Understanding the management of trauma with pain

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Abstract

Traumatic experiences may be accompanied by physical injuries. In either case, the brain has to process intense sensations that can feel unbearable and overwhelming. The brainstem is involved with the autonomic sympathetic nervous system in a protective mechanism which elicits automatic fight, fright or flight response in the face of threat or injury. The system to process this intense experience is a complex interaction between the brainstem and the higher centers of the brain to keep the person safe, alive and well. Following the event, the brain struggles to integrate the high volume of intense sensations and the experience becomes re-lived in a repetitive loop. The reliving over and over again of unpleasant and unbearable sensations can feel exhausting and difficult to cope with. Recovery from the event is not instantaneous and there is a journey to restoration. This involves the process to normalise the protective mechanism's threshold to threat so that it returns to the default resting state. This process is possible to achieve.

Introduction

Humans can suffer immensely from the experience of trauma with pain. In this context, trauma is defined as *a deeply distressing experience*. Pain is defined by the International Association for the Study of Pain *as an unpleasant sensory and emotional experience*. Here, it is highlighted that any physical sensation also has an emotional component; neither can ever be separated from each other. The combination of trauma with

a physical injury can meld into an overwhelming experience of unbearable sensations. The physical sensations of tissue damage cause painful sensations; emotional trauma causes a turmoil of many feelings; and the mental intensity causes thinking processes to be overwhelmed. This is what is meant by *trauma with pain.* For example, a person bitten by a dog on the street may be emotionally traumatised by terror, shock, no longer feeling safe on the street they have always walked on, as well as a significant wound to tissue. There is also a thinking process or cognitive state that expresses frustration with the careless owner, a strong sense of injustice, or perhaps guilt, embarrassment, or shame.

A person who has suffered trauma with pain can show a variety of behavioural responses: physical body actions (e.g. heightened muscle tension, shallow breathing or breath-holding), postures (hunched), and expressions (facial grimaces, sighing, poor eye-contact) even long after the event. There can also be changes in their usual interactions: they may be withdrawn, find themselves feeling physically colder or hotter, have increased sensitivity to sound (loud noises hurt), or sight (bright light feels irritating). When asked, they might say they are ‘in a fog’, ‘can’t make sense of anything’, or ‘my mood is all over the place’. They may struggle to focus and concentrate. Short-term memory may be affected. The physical and mental effort of doing a simple task (even making a cup of coffee) can feel exhausting. They can wake in the morning and not feel refreshed, as if they had not slept at all. Alternatively, they may experience insomnia, night terrors, or lash out in sleep. These are the most common of many symptoms. For multiple people being in the exact same traumatic situation, each may experience different physical, emotional and cognitive sensations. Some people can find these differences confusing and the misunderstanding can become a source of estrangement between relationships.

Aims

This paper focusses on two main questions. Firstly, what is happening to the brain and the body with the experience of trauma with pain? Secondly, what can be done about it? It is typical that people ask, ‘why me?’ They try to understand why it happened and what the meaning might be. The person tries to make sense of the event. This paper does not answer the question about why horrible events happen, instead it shows how to recover and be restored from these experiences.

The immediate response: What happens subconsciously during a traumatic event?

The brain is designed to protect the body from injury and threat with a protective mechanism. The immediate first line protection is the fight/fright/flight (f/f/f) response. This is governed by the autonomic sympathetic nervous system. This system is largely subconsciously controlled with capacity to also be influenced by the directions of the higher cortical centers.

This autonomic sympathetic nervous system response during a traumatic event is directed through many factors including intrinsic genes; personality; what has been learned through the environment; culture; gender and general health at the time. This means that a group of people experiencing the exact same event may respond entirely differently while it is happening. All the various responses are considered normal; some may lead to safety; while others are not necessarily helpful, depending on the context of the event. Here, I will explain the prevalent first line responses.

Fright - It is not unusual for a person to freeze; to become paralysed with fear and find there is no ability at all to physically move or think. The body and mind feel numb, the person can feel as if time has warped into a space of nothing. Research shows that the brain in this state does, in fact, stop processing; it ceases to allow sensation to be processed. This is a necessary protective response from the brain to prevent overloading of an experience it does not have the capacity to physically process, understand nor make sense of.

Flight - Alternatively, a person may flee. This escape and the adrenalin associated with it can help to accomplish incredible physical feats that would otherwise not be possible, even with high level training. The drive for the physical action to flee is automatic; there is little conscious thought in the process; it all just happens in a rush and the ability is suddenly available.

Fight - Another person may become excessively aggressive; as rage to fight actions every muscle fiber and the global muscle groups into tension. They may shout or roar; face muscles and neck posture can show rage and aggression, all without conscious awareness of this change.

Combination – It can be that a person may transition from one response to another in an event. They can reflect afterwards and are

surprised at how little control they felt with how the body automatically reacted.

In all three of these responses; the brain lowers the threshold to detection, and senses are heightened immediately. The heart rate increases; neck tension increases; a sick, cold sensation and a dry mouth can be elicited as blood is directed away from the digestive system; breathing inhales deeply and is held motionless, followed with very shallow breaths; the shoulder girdle elevates (this raises the arms closer to the body to reduce the physical effort of lifting them for fight or flight and to protect the heart if there is fright). These responses are governed by the brainstem. Here, there is a control and coordination of several multiple simultaneous inputs which are closely linked with the cranial nerves which control the face, neck, heart, and head.

Re-living the experience: What happens to the brain following trauma and pain?

The brain cannot store the fullness of the traumatic experience itself. The memory becomes mixed and blurred. Every time the thought of the event is accessed, the brain re-lives the same physical sensations. The person will feel the same sensations they experienced during the event. They may find difficulty with breathing so intensely that they feel physical pain in their chest or tingling in the arms and legs. Any of the above f/f/f can be experienced all over again. The associations of pain and trauma can interact with each other to fuel cycles that loop in an uncontrollable, repetitive reliving of the experiences. The threshold to threat remains low with a high alert state of readiness with the body's protective mechanism.

It is thought this repetitive relieving of the sensations and experiences with the trauma and pain are an attempt by the brainstem as the neural first responder to the event to engage the middle brain (limbic system) and higher cortical centers. The brainstem elicits this engagement as it does not have the capacity to fully process, nor make sense of sensations since they are intense, unbearable, and overwhelming. The brainstem needs the assistance of the two higher tiered brain areas to redirect the sensations for effective processing. The two higher tiered areas of the brain also engage in the attempt to problem-solve.

The incongruence of the traumatic event is that it was an unexpected and terrible shock. Conversely, what was expected did not happen. The higher brain centers struggle to process the incongruent sensations, trying to extract useful information for future reference. In some cases, it

is not possible for the brain to make congruent sense about what happened. In such cases the brain re-lives the experience each time anything brings the event to attention, consciously or subconsciously.

The result of this processing construct is that there can be other subsequent problems beyond the traumatic and painful event itself. The brain can become entirely preoccupied with repetitively processing the traumatic events and storing the associations with the pain sensations. The processing of repetitive reliving is intense, every sensation that was felt is experienced, over and over again. The energy reserves can become depleted as this is a high energy demanding activity for the brain.

In the sensible attempt to improve efficiency with this large volume of unexpected processing demand, the brain may try to slow the processing speed down to a more manageable and sustainable pace. The consequences can be a loss of energy and vitality. A heavy or numb sensation can arise, feeling like wearing a heavy wet blanket. There can be a sensation of exhaustion, just being alive seems a hard job, and it is difficult to complete simple actions. This fatigue and exhaustion can lead a person to feel so overwhelmed that they involuntarily shut themselves down: they no longer feel anything, and they disengage entirely from themselves and others (*disassociation*).

New, other feelings of guilt and shame can be stirred into the mix. These are normal things to feel. The brain is designed with a finite capacity, yet also with an inherent flexibility that allows it to find novel pathways to make sense of difficulties and learn about what is important to keep us safe in the future. However, people may think the event was their fault, or if they had done things differently, it might not have happened. The repetitive reliving of unresolved traumatic experiences can contribute to this guilt and shame becoming as big as the trauma itself. People in this space can feel useless and hopeless, and can withdraw from usual activities of daily life and work. Paradoxically, there may be blame directed at other people. Tragically this may be the steppingstone to a life consumed by bitterness and resentment. This can continue for years.

How can recovery and restoration be achieved?

Research and clinical experience provide excellent tools to navigate the difficult path to recovery. It is possible to provide physical, emotional, and cognitive information to the brain about **reassurance**. This reassurance is a tangible experience that is provided as physical

evidence about being well and safe in the present moment of time. Reassurance is actively sought, practiced, nurtured, experienced, and cultivated.

It is important to appreciate that this process is difficult; not in the demoralising sense. It is a challenge that is absolutely possible for any individual; it requires the same focus, concentration, and dedicated effort any paddler needs when in a rapid through a narrow gorge, or a physical labourer needs to complete the job well at the end of a long day when muscles are already aching. Reassurance can be developed through the following.

1 Recognise and accept normal aspects - It is normal to experience the reliving repetitive circular sensations; the feelings of exhaustion or sense of shutting down as if it is all too much. It is normal that there is simultaneous incongruence between a whirlwind going around in the head, and yet a body that feels like lead.

However, it is not normal to disengage, stop physical activity altogether, not ask for help, nor is it helpful try to stop the whirlwind in the mind and the relentless reliving of the sensations that were experienced.

2 See it as a journey - Since it is a journey to recovery, it does not just happen. The steady process of taking one step at a time leads to the end goal of restoration. The pace of the journey is set perfectly to our personal ability and pace. We can control the pace; we can also learn about our inherent strengths and weaknesses as all humans process intense experiences differently. Be patient with yourself, show yourself kindness, compassion, and respect. The brain is having a tough time processing all the sensations. It is helpful to find ways to show love to yourself with your choices or actions.

3 Commence the journey with talking – This is the conversation with those you trust about the feelings that are being relived, over and over again as necessary. It can be described as a tightly wound up spring that has spiraled and needs to be unwound. The feelings of guilt and shame are real, but not usually true. These sensations are rendered powerless when they are expressed and shared as this takes them out of the head where they stir the whirlwind and brings them into the light of actual life. The process of talking about them allows the issue to be looked at from other ways, rather than the single way the brain has established. It is also a physical space where their strong energy can be dissipated.

4 Activate the brainstem's restraining brake - Since the brain stem is intrinsically connected with the part of the sympathetic nervous system that also holds the restraining brake on the fight/fright/flight response; there are physical things you can do to activate this. This involves actively participating in activity that helps restore the protective mechanism back into the default resting state as it gradually lowers the alert levels.

Your face and eyes have an important role in establishing trusting relationships (this essential foundation is established at birth). In turn trust is important for reassurance. Consciously make eye contact; relax your eyes and lip muscles to smile. The auditory system has a direct calming line to the brain stem. Actively seek listening to soothing sounds. Engage your ears to sounds that bring peacefulness or tranquility.

Also, speak kindly and compassionately as you express how you feel. Remember that as you speak, your own ears hear what you are saying. The brainstem has to process that sound too. Talk it over and over, practicing using words that express how you feel without judgement, vengeance, retribution, or vindictiveness. Negative attitudes heighten the brainstem to further threat. It takes time to figure out how to say what you actually feel with genuine compassion, kindness for yourself as a victim of someone else's malice or some event's misfortune.

Inhalation is part of the initial response to danger. Take time to simply notice your breathing; and focus on long slow outbreaths. Allow the inbreath to be felt as effortless. Notice also, how your chest relaxes as the warm air breathes out slowly, and how the cooler incoming air fills your chest with a quiet strength as you allow it to be effortless. A relaxed diaphragm is immediately connected with the calming restraining of the f/f/f and is useful to practice regularly. It is helpful to practice this especially when feeling OK (rather than in a reliving moment) as this activation of the restraining brake establishes a foundation of well-being so that reliving can be felt as less intense.

4 Protective factors - There are protective factors which if already in place at the time of the event can make the journey easier; or if not; these can be sought and implemented.

a. Having social support. This means to actively engage with other people, groups, social events, family, friends, etc. Yes, it is

important to ensure you pace yourself as the brain has correctly slowed processing down so that living is physically possible. This is despite the energy drain associated with reliving traumatic sensations. Too much social engagement may not be helpful as it is also exhausting.

b. Not isolating yourself. The lack of social interaction denies the first foundation the brainstem requires for wellbeing and that is eye contact with other humans. The lack of this foundational physical experience is that the protective mechanism is maintained in its higher alert state. This means that the threshold for tolerance becomes lowered and the intensity of the reliving feels worse and becomes more difficult to process fueling and entrenching cycle.

c. Being optimistic. This means choosing to see the positive aspect with hope about anything or everything. If we lose hope, we die. A traumatic event is a terrible experience for the brain to process; the optimistic attitude is a physical processing construct that promotes the solid belief that a solution is possible. This belief acts to stimulate the restraining brake of the f/f/f so that reassurance is made possible as the viable alternative to the traumatic experience. It is important here to differentiate between toxic positivism and healthy optimism. Toxic positivism is that attitude of invisibility and that everyone not like you must have something wrong with them.

d. Having a positive affect i.e., choosing to see something good about yourself and recognising when guilt and shame are no longer appropriate. This involves i) Being able to be objective about yourself without judgement. (ii) Being able to recognise when you show bias towards something. (iii) Being able to see where you are being negative and may be catastrophising.

e. An extrovert personality; quite simply the brain recharges by processing through engaging externally instead of entirely internally. Hence, rely on the extroverts around you. They may be able to hold your hand as they may be just that one step ahead already. Extroverts, be patient with the introverts who are slower, yet also more steady with their journey. DO NOT feel bad or inadequate because you are an introvert. Processing does take you longer; that is normal.

5 Take time to replenish personal resources. We can preserve our energy to sustain ourselves as we know we now have to walk a challenging journey with the worthwhile goal of a full recovery and restoration.

a. Let go of some responsible things (they can always wait and the world will not fall over if it not done now) and take time just to be.

b. Do the things you enjoy; go to the places you love and rest there.

c. Notice and cultivate what gives you joy in just being present today.

d. Rest often with pauses; shut your eyes to feel quietness for a few seconds.

e. There are many techniques like mindfulness, mediation, sensory grounding, body awareness or breathing relaxation that are all helpful to restore energy and also provide sustenance along the journey.

f. Ensure a sensible approach to your eating habits. What you eat is who you are. Take care to notice and enjoy the textures and tasty sensations of what you are eating. Enjoy noticing the satisfaction of hunger or thirst with meals. Put down your utensils between mouthfuls so you are not chewing in a hurry. Avoid sugars, refined food and lots of carbs. These are pro-inflammatory which fire up the protective mechanism about potential danger.

g. Take care with your getting to bed for sleep routine. Late nights, or too much white light before sleep can prevent the nourishment of good sleep. Sleep is an important factor for electrical rebooting the brain for its ability to function well the next day.

6 Physical activity (exercise) - Research shows that THE most helpful instrument to have with us on a journey to recovery is physical activity or exercise. Physical activity is being active with my body for something that has another purpose e.g., building a house. Exercise is being active with my body simply for the sake of doing the activity and the associated benefits. Regular, scheduled physical activity or exercise has a stronger effect for benefit in the journey to recovery, much more than anything else in the repertoire that research shows is available.

a. What exercise looks like is not what is important.

b. What is important is that it often happens and in little bits, rather than in big chunks, especially in the initial few weeks following the event.
c. Do anything physical that you enjoy; the most cost effective is shown to be walking.
d. Walk, walk, walk and as you walk; talk, talk, talk it through over and over again. The walk does not have to be fast; at your own comfortable pace.
e. Those who love sport; get out there and go for it. Join a team if you find exercising on your own motivationally difficult.
f. Perhaps start something new that is physical, like getting a bicycle or taking up badminton or having lessons to swim well.

7 Spiritual nourishment – We are physical and spiritual beings. The inner being is a personal resource that provides a steady voice that is never wrong. The problem is that this spiritual inner being can be neglected or ignored.

This spiritual relationship has a physical connection with the inner personal resource that will guide and direct choices. These choices are critical nudges which serve to gradually direct us in one direction or another, and thereby shape our attitudes. Spiritual beliefs can help moderate unhelpful negative attitudes (such as judgement, vengeance, retribution, vindictiveness) that would otherwise amplify the brainstem's perception of threat.

What does restoration look like?
Full restoration is the place where the event is experienced as an historical event. The strong emotion and re-living of the sensations have calmed. The ability to talk about the event is a fact that no longer elicits any sensations of panic, dread, nor dry mouth, etc.

An appreciation of all the others (if any) involved in the event is about admiring their stories as you admire theirs with appreciation and gratitude. There is a compassion, respect and kindness that is novel; although present before, these have greater breadth and depth than before. The concept of taking time to ensure one's own wellbeing is prioritised without question nor doubt.

Conclusions
The brainstem has protective mechanisms which process strong sensations, and generate automatic responses in the face of threat. There follows a normal experience of re-living the sensations as the

brain struggles to process the shock of intense sensations. A journey of recovery culminates in restoration. This involves cultivating the physical sensations of safety and reassurance, and activating the restraining brake on the protective mechanism’s heightened alert. The threshold for threat can be raised back to the normal level and the autonomic response returned to the default resting state. The brain no longer needs to relive the sensations to make sense of them. The events simply become historical facts associated with a life story. There is release from pain or traumatic sensations as they have been laid to rest.

Document version 20230308