

Human Pain-Physical and Non-Physical

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ABSTRACT

Pain hurts, be it physical or mental (non-physical). None of us escape it but how many of us have given a thought to which pain is more severe the physical or non-physical. Just consider the famous lines by C.S. Lewis -" Mental pain is less dramatic than physical pain, but it is more common and also harder to bear. The frequent attempt to conceal mental pain increases the burden; it is easier to say, "My tooth is aching" than to say, "My heart is broken". These lines speak volumes about the emotional pain's intensity over the physical pain. In this paper, we shall be delving deep into facets of pain both physical as well as non-physical and shall understand their meanings, their comparative imprints on the affected person, the brain processes underlying both types of pain, and ways and means of treating both pains. Also, we shall examine whether the end results of pain are always negative or sometimes the pain leaves a "spark" which proves to be a great positive game-changer.

Keywords: Pain, Physical Pain, Emotional Pain, Non-Physical Pain, Brain Processing of Pain

Laurell K Hamilton said, "*There are wounds that never show in the body that are deeper and more hurtful than anything that bleeds*".

A similar wound left me shattered when I lost my dearest sister closest to me recently and the then thought process and the pain felt by me on her being snatched away by pandemic demon Corona in the pandemic times led me to pen a heart tearing tribute. Tears were rolling my cheeks while I was writing the tribute with a feeling that her hands were wiping my tears. The lines filling the tribute showed the throbbing unbearable pain I was undergoing while penning the lines and the lines inflict piercing pain even now when I re-read them. Close as she was to me, the loss was unbearable and the pain overwhelmed me and its effect was so profound and excruciating that I was not me for many days after her sad death. The pain was unbearable and I felt terrible! The moment when I heard the news of her transcending to death left me stunned and numb and immediately after I felt pain -severe unbearable pain- which tormented me for few moments as if draining all energy out of me. Even now this pain is shattering me. But when I think about where does it pain, I am unable to pin it down to a part of my body. Colloquially speaking my heart was aching- Maybe if doctors examined me, they may have said that my heartbeat had gone up but is the pain in my heart. Pain in the heart or heartache is associated with a heart attack. But I am not in that

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worse condition; it is not a heart attack. In fact, the pain is totally different, it is not physical pain, it is scorching pain engulfed in grief—the word is bereavement pain!!

Following the above heart-breaking incident when I became calm, I thought about the pain and I am down to writing this paper.

Bereavement pain is a pain that is not physical. There are many such pains. Pains arising out of desertion by beloved; pain arising out of guilt from a grave misdeed; pain felt on being ridiculed in front of people whom you love most and so on...These may probably be termed as ***Social Pain, Emotional pain, or psychological pain***. I shall be using any of these phrases to refer to non-physical pain in this paper.

Such pains make a deep impression in our mind and when something triggers us to recall these, momentarily then you speak aloud "Ouch!!!" and jerk your head as if to shrug off the intense feeling associated with that incident. Pains which are other than physical are often more piercing than physical pain. The physical pain can be numbed with pain killers but there are hardly any pain killers to subdue the non-physical pains—only time is the healer which pushes the pain gradually to the subconscious mind and we come out to live life in the normal way. But the pain lingering in the subconscious mind is alive, unlike the physical pain which is eliminated on treatment. The lingering pain surfaces up on triggers that happen unannounced and make you experience the excruciating pain off and on.

In this paper, we shall discuss human pain, both physical and non-physical (Social/emotional/psychological), and shall try to deeply research - what are physical and non-physical pains, in what forms they manifest, how we feel when these manifest, their location, their impact on us both mentally and physically, similarity and differences between them, the brain processes involved during their occurrence and the ways to alleviate them and possibilities of completely obliterating them. We shall also see if the non-physical pain has some positive impact on our lives.

What is pain

The dictionary meaning of human pain is:

1. *A strongly unpleasant sensation caused by illness or injury*
2. *Mental illness*
3. *(pains) great care or trouble*

Medical definition of human pain:

Pain is an unpleasant feeling that is conveyed to the brain by sensory neurons. The discomfort signals actual or potential injury to the body. However, pain is more than a sensation or the physical awareness of pain; it also includes perception, the subjective interpretation of the discomfort. Perception gives information on the pain's location, intensity, and something about its nature. The various conscious and unconscious responses to both sensation and perception, including the emotional response, add further definition to the overall concept of pain. (medical-dictionary.thefreedictionary.com/pain)

If we look at the last sentence in the above definition- *The various conscious and unconscious responses to both sensation and perception, including the emotional response, add further definition to the overall concept of pain;* it includes the emotional aspect also which correlates with pains which are non-physical.

Physical pain

Gabbey Amber Erickson (2021) describes the cause of physical pain: In some cases, pain is clearly caused by a specific injury or medical condition. In other cases, the cause of the pain may be less obvious or unknown. Some common causes of physical pain include:

- Headache
- Toothache
- Sore Throat
- Stomach Ache or Cramps
- Muscle Cramps or Strains
- Cuts, Burns, Or Bruises
- Bone Fractures

Many illnesses or disorders, such as the flu, arthritis, endometriosis, and fibromyalgia, can cause pain. Depending on the underlying cause, you may develop other symptoms as well. For example, these may include fatigue, swelling, nausea, vomiting, or mood changes.

Pains could be acute but short-lived or can be chronic. Acute pain tends to be sharp, rather than dull. It usually goes away within a few days, weeks, or months, after the cause has been treated or resolved. Whereas Chronic pain lasts for longer periods and can go but can relapse over multiple months or years. It may result from a variety of diseases such as arthritis, fibromyalgia, chronic migraine, or cancer. Some people also experience chronic pain following an injury, even after the initial injury has healed.

In some cases, the cause of chronic pain is hard to identify. Some people experience chronic pain when there's no other evidence of underlying injury or illness. Such pains are difficult to treat. Migraine is one such type and I shall dwell on it:

Physical pain Migraine-I see both my grown children often down with a migraine. The discomfort prevents them even to talk to us on Google video (both stay abroad). The migraine bouts appear off and on and both of them suffer a lot because even the medicines subscribed by local doctors do not provide them relief and they are forced to leave all the work and lie down to let the migraine bout pass over and it takes anywhere between 6 hours to 24 hours for the “migraine hangover” to leave them. They consulted many doctors and learned that there is hardly any cure -temporary or permanent.

Dr. Webberly Helen (2020) elaborates on different aspects of Migraine- Migraine is a medical condition that involves severe, recurring headaches and other symptoms. Before the headache, there may be sensory changes that are known as an aura.

A migraine episode is different from a headache unrelated to a migraine. An episode usually occurs in stages and can last for several days. It can affect a person's daily life, including their ability to work or study.

Symptoms of Migraine- How migraine affects people can also vary. There is a range of triggers, severity, symptoms, and frequency. Some people have more than one episode each week, while others have them only occasionally. A person may experience physical and sensory symptoms before a migraine episode starts.

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Symptoms of migraine tend to occur in stages:

- **Before the headache:** According to older research, around 20–60% of people experience symptoms that start hours, or possibly days, before the headache. These include physical and sensory symptoms, such as aura.
- **During the headache:** Alongside a mild to severe throbbing or pulsing headache, symptoms may include nausea, vomiting, and nasal congestion.
- **Resolution:** Tiredness and irritability may last another 2 days, and this period is sometimes called the “migraine hangover.”

Other common features are:

- head pain that worsens during physical activity or straining
- an inability to perform regular activities due to pain
- increased sensitivity to light and sound that lying quietly in a darkened room relieves

Other symptoms may include sweating, temperature changes, a stomachache, and diarrhea.

Probable causes of Migraine

Experts do not know what causes migraine episodes. They may stem from changes in the brain that affect the:

- way nerves communicate
- balance of chemicals
- blood vessels

Genetic features may also play a role, as having a family history of migraines is a common risk factor.

Migraine triggers vary but include:

- **Hormonal changes**, for example, around the time of menstruation.
- **Emotional triggers**, such as stress, depression, anxiety, and excitement.
- **Dietary factors**, including alcohol, caffeine, chocolate, cheese, citrus fruits, and foods containing the additive tyramine.
- **Medications**, such as sleeping pills, hormone replacement therapy (HRT), and some birth control pills.
- **Environmental factors**, including flickering screens, strong smells, secondhand smoke, loud noises, stuffy rooms, temperature changes, and bright lights.

Some other possible triggers include tiredness, a lack of sleep, shoulder and neck tension, poor posture, physical over-exertion, low blood sugar, jet lag, irregular mealtimes, dehydration

Cure for Migraine-There is no cure for migraine. However, medications can treat the symptoms when they arise, and people can take steps to reduce the frequency and severity of episodes.

Medications for Migraine-Pain relief and other types of medication can often help. Taking medication as soon as symptoms start may keep them from becoming severe.

Some over-the-counter pain relief medications that may benefit people with migraine include:

- naproxen (Aleve)
- ibuprofen (Advil)
- acetaminophen (Tylenol)

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Other options include:

- triptans, such as sumatriptan, to help reverse the brain changes that cause migraine
- antiemetics to manage any nausea and vomiting
- which block a protein involved in inflammation and pain called calcitonin gene-related peptide (CGRP)
- which interact with 5-HT_{1F} receptors on the sensory nerves and blood vessels

It is important not to overuse medication, as doing so can cause a rebound headache. A healthcare provider can help a person determine how much of each medication is safe and effective.

Can we prevent migraine---While it is not always possible to prevent migraine episodes, there are ways to reduce their frequency and severity? The following medications may help to prevent Migraine episodes-The following prescription drugs may help reduce the number of episodes that a person with severe migraine experiences: Topiramate, an antiseizure drug; Propranolol, for treating high blood pressure; antidepressant medications; Botox and Gepants. It may take several weeks to see an improvement.

Prevention can be done by identifying and avoiding triggers. A migraine episode is often a response to a trigger. To figure out the culprit, a person might try keeping a diary and recording what they did, ate, and drank before an episode. It may be particularly helpful to avoid low blood sugar, physical overexertion, stress, certain foods, such as chocolate and any that contain tyramine, certain medications, including HRT and some birth control pills, bright lights, and flickering screens.

The following strategies can also help reduce the frequency of migraines: getting enough sleep, reducing stress, drinking plenty of water, improving posture, avoiding dietary triggers, such as caffeine, alcohol, and cheese, getting regular physical exercise.

If making these changes does not ease the severity and frequency of migraine episodes, a doctor may suggest medication or other options.

So much so for Migraine.

We discussed Migraine at length and shall now give some thoughts on pains associated with tissue /nerve damages and also Functional pain.

Gabbey (2021) talks about Nociceptive pain that is caused by tissue damage. For example, it may result from injuries such as cuts, burns, bruises, or fractures. When nociceptive pain develops in your skin, muscles, ligaments, tendons, joints, or bones, it's known as somatic pain. When it develops in your internal organs, it's known as visceral pain. Nociceptive pain may be acute or chronic, depending on the underlying cause. It may feel achy, throbbing, or sharp.

Another type of pain is Neuropathic pain which results from nerve damage, which may be caused by a variety of injuries and illnesses. For example, you may experience neuropathic pain if one of the discs in your spine slips out of place and puts pressure on a nerve. You may also develop neuropathic pain as a result of certain illnesses, such as shingles, diabetes, multiple sclerosis, or cancer.

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And finally, we have what is called Functional Pain- No obvious injury or damage to the body is known for this type of pain-some examples of functional pain are given below:

- fibromyalgia, which causes widespread pain throughout the body
- irritable bowel syndrome (IBS), which causes abdominal pain
- temporomandibular dysfunction, which causes jaw pain
- chronic cardiac chest pain, which causes chest pain

Physical pain is localized to a part of the body and we can pinpoint the part from where the pain is emanating. To be in physical pain is very debilitating and may feel like a sharp stab or dull ache. It may also be described as throbbing, pinching, stinging, burning, or sore. It leaves uncomfortable sensations in the body. It stems from activation of the nervous system when signaled from the body part which is so affected.

How is physical pain perceived and what activities happen in our brain is discussed below:

Processing of physical pain in our brain

How does our brain make us perceive pain? How does it know the difference between the soft touch of a feather and a needle prick? And, how does that information get to your body in time to respond? What is happening in the brain when pain is making us scream –

Erica Jacques (2020) has the answers: Our nervous system is made up of two main parts: the brain and the spinal cord, which combine to form the central nervous system. The sensory and motor nerves form the peripheral nervous system. The brain and spinal cords are the hubs and the sensory and motor nerves stretch out to provide access to all areas of the body.

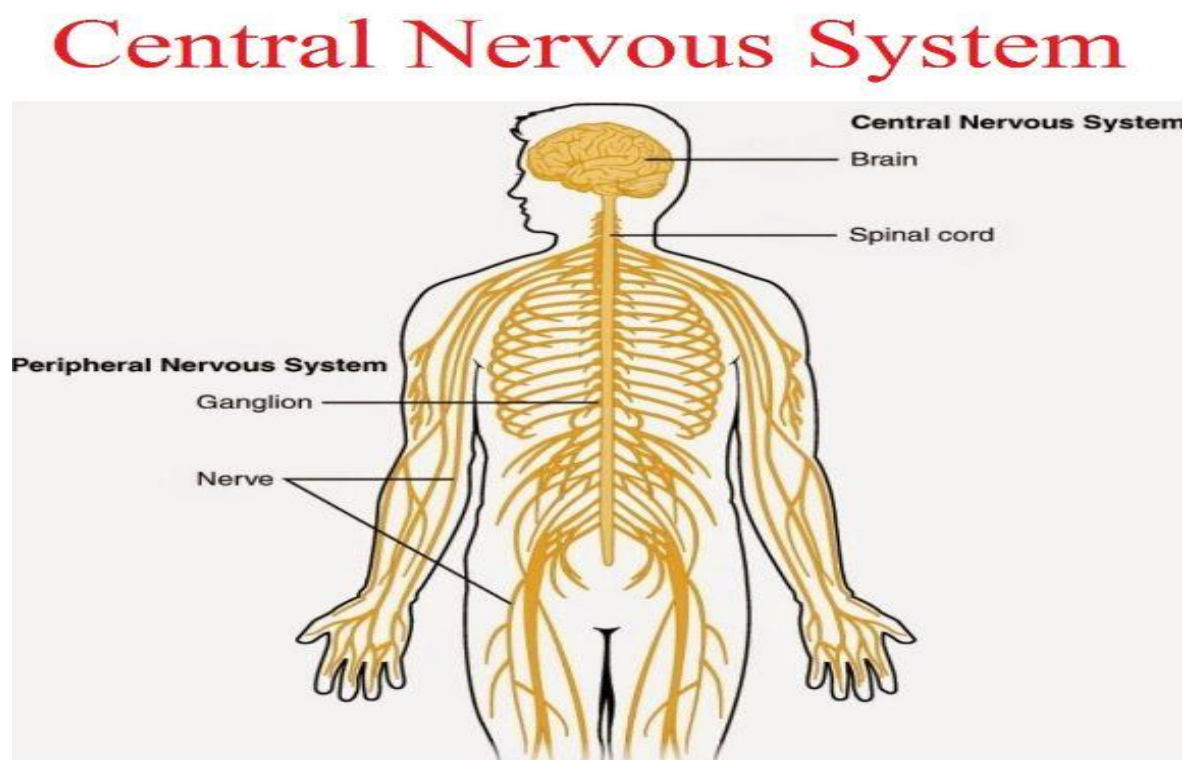


Figure 1—Central Nervous System

(Source: <https://www.anatomynote.com/wp-content/uploads/2019/07/10091/Central-nervous-system.jpg>)

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The sensory nerves send impulses about what is happening in our environment to the brain via the spinal cord. The brain sends information back to the motor nerves, which help us perform actions. Different sensory nerve fibers respond to different things and produce different chemical responses which determine how sensations are interpreted. Some nerves send signals associated with a light touch, while others respond to deep pressure. Special pain receptors called nociceptors get activated whenever there has been an injury, or even a potential injury, such as breaking the skin or causing a large indentation. The impulse heads through the nerve into the spinal cord, and eventually all the way to our brain. This happens within fractions of a second.

Our spinal cord is a complex array of bundles of nerves, transmitting all kinds of signals to and from the brain at any given time. It is a lot like a freeway for sensory and motor impulses. But our spinal cord does more than act as a message center: it can make some basic decisions on its own. These “decisions” are called reflexes. An area of the spinal cord called the dorsal horn acts as an information hub, simultaneously directing impulses to the brain and back down the spinal cord to the area of injury. If our brain is the body’s CEO, then the spinal cord is middle management. Even though the spinal reflex takes place at the dorsal horn, the pain signal continues to the brain. This is because pain involves more than a simple stimulus and response. Pain gets cataloged in our brain’s library.

When the pain signal reaches our brain, it goes to the thalamus, which directs it to a few different areas for interpretation. A few areas in the cortex figure out where the pain came from and compare it to other kinds of pain with which is it familiar. Was it sharp?

Signals are also sent from the thalamus to the limbic system, which is the emotional center of the brain. Ever wonder why some pain makes us cry? The limbic system decides. Feelings are associated with every sensation you encounter, and each feeling generates a response. Our heart rate may increase, and we may break out into a sweat.

Pathway of pain- Finer aspects about pain processing will be known once we understand the pain pathway.

The perception of a series of sensory events is required for the brain in order to detect pain and produce a response towards the threat. There are generally four main stages in the perception of pain. The first stage is pain sensitivity (**Transduction**), followed by the second stage (**Transmission**) where the signals are transmitted from the periphery to the dorsal horn (DH), which is located in the spinal cord via the peripheral nervous system (PNS). Lastly, the third stage (**Modulation**) is to perform the transmission of the signals to the higher brain via the central nervous system (CNS) and finally we reach the fourth stage **Perception** when we feel and experience the physical pain. Typically, there are two routes for signal transmissions to be conducted: ascending and descending pathways. The pathway that goes upward carrying sensory information from the body via the spinal cord towards the brain is defined as the **ascending pathway**, whereas the nerves that go downward from the brain to the reflex organs via the spinal cord is known as the **descending pathway**. Stagewise details are given after the figure of pain pathway:

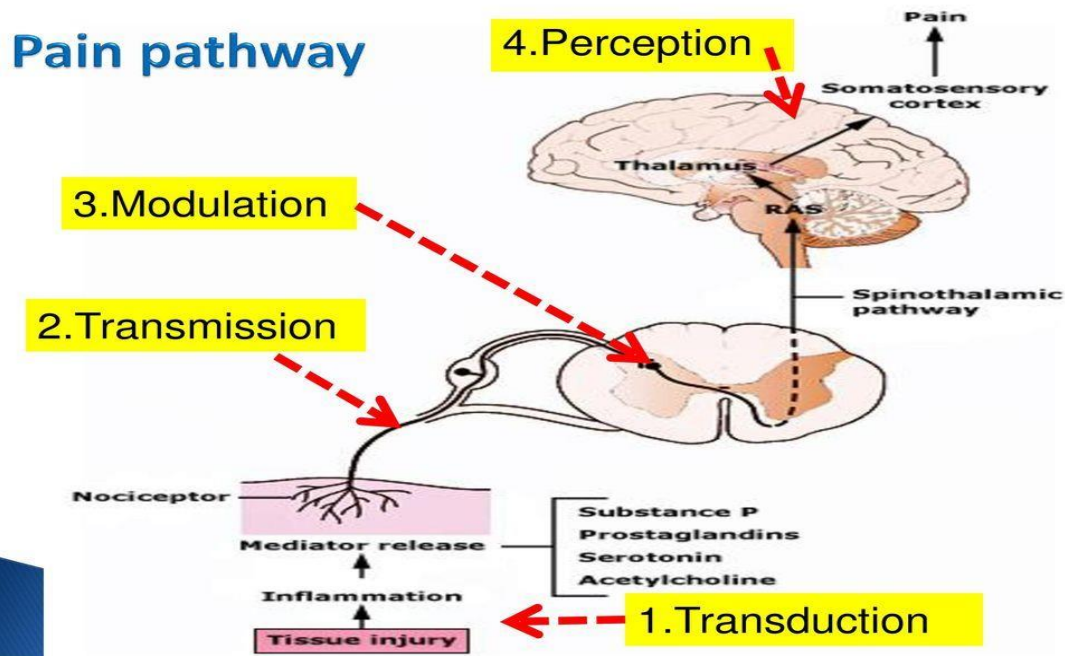


Figure 2-Pain pathway stages

(source: <https://www.pinterest.com/pin/189362359318581764/>)

The pain pathway starts with Transduction-

Transduction and Conduction-To understand it first we should understand the meaning of *Noxious stimulus* which is a tissue-damaging event and it can be mechanical (e.g. pinching or other tissue deformation), chemical (e.g. exposure to acid or irritant), or thermal (e.g. high or low temperatures). Some types of tissue damage are not detected by any sensory receptors and thus cannot cause pain. Therefore, not all noxious stimuli are adequate stimuli of nociceptors. The adequate stimuli of nociceptors are termed *nociceptive stimuli*. A *nociceptive stimulus* is defined as "an actually or potentially tissue damaging event transduced and encoded by nociceptors. **Transduction** is the conversion of these *nociceptive stimuli* (*mechanical, chemical, or thermal*) into electrical energy by a peripheral nociceptor (free afferent nerve ending). This is the first step in the pain process by which the sensation of tissue damage caused by a mechanical, chemical, or thermal source at nerve ending nociceptors gets converted into electrical energy also known as Active Potential (AP) a nerve signal. This occurs at the ends of sensory nerve cells (Nociceptors) whose terminals are very sensitive. The AP is conducted to central process in the next phase which is conduction: *Conduction* of an AP is the second phase of nociception. An AP generated in nociceptor terminals is conducted across the peripheral process to the central process where it depolarizes the presynaptic terminal. The presynaptic terminal interfaces with a network of interneurons and second-order neurons in the dorsal horn. Interneurons can facilitate or inhibit transmission to second-order neurons

The next stage of pain processing starts which is Transmission-

Transmission-Transmission is the process of transferring pain information from the peripheral nerves to the central nervous system. Electrical Signals are transmitted along the axons of nociceptors, primary nociceptive sensory nerve fibers, synapse with second-order neurons in the dorsal horn of the spinal cord. From here, neurons project to the brainstem, thalamus, and hypothalamus, as well as to reflex arcs to mediate an avoidance response.

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Modulation is the next stage in the pain pathway:

Modulation-This phase is when your brain interacts with your nerves to modulate or alter the pain experience (for example, to adjust the intensity and duration). Modulation involves the release of chemicals, such as endorphins and serotonin, that reduce the transmission of pain signals. The concepts of pain threshold (when a sensation becomes "painful") and pain tolerance (the amount of pain a person endures) also fit into this stage. A person's pain threshold and tolerance are based on several factors, both learned and inherited. Pain modulation refers to the up or down-regulation of pain signals throughout the spinal cord and the brain. Many of these signals never reach consciousness because they are dampened by intrinsic modulatory activity within the central nervous system. The signals originating in the brain can both inhibit and facilitate pain signal transmission.

Finally, perception of pain occurs in the fourth stage-

Perception of pain-*Perception* of nociceptive pain is dependent upon neural processing in the spinal cord and several brain regions. Pain becomes more than a pattern of nociceptive action potentials when they reach the brain. Action potentials ascending the spinothalamic tract are decoded by the thalamus, sensorimotor cortex, insular cortex and the anterior cingulate to be perceived as an unpleasant sensation that can be localized to a specific region of the body. Action potentials (APs) ascending the spinobulbar tract are decoded by the amygdala and hypothalamus to generate a sense of urgency and intensity. It is the integration of sensations, emotions, and cognition that results in our perception of pain.



Figure 3—Pain reception areas of the brain

(Sources: www.painpointsofview.com/professionals/the-pathophysiology-of-pain/nociceptive-pain-2/, <https://www.painpointsofview.com/professionals/understanding-pain/nociceptive-pain-u/>, and Jacques Erica (2020))

The above few paragraphs made us peep into our brain when we are experiencing physical pain. We have covered most of the aspects of physical pain and now we take on Non-Physical pain.

Non-Physical Pain

Non-Physical Pain often referred to as Mental Pain can be defined in many ways- Tossani Eliana (2013) captures various definitions put forth by several thinkers –

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Bakan (1968) observed that the individual feels psychological pain at the moment when he/she becomes separated from a significant other. From his perspective, pain is the awareness of a disruption in the person's tendency towards maintaining individual wholeness and social unity.

Sandler (1962) defined psychological pain as the affective state associated with the discrepancy between the ideal and actual perception of self.

Baumeister (1990) referred to mental pain indirectly in his theory on suicide. He viewed mental pain as an aversive state of high self-awareness of inadequacy. When negative outcomes fall far below one's standards of the ideal self and aspirations, and outcomes are attributed to the self, that person experiences mental pain. The basic emotion in mental pain is, thus, self-disappointment.

Shneidman (1993) defined psychache as an acute state of intense psychological pain associated with feelings of guilt, anguish, fear, panic, angst, loneliness, and helplessness. The primary source of severe psychache 'is frustrated psychological needs. Psychache is the mental pain of being perturbed. Perturbation refers to one's inner turmoil or being upset or mentally disturbed.

Bolger (1990) defined emotional pain as a state of 'feeling broken' that involved the experience of being wounded, loss of self, disconnection, and critical awareness of one's more negative attributes. Essential characteristics of emotional pain were described as a sense of loss or incompleteness of self and an awareness of one's own role in the experience of emotional pain.

Orbach I, Mikulincer M, Sirota P, Gilboa- Schechtman E (2003) have defined mental pain as a wide range of subjective experiences characterized as a perception of negative changes in the self and its function that is accompanied by strong negative feelings. Intense 'unbearable' mental (psychological) pain is defined as an emotionally based extremely aversive feeling which can be experienced as torment. It can be associated with a psychiatric disorder or with severe emotional trauma such as the death of a child. Psychological pain has many metaphors borrowed from physical pain (e.g., heartache, broken heart).

The diverse views of the thinkers encompass different types of non-physical pain. The bereavement grief pain which I presented in the opening paragraph appears in the definitions given by Bakan, Orbach and colleagues, and Shneidman. Their definition of non-physical pain / mental pain/ psychological pain includes emotional trauma of death, helplessness while grieving and separation from a significant other signifying bereavement.

Non-Physical / Psychological pain also includes guilt which keeps on lingering in memory and often results in a feeling of pain-Orbach captures it as a negative feeling in his definition; Bolger calls it critical awareness of one's more negative attributes; for Shneidman the psych-ache is an acute state of intense psychological pain associated with feelings of guilt. The guilt also arises out of discrepancy between the ideal and actual perception of self. The pain arising out of such guilt is defined as non-physical pain by Sandler. Most often the manifestation of guilt and associated non-physical pain happens when our inner consciousness reveals firm conviction that the act done by us was wrong- be it deserting the partner who had a lot of faith in you; be it expressing your love based on your misjudgment that the other person loved you and it hit your self-esteem; be it betraying the faith of your friends for your short-term gains; be it physically assaulting an innocent person or any such

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action which made you repent later. Sandler described guilt in his very apt words as a "discrepancy between the ideal and actual perception of self". Whenever you feel that you have acted in deviation from what could have been your just action, you get guilt; the more the deviation higher the guilt and if you acted diametrically opposite to your just way of thinking, the guilt inflicts severe pain.

The psychological or non-physical pain can get aggravated to a degree that even could surpass severest physical pain and a person could proceed towards an extreme step- suicide. Suicide is mostly prompted by an aversive state of high self-awareness of inadequacy which could lead to acute self-disappointment and lead to a feeling of helplessness and all thoughts lead to end the suffering only by ending life.

Such extreme cases are witnessed by us quite frequently. Extreme suffering due to severest physical pain could lead a patient to seek Euthanasia (mercy killing) but he does not take the extreme step himself but in the case of Psychological non-physical pain, if most severe, it could lead the person to take his own life. As per Shneidman psychache could be the main ingredient of suicide and psychological pain may be correlated to the fact that, if suffering individuals could somehow stop consciousness and still live, they would opt for that solution. Shneidman further postulated that psychache is intolerable because it results from basic needs that have been thwarted. Suicide occurs when the psych-ache is deemed by that individual to be unbearable.

What I am trying to say that the physical pain could be alleviated and eliminated by treating the illness or physical damage but the non-physical pain damages invisibly and internally and many a time the consequence could even be fatal. Hence non-physical pain is to be dreaded more than physical pain!!

The above paragraphs have made us aware of the definition and meaning of non-physical pain which is mental or psychological pain or as some thinkers call it psychache.

We shall now dwell on physical pain versus non-physical pain

Physical Pain vs Non-physical pain

Pains cause discomfort- be it physical or non-physical. As we saw in the above paragraphs, non-physical pains could be so severe that these could lead a person to end his/her life because the person could not find a remedy. But in the case of physical pain, there is always a remedy barring cases of Migraine- but it is temporary and goes away by itself after a period and, hence, it is not as severe as psychological pain. Physical pain has a short-term remedy through the use of pain killers and also has permanent remedy because pain's source is known and can be treated and the pain gets eliminated in the long run. Treating physical pain is comparatively easier than treating non-physical pain.

One significant difference between physical and non-physical pain is that physical pain is visible because its source is visible- broken leg causes pain and the pain is visible as it is emanating from the leg which is broken but psychological / non-physical pain is latent and is not visible—bereavement pain is within and invisible; the pain inflicted through guilt is invisible as it is not related to a part of the body like the leg in the example of physical pain. Visibility of physical pain gets the attention of people whereas emotional pain is invisible and many a time people around us do not notice our pain. Guy Winch (2018) has some views on this- "If your ankle swells even slightly, your physical discomfort will be noticed and you will be afforded both compassion and consideration. But if your heart gets ripped out of your

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chest and the emotional pain you feel is so severe you can't even concentrate; you will be given neither. If this is how we react to emotional pain, is it any surprise that heartbreak is so poorly understood and that emotional pain is so often ignored? The bruised part of our body creates the pain and the body is affected and pain continues till we get the pain killer and the physical pain gets eliminated when given treatment to the bruised part but the emotional pain is nearly "unbearable" for days, weeks, and even months on end. Our body experiences stress that can damage both our short-term and long-term health.

Our grief activates circuitry in our brain that causes withdrawal symptoms similar to those experienced by people who are addicted to cocaine or heroin. Our ability to focus and concentrate, think creatively, problem-solve, and generally function at our regular capacity becomes significantly impaired. Our lives are thrown upside down, leaving us questioning who we are and how to define ourselves going forward. Studies have found that when societies do not sanction grief, we internalize these standards and regard our emotions and reactions as less legitimate. ***The fact that all this goes virtually unrecognized, if not entirely ignored by society, makes our ordeal far more challenging than it already is.***

It is a fact that non-physical pain is not visible as physical pain is and this creates a lot of problems for the person undergoing non-physical pain. Winch rightly says- ***If emotional pain were visible; we would all conduct ourselves very differently.*** We would find kinder ways to break up with the person we were dating, and we would be less cruel when rejecting people who expressed interest in us. We would show more concern when we saw someone sitting alone, an anguished look on their face. We would be more patient and less judgmental when a friend or loved one fails to get over a broken heart in what we consider a timely manner. And when our own heart gets broken, we would be more self-compassionate, feel less shameful about our distress, and be more open to asking for the help we need.

Since the pain is not visible, we miss getting support from people around us. Bereavement pain, to some extent, gets the support of people as people can see and feel our loss and we get sincere empathic treatment from our near dear ones which cannot eliminate the pain but do reduce it.

Talking about bereavement grief pain, Engel (1961) explains that bereavement grief is the characteristic response to the loss of a loved person and the grief is a cause of mental pain, produces a variety of bodily and psychological symptoms and it interferes with our ability to function effectively. Indeed, the most prominent characteristic of grief is its painfulness. The pain of depression is similar to grief as are other depressive symptoms such as low energy, inward-turning, preoccupation, guilt, and self-criticism. However, grief is less often characterized by low self-esteem, pessimism, and hopelessness.

Losses of resources, including health, material resources, territory, status, relationships, or kin, cause comparable emotional pain. Kato and Mann (1999) have suggested, for example, that the loss of a spouse is often conceptualized as a loss of the emotional, instrumental, and financial aspects of social support. Bereavement grief being visible due to obvious reasons gets soothing words from people and hence the piercing intensity gets reduced to some extent and since we all know that death is a certainty, we somehow try to adjust to the situation. But other non-physical pains mostly get unnoticed because of their invisibility and their intensity goes on multiplying.

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Another remarkable feature of Non-physical / emotional/ psychological pain is that it echoes more frequently than physical pain.

Emotional Pain Echoes in ways the physical pain does not- If you got a call about your parent dying while you were having a romantic lobster meal with your partner on Valentine's Day, it will probably be a few years before you can enjoy lobster or Valentine's Day without becoming extremely sad. But if you broke your foot playing softball in an amateur league you will likely be back on the field as soon as you're fully healed. Physical pain usually leaves few echoes (unless the circumstance of the injury was emotionally traumatic) while emotional pain leaves numerous reminders, associations, and triggers that reactivate our pain when we encounter them. (Winch guy, 2014)

All emotional pains leave a permanent dent in our mental health by damaging our self-esteem whereas only extreme physical pains affect our personality.

Emotional Pain but not Physical Pain can damage our self-esteem and long-term mental health: Physical pain has to be quite extreme to affect our personalities and damage our mental health (again, unless the circumstances are emotionally traumatic as well) but even single episodes of emotional pain can damage our emotional health. For example, failing an exam in college can create anxiety and a fear of failure, a single painful rejection can lead to years of avoidance and loneliness, bullying in middle school can make us shy and introverted as adults, and a critical boss can damage our self-esteem for years to come. (Winch Guy, 2014)

Very true, time does heal the emotional wound to some extent but the dent of emotional trauma is deep, and very often when it echoes in our mind, we jump with an audible "Ouch" coming from our mouth, and momentarily we are shaken. Physical pain is excruciating when it got inflicted in our body but the enormity of pain intensity in case of emotional pain keeps on lingering even long after the emotionally traumatic incident happened.

Inter-relationship between physical and non-physical pains

Another aspect that comes to mind is that both types of pain are also interrelated. Physical pains do cause emotional pain as well. For example, if I cut my finger accidentally, the physical pain makes me suffer, and simultaneously there is an emotional pain caused in form of anger on myself for being foolish to let the accident happen due to negligence. On the other hand, those people who felt more pain due to social exclusion also reported more painful responses to heat stimuli. Consequently, the reduction of the experience of social pain or loneliness can also reduce the experience of physical pain (Masten, CL, Telzer, EH, Fuligni, AJ, et al., 2012). It has been found in many studies that social pain can affect the perception of physical pain. For instance, experiencing social exclusion can trigger physical pain (Lieberman, MD, Williams, KD, 2003). Eisenberger's study showed that the experience of social exclusion increases sensitivity to pain elicited by noxious stimuli (Eisenberger, NI, Jarcho, JM, Lieberman, MD, et al., 2006).

It is found that there are commonalities between social pain and physical pain. Published studies reveal that individuals who are more sensitive to physical pain are more sensitive to social pain (Yao, ML, Lei, Y, Li, P et al., 2019), and that increased physical pain can also increase social pain (Eisenberger, NI, 2012). Thus, we see that there is a correlation between Physical pain and Non-Physical pain.

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We shall end our discussion on the comparison of physical and non-physical pains by summarizing those physical pains being localized and temporary do not affect the personality of a person to the extent the non-physical pains do and it is also a fact that there is some correlation between physical and non-physical pains and it is observed that physical pains do produce non-physical pain and vice-versa.

Now we move on to examine the brain functioning during non-physical pain

Brain Process during non-physical pain

Ethan Kross, Marc G. Berman, Walter Mischel, Edward E. Smith, and Tor D. Wager (2011) bring out the processing of non-physical pain in the brain and compares it with the brain processing of physical pain.

The research suggests that when non-physical pain is triggered when memory freshens up about some unfortunate past incident then the brain areas that support the sensory components of physical pain (secondary somatosensory cortex; dorsal posterior insula) become active with the manifestation of this non-physical pain. This demonstrates that non-physical and physical pain are similar not only in that they are both distressing—they share a common somatosensory representation as well. Also, the network of brain regions that support the aversive quality of physical pain (the “affective” component), principally the dorsal anterior cingulate (dACC) and anterior insula (AI), also underlie the feeling of a non-physical pain.

However, the brain areas which do not get activated during non-physical pain but are affected by physical pain are operculo-insular region [i.e., secondary somatosensory cortex (S2) and dorsal posterior insula (dpINS)]

Thus, we see that there are common areas in the brain that get activated during the manifestation of physical or non-physical pains. But there are some areas of the brain which are affected during physical pain but do not show any activation during non-physical pain.

Similar views surfaced up during a study by Esther L Meerwijk, Judith M Ford, Sandra J Weiss (2013)-Research on brain areas involved in experiencing emotion and physical pain proposes a tentative neural network for psychological pain that includes the thalamus, anterior and posterior cingulate cortex, the prefrontal cortex, cerebellum, and parahippocampal gyrus. Results indicated that grief may be a more accurate exemplar of psychological pain than recalled sadness, with indications of greater arousal during psychological pain. The proposed neural network for psychological pain overlaps to some extent with brain regions involved in physical pain, but results suggest a markedly reduced role for the insula, caudate, and putamen during psychological pain.

Roberts F Nicole (2020) echoes the same views in her research paper - Although the brain does not process emotional pain and physical pain identically, research on neural pathways suggests there is substantial overlap between the experience of physical and social pain. The cascading events that occur and regions activated in our brains - and therefore our reactions to acute pain - appear to be similar.

Now it is abundantly clear that both physical and non-physical brain processing has some overlap but the physical brain has some additional areas in the brain which get activated but those are not touched by the psychological pain.

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Pain whether physical or non-physical results in suffering to the affected person. Physical pain being localized and having a known cause is possible to treat easily and the person comes out of pain permanently with effective medical treatment. The only exception is migraine which keeps on coming and going as it does not have a permanent cure. Physical pain, thus, is temporary and does not leave a lasting imprint on the person. On the other hand, the suffering is more distressful in the case of non-physical pain which has a lasting effect and does leave an imprint on the outlook and behavior of the affected person. The period when it is dormant keeps the person appearing normal but as soon as there is some trigger that brings back the memory of an incident that resulted in self-hatred/guilt/grief/separation from ex-partner (various forms of non-physical pain), the person's outlook and behavior are deeply affected by excruciating non-physical pain. It is said that time is the best healer; it is true even for non-physical pain but the affected person is not permanently cured by time as he carries the memory in the subconscious mind and the non-physical pain when triggered by anything which brings the memory back and with it comes the excruciating non-physical pain.

Physical pain has medical remedies but do we have some treatments for non-physical pain? Discussions on pain will not be complete without the exploration of treatment for non-physical pain.

Treatment for non-physical pain

While physical pain can be treated permanently through medical intervention with drugs or even needed surgery which treats the cause of pain and the patient gets relieved of the physical pain permanently. But there are no drugs or surgery to cure the non-physical pain.

The treatment of non-physical pain happens differently. Whitbourne Susan Krauss (2013) suggests 7 practical ways for recovery from emotional (i.e., non-physical) pain. She posits in her paper --Let's take a look at these seven sources of emotional injury and briefly examine their cures or antidotes:

1. **Social Rejection**—The pain inflicted through rejection- whether a friend stops returning your calls, a lover breaks up with you, someone unfriends you on Facebook or your work buddies snubs you, even if unintentionally, it hurts. Even if the rejection is a slight one, it can be enough to cause you to question your self-worth. *Guy Winch's remedy for rejection involves a four-pronged strategy: Don't accept self-criticism, rebuild your self-worth by focusing on your strengths, find other people to fill the void, and desensitize yourself to the pain of future rejection through practice bouts in which you set yourself up for mild rejections that you can readily overcome. (Source his book - Emotional First Aid)*
2. **Loneliness**-People can become or remain lonely through the sheer atrophy-the cause of loneliness could be due to a feeling that no one could ever love or care about you because you start believing that others are always thinking negatively about you. The feeling gives you emotional pain and frustrates you. *The cure may lie in fighting the pessimism with some logical counter-arguments. Try some logic to counter your skepticism by questioning your own negative assumptions. Exercising your empathy can also strengthen your relationship muscles, making it more likely that those you care about will want to be close to you. One relatively easy strategy, though it requires some commitment, is to adopt a pet on whom you can practice getting and giving emotional rewards.*
3. **Trauma / Bereavement Grief**: Distress is a natural emotion that results when someone close to you dies or you suffer a traumatic experience. Winch states, "Loss and trauma can shatter the pieces of our lives, ravage our relationships, and subvert our very identities". *Winch wisely recommends that particularly in the immediate*

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aftermath, you find a way to ease the pain that is consistent with your ordinary coping style. It may be too early for you to examine the meaning of the loss for your life and your future; instead, you may be better able to recover by giving yourself more time to heal. Indeed, Time is the best healer for bereavement pain. Also, the belief in life after death also helps in alleviating bereavement grief. Please see my paper "The Purpose(s) Served by Believing in Life After Death", which gives the details of how people could easily reconcile the death of a loved one by believing in after-life.

4. **Guilt-** In guilt, you essentially are the source of your own unhappiness. Guilt can be adaptive when it shows you where you've strayed from your own moral compass. However, just as often as not, it's unhealthy. Winch describes the three types of unhealthy guilt as unresolved, survivor, and separation (or disloyalty). Unresolved guilt refers to the feelings left behind when you believe you may not have completely apologized for a wrong you committed against another person even though, in reality, you did. Survivor guilt occurs when you literally outlive someone in a case where you easily could have died yourself. In separation guilt, you feel that you don't have the right to pursue your own independent life and success because to do so makes others seem flawed in comparison. *To overcome guilt, you need either to apologize (for the unresolved variety) or apologize to and then forgive yourself (for survivor or separation guilt). After you've forgiven yourself, you need to feel that it's okay for you to re-engage with your life and go on to enjoy that success you feel so guilty about. The people you think you're being disloyal to may, to your surprise, be the first in line to cheer you on.*
5. **Failure-** When you're thwarted in your ability to reach a goal, your self-esteem is bound to take a hit. The failures are distressing and cause a lot of non-physical pain. *In addressing the problem of failure head-on, Winch's advice is to seek support from those closest to you who can help you gain perspective on the situation. They may also help you "get real," and stimulate you to recognize that even though you may have failed in this one area of your life, it doesn't mean that you are a complete and utter failure in all areas of life. By talking to someone else, you may also help to get the perspective you need so that you can look for a silver lining in the experience.*
6. **Low self-esteem-** Once your self-esteem starts to dip, it can become a self-perpetuating process. You start to question yourself and your worth, and pretty soon you are making those mistakes and missteps that you feared would happen. With low self-esteem, you're more vulnerable to other people's critical comments (real or imagined), you feel responsible for the bad things in your life, you ruminate over your frailties, and will lack the self-efficacy that you need to succeed at important life tasks. *The treatments for this mental ailment include having compassion for yourself (and those frailties) and taking a mental catalog of your strengths. You can also allow yourself to hear compliments for the well-intentioned comments they are generally meant to be rather than questioning their sincerity. Finally, build up your mental reserves by practicing mindfulness, exercising your willpower "muscles," and accepting the fact that occasional lapses and failures interfere with your best-intentioned efforts.*
7. **Emotional Rumination-** Going over and over the unpleasant or disappointing experiences in your life, whether real or imagined, takes its toll on your well-being. Like a scar that you pick at over and over again, it will leave a permanent mark unless you learn how to stop. *The first step to overcoming rumination is to realize that other people don't see the world the same way that you do. Make a mistake? Fail at an important goal? Trip and fall while walking down the street? The chances are, according to Winch, that you're the one most aware of your small slip-ups. Once you*

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realize this, you'll be less likely to replay the event in your mind's eye. If that doesn't work, you can try to distract yourself by focusing on something else. If it's anger at someone else that you're mulling over, try to put a positive spin on it. When people tease you or try to make you feel inadequate, reframe things so that you see their jabs as motivational fuel for your own self-improvement.

The above approaches to alleviate the non-physical pain fall under cognitive-behavioral therapy, which proposes that emotional change follows from changes in thoughts and behavior. Rather than becoming mired in emotional self-doubts, worry, and sadness, you can take actions that will help you see the world, and yourself, in a more positive light. When these actions don't work, then it may be time to consult a mental health professional.

Along with the therapy provided in the above paragraphs, the emotional pain (i.e., non-physical) pain can be reduced following the following simple tips provided by Eddins Rachel (2016):

- **Find a New Hobby:** Pick up a new hobby, something that you've always wanted to try, or maybe something that you already know you love but haven't made the time for.
- **Move Your Body:** While suffering from emotional pain you may not even want to get out of bed. Unfortunately, this can contribute to greater heaviness and depression. Instead, go for a short walk around the block. Stand up and stretch. Do a short beginner yoga video online (doyogawithme.com is one to try). Dance to uplifting music in your living room.
- **Don't Ruminates:** Don't torture yourself by fixating on what caused the pain you're suffering from. What has happened has already been done and cannot be undone. Going over it again and again in your mind will only make things worse for you. If you need to, ask yourself, what can you do now? What control do you have over the situation? If nothing can be done, your only and best choice is simply to accept what is and allow yourself to feel what you feel. It can be helpful to process your feelings with a friend or therapist.
- **Stop Telling the Story:** You may think that you're no longer worrying about what caused the pain, but as soon as there is an open ear willing to listen, you find yourself retelling the story. At first this can help, but at some point, you have to stop telling the story as you're just opening up the wound again. Rather, focus on where you are now. What have you overcome? What resources have you used to get past the emotional pain? Rather than venting, sink deeper into your most primary feelings about the situation and allow yourself to really experience them.
- **Cry:** Have you been fighting back the tears? Don't. Let them go. Crying has health benefits such as releasing toxins from your body and relieving stress. Meanwhile, bottling up such emotions can only poison your body and mind. Actually, this is true. When we suppress or block our emotions, our body uses physical strategies such as constricting muscles, altering breathing, and so forth. These behaviors over time can lead to physical symptoms with digestion, chronic pain, or immune-related issues. If you find it difficult to cry, try watching a movie that has similar themes to the pain you're in.
- **Open Yourself to Others, Let Them In:** Does it hurt you to see your loved ones suffering? The same goes for your loved ones when they see you suffering. Don't lock yourself up in your room and avoid others. Let them in, it benefits both them and

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you. Humans are social creatures, isolating yourself ends up exacerbating your pain. Connection is the antidote.

The above 7 tips are simple and easy to follow and will prove very effective to persons undergoing emotional pain.

We summarize the discussions on pain by observing that we have covered many facets of pain both physical and non-physical. We have understood the meaning of pain and seen its anatomy and how it affects us. We have also peeped into the brain and saw what goes on during the physical and non-physical pains. We have also seen how we can overcome pain.

I shall conclude the paper by adding one more important aspect to what we have learned about non-physical pain, and that is however strange it may sound but emotional pain could sometimes yield a positive result. I narrate my own humiliating pain which proved to yield a "spark" in my life which was a game-changer and led me to what I am today.

Having passed out of secondary school when I entered college life, it was altogether a new world. The strict parental control loosened and I got into a world full of young men and women of my age who had grown in physique but had not grown mentally to become a grown-up matured adult. The freedom allowed us to remain away from home for longer periods with no questions asked. This led me astray and I got engaged in actions that gave me more enjoyment by bunking classes and enjoying movies in a cinema theatre. Till I moved out of school, I had not gone to any cinema theatre. I enjoyed thoroughly the first year of my college life. But when exams approached, I was scared whether I will fail. No one in my family had ever failed. The fear kept on growing and on the day of the result, I was praying to God to somehow come and rescue me and send me to the second year. God is there and he heard my prayers and the notice board had my name on the list of passing students. With renewed vigor, I entered the second year of my college life. The first day of the second year was the day etched in my memory as it brought me overwhelming humiliating pain which even now when I remember makes me very uneasy. Our class-teacher began the first session of the second year with opening remarks by welcoming us all as we had cleared our first year exam and then he threw a bombshell to my ears when he said, "We have promoted two students this year who were on verge of failing, Mr. Naresh Kumar and Mr. X (I do not want to give the real name for obvious reasons) with a hope that they will concentrate on studies and their progress will be under our continuous watch because this year's exam is going to be university exam and first year results will not get counted for the final result but part-1 university exam will be part of the final result. Both students must stop bunking classes and must concentrate to improve their performance".

I felt overwhelmingly humiliated and felt immensely ashamed for having been pulled down in front of my co-students especially the female students. The pain was unbearable mostly due to humiliation but more by the guilt of my wrongdoing. But this served as a ***"spark" that made me promise myself to prove my worth and this spark changed my life.*** I got absorbed in my studies and when my co-students were enjoying in the café during free periods, I was in the library studying. I forgot everything else and was studying and studying. When the results of the second year came, I had scored 88% marks and stood 5th in the whole university and had ranked 2nd in my college. On the first day of the second year, the same class teacher was beaming with happiness when he told the class about how glad he was to observe a remarkable change in Naresh Kumar.

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I never looked back, graduated with 86% marks standing seventh in the university, and went on to clear a competitive exam where only 30 students from all over the country could get through and could get entry into the world fame institution- Indian Statistical Institute to do my post-graduation in Statistics which facilitated my bright professional career. ***The humiliating pain had provided a much-needed "Spark" which was a game-changer. Who says that pain always has negative results, pains can also be positive game-changers filling positivity in our lives?***

Last but not the least, let us remember even when positive or negative outcomes could happen, pains (physical or emotional) invariably cause suffering and are not pleasant experiences to remember and we cannot escape the same. Each one of us has undergone pain and we all realize the feelings when we are in pain.

Pain will come to all of us and we should take it in our own stride and accept it with open arms by following Paul Coelho suggestion- ***"If pain must come, may it come quickly. Because I have a life to live, and I need to live it in the best possible way possible."***

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