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Hello and welcome to the Health Hits podcast.

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This time we're talking about headache. We'll go over the three most common headache types including migraine, and learn the surprising but disgusting origin of a commonly used painkiller.

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I'm Tom Fisher and I'm a doctor working in Oxford in the UK.

There is nothing more fascinating than the human body. How it works and how it can go wrong. I research and present this podcast with the aim of removing some of the mystery around common medical conditions. Along the way we will encounter the unusual, the bizarre, as well as exploring medicine from the past and in the future.

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So headache.

Headache is the unpleasant sensation of pain around the head, in the head, and in the neck.

Over 90% of headaches are not serious and come and go from time to time, often feeling the same, and usually getting better by themselves.

Sudden onset headaches, or headaches that are different from anything a person has experienced before or those that have other symptoms, such as vomiting, fever or related to injury may be more serious. This is beyond the scope of this episode, but as always, if you have symptoms that are new and that worry you, it is always best to contact your doctor.

Tension headache is the most common headache type and everyone knows what that feels like. A tight band of pain around both sides of the head. It can be like a pressing feeling and apart from affecting both sides of the head it can also affect the neck.

The brain itself has no pain nerves. It cannot feel directly. So the sensation of pain in the headache must come from somewhere else.

In the case of tension headaches its related to tightness or sustained contraction of the fibres in the muscles that cover the skull. These muscles are surprisingly large and if you've ever looked at a skull you'll know it's a very different shape to a head. And that's because of the large muscles, one of which is are temporalis, the large, powerful muscles in front and above the ears whose sole job is to create the powerful biting action of our jaw.

Its also thought that the extended contraction can affect blood flow within the muscle and lead to a cramp-like effect that is painful.

We know that stress, poor posture and dehydration all contribute to tension headaches, presumably because of how these things all affect the muscles of the head and neck.

Although unpleasant a tension-type headache is often mild enough that most people can get on with what they want to do. It typically lasts between 30 minutes and 7 days, but less than a day is much more common.

Simple painkillers like paracetamol can often be enough to keep the headache under control until it settles. Paracetamol, also known as acetaminophen, is a really common drug, perhaps the most commonly used in the world. It works in the brain and spinal cord by blocking an enzyme, known as the COX enzyme, which is important in the pain response.

Paracetamol was discovered by accident in the late 1800s when it was noticed that the dried urine of patients taking another painkiller called phenacetin formed a white crystal with a bitter taste.

*There must've been a moment in around the 1880s when a scientist thought: "Hmmm, I wonder what happens if I put this in my mouth".

Fortunately paracetamol is now made in the lab rather than in the human body, and has gradually become the most popular painkiller as research consistently finds it safer than its predecessors.

Another painkiller used in tension headache is ibuprofen. It is a much younger drug, only being developed in 1961. It also acts on COX enzymes but this time in the peripheral tissues, at the site of the pain. Ibuprofen is known as an anti-inflammatory because by stopping the COX enzymes in the body tissue, it can actually reduce the amount of inflammation or swelling and so the pain that this causes.

It is associated with more side effects than paracetamol, the most common being irritation of the lining of the stomach which causes burning or hunger pains. The stomach seems to be much better protected if you take ibuprofen after food. And it's important to know that one in five patients with asthma can get worsening of their breathing after taking ibuprofen.

Find out more about asthma in episode 1 of the podcast and written versions of the episodes are available on www.HealthHits.info.

I'm going to talk about migraine in a moment but first I'm going to mention a much less common headache type called cluster headache. Fortunately less than 1 in a thousand people are affected because it has been described as the most intense pain a human can experience.

In this headache type you get clusters of headaches, usually once a day, for 6 to 8 weeks that then disappear sometimes for years.

The pain is usually felt like a red hot poker in one eye and can last 1-2 hours. You also often see watery eye and runny nose just on that side. Its cause is not fully understood, but current theories suggest one of the sensory nerves of the face or the blood vessels may be playing up resulting in pain signals being sent to the brain.

Cluster headaches are so awful that sometimes they're called suicide headaches because people have been known to kill themselves during the attack or even in anticipation of the pain coming on.

Treatment has historically been very difficult and conventional painkillers don't seem to help but there is hope. Oxygen through a mask does help some people and new techniques to apply electric current to the muscles of the neck or down a wire deep into the brain are showing promise.

If you would like to find out more there is a resource library on the www.HealthHits.info site and all the episodes are available in written format there too.

So the last of the three long term headache types is migraine. Migraine is a distinct headache type and not just a way to describe a bad headache.

Greek physician Galen of Pergamon seems to be the first person to describe what we recognise as migraine in the 2nd century when he called it Hemikranion meaning half a skull. It worked through Latin and French from Hemikranion, Hemikrania, Mikrania, Migraine. It's a bit of stretch.

But it has this origin because the pain typically affects one side of the head. It can affect a person on both sides, but usually not at the same time. The pain is usually a throbbing sensation that comes on so intensely that people will often have to stop what they're doing and take themselves off to bed. The pain can last anywhere between a few hours and a few days and often comes along with feeling sick or being sick and sensitivity to light and noise.

For some its just the headache but others experience neurological symptoms just before, known as aura. These can be visual changes like flashing lights or zig-zags. Even temporary vision loss. Tingling or weakness in the arms and legs, speech difficulty, even problems with regulation of body function resulting in cold sweats or diarrhoea.

The reason for these strange symptoms is a wave of electrical activity spreading across the brain and triggering parts of the brain that would normally receive signals from the eyes or the arms and legs for example.

It is possible to get aura without the subsequent headache and that's called a silent migraine. This can often be confused with a form of epilepsy. And of course neurological symptoms in someone who has never had them before would make a doctor worry about stroke or mini-stroke. A repeated pattern of similar symptoms is reassuring, a one off would perhaps require further tests.

Migraine affects around 1 in 11 men and 1 in 4 women. This difference is probably related to changes in oestrogen levels as we see a spike in symptoms around periods, pregnancy and menopause.

Other things which can commonly bring symptoms on in migraine sufferers include certain foods like alcohol, caffeine, cheeses or food additives. Bright lights, changes in weather pressure. Everyone is affected differently but most seem to be able to work out which things affect them the most.

No one is certain of the exact cause of migraine but for a long time it was thought to be related to tightening then relaxing of arteries in the head, resulting in that one sided throbbing pain. However, more recent thought centres around excess sensitivity of the nerve fibres in the brain, and so an increased sensation of pain. This would fit better with the wave of electrical activity that causes the aura. The truth is that the nerves and the blood vessels probably both play their part in the migraine syndrome.

So how can we treat the migraine headache?

Well there are simple painkillers like paracetamol and ibuprofen as discussed before. Ant sickness medications are often also helpful for the nausea that comes along for a lot of people.

Codeine, which is an opiate, a much weaker version of morphine, has been used but the evidence is starting to show that it has very minimal benefit.

A modern breakthrough in the management of migraine headache is a class of drugs developed in the 1990s called triptans. Sumatriptan, Rizatriptan, Zolmitriptan are examples and I particularly like this naming structure because there is zero confusion about what class of drug they are in,

The triptans work by mimicking the serotonin, a neurotransmitter chemical in the brain. This seems to reduce inflammation and blood vessel spasms and so stops the pain. Although it often stops the headache, it usually doesn't prevent the several days of exhaustion that typically follows a migraine.

Its estimated that with the headache and the subsequent fatigue that billions of pounds worth of missed working days in UK each year.

I read an interesting case study of a Canadian patient who bled green blood on the operating table in 2007 due to the huge doses of sumatriptan he was taking every day. The harmless sulphur mixed in with this triptan preparation had bound to his red cells, turning his blood green and giving his surgeons quite a shock.

Apart from the avoiding the obvious triggers there are medications that can be used if people are getting frequent troublesome migraines. Anticonvulsant, betablocker or old fashioned antidepressant drugs are commonly used. And recent evidence suggests that the B vitamin riboflavin taken daily can reduced migraine frequency and intensity.

The future of migraine treatment seems to be along the same lines as current practice with pills to prevent the attacks and other pills to reduce the frequency of the flareups. New drugs in the trial stages are focusing on switching off some of the pain receptors in the brain but they will likely not be on the market for some years, and when they do they will undoubtedly be expensive. However, simple dietary changes are increasingly being shown to be not only simple but effective. A lot of artificial food flavourings and preservative, for example Monosodium Glutamate or MSG has been shown to be a trigger for lots of people and with modern food labelling, cutting this out is easier now than in the past.

That's all for the headaches episode. It isn't exhaustive but we have covered the three most common chronic headache types. Its important to remember that new, sudden onset headaches or headaches that are different from anything you have experienced before are discussed with your doctor. Resources and text versions of the episodes are available on www.HealthHits.info

You can also ask questions and make suggestions, as well as keeping up to date with the latest news at www.facebook.com/healthhitspod and on twitter @HealthHitsPod.

Thank you so much for listening and please join me again for another episode of Health Hits.