Beyond the physical

Drawing on a case study that he will present during the APA conference, Specialist Sports Physiotherapist **Joao Paulo Caneiro**, FACP, describes the use of cognitive functional therapy in the management of a footballer with non-specific chronic low back pain.

Contemporary literature proposes that the experience and responses to pain result from a complex interaction of biopsychosocial factors (Campbell & Edwards 2009), supporting the need for a multidimensional approach in dealing with persistent back pain disorders (O'Sullivan 2011). This report describes the clinical presentation of an athlete with a history of gradual onset of low back pain (LBP) and its development to a chronic state. It outlines the contributing factors to this disorder, highlighting the multifactorial nature of chronic LBP. The aim is to demonstrate the application and outcomes associated with a classification-based cognitive functional intervention used to manage this athlete's disorder.

Case description

A 20-year-old West Australian Amateur Football League player and licensed carpenter reported a 12-month history of LBP. He noticed a gradual onset of LBP weeks after he started a full-time job as a carpenter. The pain was worse at the end of the day, after lifting heavy objects. He reported that his back was aggravated by static postures (sitting, standing, sustained bending) and activities (running, bending, lifting, and stabilisation exercises). A MRI scan (organised by the GP) reported L5/S1 disc degeneration with minor posterior disc annulus fissuring, but no evidence of focal disc herniation or neural entrapment. Based on the scan, he was told to be careful and avoid bending or lifting in order to protect his back. The physiotherapy management at that time consisted of stabilisation exercises and deep abdominal muscle activation integrated to function. After three months of minimal improvement in pain and progressive increase in disability, the patient had stopped working and training completely.

He reported high levels of stress (7/10), anxiety (7/10) and depression (6/10) due to the nature of his disability, the inefficacy of the proposed treatment, his inability to train for football, exercise, work and socialise with his friends. The athlete reported LBP (occasionally spreading to the buttock region) as deep, constant, dull/ache in nature with 4/10 intensity (on the visual analogue scale [VAS]), that would occasionally progress to a sharp/catching pain with movement (7/10 VAS). He was classified as high risk for chronicity (STarT Back screening tool [Hill et al 2011]) and moderate risk of work-related disability (OMPQ 109/140 [Linton & Boersma 2003]), his disability level (RMDQ [Roland & Fairbank 2000]) was 13/24, catastrophising was 28/52 [Sullivan et al 1995]), and he had low levels of functional capacity (PSFS [Startford et al 1995]) and high levels of kinesiophobia (Tampa scale 54/68 [French et al 2007]).

Observation of sitting and standing postures revealed extended thoraco-lumbar spine and loss of lordosis of the lower lumbar spine with sustained co-contraction of abdominal and paraspinal muscles (bracing). AROM analysis revealed that slow movement, breath-holding, and co-contraction of the abdominal and paraspinal muscles (observation and palpation) reported pain through range; however, full ROM was achieved in all directions.

Functional movement tests—bending to pick up a pen, sit to stand and squatting to lift 5 kg—were associated with pain (5/10 VAS) and were performed with an extended thoraco-lumbar spine and flexed lower lumbar spine, and sustained co-contraction of abdominal and paraspinal muscles. A squat-hold test with neutral lordosis revealed low lower limb endurance (20 sec).

Correction of movement patterns—bending with a relaxed abdominal wall (breathing through movement), facilitating thoracic flexion, anterior pelvic tilt, slight knee flexion and using the legs/hips to return to upright—led to immediate reduction in pain and abolishment of pain communicative behaviours (guarded postures, facial grimaces, protective behaviour). The same pain reduction was observed during squatting and lifting, indicating the adopted movement behaviour was provocative (maladaptive).

Neurological screening was unremarkable, with an absence of neurological (reflexes, sensation and power) or neural provocation findings

Passive physiological motion segment testing was normal. Provocation palpation L5/S1 central reproduced the athlete's LBP. It also revealed tenderness over erector spinae (ES) and quadratus lumborum (QL).

Analysis/clinical reasoning

Even though the area of pain correlated with disc degenerative changes on MRI at L5/S1, the patient's symptoms were modifiable by changing his behaviours. Recent studies suggest that these MRI changes are not strongly predictive of future lower back pain (Jarvik et al 2005). Other factors such as the patient's maladaptive cognitive, affective and movement behaviours are more likely to be associated with the sensitisation of the spinal segment. In addition, Flyn et al (2011) describe that a patient's knowledge of imaging abnormalities can actually decrease self-perception of health and may lead to fear-avoidance and catastrophising behaviours.

The belief that the lumbar spine (disc) was damaged and the advice to stabilise it in order to avoid harmful movements and to prevent further damage (reinforced by healthcare professionals' advice) appeared to perpetuate a number of maladaptive cognitive and movement behaviours that were provocative to the patient's disorder. He was also highly deconditioned and adopted unhealthy lifestyle habits such as poor sleep, poor diet and sedentary behaviour. This reinforced fear of movement, catastrophising, hypervigilance, pain focus, anxiety related to movement, stress, depressed mood and excessive muscle guarding, potentially sensitising his back via both central and peripheral nociceptive mechanisms.

Treatment/intervention

This consisted of cognitive functional therapy based on his classification and delivered within a multidimensional framework. A total of six visits were delivered over 10 weeks.

Initially the athlete was educated regarding the multifactorial nature of his disorder leading to pain sensitisation, and that MRI findings such as disc degeneration are common in active pain-free people. His fear of further 'damaging' his back led to anxiety, hypervigilance, avoidance of activity and consequent inability to relax the motor system. These factors likely contributed to central nervous system amplification of pain, deconditioning, distress and disability, causing further LBP and maintaining a vicious cycle of pain. This was explained to him in diagram form, providing him with awareness of the pain mechanism and contributing factors responsible for the ongoing pain experience.

From a cognitive-functional perspective, the aim was to provide the athlete with alternative strategies to normalise his postural, movement and pain behaviours. Demonstrating to the athlete that relaxing his trunk muscles and normalising his movement patterns reduced his back pain challenged his belief that his spine was damaged. This involved the use of movement education, pain feedback with movement, videos and mirrors to facilitate changes of movement behaviour through body awareness. He was initially instructed to learn diaphragmatic breathing in relaxed postures such as lying, sitting and standing. Relaxed movement with diaphragmatic breathing provided immediate reduction in pain during bending. This was progressed to targeted functional postural and movement training aimed at optimal load distribution through the trunk and lower limbs. For instance, during lifting, the athlete was instructed to keep the trunk relaxed and drive the movement from the hips, followed by the knees and finally from the back; on return, lift from the legs and not the trunk. This promoted immediate reduction in pain during lifting. It was emphasised that bending the spine is normal and safe. Load and speed were progressively increased, allowing him to return to the gym in a non-threatening and provocative manner.

To re-integrate this athlete to sports-specific training, he was encouraged to participate in sessions with his teammates (eg, stretching sessions with the group). More specific tasks such as running, changing directions, jumping and marking were gradually integrated into training in a progressive manner. Contact drills were progressed from a controlled to an uncontrolled environment. Once the athlete was participating in mini-games, including full contact, he was ready to return to full training.

Outcomes

After the intervention (three months) the athlete presented with reduced levels of pain (VAS 1/10), disability (RMDQ 0/24), work-related disability (OMPQ 71/140), catastrophising (7/52) and fear (TAMPA 32/68). He presented with increased levels of function (PSFS 37/40) and conditioning (running tolerance 60 min and squat-hold 120 sec). The athlete gradually increased his functional activity, which culminated in return to full training and duties at work (Table 1).

Discussion

This case report highlights the importance of identifying pain-related psychological variables such as stress, depression, anxiety, catastrophising and pain-related fear via interview and the use of validated questionnaires. These factors are commonly associated with disabling pain (Meyer et al 2009), lower tolerance for physical activity (Thibault et al 2008), prolonged work disability (Martel et al 2010) and return to sport (Chmielewski et al 2008), and have been reported to have physical, neuro-muscular, lifestyle and neuro-endocrinal consequences, highlighting the body–mind interactions (Campbell & Edwards 2009). Yet they are rarely considered in clinical practice for sporting populations.

It is therefore of vital importance that maladaptive beliefs are corrected as part of a multidimensional management plan (Gatchel et al 2007). There is growing evidence that educational strategies that address neurophysiology/biology of pain can have a positive effect on pain, disability, catastrophisation and physical performance for chronic musculoskeletal pain disorders (Mannion et al 2012, Louw et al 2011, Balderson et al 2004).

From a physical perspective, patients with non-specific chronic low back pain have been found to have on average greater trunk muscle activity compared to asymptomatic individuals, which has been associated with greater trunk stiffness and spinal loading/stability (Moorhouse & Granata 2005). This evidence suggests that this athlete would not be suitable for the use of exercises that provide additional trunk stability as it may act to further reinforce his protective behaviours.

This report illustrates the management of an athlete with a maladaptive cognitive and movement control disorder. It provides an insight into an integrated multidimensional approach to dealing with persistent LBP in an athlete. This case study is supported by recent RCT evidence as to the benefits of this approach (Vibe Fersum et al 2013).

The author acknowledges the support of Professor Peter O'Sullivan, FACP, in the preparation of this article. Email ngeditor@physiotherapy.asn.au for references.

Joao Paulo Caneiro is a Specialist Sports Physiotherapist with a clinical master's in sports physiotherapy and a research master's in biomechanics. He works at Body Logic Physiotherapy in Perth and tours internationally for major competitions as part of the Australian Rowing medical team. In addition to his clinical work, he is part of a research team led by Professor Peter O'Sullivan at Curtin University. Joao Paulo is currently involved in clinical research of spinal pain disorders and a new management approach called cognitive functional therapy for non-specific chronic lower back pain.

TABLE 1. Comparison of the outcome measure scores pre- and post-intervention (three and six months)

OUTCOME MEASURES	PRE	POST (3 months)	POST (6 months)
STarT Back Questionnaire (Hill et al 2011)	High risk (Total score 7/9; sub-score 5/5)	Low risk (Total score 2/9)	Low risk (Total score 0/9)
Orebro Musculoskeletal Questionnaire (Linton & Boersma 2003)	109	71	69
Roland Morris Disability Questionnaire (Roland & Fairbank 2000)	13/24	0/24	0/24
Patient Specific Functional Scale (Startford et al 1995)	RUN=0 BEND=2 LIFT=0 SIT=3 TOTAL=5/40	RUN=9 BEND=10 LIFT=9 SIT=9 TOTAL=37/40	RUN=10 BEND=10 LIFT=9 SIT=10 TOTAL=39/40
TAMPA Kinesiophobia Scale (French et al 2007)	54/68	32/68	25/68
Pain Catastrophising Scale (Sullivan et al 1995)	28/52	7/52	1/52
VAS (average over a week)	4/10	1/10	1/10
Running tolerance	0 min	60 min	60 min
Lower limb endurance (squat-hold)	20 sec	120 sec	200 sec