



Painkillers and Drug Safety - A Challenged Balance

Dr. Mamata Tiwari, Associate Professor,

R.R. Government Autonomous College, Alwar

Abstract

Pain is an inherent part of the human experience that has afflicted humanity throughout the ages. Since ancient times, people have been searching for effective remedies to alleviate pain, and this pursuit has persisted to the present day. This article explores the historical progression of pain medications, encompassing their evolution, various aspects, and advancements. We will examine the journey of pain relief, starting from natural substances and leading to the discovery of opioids, the emergence of nonsteroidal anti-inflammatory drugs (NSAIDs), and the introduction of innovative methods like nerve blocks and neuromodulation. By comprehending the historical background and the different aspects of pain medicine, we can acknowledge the advancements made in mitigating suffering and enhancing the well-being of countless individuals.

Introduction

What is Pain-Relief Medicine?

Medications for alleviating pain are employed as a component of a comprehensive approach to address both short-term (acute) and extended (chronic) pain. These drugs function by either addressing the root cause of the pain or diminishing the sensation of pain itself. Pain, as a combination of physical and emotional sensations, drives individuals to seek solace and relief. Throughout the course of history, people have endeavored to alleviate pain through diverse methods, ranging from natural remedies to advanced pharmaceuticals. This article aims to explore the historical progression of pain-relief medications, illuminating the notable milestones, subtopics, and breakthroughs that have influenced our comprehension and treatment of pain.

- *Ancient Healing Methods and Early Strategies:* In ancient civilizations, people sought relief from pain by utilizing natural substances. The ancient Egyptians relied on opium and mandrake,



while the Greeks employed willow bark and meadowsweet, both rich in salicylates, to alleviate pain. These early remedies laid the groundwork for future advancements in pain management.

- *The Unveiling of Opioids:* A significant milestone in pain medicine occurred with the discovery of opioids. In the early 19th century, scientists isolated morphine from opium, leading to a breakthrough in pain relief. However, due to the addictive nature of opioids, alternative options needed to be explored.
- *Nonsteroidal Anti-Inflammatory Drugs (NSAIDs):* Pain management was revolutionized by NSAIDs, which offered effective relief while avoiding the addictive properties of opioids. The development of medications like aspirin and ibuprofen played a vital role in treating pain, inflammation, and fever. These drugs became widely accessible and continue to be commonly used today.
- *Local Anesthetics and Nerve Blocks:* Advances in pain medicine went beyond systemic medications. The discovery of local anesthetics and the practice of nerve blocks marked a significant breakthrough in pain management. These techniques allowed targeted pain relief during surgeries, childbirth, and chronic pain conditions, enhancing patient comfort and improving outcomes.
- *Neuromodulation and Innovative Approaches:* In recent times, the field of pain medicine has witnessed the emergence of innovative approaches. Neuromodulation techniques, including spinal cord stimulation and deep brain stimulation, provide new avenues for managing chronic pain. These interventions aim to modify pain signals and offer relief to patients who have not responded to traditional treatments.

Prescription Medicines

To obtain specific medications from a pharmacist, it is necessary to possess a valid prescription issued by a medical professional. In addition to doctors, dentists and certain authorized nurses also have the authority to prescribe these medications.

Prescription NSAIDs



Certain nonsteroidal anti-inflammatory drugs (NSAIDs) can be purchased in lower doses without a prescription. However, stronger variants of these NSAIDs, like diclofenac and naproxen, require a prescription. In addition, specific NSAIDs such as meloxicam and COX-2 inhibitors like celecoxib are exclusively available through a prescription. It is important to note that individuals with stomach issues, liver complications, hypertension (high blood pressure), or asthma may not be suitable candidates for these medications.

Opioids

Opioids, such as oxycodone, morphine, and codeine, have potential applications in alleviating moderate to severe short-term pain, typically following surgery, injury, or in individuals with cancer experiencing chronic pain. Their usage should be limited to cases where alternative treatments have proven ineffective or are not tolerated by the patient. However, there is insufficient evidence supporting the use of opioids for managing chronic non-cancer pain. It is important to note that opioids carry the risk of addiction and can lead to severe side effects, including life-threatening respiratory issues. Nausea, vomiting, constipation, and drowsiness are also common occurrences. Prolonged use of opioids increases the likelihood of experiencing adverse effects, so it is advisable to use them for the shortest duration necessary.

Anti-Epileptic Medicines

Gabapentin and pregabalin are frequently prescribed medications for individuals experiencing neuralgia or fibromyalgia. These anti-epileptic drugs are commonly used to alleviate nerve pain. Additionally, carbamazepine, another anti-epileptic medication, can be effective in treating trigeminal neuralgia, a severe facial pain condition.

Antidepressants

Antidepressants function by altering one's pain perception. These medications are occasionally recommended for the management of specific forms of persistent pain, such as the treatment of neuralgia (nerve pain) and pain associated with fibromyalgia.



Topical Products

Certain analgesic medications can be directly administered on the skin at the specific area of discomfort, referred to as topical medicines. These can offer temporary relief from pain, particularly in cases such as osteoarthritis. Topical pain medications commonly contain nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen, diclofenac, or piroxicam. These medications function by reducing inflammation and swelling. Additionally, capsaicin, derived from chili peppers, is sometimes included in topical pain-relief medications. It is crucial to apply the appropriate quantity of these products since a small portion of the medicine can be absorbed into the bloodstream.

How Pain Affects the Body?

Pain serves as a complex and vital mechanism for safeguarding the body. It plays a crucial role in the process of evolution by alerting us to potential dangers and protecting us from harm.

Within the body, there exist pain receptors that are connected to two primary types of nerves responsible for detecting potential threats. One type of nerve transmits messages rapidly, resulting in sharp and sudden pain sensations. The other type transmits messages more slowly, leading to dull and throbbing pain.

Different areas of the body possess varying densities of pain receptors. For instance, the skin contains a multitude of receptors, enabling us to accurately identify the precise location and type of pain being experienced. Conversely, the gut has fewer receptors, making it more challenging to pinpoint the exact source of a stomach ache.

When the pain receptors in the skin are activated, such as through contact with something dangerous like a hot object or a sharp surface, these nerves send warning signals to the spinal cord and subsequently to a region of the brain known as the thalamus.

In certain cases, the spinal cord promptly sends signals back to the muscles, causing them to contract. This reflexive reaction moves the affected body part away from the potential harm or danger, effectively preventing further damage. Importantly, this response occurs before the sensation of pain is consciously perceived.



Once the alert message reaches the thalamus, it processes the information conveyed by the nerves, taking into consideration an individual's prior experiences, beliefs, expectations, cultural background, and social norms. This accounts for the significant variations in people's responses to pain.

Subsequently, the thalamus transmits the processed information to other parts of the brain that are associated with physical responses, thoughts, and emotions. It is at this stage that one may begin to perceive the sensation of pain, think along the lines of 'That hurt! What caused it?', and experience feelings of annoyance.

Furthermore, the thalamus also contributes to mood and arousal, which helps explain why the interpretation of pain is influenced by one's mental state and overall emotional well-being.

Managing Pain without Medicines

There are numerous non-medical treatments available to assist in pain management. Utilizing a combination of therapies often yields better results compared to relying on a single method. Some non-medical options include:

- *Heat or Cold:* After sustaining an injury, ice packs can be applied immediately to reduce swelling. Heat packs are more suitable for relieving chronic muscle or joint injuries.
- *Physical Therapies:* Engaging in activities like walking, stretching, strengthening exercises, or aerobic exercises can help alleviate pain, enhance mobility, and uplift mood. It's important to gradually increase exercise intensity to avoid overexertion.
- *Massage:* This form of physical therapy is beneficial for soft tissue injuries but should be avoided if the pain originates from the joints. While there is some evidence suggesting massage's effectiveness in pain management, it is not recommended as a long-term therapy.
- *Relaxation and Stress Management Techniques:* Techniques such as meditation and yoga can aid in relaxation and stress reduction.
- *Cognitive Behaviour Therapy (CBT):* This type of psychological therapy assists in altering one's thoughts, emotions, and behaviours related to pain. CBT is valuable for learning self-management strategies in chronic pain cases.



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- *Acupuncture*: Originating from traditional Chinese medicine, acupuncture involves the insertion of thin needles into specific points on the skin. Its aim is to rebalance the body and trigger the release of natural pain-relieving substances (endorphins). While some individuals report reduced pain severity and improved functionality with acupuncture, the effectiveness of this treatment remains inconclusive based on current research.
 - *Transcutaneous Electrical Nerve Stimulation (TENS) Therapy*: By transmitting low voltage electrical currents through the skin via electrodes, TENS prompts the body to respond with pain relief. Limited published evidence exists to fully support the use of TENS for treating certain chronic pain conditions. However, some individuals who are unresponsive to other treatments may experience benefits from TENS therapy.

Pain Medicines

Many individuals will utilize pain medication, also known as analgesics, at some point in their lives. The primary categories of pain medication include:

- *Paracetamol*: Often recommended as the initial medication for relieving short-term pain.
- *Aspirin*: Used for short-term relief of fever and mild-to-moderate pain, such as period pain or headaches.
- *Non-steroidal anti-inflammatory drugs (NSAIDs), like ibuprofen*: These medications alleviate pain and reduce inflammation, including redness and swelling.
- *Opioid medications, such as codeine, morphine, and oxycodone*: Reserved for severe or cancer-related pain.
- *Local anesthetics*: Available in the form of drops, sprays, creams, or injections, they are employed when nerves are easily accessible.
- *Certain antidepressants and anti-epileptic medications*: Utilized specifically for nerve pain.

How Pain Medicines Work?

Pain medications function through different mechanisms. One category of pain relievers, such as Aspirin and other NSAIDs, aid in reducing inflammation and fever. They achieve this by inhibiting



prostaglandins, chemicals that contribute to inflammation, swelling, and heightened sensitivity of nerve endings, resulting in pain. Prostaglandins also play a role in protecting the stomach lining from stomach acid, explaining why these medications may cause irritation and bleeding in certain individuals. On the other hand, opioid medications operate through a distinct mechanism. They alter pain signals within the brain, which is why these medications can potentially lead to addiction.

Side Effects of Pain Medicines

Some commonly used pain medications have potential side effects, which are as follows:

- *Paracetamol*: Side effects are uncommon if taken as directed and for a short duration. Large doses over an extended period may lead to skin rash and liver damage.
- *Aspirin*: Nausea, vomiting, indigestion, and stomach ulcers are the most frequent side effects. More severe reactions like asthma attacks, ringing in the ears, kidney damage, and bleeding may occur in some individuals.
- *Non-steroidal anti-inflammatory drugs (NSAIDs)*: Possible side effects include headaches, nausea, upset stomach, heartburn, skin rash, fatigue, dizziness, ringing in the ears, and elevated blood pressure. NSAIDs can worsen heart and kidney failure, increase the risk of heart attack, angina, stroke, and bleeding. It is advised to use NSAIDs with caution and for the shortest duration necessary.
- *Opioid pain medications like morphine, oxycodone, and codeine*: Commonly reported side effects are drowsiness, confusion, falls, nausea, vomiting, and constipation. These medications can also impair physical coordination, balance, and have the potential for dependence. Furthermore, they can slow down breathing, which may result in accidental fatal overdose.

Managing Pain that cannot be Easily Relieved

Here are some rephrased suggestions for dealing with persistent pain when it becomes difficult to alleviate:

- Instead of striving to completely eliminate the pain, focus on enhancing your day-to-day functionality.



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- Acknowledge that the pain may persist and occasional flare-ups might happen. Mentally guide yourself through these challenging periods.
 - Educate yourself about your condition to avoid unnecessary anxiety and worry regarding the pain.
 - Seek the support of your loved ones by informing them about the assistance you require, and find ways to stay connected.
 - Take measures to prevent or alleviate depression using methods that work for you, such as confiding in friends or seeking professional help.
 - Refrain from increasing your pain medication without consulting your doctor or pharmacist first.
 - Raising your dosage may not effectively alleviate your pain and could potentially cause harm.
 - Enhance your physical fitness, consume nutritious foods, and ensure you get adequate rest.
 - Try not to let the pain impede your desired lifestyle. Gradually reintroduce activities you used to enjoy, and if flare-ups occur, temporarily reduce participation but gradually increase again as you did before.
 - Focus on discovering enjoyable and fulfilling activities that do not exacerbate your pain.
 - Consult a healthcare professional, such as a psychologist, to learn about new coping strategies and skills.

Conclusion

The fascinating chronicle of pain medications reflects humanity's enduring pursuit to relieve agony. Throughout the ages, various remedies have emerged, including the breakthrough of opioids, the evolution of NSAIDs, and the introduction of groundbreaking methods such as nerve blocks and neuromodulation. These remarkable advancements have had a profound impact on numerous people, granting them respite and enhancing their overall well-being. As ongoing research and technological advancements persist, the future holds great potential for further advancements in pain management, offering increasingly effective and tailored solutions for alleviating suffering.



References

- Bailey JE, Campagna E, Dart RC. The underrecognized toll of prescription opioid abuse on young children. *Ann Emerg Med* 2009; 53:419-424.
- DuPen A, Shen D, Ersek M. Mechanisms of Opioid-Induced Tolerance and Hyperalgesia. *Pain Management Nurs.* 2007;8(3):113–121.
- Leonard T, Klem S, Asher M, et al. Relationship between pain severity and serum beta-endorphin levels in postoperated patients. *Pharmacotherapy.* 1993; 13:378–381.
- Przewlocki R. Opioid abuse and brain gene expression. *European Journal of Pharmacology.* 2004;500(1–3):331–349.