

Graduation project in the field of neuroscience about chronic migraine.

Introduction

Migraine is a chronic neurological condition that involves complex changes in brain function and blood flow. It is more than just a headache—it is a neurovascular disorder that affects the brain, the trigeminal nerve, and blood vessels. Recent research in neuroscience has shown that migraines are associated with cortical spreading depression, a wave of abnormal electrical activity in the brain, as well as disturbances in serotonin and other neurotransmitters. These insights help scientists and doctors better understand the causes and potential treatments for migraines. As a result, neuroscience plays a crucial role in uncovering the mechanisms behind this condition and developing targeted therapies to reduce its impact

Statistics

Migraine affects 10% of the world's population, including 25% of adult women and 9% of children.

A migraine attack is more than just a severe headache; it is a collection of symptoms that may include neck pain, nausea, dizziness, visual disturbances, and sensitivity to light, sound, and smells, along with a variety of other symptoms.

Many sufferers often lose hours or even days due to this condition.

About the historical development of the disease

Regarding the classification of migraine, the latest version of the International Classification of Headache Disorders published by the International Headache Society, ICHD-III (beta) (Headache Classification Committee of the HIS, 2013), includes a number of significant changes.

For example, chronic migraine, which was previously classified as a complication of migraine, is now considered a subtype of migraine.

Furthermore, the new version states that patients who experience headaches (tension-like and/or migraine-like) for 15 or more days per month for more than 3 months, with migraine features present on at least 8 days per month, should be classified as having chronic migraine (Headache Classification Committee of the HIS, 2013).

In this way, the classification defines migraine based on the frequency of attacks, thereby highlighting more severe forms within the migraine spectrum.

Recent Advances in the Understanding and Management of the Disease

In recent years, significant progress has been made in understanding the course and pathophysiology of migraine. Migraine can now be accurately diagnosed using the ICHD-3 criteria [17], and it can be distinguished from other types of headaches. Based on this, specific pathological mechanisms have been identified [8], leading to the development of highly effective treatment options with precise and targeted interventions in the course of the disease [6, 7].

As a result, many sufferers can now be effectively helped. However, some patients still do not experience satisfactory relief from currently available preventive and acute treatments.

Nevertheless, the current line of research is promising: it is rich with potential new targets, medications, and other future treatment options.

Treatment of the Disease

Instead of saying “I can’t do this,” change your mindset. Tell yourself, “This will be difficult, but I can do it.”

Enjoy your time. Find at least 15 minutes each day to do something you enjoy. It could be playing a game, having coffee with a friend, or practicing a hobby. Doing something you enjoy is a natural way to cope with stress.

Relax. Deep breathing from your diaphragm can help you relax. Focus on slow, deep inhaling and exhaling for at least 10 minutes a day. This can help you relax your muscles—one group at a time. When you’re finished, sit quietly for a minute or two.

Keep a migraine journal.

A journal may help you identify what triggers your migraines. Note when your migraine attacks start, what you were doing at the time, how long they lasted, and whether anything helped relieve the pain.

Avoiding migraine triggers used to be the best advice. But recent research suggests that it may actually increase sensitivity to potential triggers.

A more helpful approach may be to gradually expose yourself to migraine triggers and learn how to cope with them using behavioral management techniques. These may include identifying and challenging negative thoughts, relaxation training, and stress reduction. More research is needed to understand whether this approach is more effective in controlling migraines and how well it works.

Maintain balance.

Living with migraines is a daily challenge, but making healthy lifestyle choices can help. Ask for support from your friends and loved ones.

And if you're feeling anxious or depressed, consider joining a support group or seeking counseling. Believe in your ability to manage the pain.

Conclusion

Migraine is one of the most complex and prevalent neurological disorders, presenting a continuous challenge for both researchers and clinicians. Thanks to the rapid advancements in neuroscience, we are gradually uncovering the underlying neural and molecular mechanisms of this condition — from the role of the trigeminovascular system to the profound effects on the cerebral cortex and brain networks involved in perception and pain processing.

This deeper understanding has enabled the development of more precise and effective treatments, such as CGRP antagonists and neuromodulation techniques, marking a promising step toward transforming migraine management from mere symptom relief to targeted intervention.

Nonetheless, migraine remains a significant health, psychological, and social burden for millions of patients worldwide. This highlights the urgent need for continued multidisciplinary research and collaboration across neurology, behavioral science, genetics, and medical

technology to achieve more personalized and effective therapeutic approaches.

In light of these insights, our understanding of migraine is entering a new era — one where it is no longer seen as “just a headache,” but rather as a complex neurological disorder worthy of rigorous scientific investigation.

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