear that physical activities will cause increased pain or further (re)injury. A patient's cognition, i.e. what the patient thinks and understands about the nociceptive sensation, will again influence their emotional reaction to it. Current results indicated that both passive and active coping strategies were implemented in order to cope, confirming previous statements that these subjects are so desperate for help and would do anything, take anything or have anything done to them to get pain relief (Gifford 2001; Persson and Lilja 2001). According to Main and Watson (1999), if pain is sufficiently severe, cannot be controlled and has a widespread effect on a patient's life, as demonstrated by this condition, the patient's coping skills can become exhausted and depression and anger can become evident. This can be one of the reasons why eight subjects presented with 'possible' or 'probable' cases of depression. It can be argued that if the condition remained, resulting in chronic pain, coping skills might further be decreased, resulting in even higher depression levels reported by even more

subjects. The symptom presentation commonly described by patients with CR can therefore explain why psychosocial factors can be present as a result of the condition.

Since anxiety and depression, as well as beliefs and coping strategies, were not assessed before the onset of the condition, it is impossible to determine whether these psychological aspects are primary, such as underlying personality characteristics, or secondary, as a result of the condition. However, underlying emotional factors such as anxiety and stress due to personality characteristics may again increase the perceived experience of pain. It has been demonstrated that when stress and anxiety is experienced, ectopic sites can become sensitive to adrenaline and noradrenaline which are released as a result of sympathetic nervous system activity, resulting in increased pain (Devor and Rappaport 1990; Devor 1994). Thus, if these subjects are prone to high anxiety levels which could or could not be connected to pain, it can further increase the perceived pain intensity. In addition, Main and Watson (1999) stated that the combination of cognitive features underpins the appraisal of pain. Thoughts and beliefs like the fear of activities and the fear of re-injury are also nerve impulses and can increase pain (Butler and Moseley 2003). The altered beliefs and coping strategies, whether primary or secondary, found in this sample can further increase the perceived experience of pain. Regardless of whether psychosocial issues are primary or secondary, they need to be assessed specifically and treated appropriately.

Traditionally, physiotherapists use a wide variety of manual techniques when treating CR. Currently, the optimal management for CR is unclear and controversial (Wainner and Gill 2000), even though many studies and systematic reviews assessed the efficacy of different treatment approaches (Zylbergold and Piper 1985; Rosomoff et al 1992; Saal et al 1996; Malanga 1997; Persson et al 1997; Wainner and Gill 2000; Moeti and Marchetti 2001). Studies do not show conclusive evidence of the effectiveness of the different approaches since randomized clinical trials are



frequently poorly designed and mixed and/or inadequately described interventions are performed on heterogeneous samples.

Another reason why various management interventions of CR failed to be effective in the past might be due to the negation of cognitive and affective factors. These factors were ignored both in assessment and management. Firstly, the outcome measures selected to determine the effect of treatment interventions were not appropriate since they were unable to measure improvement in the cognitive and affective state, as well as functional abilities. Since psychological factors, especially beliefs and coping strategies, can influence the response to treatment (Main and Watson 1999), appropriate outcome measures, such as the NDI, HAD Scale, and MPQ (long form) as used in this study, should be administered when assessing the effectiveness of different management interventions for CR. It could thus be argued that the current management of CR might result in better outcomes if different, more appropriate health-related outcome measures are used in conjunction with very specific diagnostic criteria to ensure more homogeneous patient samples. Secondly, the cognitive behavioural approach has been neglected in the past as part of the management. Arguably, management could be more effective if it did not only focus on the sensory experience of pain, but also include the previously neglected affective and cognitive factors as part of the management plan. The researcher therefore suggests that the influence of psychological factors should be acknowledged when assessing and managing CR.

In the future, the physiotherapy management for patients presenting with this multi-dimensional condition, needs to be more comprehensive. The inclusion of cognitive behavioural therapy programmes and multi-disciplinary therapy groups to improve coping with pain and to alter negative attitudes towards work, social circumstances and disability might be necessary. Since psychological factors are frequently overlooked, physiotherapists should be able to identify the presence of psychological factors in order to determine

whether further referral is necessary. Psychosocial factors should therefore be addressed and measured before management of this multi-dimensional condition can be optimal.

The presence of psychosocial factors, whether these are underlying or as a result of the condition, found in this sample suggests that a biopsychosocial approach should be followed during the assessment of patients presenting with CR. The traditional medical assessment based on the sensory experience of pain is therefore insufficient (Vlaeyen et al 1995). According to Persson and Lilja (2001) it is irrelevant to assess pain states as an isolated pain phenomenon, but questioning on interference and coping strategies must also be included. The NDI, HAD Scale, and MPQ (long form) as used in this study are appropriate standardized outcome measure when assessing this multi-dimensional condition. However, findings cannot be generalized due to the small sample size. Further research performed by a variety of physiotherapists on larger and more representative samples, including severe and less severe NR conditions, is essential to confirm these observations and recommendations.

#### CONCLUSION

In this study, the results indicated that acute CR is not only a sensory experience, but altered emotional and cognitive states were present and the ability to perform daily activities was frequently affected. It is therefore proposed that these psychosocial factors, irrespective whether they are underlying or as a result of the condition, need to be addressed in the assessment and management of CR. Due to the small sample size, observations and recommendations cannot be generalized but requires further investigation.

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Unpublished

Conradie M, Bester MM, Crous LC Unpublished 2004a Clinical presentation of acute cervical radiculopathy based on pathophysiological mechanisms - Overview of the literature

Conradie M, Bester MM, Crous LC Unpublished 2004b Clinical symptom presentation of acute cervical radiculopathy

Conradie M, Bester MM, Crous LC, Kidd M Unpublished 2004c Do clinical features and magnetic resonance imaging suggest the same nerve root level in acute cervical radiculopathy?

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## BOOK REVIEW

# FUNCTIONAL MOVEMENT DEVELOPMENT ACROSS THE LIFE SPAN

**By Donna Cech, MS, PT, PCS and  
Suzanne Martin, MACT, PT  
ISBN 0 7216 8122 0  
WB Saunders 2nd edition 2002**

*Functional Movement Development Across the Life Span* is a comprehensive book which covers theoretical, practical and clinical aspects of the development of movement from the foetus to old age. The book is extensively illustrated with photographs and clear diagrams and the text is succinct and logical.

The book is divided into three units:

1. Definition of Functional Movement
2. Body Systems Contributing To Functional Movement
3. Functional Movement Outcomes

The content thus follows a logical progression from the theoretical background to problem solving and clinical application.

Unit 1, Definition of Functional Movement has five chapters that explore the basis of functional independence in relation to different theories of motor development. The authors have taken care to contextualise the theory within the framework of the ICIDH2.

Motor control and motor learning are discussed in detail. Good use is made of clinical examples to highlight the functional implications of different theories. Chapter 5, Evaluation of Function, gives an excellent overview of a few well known paediatric and adult functional assessment tools. It discusses the concepts of validity and reliability simply and clearly and puts forward a solid argument for the use of standardized assessments of function in clinical practice. I found this chapter particularly helpful.

Unit 2, Body Systems Contributing to Functional Movement, is devoted to discussing the changes that occur across the life span in the skeletal, muscular, cardiovascular and pulmonary, nervous and sensory systems. Each chapter starts with a comprehensive summary of the anatomy and physiology related to the particular system. Good use is made of diagrams in these sections. The development of each system is then discussed from infancy to old age. Each chapter concludes with a discussion of the functional implications of the changes that have been presented. I consider these chapters to give an excellent overview that would be very

useful to anyone with a broad interest in development. I do however think that if you are particularly interested in a specific age group, you might find that the information presented does not go into sufficient detail and depth.

Unit 3, Functional Movement Outcomes, has chapters on vital functions, posture and balance, locomotion, prehension and health and fitness. I found the chapter on vital functions somewhat misplaced in this unit, the information may have been more valuable had it been incorporated into the chapters in the previous unit. The remaining chapters in this unit are well written and again provide an interesting overview without going into too much specific detail.

I enjoyed *Functional Movement Development Across the Life Span* and know that I will refer to it again. The information is well presented and is easily accessible. I would recommend this book to anyone with an interest in development and think it would make an excellent reference book for undergraduate and postgraduate students.

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