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A biopsychosocial approach to chronic low back pain and disability in a private chiropractic setting: a case study

Kevin A. Parish, BSc, DC, FCCRS(C)*

For the clinician in private practice, a patient presenting with chronic low back disability can be challenging. Physical factors as well as psychosocial factors play a role in the development of chronicity. In fact, psychosocial factors may be the most dominant factor in the development of chronic low back pain and disability. Fear-avoidance behaviour is identified as one component of the bio-psychosocial model of low back disability. The clinician must recognize that treatment outcome will be dependent on addressing both physical and psychosocial factors. This case study presents an attempt at addressing the psychosocial factors (specifically fear-avoidance behaviour) of a patient presenting with chronic low back disability with a cognitive-behavioural approach, including screening, education and graded exposure. This approach appears to have played a role in returning this patient to modified duties after a year absence from work. More empirical and clinical studies are needed to develop and define which measures and treatment protocols are the most practical and effective for a clinician in private practice to utilize.
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KEY WORDS: psychosocial, low back pain, disability

Pour un clinicien en pratique privée, un patient qui se présente avec une invalidité due à une lombalgie peut être difficile à traiter. Des éléments physiques et psychosociaux jouent un rôle dans le développement de la chronicité. En fait, les raisons psychosociales peuvent être l'élément le plus important dans le développement de la lombalgie et de l'invalidité résultante. Le comportement d'évitement de la peur est identifié comme un des composants du modèle bio-psychosocial de l'invalidité due à une lombalgie. Le clinicien doit reconnaître que les résultats de la thérapie dépendent de l'examen des éléments tant physiques que psychosociaux. Cette étude de cas tente de traiter les facteurs psychosociaux (en particulier le comportement d'évitement de la peur) chez un patient qui présente une invalidité due à une lombalgie par une approche cognitivo-comportementale qui comprend le dépistage, l'éducation et l'exposition graduée. Cette approche semble avoir joué un rôle dans le retour du patient à des tâches adaptées après une année d'absence du travail. Des études cliniques et expérimentales supplémentaires sont nécessaires afin de développer des mesures et des protocoles thérapeutiques et de définir lesquels sont les plus pratiques et efficaces à utiliser par le clinicien en pratique privée.
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MOTS CLÉS : psychosocial, lombalgie, disability.

* Private practice.
11404 – 40 Avenue, Edmonton, Alberta T6J 0R5
tel: 780-434-0505.

Introduction

It is well-known that prolonged time off work due to disabling low back pain diminishes the probability of returning to work. In fact, the probability of ever returning to work after an absence of one to two years approaches nil.[1,2] Consequently, the most appropriate approach relating to the reduction of low back pain disability would be early intervention and return to work early in the course of a low back injury or episode.[3,4] However, in private practice the stage of low back pain with which the patient presents (i.e. acute, subacute or chronic) is usually out of the control of the clinician. For a patient who presents with chronic low back pain and resultant long term disability, it can be assumed that the "window of opportunity" for early intervention and resumption of normal activities was never opened and taken advantage of. Therefore, to reduce the likelihood of chronicity it becomes important for the clinician to identify factors which influence the development of low back disability so that the most appropriate management strategy is implemented.

It has been established that disability as a result of chronic low back pain is multifactorial.[1] Therefore it follows that a successful treatment approach would attempt to identify and address most or all related factors.[5] Although a multidisciplinary approach may be best suited for the patient, this is not always possible due to cost and unavailability of a formal program.[6] The clinician in private practice must therefore be able to recognize that low back disability depends not only on severity of pain and objective physical impairment but also on the affective component and the pattern of developing illness behaviour.[7]

The influential role of psychosocial factors, even more than physical factors, in the failure to return to work as the result of low back injury is well documented.[8–14] The most reasonable approach for the clinician is then to consider both the physical as well as the psychosocial components of chronic low back pain. In a primary care setting the physical component may be addressed using functional restoration protocols regardless of the structural diagnosis.[15] Treatment emphasizing the structural lesion only and ignoring the functional disorder increases the probability of failure, predisposing the patient to depression and illness behaviour.[16,17] One strategy for addressing the psychosocial component is a cognitive-behavioural approach mapped out along three steps: screening, education and exposure.[18,19]

Screening for the numerous risk factors that may increase the probability of chronicity in the low back pain patient should be useful to the clinician. Indicators may be identified during the clinical history and examination.[5] Single factors have been categorized in an attempt to correlate their predictive value with the various stages in the progression to chronicity.[20] These are defined as primary, secondary and tertiary indicators.[20] Primary indicators predict which uninjured individuals may eventually suffer injury. Secondary indicators identify individuals with acute back pain who may eventually develop chronic back pain. Tertiary indicators predict those individuals with chronic pain who fail to improve with treatment. It should be noted that using a single variable across all patients or situations is inappropriate because of the multifactorial nature of low back disability.[5]

It is likely more appropriate for the clinician to consider grouped factors when assessing potential for chronicity and disability.[5] Self-reported pain and disability ratings, demographic, psychosocial and occupational factors are good predictors.[5] Conversely, imaging studies and physical examination are less effective as predictors.[5] Instruments for predicting treatment response and probability of chronicity are few and as of yet to be well validated.[5] However, there are a number of instruments that may be used in office to measure pain, disability and psychosocial status, which are practical and simple.[21] Pain may be measured using the visual analog scale (VAS) for intensity, and pain drawing (location). Measurement of psychosocial, lifestyle and disability factors may be achieved by using the Beck Depression Index, Waddell's Behavioural Signs, Oswestry Disability Questionnaire, Neck Disability Index, Roland-Morris Questionnaire and the Dallas Pain Questionnaire.[21]

With regard to screening it is important to note that psychosocial factors may be the most important to consider in the development of chronic low back pain.[7,9,22,23] Of the various psychosocial responses, fear-avoidance behaviour has been closely linked to chronic low back pain and disability.[7,9,23] In fact, the fear-avoidance model emphasizes the primary role of fear of pain and subsequent pain-avoidance behaviour as the most important cognitive-behavioural dimension in chronic low back pain.[7,24,25] Klenerman et al. (1995) found that fear-avoid-

ance behaviour was the single best predictor of pain and disability after two months, measured by the Roland-Morris Disability Questionnaire.[9] Furthermore an increase in predictive accuracy was obtained by combining demographic, historical, physical examination and fear-avoidance variables. After twelve months, greater accuracy was obtained by adding Waddell's Behavioural Signs, pain severity, modified somatic perception questionnaire, modified Zung depression index and the Oswestry Disability Questionnaire.[9]

If it is established that the patient's degree of disability is most likely due to fear-avoidance beliefs rather than structural or physical status, the next step with regard to behavioural intervention includes education.[18,19] It is suggested that prior to initiating education it is worthwhile to inquire what the patient is actually afraid of.[19] The goal would then be to challenge the patient's belief system and to cultivate the idea that their condition is not a serious disease; it can be self managed and overprotection from movement is counterproductive.[19]

Patients who have adopted fear-avoidance behaviour have beliefs and concerns about the causes of pain (such as herniated discs, severely damaged nerves or arthritis), and that certain activities or movements will make them worse.[19] This "hurt equals harm" coping strategy promotes fear of movement, activity avoidance, deconditioning, and ultimately debilitation.[26,27] Therefore, education of the patient should emphasize that "there is a difference between hurt and harm" to decrease the fear of movement.[27] This can lead to a resumption of daily or modified activities to restore function.[27]

The third step emphasizes a graded exposure to daily activities including work.[19,28] An attempt should be made to expose the patient to the specific movements and activities which invoke fear of pain and reinjury.[19,29] For example, if a patient fears reinjury of his back during transition from prolonged sitting to ballistic movements, then graded exposure should include tasks which mimic that specific activity while attempting to confront the fears that coincide with it.[29]

The purpose of this case is to emphasize to the clinician the importance of utilizing a biopsychosocial approach when dealing with a patient presenting with chronic low back pain and disability.

Case report

A thirty four-year-old Caucasian male police officer presented with the complaint of constant "low back pain" as the result of a motor vehicle accident twelve months prior. He reported that at the time of the head-on collision he was wearing the lap-shoulder-harness seat belt in the half-ton truck that he was driving. He stated that he was taken to hospital immediately after the accident, where radiographs were taken. He was prescribed medication and discharged within a few hours.

Over the next week, he developed severe low back pain with associated right side sciatica. After nine days of bed rest he was assessed by a physiotherapist and commenced treatments consisting of heat, massage, ultrasound, muscle stimulation and walking (5–15 minutes) at a frequency of three to four treatments per week. He reported that constant physiotherapy, medication (Tylenol 3) and walking helped him "get through the day" and allowed him three to four hours of sleep per night. He continued physiotherapy for a total of approximately eight months.

Approximately two months post-trauma, he was referred by his family physician to an orthopaedic surgeon as a consequence of his disabling back pain and right side sciatica. He was sent for a CT scan, which revealed moderate central and left side discal bulges at L4–5 and L5–S1. His surgeon concluded that he did not have a surgical lesion.

Approximately six and one half months post-trauma, he was referred by his family physician to another orthopaedic surgeon because of his unresolved symptomatology. His significant examination findings revealed limited forward trunk flexion by back pain. He was able to do only a partial squat because of back pain. Sitting straight leg raise produced a positive tripod sign bilaterally, which was now worse on the left. Lying supine straight leg raise was reported to be 75 degrees on the right with hamstring tightness and 60 degrees on the left with fairly acute signs of nerve root irritation. Motor, sensory and deep tendon reflexes were reported intact and equal bilaterally. There were no signs of an upper motor neuron lesion, and bowel, bladder and sexual function were intact. The orthopaedic surgeon suspected sciatica secondary to a lumbar disc herniation and consequently ordered a CT discogram.

CT discograms were performed approximately eight months post trauma with the associated follow-up visit with the orthopaedic specialist a few weeks later. The discogram study revealed degenerative disc disease at

L3–4, L4–5 and L5–S1. A central bulge was evident a L4–5 and a central and left sided bulge at L5–S1. The discogram study reproduced back pain but not sciatica. It was reported that the physical examination on that day produced straight leg raising limited to 60 degrees bilaterally with back pain but no reproduction of sciatica.

As a result of this study, the surgeon explained to the patient that surgical intervention in the form of fusion was probably not indicated (because of the amount of degeneration present) but was not absolutely out of the question. He suggested to the patient that the criteria would be to demonstrate consistent signs of sciatica in association with obvious nerve root impingement on radiological study. Arrangements were then made for a CT myelogram. Furthermore, he was referred to another physiotherapy clinic for ongoing conservative therapy and a work capacity evaluation.

The CT myelogram was performed approximately ten months post-trauma with follow-up consultation approximately one month later. The myelogram demonstrated some disc bulging at L4–5 and L5–S1 with left sided herniations but without definite evidence of nerve root impingement. The orthopaedic specialist diagnosed L3–4, L4–5 and L5–S1 degenerative disc disease and concluded that surgery was not indicated because the condition is back pain dominant. Therefore, he suggested that he continue with his rehabilitation program for another six months, reduce his pain medication intake and attempt modified duties.

The patient presented himself for chiropractic evaluation approximately one year post-trauma. He related a constant ache in his low back that radiated into his buttocks bilaterally. He rated his pain at 5 out of 10 (with 10 being the most severe), which was aggravated by prolonged standing, sitting and certain trunk movements. He reported occasional right posterior leg pain, especially with prolonged sitting. He was able to do light housework with only mild pain. He stated that pain disturbed his sleep after three to four hours but was relieved by bringing his knees to his chest.

At the time of consultation the patient was taking three to four Tylenol 3 per night. He was no longer under the care of a physiotherapist but continued to do "light rehabilitation" on his own. He had been off work since the day of the accident. Insurance and compensation matters were ongoing.

He reported a previous episode of low back pain four months prior to the motor vehicle accident, which was diagnosed as "disc related". He was successfully treated with conservative physiotherapy and returned to work within a few weeks of onset without complication. Further review of his medical history was unremarkable.

On physical examination the patient was not in distress. He was able to walk on his heels and toes. Active range of motion was limited by moderate local low back pain in flexion (approximately 40–50 degrees). There was no spasm or antalgia noted. A mild decrease in the lumbar lordosis, hypotonicity of the lumbosacral paraspinal muscles and hypertonicity of the thoracolumbar paraspinal muscles bilaterally was evident. Deep tendon reflexes were equal and symmetrical at the knees and ankles. Motor and sensory functions of the lower limbs were intact. Supine straight leg rising was 80 degrees bilaterally, producing only localized back pain without nerve root irritation. Static and dynamic articular challenge produced local pain and restriction at the level of L4–5 and L5–S1.

Behavioural response to examination (Waddell's signs) was positive for overreaction and simulation rotation.[30] A static back endurance test was performed to assess strength/endurance of the trunk extensors. The patient exemplified signs of apprehension when performing this test. When confronted he explained that he did not want to make the disc pain and degeneration worse. He scored significantly lower (35 seconds) than the normative value for his age group (97 seconds), suggesting decreased endurance of the trunk extensors.[31] The pain diagram VAS and the Revised Oswestry Low Back Pain Questionnaire was completed on the initial assessment.[32] The Oswestry score was 58% (40–60% suggests severe perceived disability) and VAS rated at 5 out of 10.

A working diagnosis of lumbar deconditioning syndrome and associated fear-avoidance behaviour with secondary symptomatic lumbar spondylosis was given. Deconditioning syndrome was identified as the primary diagnosis by the presence of immobility, muscle weakness and pain avoidance behaviour.[15]

Written and verbal informed consent was obtained before commencement of treatment. In office treatment/rehabilitation consisted of spinal manipulative therapy, manual resistive techniques, graded lumbopelvic progressive stabilizing exercises, rocker board sensorimotor stimulation exercises and education in biomechanics of

activities of daily living (i.e. maintain neutral spine during trunk flexion, change postures every 10–20 minutes, abdominal bracing, etc.).[15] Reassurance was given of the safety to gradually resume normal daily activities. One of the treatment considerations was the continual positive reinforcement of "hurt does not equal harm" during exposure to generalized movements. The ongoing motivation to work through the pain to optimize flexibility, strength and endurance was important to decrease the fear-avoidance of physical activity.[7,19,33]

A graded exposure task mimicking transition from sitting to ballistic movements was performed at each treatment. This included sitting for one minute then quickly standing on one leg while the clinician gently challenged his balance by tapping his torso in varying directions for twenty seconds. This procedure was then repeated using the other leg. This task progressed to stand on a rocker board from sitting and finally to challenged balance on rocker board from sitting. A home exercise protocol was established to include a cardiovascular component to be done at a local fitness facility. In office treatments were scheduled at three sessions/week for twelve weeks.

After the first twelve weeks of treatment, the Oswestry Disability Questionnaire and VAS was measured improving from a score of 58% to 30% and 5 out of 10 to 3 out of 10, respectively. The static back endurance test improved from 35 seconds to 55 seconds (normative value equal to 97 seconds).[31] Additional quantitative functional capacity tests were performed at this time, which included the repetitive sit-up test (score 17 reps, normative value 32 reps), repetitive arch up test (score 17 reps, normative value 29 reps), and repetitive squat test (score 27 reps, normative value 42 reps).[31] At this time the patient had returned to full time modified duties consisting of deskwork.

Continuing rehabilitation of this patient emphasizes the home exercise program of spinal stabilization and cardiovascular fitness. Chiropractic treatment/rehabilitation was reduced to one to two treatments per week for the next eight weeks. Chiropractic care will continue to be goal directed and time limited.[33] The goal of returning to full time patrol constable with reduced dependency on painkillers and passive care was set for six months or less from the last functional capacity evaluation.

Discussion

The case history reveals a number of relevant tertiary predictors for chronic disability. Occupational factors such as ongoing compensation and prolonged duration off work were identified.[34] Pain profile revealed a moderate and high score of self reported pain intensity (VAS) and disability (Oswestry Questionnaire), respectively.[11] Current activity levels were diminished and the report of intermittent leg pain was noted.[34] Also, the onset of pain as a result of trauma (accident related) may be considered as a psychosocial predictor for chronicity.[35]

Other important factors reported in the clinical history that may have played a role in the development of chronicity and disability were the initial emphasis on prolonged bed rest (i.e. nine days) and passive care.[36] Combined, these two factors propagate the negative effects of immobilization and contribute to deconditioning.[37] It has been suggested that bed rest lasting longer than two days may be counterproductive.[2]

It has been pointed out that compared to the clinical interview, the ability of clinical examination findings to predict treatment outcomes and chronicity is less reliable.[5] Reduction in true thoracolumbar flexion and hip flexion has been identified as a tertiary predictor.[11] Although in the case presented thoracolumbar flexion was estimated and not instrument measured, an apparent reduction in active flexion was noted and considered as a possible predictor of continued low back pain and disability.

As a point of interest, the patient also scored poorly on the static back endurance test and exhibited positive Waddell signs. These are classified as primary and secondary predictors, respectively, and their reliability and validity have not been established when discussing a chronic low back disability patient.[38,39]

It became apparent when considering the grouped results of the historical and physical examination data with results of the fear-avoidance data (that is, Oswestry Questionnaire results suggesting severe disability, positive Waddell behavioural signs, VAS results and apprehension during the static back endurance test) that management of this patient focusing solely on the pain intensity and physical impairment would likely be met with a poor outcome. Therefore, intervention strategy including physical and cognitive-behavioural parameters needed to be implemented.

It was postulated that with this patient the developing

fear-avoidance beliefs began with the uncertainty of the diagnosis. From the onset an early aggressive rehabilitation program did not take place, in part due to the continual search for a structural diagnosis. Waddell found that fear-avoidance beliefs do not increase with pathological severity but rather with an increase in uncertainty of diagnosis.[7] Eventually, fear-avoidance beliefs continued to develop with labelling of the patient as having a herniated disc and degenerative disc disease. Labelling may have enhanced his perception that he is "seriously injured" or diseased and that physical activity and work would worsen his condition.[40] With this mind, an effective education program for this patient would then provide reassurance that there is no serious disease or injury and that "hurt does not equate to harm" when performing normal activities.[19,23,27]

Educating the patient with the principle described above was a component of each office visit and reinforced during flexibility, lumbopelvic stabilizing and rocker board exercises. Performing physical movements concurrently with receiving reassurance allowed the patient to experience a change in behaviour and challenged his fear-avoidance beliefs. This technique would appear to facilitate behavioural change more effectively than the use of in-office lectures alone.[19]

Implementing graded exposure to this patient's specific pain-related fear stimuli was met with some barriers. The most important was the limitations (safety and legal issues) expressed by the employer in gradually exposing this patient to his normal work demands (officer on patrol). The challenge would be to gradually introduce this patient to activities which mimic tasks such as suddenly engaging in foot pursuit or physical combat after prolonged sitting in a police cruiser. During these activities it would be important to reassure him that these tasks may be uncomfortable but would not cause reinjury. Consequently, an attempt was made in the clinic to perform a physical task (stand on one leg with the clinician challenging his balance) after a period of sitting. This exercise was designed to gradually progress to a more difficult task (i.e. challenge balance on a rocker board) over time. Although it can be argued that this exercise did not mimic the exact demands of his employment, it was an attempt to address his fearful belief that sudden movements after sitting would aggravate his herniated disc and degenerative spine.

This case demonstrates the importance of assessing and treating not only the physical component but also the psychosocial component of the patient presenting with chronic low back pain and disability. In this case, he was encouraged and able to return to modified desk duties after a one-year absence from work. A cognitive-behavioural approach to reduce fear-avoidance behaviour appeared to play a role in his return to work. His future progress and eventual return to full-time demands of employment depend on many variables.

One must keep in mind that this case presents with some limitations. One such limitation is that no specific tool for measuring the patient's fear-avoidance beliefs was utilized. The Fear-Avoidance Beliefs Questionnaire (FABQ) has the ability to measure fear-avoidance beliefs in a primary contact setting.[7,19] It consists of 16 questions and measures fear-avoidance beliefs on two scales, regarding work and physical activity.[7] Perhaps a more specific understanding of the patient's fear avoidance beliefs could have been obtained with use of the FABQ. Use of a more reliable and valid measure may have led to the implementation of a more specific treatment protocol with the consequence of better treatment outcomes. Furthermore, the question arises, could the FABQ have been used in this case for early detection of developing fear-avoidance beliefs, to prevent chronicity and disability?[7,19]

It seems certain that this patient would have benefited more from a multidisciplinary rehabilitation program which emphasized a biopsychosocial approach. As discussed earlier, this was not possible. It has been suggested that the clinician in a private practice may improve treatment outcomes by developing a network of professionals that he/she may refer to when dealing with the multifactorial causes of chronicity.[5]

Conclusion

This case should make the reader aware that the development of low back disability is dependent on many biopsychosocial factors. Management of this case was an attempt at a cognitive-behavioural approach to address the psychosocial factors, specifically fear-avoidance behaviour. Screening for risk factors, education and graded exposure to the fearful movements were utilized. For the artful clinician in a private setting questions arise, such as which factors predict and/or initiate chronicity: which practical, valid and reliable tools are there to measure

these factors; and which treatment algorithms have been developed so that the most appropriate interventions may be implemented? Further empirical and clinical studies are needed to answer these questions.

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