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The Evolution of Pain

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Pain is one of the most basic and universal human experiences. It is shared among the diverse societies of the globe and has spanned human existence since its very beginnings. However, the pain people experience today has a different meaning from the pain of our ancestors. In the past, pain was caused by divine powers and accepted as normal. In today's Western society, pain is viewed as undesirable and has a medical explanation rooted in science. It is defined as the "unpleasant sensory and emotional experience arising from actual or potential tissue damage, or described in terms of such damage."¹ There are still many mysteries involving pain. Pain itself can become a chronic illness and a challenge to modern medicine. This paper will examine the understanding of pain in the past, in our present society, and as an application for future management.

In the remote past, pain was recognized as supernatural in its origin and believed to be caused by evil spirits or wrathful gods.^{2,3} Treatments were carried out by shamans and involved the use of magical rites or making a patient so uncomfortable that the spirit would leave.³ Another remedy in certain cultures was trepanation, a procedure in which coin-sized holes were bored through the skull.² The Paracas Indians of Peru practiced trepanation to release evil spirits that inhabited the mind of a possessed person.⁴ The recovery of healed ancient skulls indicates that patients survived this operation.² The pain they experienced during this procedure can be left to the imagination.

The meaning of pain was also strongly embedded in religion. This was most evident during the Dark Ages of medieval Christianity, also known as the Age of Faith. During this time, the central belief was that pain was "a godsend and a trial of faith," to be healed only by holiness.⁵ Flagellants publicly tortured their bodies in order to attain spiritual enlightenment.⁵ They "flogged themselves with metal-tipped leather scourges, singing, praying, and sobbing, until they collapsed . . ." ⁵ Pain was a divine punishment and a normal aspect of everyday life.

Such acceptance of pain continued into the early nineteenth century. In early European societies, children were struck at school, criminals were whipped, prostitutes were flogged and executions were public in front of cheering crowds.⁵ Medicine, whose purpose was to treat diseases to improve well-being, was not exempt from pain, either. This description of a leg amputation in 1841 reported in the *New York Herald* paints a clear picture of pain in the past:

[The] professor took the long glittering knife, felt for the bone, thrust in the knife carefully but rapidly. The boy screamed terribly...the first cut from the inside was completed, and the bloody blade of the knife issued from the quivering wound, the blood flowed by the pint, the sight was sickening...The saw glistened in the hands of the operator . . . grate — crush — once, twice, and the useless limb from the toes to the centre of the thigh, was quickly dropped into the tub under the table . . .⁶

Surgeries and amputations such as this occurred for centuries without any effective pain relief. It was not until the early 1840s that the pain of major operations was significantly reduced with the introduction of anesthesia. The discovery of anesthesia is one of the "greatest gifts to humanity"⁶ and merits discussion.

Many people contributed to the development of anesthesia. However, Crawford Williamson Long discovered the first general anesthetic, known as ether.⁵ On March 30, 1842, Long excised a tumour from the back of the neck of James M Venables, who inhaled ether during the procedure.⁵ The surgery was noted as painless and uneventful.⁵ Unfortunately for Long, he did not receive recognition for his ingenuity, because he did not publish his findings.^{5,6} By the time Long began to claim his discovery, others were battling to claim it as their own.⁵

The benefits of anesthesia were initially received with opposition. Ordinary people resisted the idea of no pain. Pain indicated that one's organs were intact and one was alive.⁵ General anesthesia resembled end-of-life conditions such as coma, fatal poisonings, and brain injuries⁵ and was therefore not a desirable state. Likewise, physicians believed that pain was a necessary evil in medicine. Pain had to be endured for safety reasons because it guided the surgeon on how to proceed during an operation.⁵ Moreover, there were religious objections. Ministers quoted biblical passages to remind the public that pain was God's intention.⁵ The Church warned that anesthesia during childbirth would prevent bonding of mother and child.⁵

Like many new medical ideas, it took time for anesthesia to be accepted. A significant advancement in the approval of anesthesia is attributed to John Snow, the first modern anesthetist.⁵ On April 3, 1853, he was summoned to Buckingham Palace, where he administered chloroform to ease the labour pains of Queen Victoria.⁵ Following the delivery, the Queen described the experience as "soothing, quieting and delightful beyond measure."⁵ The Queen's support of anesthesia spread throughout the Empire. A favourable shift in the perspective of painless surgery began to take hold.

The welcome of anesthesia brought a new concept: pain as unnecessary. Beginning in the mid-nineteenth century, patients began to demand to be put to sleep.⁵ The same desire has continued until today. Patients regard pain as an unacceptable state requiring intervention. Once viewed as inappropriate, anesthesia is now essentially a patient's right.

Furthermore, the understanding of pain has shifted from a divine process to a physiological pathway. In this pathway, pain originates in an integrated matrix of neurons consisting of at least three levels: peripheral, spinal, and supraspinal.⁷ Simply put, the peripheral level consists of afferent axon fibres that conduct sensations, including pain, from the periphery.⁷ These sensory fibres connect in the dorsal horn of the spinal cord, and from there, the signals continue to the brain via ascending pathways.⁷ Pain modulation occurs at these three levels through inhibiting pathways, which can also be controlled pharmacologically.

This physiological pain pathway is well-suited for explaining the pain from a sprained ankle or a heart attack. It confirms a direct link between pain and the presence of an underlying cause, such as disease or trauma. However, it cannot be applied to the understanding of all pain. Chronic pain, which can persist long after an injury has healed, is much more complex and multifactorial in origin. Psychological, physiological, social, and cultural factors are involved in its manifestation.⁸ Chronic pain is not merely a symptom of an injury; it is itself an illness.

Chronic pain is a serious health problem. It affects between 18 and 29% of Canadian adults,⁹

many of whom must wait many years for admission to a pain clinic. Even when treatment becomes available, the pain is often resistant to the traditional therapies of analgesics and opioids.⁷ Much has been learned about the mechanisms of chronic pain, such as spinal sensitization and central nervous system plasticity, but many questions remain unanswered.⁷

The understanding of chronic pain is further complicated by the fact that pain is subjective. The same injury can be interpreted differently by different individuals. Mood, attention, motivations, and cognition are known to alter pain perception.¹⁰ Attention focused on a painful stimulus or anticipation and anxiety of pain have the potential to exacerbate a painful experience.¹¹ Recently, functional magnetic resonance imaging demonstrated that patients with a low pain threshold have increased activation in areas of the brain involved in pain perception.¹¹

Regardless of its cause or type, chronic pain has a destructive effect on patients and their families. Daily activities, income, social relationships, and sleep are affected, and patients are more likely to have anxiety or depressive disorders.⁹ Current medical treatments are often inadequate at providing relief, and the cost to the Canadian healthcare system is enormous.⁹

Like our predecessors, who were challenged with relieving the pain of surgery and childbirth, modern medicine is now confronted with the puzzle of understanding and curing chronic pain. There is a tendency to incorrectly view chronic pain as one-dimensional, resulting in a void in the cultural comprehension of chronic pain. Some patients suffer in silence, and they are sometimes blamed for their own condition by society and institutions. Historical insight shows how a shift from a religious to a scientific explanation changed the management of acute pain. A similar evolution of thought and attitude on behalf of medical professionals is required to influence a change from a "monotherapy" approach to a multidimensional approach for chronic pain treatment. In the future, this change in attitude towards chronic pain is fundamental for discovering superior therapies for its relief.

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