Pain and Stress

Stress should be seen as a biological response to the wide range of stressors that face human beings. This could be more traditional physical overload stressors as we may see in an overuse injury or less apparent stressors such as work or family related. Any stressor can disrupt someone’s homeostasis leading to the activation of neural, hormonal and physiological processes aimed at restoring homeostasis.

This process is known as allostasis, meaning maintaining stability through change, and the longer it goes on for, in response to prolonged stressors, the greater the allostatic load can become. This chronic exposure can adversely affect the health of the individual.

Conditions that can lead to an increased Allostatic load are:

- Repeated frequency of stress response to multiple novel stressors
- Failure to habituate to repeated stressors of the same kind
- Dysregulation of a normal adaptive response

Pain can be seen as a component of the stress system with the purpose being to motivate the organism to change its behavior in order to protect and survive.

The hypothalamic-pituitary-adrenal axis (HPA) and the locus coeruleus-noradrenergic system (LC-NA) are both involved releasing the two main stress hormones, epinephrine and cortisol. They can suppress the immune system and also erode bone, muscle and neural structures if activated long term via a wide array of psychological and physical stressors. The HPA axis receives projection from and can be activated by the amygdala, hippocampus and the prefrontal cortex. This means emotions, memories and a wide array of cognitive behaviours can potentially provide an increase in stress hormones. A belief regarding the body could potentially be a stressor as could the fear of reinjury.

Many of the systems involved in stress and pain overlap and sustained endocrine responses maybe maintained by or maintain persistent pain problems.
Pain and Stress

SIMPLE SIDE

Pain is complex and multi dimensional. Many stressors can have an effect on someone’s current pain state and modern human living exposes us to many more concurrent and complex stressful situations and over longer periods of time leading to greater stress levels.

It can be good to help people recognise times pain gets better or worse and if stress could be involved and potentially reduced.

• An intense period at work?
• Less over the weekend or on holiday?
• Have they had adverse life events recently?

The simple story

“Lots of different things can be stressors, not just what we might think traditionally as stress and the systems involved with stress and pain are quite similar. The hormones involved with stress can be quite destructive on the body.

Imagine stress is like a big bucket with lots of different taps dripping into it. A work tap, a family tap, a money tap and maybe a physical activity tap too! This is fine when the taps are only dripping and the bucket is only half full. Sometimes the stress taps turn on full blast though, a deadline at work or a family member not being very well, then the buckets can overflow, making us more sensitive and this can increase the pain we experience”

Reading List

Understanding migraine through the lens of maladaptive stress responses: a model disease of allostatic load
Borsook Neuron. 2012

The stress model of chronic pain: evidence from basal cortisol and hippocampal structure and function in humans
Vachon Presseau. E Brain. 2013

Melzack. Psychosocial factors in pain 1999

The mature organism model
Louis Gifford 2002