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biopsychosocial pain

Biopsychosocial pain : Pain and brain - the biopsychosocial method of chronic injury rehabilitation

In the first part of this two-part series we discussed the current scientific evidence surrounding pain and how pain can become persistent and maladaptive despite prior healing of the tissue injuries that initially cause the pain. In the second part, Stephen Robson and Louis Gifford explain exactly how this 'biopsychosocial' approach can be used to rehabilitate chronic injuries.

The conventional approach to treating pain and injury will almost certainly include a biomedical assessment, ie an assessment of the state of the tissues that may be involved with each person's pain. This is the part of clinical examination that most people are familiar with, involving physical testing of things like joint movements, muscle power, reflexes etc. Good biomedical assessment tries to determine the following:

- Is there any evidence that might indicate serious injury or disease?;
- Is the problem a 'common syndrome' with a well- defined natural history? For example, frozen shoulder is a common syndrome that can be predicted in terms of its longevity and prognosis;
- Is the nervous system competent? This requires skilled and appropriate neurological testing;
- Are the tissues that hurt or that may be responsible for the pain strong enough to be progressively loaded?;
- What pain mechanisms are operating and are they adaptive/helpful or maladaptive/unhelpful?
(see box, below)

What kind of pain have I got?

Knowing whether the pain associated with an injury is adaptive (helpful) or maladaptive (unhelpful) is critical to determining how to progress and rehabilitate that injury. Although a proper diagnosis requires a skilled and qualified physiotherapist, there are some useful pointers:

Adaptive pain

- Produces behaviours that promote recovery and healing. A sprained calf muscle is usually very sore to walk on the next morning because the pain is demanding that you look after the muscle while the first (inflammatory) stages of the repair process get underway;

- After a day or two the initial pain of movement subsides as you move the tissues more and more, indicating that the healing tissue likes some movement;
- Move too much and the tissue gets sore again and demands more rest;
- Rest too long and the discomfort can also get you to move once more - ie adaptive pain makes you stop a bit, and go a bit - just what healing requires.

NB. If tissues have a history of injury, or are arthritic, some adaptive pain may have to be accepted. However, these tissues can still be rehabilitated to become very strong and capable of high performance given appropriate functional graded exercises and adequate warm-ups on the day.

Maladaptive pain

- Often out of all proportion to the actual tissue damage done (eg the nerve pain described in Sam's case - see case history lower on page);
- Pain persists long after the initial injury, even though the healing phase has been completed;
- Pain is the problem rather than the actual tissues that contain the pain, which may be just weak, deconditioned or contain modest scar tissue, none of which make pain inevitable;
- May often require a carefully graded, acceptable and activity-relevant approach to strengthen the tissues and fully rehabilitate the athlete.

The biopsychosocial approach differs, however, in that it also focuses on psychological and social factors (see box below), which have been shown to be vital considerations in predicting the outcome from a musculoskeletal pain problem - even stronger predictors of outcome than any individual biomedical measures.

Psychosocial assessment

A psychosocial assessment is often logically carried out using the headings A, B, C, D, E, F and W⁽²⁾:

- **Attitudes and beliefs** about pain.
- **Behaviours**; how people respond to pain, what they avoid or have difficulty with and how they react and report their situation.
- **Compensation issues**; compensation, disputes, financial hassles and legal wrangles following injuries often create a lot of stress for people and certainly do not help.
- **Diagnosis and treatment issues**; what health professionals say to patients. For example, complicated medical language and diagnoses, conflicting diagnoses, explanations that create notions of physical weakness or long-term incapacity (you have the spine of a 70 year old),

dramatic and unscientific explanations of injuries and pathology and ‘salesmanlike’ approaches to therapy that can falsely raise expectations of a ‘quick and easy’ cure.

- **Emotions;** chronic pain and injury can lead to increasing levels of distress, altered routines and habits, reduced social interaction and even clinical depression. Athletes experiencing pain should be involved in taking control and responsibility for their pain, which is often the start of improved fitness, self-esteem and the confidence to move forward.
- **Family;** family and friends can have a big impact on how individuals react towards their pain, sometimes reinforcing a ‘be careful don’t move’ style of coping while at the same time taking away responsibilities and making the athlete feel hopeless and useless.
- **Work;** being engaged in both the physical and mental tasks of work are essential components for recovery. If you reduce or stop physical activity and work, you’ll have nothing better to do than sit around and think about your pain all day every day. It is a sobering statistic that 90% of people who are ‘off work’ for six months or longer never return to full-time employment⁽³⁾.

For example, an athlete with a significant disc protrusion causing back pain and sciatica will not necessarily have a poor outcome, but if he or she believes that any activity that provokes the slightest discomfort should be avoided and as a result rests completely, the likelihood is that it will be harder to return to sport and normal activities than had the athlete confronted their problem and tried to keep going. In short, the outcome for any sportsman or woman suffering from pain and injury is hugely determined by how they interpret and react to the situation they are in.

Clinicians also have a huge impact on how well patients cope and how they recover, most especially early on. For example, advice and therapy that creates fear of movement, or fear of biomechanical or structural weakness, or that focuses too much on pain at the expense of function, has enormous negative connotations. However, an approach that appropriately reassures the patient with evidence-based education, advice and functional rehabilitation can progressively restore their confidence, assist recovery and get them back to normal activity⁽¹⁾.

Biopsychosocial approach in action - case studies

The two case histories that follow are not meant to be prescriptive for the pain problems both of these athletes were facing. Instead they give some practical examples and ideas that can be helpful in the treatment and management of pain.

Johnny - an 18-year-old county and national rugby player

Johnny's problem started when he was 16 years old and playing rugby; during a sprint down the wing he felt a sharp pain in the back of his left thigh that immediately brought him to a halt. He was unable to continue playing and rested for a number of weeks with what he described as a 'torn hamstring'. He gradually made a successful return to rugby but then experienced a further four recurrences of this pain. He had grown more and more concerned that his injury didn't seem to be progressing - in fact, if anything it was getting worse and he was able to do less and less rugby training as time went on. He had made big efforts to maintain his cardiovascular fitness by cycling and swimming regularly and was continuing to do his strength training in the gym, but avoided hamstring exercises because they hurt.

Initially, I spent considerable time talking to him and using the A, B, C, D, E, F & W approach (see box, above), I discovered that he believed his hamstring was seriously damaged and that his pain was from further harm being caused to the hamstring every time he tried to use it. As a result he avoided any activity that caused the slightest reproduction of his pain. He also believed that he had poor 'core stability' and major 'muscle imbalance' around his low back, pelvis and lower limbs.

His behaviour had fluctuated between long periods of rugby training inactivity to a 'boom or bust' approach when he had moved straight from a period of relative inactivity and attempted to return to full training all at once. It emerged that his belief regarding his poor core stability and muscle imbalance was the result of a 'diagnosis' given to him by a physiotherapist looking after one of the squads he belonged to.

After two years of this problem he had lost the enjoyment he used to have for rugby and was worried about his future in the sport - so anxious he would constantly mentally check himself to see whether he could feel any pain at his hamstring. Although his mother and father were concerned about him, they had begun to show frustration at his poor recovery from this problem, and one of his coaches was convinced he was 'exaggerating the seriousness of his injuries'.

A biomedical examination revealed:

- He had exceptionally good muscle tone throughout his body and there was no obvious leg length inequality or asymmetry;
- Movements at his low back and hips were full and painless and neurological tests performed throughout both lower limbs were normal;
- Muscle length tests at both lower limbs did not reveal any shortening of the involved structures and indicated that his hamstring length and flexibility was excellent;

- Resisted manual muscle tests applied to the left hamstring indicated normal power but did reproduce his pain;
- Palpation at the midpoint of the hamstring evoked tenderness and further functional tests also reproduced his pain during running, jumping and hopping activities.

These findings did not indicate the possible presence of serious disease or injury, and we therefore proceeded to agree on a plan of management to address his problem. During our discussion I made efforts to point out all that was positive with his examination as well as those things that could be worked on to assist his recovery.

I also explained that his pain had become maladaptive and that it stemmed from a multidimensional biopsychosocial problem, which although involving powerful brain processing, was not 'psychosomatic' as had been suggested to him. I further pointed out that treatments that focus too much on single tissues or one part of the body system, for example the muscle system in the core stability approach, have yet to produce any compelling results in the clinical research trials that have been carried out ^(4,5).

We also looked at how we could approach his rehabilitation avoiding the 'inactivity' or 'boom or bust' cycle by using an approach known as graded exposure. This involves gradually exposing patients to the very movements that are actively feared or avoided. Graded exposure requires that patients want to overcome their fear, understand that exercise will help the problem not hinder, and are willing to put in the effort and time.

Therapy problems

Although the concept of maladaptive pain is gradually gaining wider acceptance in physiotherapy, it is still a poorly understood concept, particularly in the field of sports therapy, where the focus tends to remain on some sort of tissue abnormality, muscle imbalance, joint tightness, trigger point or disordered movement pattern - to name a few. While these approaches may be helpful in some cases, they certainly are not if the end result is an over-focus on pain or on some unproven 'weakness' somewhere. Increased attention and anxiety about a structure or about a pain only serves to increase awareness and hence leads to increased pain.

In Johnny's case, not only was there no evidence that his core stability was poor, focusing on this perceived muscle imbalance only served to constantly direct his attention to the pain he was experiencing, increasing anxiety and therefore compounding the problem. Moreover, by constantly thinking about contracting his transversus abdominis to try to combat this perceived instability, he was actually learning new and unnatural patterns of movement associated with the pain - exactly the opposite of what is required for 'thoughtless fearless movement' ⁽⁶⁾.

The initial aim is to make each exercise simple, easy and achievable so that it doesn't produce pain (which can be demotivating) and the patient feels confident they can manage it. We initially identified a number of component movements (ie that are relevant to the feared and avoided movements/activities) that could be improved in terms of their endurance, strength and quality. Easily achievable baselines were set as were the goal amounts for each exercise and Johnny worked through these diligently.

The specificity of his programme was constantly adjusted to achieve greater ranges of movement, increased and alternating speed of movements and improved muscle strength and endurance (see box, below right, for an example of this approach). The ultimate goal at all times was to restore 'thoughtless, fearless movement'. Normal movement does not have any fear, apprehension or thoughts associated with it, and restoring this state through graded exposure and careful exercise pacing often results in the ultimate success with rehabilitation. In Johnny's case, he made a sustained return to first class rugby three months later.

Sam - a 42-year-old elite golfer

Sam began experiencing right-sided neck, shoulder and arm pain, which had become much more severe and was now accompanied by occasional episodes of pins and needles over the arm. He was also aware that his right arm was getting weaker and his shoulder movement seemed to be getting progressively more restricted, which was now interfering with his golf swing.

The same assessment approach was used as previously described for Johnny. Psychosocial information gathered included a belief that his pain was harmful. He also has a close friend who was a former European golf tour professional and whose career was blighted and prematurely ended by 'a similar injury'.

Sam had largely avoided playing golf and had rarely practised over the previous three months. His GP had diagnosed a 'trapped nerve' after referring him for an MRI scan, which showed a disc prolapse affecting one of the nerves on the right side of his neck. His GP subsequently organised a referral to a neurosurgeon and told him that he would probably need an operation. Emotionally, Sam was very anxious about this diagnosis and the idea of surgery on his neck, as well as by his inability to play golf or to play freely with his children. He had continued going to work but was struggling with some jobs that involved lifting, reaching and stretching.

A biomedical examination revealed:

- He preferred to sit or stand with his head and neck flexed forwards (this position reduced his pain);
- His neck movements were painfully limited and increased his neck, shoulder and arm pain when he extended his head backwards or towards his right side;

- Neurological tests revealed that the nerves in the region were sensitive to being compressed and elongated;
- He also had weakness at the muscles of the right arm that are supplied by these same nerves. Functionally, he could not place his right arm behind his back or take it into the top of the back swing position of his golf swing.

I took time to explain my provisional diagnosis of pain coming from a peripheral nerve. Although this condition is often referred to as a 'trapped nerve', I explained that this terminology is often misleading as the nerves involved are generally not trapped but are irritated and 'sensitised' by inflammatory chemicals released from surrounding tissues or the nerve itself. I also informed him that, unlike his friend, the vast majority of these injuries usually recover with good management and without needing surgery; this was something he was very relieved to hear.

An example of graded exposure

Johnny had difficulty bending his right knee and moving his hip backwards against resistance without pain.

We tried a number of different positions in which to perform these movements and found that standing was the one he liked best. His range of movement was full but there was some discomfort at the end of the movement when he actively bent his knee. We reduced the range of movement and looked at the middle part of his range and found this to be pain free and easy to perform.

We then added some resistance by attaching a light resistance latex exercise band around his lower leg above the ankle and he then attempted a number of repetitions that he felt would be easy and achievable. We reduced this number slightly and this was set as his baseline.

Having decided on a goal number of repetitions and sets, he worked through these at his own pace, gradually increasing to his goal amount. We then established new baselines and goals incorporating more resistance and increased range and speed of movement.

His exercises were then integrated and progressed into more functional activities such as running, bounding and hopping drills, where the focus was to develop his ability to alternate the speed and direction of movement so that his rehabilitation reflected the components of his sport. Later on in his rehabilitation we liaised directly with his coaches to carry these principles right through to his return to competitive rugby. The aim throughout was to help him to restore a state of 'thoughtless fearless movement' ⁽⁶⁾.

We initially looked at improving his pain management. His GP had prescribed analgesic and anti-inflammatory medication but Sam was not taking these regularly as he believed they were just masking his symptoms. A simple explanation of the action of these drugs and the importance of taking them regularly was enough to change his approach to medication and this resulted in significant reduction of his pain.

This provided an ideal opportunity to begin rehabilitating lost function and muscle power at his neck and right upper limb.

Because it is important to progress carefully with 'nerve injuries' (some attempts to abruptly restore restricted spinal movements by forceful manipulation have resulted in catastrophic injuries ⁽⁷⁾), I recommended the graded exposure approach. Sam felt happy with my explanation of his problem and was now enthusiastic about exploring movements that could be used to improve his function.

We initially tried some rotational and side-bend movements of his head and neck and established baseline and goal amounts. On returning to clinic he demonstrated significant improvements in these movements. This allowed us to look at gradually strengthening the affected muscles using small mid-range movements in functionally relevant positions, and resistance was introduced using a latex exercise band.

These movements were progressed into the combined patterns of movements needed to carry out his golf swing and once again progressive resistance was added using an exercise band. Sam then progressed onto the practice range with graded golf shot drills right up to his full return to playing golf. We also devised an ongoing exercise programme that he has continued to use to improve his strength and flexibility for golf. He attended his appointments with the neurosurgeon who agreed with Sam that he had progressed well and did not need surgery.

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