

A TARGETED COGNITIVE FUNCTIONAL APPROACH FOR THE MANAGEMENT OF BACK PAIN

– Written by Peter O’Sullivan, Australia

THE FAILURE OF CURRENT PRACTICE

“I am almost 25 years old and up until June 2007 I was very active and played a lot of sport. My back problems began in late 2004 – the physical therapist gave me core strength exercises. I was determined not to re-injure my back and did a lot of core stability/strength work prior to the June 2007 injury. In June 2007 I felt some restriction and pain on the lower right side of my back. It is still the same today and I am nowhere near the once active lifestyle I had a few years ago.

I have seen a number of specialists including, physical therapists, chiropractors, osteopaths, orthopaedic surgeon, neurosurgeon, sports physician, golf physical therapist, pain doctor and have tried orthotics to try and get rid of my leg length discrepancy.

My MRI shows a damaged L5/S1 disc and damaged L4/5 disc. Up until a few months ago I didn’t really know what was causing my pain until I had a discogram done. I could

only describe it as the worst pain I’ve ever had when they put a needle in my L5/S1 lumbar disc. This proved that the majority of the pain and problems are coming from this area. A neurosurgeon says he can perform a fusion on my lower back but I think this may be very risky.

I am disappointed that I can never play basketball, golf or go for a run ever again. Does my back problem sound like something that you may be able to help me with? Is surgery the right thing for a 25-year-old? My pain is very restricting which is why I am considering surgery.

Is this the kind of problem you can help? I would like to get a professional opinion on my back problem.”

– By email, July 2010

This true story highlights the enormous personal, social and economic burden of persistent back pain (PBP) disorders and the failure of current therapies to effectively manage the problem. Back pain is the leading

cause of disability in the western world and major reason for activity avoidance and athlete retirement. The biomedical approaches to manage PBP over the past 15 years have led to an exponential increase in rehabilitation therapies that have largely focussed on: enhancing core stability of the spine, MRI imaging, spinal injections, surgical interventions and pharmacological treatments. These approaches have resulted in a massive increase in healthcare costs, associated with a concurrent increase in disability relating to PBP¹.

THE MULTI-DIMENSIONAL NATURE OF PBP

There is growing evidence that PBP disorders in both sporting and non-sporting populations are associated with a complex combination of factors such as: pathoanatomical, physical, lifestyle, psychological, cognitive, social, neurophysiological and genetics, all of which can co-exist to maintain a vicious

cycle of pain, distress and disability^{2,3}. These factors are discussed below.

Pathoanatomical factors

A definitive pathoanatomical diagnosis cannot be made for the majority (85 to 90%) of low back pain (LBP) disorders, while 'red flag' disorders such as malignancies, fracture and nerve compression only account for 1 to 2% of cases⁴.

In pain-free populations there is a high prevalence of abnormal findings on MRI scans such as:

- disc degeneration (91%),
- disc bulges (56%),
- disc protrusion (32%) and
- annular tears (38%)⁵.

This makes a pathoanatomical diagnosis difficult. Furthermore, prospective studies support that depression is more predictive of future LBP than MRI results⁶.

Early MRI imaging for minor back strains has been shown to result in poorer prognosis, increased instances of sick leave and a higher possibility of surgery⁷. This highlights the potential iatrogenic influence that imaging plays in LBP. This research also confirms that healthcare practitioners (HCPs) play a critical role in communicating radiology findings in a manner that is evidence-based and does not create fear and anxiety, causing the patient to catastrophize their condition.

Physical factors

Extrinsic factors

An increased risk of back pain is linked to specific sports associated with sustained and cyclical loading of the spine – especially when rotation is coupled with side bending. These sports-specific factors interplay with training loads, increasing the risk of back pain. For example, sports such as cycling, hockey and rowing are associated with increased flexion loading with or without rotational strain, whereas sports such as dance, gymnastics, tennis and fast bowling in cricket are associated with increased



© Renee McKay / Stringer / Getty Images

extension strain coupled with side bending and rotation. Considering these extrinsic factors in conjunction with the demands of coaches and the sport as well as the intrinsic factors of the individual is important for targeted management.

Intrinsic factors

While there is limited prospective evidence to support individual risk factors as strong predictors of LBP there is evidence for the presence of changes in motor control linked to the persistence of LBP. People with

PBP generally show increased trunk muscle co-activation, an inability to relax the back muscles^{8,9} and a tendency for earlier onset of feed-forward activation of the transverse abdominal muscles¹⁰. This challenges the underlying basis of using core stability exercises which are so prevalent throughout the world.

Growing evidence suggests that people with PBP may adopt maladaptive postural and movement patterns that actually become provocative of their disorder^{8,11}. This is similar to the 'limp' that occurs when a

person sprains their ankle and that then persists beyond the natural tissue healing time. These patterns are not stereotypical and may, in some back pain cases, be associated with maintaining hyperlordosis (termed an active extension pattern where a person actively holds their back in lordosis during functional tasks such as sitting, bending and lifting) or result in focal flexion stress to the low back (flexion control pattern where the person initiating forward bending and lifting by fixing their pelvis with their posterior hip muscles and flexing their low back with excessive abdominal wall activation)^{8,11}. These clinical patterns can be characterised and identified by trained therapists^{12,13} and present an opportunity for targeted rehabilitation.

Deconditioning and muscle weakness in one body region can also alter patterns of motor control in a proximal region. For example, weakness of the gluteal muscles has been shown to increase lateral trunk shift and levels of co-contraction with single-leg loading, resulting in increased spinal loading.

High levels of back muscle activation correlate with pain intensity, disability

levels and a range of psychological factors all of which support the close mind/body relationship that exists in people with PBP⁴. There is also evidence that altered movement behaviours are associated with central nervous system changes, reflecting altered body perceptions (the brain's representation of the body)^{15,16}.

Lifestyle factors

Smoking, sedentary behaviour, activity levels, obesity, sleep deficits and chronic stress are all known to be risk factors that can act to both peripherally and centrally sensitise PBP^{17,18}.

Cognitive factors

Negative beliefs and fear of movement and activity are more predictive of pain-related disability than pain intensity levels¹⁹. HCPs provide a critical role in transferring beliefs with regard to back pain to their patients. Language such as 'your back is unstable' may be interpreted as 'my back is damaged and it's dangerous to move'. A comment that states a 'lack of core stability' may lead the patient to believe that 'my back is weak and vulnerable and

I need to be vigilant to protect it when I move'. Words such as 'disc degeneration' and 'wear and tear' may also have long-lasting negative effects^{20,21}. These may result in hyper vigilance and catastrophizing. The responsibility of the HCP is to use language that builds confidence and empowers the patient, in a way that reflects a contemporary bio-psycho-social understanding of their back pain.

Emotional factors

Emotional factors such as stress sensitivity, anxiety, depression and anger can act to reinforce maladaptive behaviours, further enhancing the pain experience and disability levels². They can also influence pain processing, both centrally and peripherally, through dysregulation of the hypothalamic-pituitary-adrenal axis, altered immune and neuroendocrine function and cortical changes²².

Social factors

Work-related issues, expectations of the coach, sport demands, family stress and cultural factors can all have an influence on pain beliefs, coping and vulnerability^{2,3}.





targeting the modifiable beliefs and behaviours that drive pain and disability is more effective than simply treating the symptoms of pain



Neurophysiological factors

Back pain can present as a spectrum, from mechanical (pain that is localised and predictably provoked and relieved with movements and postures), to non-mechanically provoked pain (pain that is more constant and more widespread, either not provoked and relieved with movements and postures or where minor mechanical provocation results in a disproportionate pain response – reflecting a spectrum of peripheral nociceptive pain to more centrally mediated pain)²³. Other studies have associated PBP with a loss of grey matter in the brain, increased resting state of the brain, changes in the sensorimotor cortex and loss of endogenous pain inhibition; factors that contribute to widespread sensory changes as well as altered motor functions and movement disturbances^{16,24}.

Genetic factors

There is growing evidence to support that genetic variations, as well as environmental interactions, have a potential influence on pain and structural vulnerability in specific populations²⁵.

Individual considerations

The presence of health and pain comorbidities, the patient's goals, values, levels of acceptance, expectation and

readiness for change are all known to be important considerations in the assessment, management and prognosis of people with PBP^{2,3,19,26}.

Evidently, there is a clear need for a consensus in the diagnosis and classification of PBP disorders. A multi-dimensional clinical framework is proposed, directed by a clinical reasoning process based on the patient's 'story', screening questionnaires^{27,28} and clinical examination. During this process consideration is given to determine the relative weighting, dominance and relevance of the variety of factors with regard to the individual's disorder.

TARGETED COGNITIVE FUNCTIONAL APPROACH TO MANAGEMENT OF PBP DISORDERS

There is growing evidence that targeting the modifiable beliefs and behaviours that drive pain and disability is more effective than simply treating the symptoms of pain^{29,30}. This must be combined with discussion with the coach and consideration of managing training loads.

Cognitive functional therapy (CFT) is an integrated, person-centred, goal-orientated management approach for PBP. The focus of this process is directed by the findings taken from the multidimensional examination, with regard to the indicated primary contributing factors across the different

domains linked to the patient's disorder. Developing a strong clinical alliance, utilising motivational interview techniques, underpins this process.

The key cognitive aspects of the CFT approach involve:

- Addressing negative beliefs and fear regarding pain with positive information regarding the spine's resilience³¹.
- Providing epidemiological advice regarding MRI findings.
- Providing effective patient-centred education regarding the multidimensional bio-psycho-social mechanisms that drive their vicious cycle of pain and disability.
- Promoting active coping strategies for pain – installing confidence and hope for change.
- Facilitating goal-orientated behavioural change regarding stress management, sleep, physical activity, pacing and diet.
- Training mindfulness of body and movement.
- Feedback is critical and involves:
 - Mindfulness of the body/mind responses to pain, movement and its perceived threat.
 - Visual feedback with the use of mirrors, video and written instruction.

Functional behavioural aspects of the CFT approach include:

- Maladaptive movement and pain behaviours are identified and provocative movement patterns are broken down into component parts and retrained in a mindful/relaxed manner in order to provide strategies that will enable the patient to master pain control.
- The 'new' movement behaviours are gradually targeted towards the activities and movements that provoke pain and/or are avoided by the patient in order to reduce the threat value of the task and normalise it.
- These new behaviours are then integrated into the patient's daily life and sporting activities in a graduated manner.
- Targeted strengthening and conditioning is incorporated as required by the functional goals of the patient and the specific demands of the sport.

- Pacing and the use of diaries are a component of this process where poor coping strategies persist.

In situations where central pain mechanisms and/or psychological comorbidities dominate and present an obstacle for management, CFT may be integrated with medical and/or psychological management. Manual therapy is only used as a window of opportunity to change behaviours where movement impairments are present, rather than being a treatment in isolation.

A recent randomised controlled trial has shown that CFT resulted in superior long-term outcomes of reduced disability, pain intensity and episodes, fear, improved mood, reduced need for ongoing care and sick leave, when compared to physiotherapy-led manual therapy and stabilising exercises³⁰. This approach has also been shown effective in sporting populations. Further randomised trials are underway.

It is also proposed that this model of assessment and management may apply to musculoskeletal pain disorders in general.

SO, WHAT HAPPENED TO THE YOUNG MAN?

The young man, whose email appears at the start of the article, had a belief that his “back was damaged” and, despite numerous visits to HCPs, he had no active coping strategies to manage his LBP. He was hyper-vigilant to his pain, fearful, anxious and avoidant of movement and activity. He had a predominant mechanical behaviour to his pain linked to movement and loading his right leg. This was reinforced by adopting provocative movement patterns related to avoiding loading his right leg and abnormal bracing strategies through his back and abdominal wall muscles – associated with fear of pain. He was deconditioned (especially relating to loading of his right leg), was in a depressed state and had low levels of self-efficacy. He had adopted unhealthy lifestyle habits, such as sedentary behaviours and poor sleep and dietary habits. He had little hope for change. Most of his beliefs and behaviours were reinforced by well-meaning HCPs.

Based on these findings, he was provided with an individualised CFT intervention that involved educating him to the fact that his MRI findings were common in active people without pain and that pain does not equal harm. It was explained that his pain state represented sensitisation of his nervous system fed by a vicious cycle of fear, anxiety, negative beliefs, vigilance, protective muscle guarding and avoidance of movement and activity. The fact that the spine is strong and robust was impressed on him, as was the importance of adopting relaxed, normal patterns of movement and healthy lifestyle habits.

In conjunction with this cognitive re-education he underwent a targeted, graduated, functional rehabilitation programme that focused on training him to relax his back and abdominal wall muscles through diaphragm breathing and adopting relaxed postures and movements. He was given a graduated programme of loading his right leg with visual ‘mirror’ feedback to reinforce a normal body awareness and fear reduction. Once he realised that to load his leg and move in a relaxed manner in fact reduced his back pain, his fear of activity reduced. This was progressed in a gym setting where his functional capacity was gradually developed around his goals to run and play golf and basketball again. Whole-body functional movements were used to reinforce confident, relaxed movements specific to these sports.

He sent another email in December 2010, after he had completed this programme:

“Just an update on my lower back problem.

It has been just over 6 months since I began my rehab programme and I have improved in lots of areas. My fitness has gotten better and I am doing things that I believed I would never do again.

A previous PT told me I could never run again...I ran five kilometres the other day, played basketball and then played volleyball in the evening.

I am doing these things with a bit of pain, but it decreases when I’m active and not thinking about it.

On a good day I almost feel perfectly normal and just want to go out and be active.

I would like to thank you for getting me back on the right track.”

This young man is now fully active with no need for ongoing health care. He has confidence in his back and hope for the future. This outcome is not the case for all people with PBP and, sadly, many never get the opportunity to take this journey.

It is our challenge as HCPs to help our patients on this journey!

For future information on this approach and patient stories refer to: www.pain-ed.com

Permission was granted by the patient to reproduce his emails.

References

Available at www.aspetar.com/journal

Peter O’Sullivan Ph.D.

Professor

School of Physiotherapy and Exercise Science

Curtin University

Perth, Australia

Contact: p.osullivan@curtin.edu.au