

NIH News in Health

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Managing Pain Moving Beyond Opioids

Most people experience some kind of pain during their lives. Pain serves an important purpose: it warns the body when it's in danger. Think of when your hand touches a hot stove. But ongoing pain causes distress and affects quality of life. Pain is the number one reason people see a doctor.

A class of drugs called opioids is often used to treat pain. One reason, explains NIH pain expert Dr. Michael Oshinsky, is that opioids work well for many people. Opioids can stop the body from processing pain on many levels, from the skin to the brain. Because they work throughout the body, he says, "Opioids can be very effective for multiple types of pain."

But opioids also produce feelings of happiness and well-being. And they're reinforcing: the more people take them, the more they crave them. This can lead to addiction, or continuing to take opioids despite negative consequences. Scientists have not yet been able to develop opioids that reduce pain without producing these addicting effects, Oshinsky explains.

The longer someone takes opioids, the more they may need to take to get the same effect. This is called tolerance. Having a high tolerance doesn't always mean you'll become addicted. But taking higher doses of opioids increases the risk for both addiction and overdose.

The U.S. is now in the grip of an opioid crisis. Every day, more than



100 Americans die from an opioid overdose. This number includes deaths from prescription opioids.

"We don't need 'better' opioids. We need to move away from the reliance on opioids for developing pain treatments," Oshinsky says.

NIH is funding research into new and more precise ways to treat pain. It's also working to develop new treatments to combat opioid misuse and addiction.

Opioids Not Always Needed • Opioids are often prescribed for acute pain. Acute pain is short-term pain, the kind experienced after an accident or an operation. But other drugs may be just as effective for acute pain, even after surgery, explains Dr. Dena Fischer, a dental health expert at NIH. Some of these drugs, like acetaminophen or ibuprofen, don't require a prescription.

People may think that prescription drugs work better for acute pain. But that's often not the case, Fischer

says. Using something other than an opioid first can be especially important to manage acute pain in fields such as dentistry, she adds.

Many people receiving opioid prescriptions from dentists are teens or young adults who have never been prescribed an opioid before.

"Research is starting to tell us that people who receive an opioid prescription as a teenager have a tendency to continue to take opioids for non-medical purposes in the long term," Fischer says.

Healthcare providers who decide their patient needs an opioid are now being encouraged to give only a few pills at a time. People who receive shorter prescriptions are less likely to misuse their pills by taking more than prescribed or taking them after the pain is gone. This also cuts down the chance that the pills could be taken by others.

When Pain Is Chronic • Managing chronic pain is more complicated than treating acute pain. More than 25 million people in the U.S. alone live with chronic pain, which is pain that lasts more than three months.

Many things can cause chronic pain. For example, Oshinsky says, a

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muscle that was damaged in an accident may heal relatively quickly. But if a nerve was also hurt, it can continue to send pain signals long after the body has repaired the muscle.

Other types of chronic pain are driven by brain changes, explains Dr. David Williams, an NIH-funded pain researcher at the University of Michigan. When these changes happen, the brain continues to perceive pain even though the injury has healed.

For people with this type of chronic pain, sometimes called central pain, opioids and some other kinds of pain medications can actually make the pain worse.

Research has shown that talk therapies, such as cognitive behavioral therapy, can help many people with chronic central pain. These types of therapies “emphasize behaving in different ways or thinking in different ways that alter the perception of

Definitions

Neurotransmitters

Chemicals that send signals from one nerve cell to another.

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pain,” Williams explains. “Pain is a combination of a sensory and an emotional experience.”

Cognitive behavioral therapy can also help people with chronic pain manage related health problems, such as problems sleeping, feeling tired, or trouble concentrating. This can increase quality of life for people with chronic pain. It can also have overlapping effects.

“Pain processing and sleep and thinking and mood all share the same **neurotransmitters** in the brain,” Williams says. “So, by improving something like sleep, you’re also improving pain.”

Non-opioid drugs can help some people with chronic pain too, Oshinsky says. Many of these drugs were first developed to treat different health conditions, such as seizures, depression, or anxiety. But they can also change the way the brain processes pain.

Some people benefit from devices that stimulate the nerves directly to block pain signals from reaching the brain, Oshinsky adds. Different devices can work on different parts of the nervous system, from the nerves in the skin to the spinal cord.

People with certain types of pain have also been shown to benefit from exercise, acupuncture, massage therapy, or yoga.

Expanding the Options • The alternatives to opioids we have now don’t work for everyone’s pain. More non-opioid, non-addictive treatment options could help reduce the number of opioids prescribed each year.

Recently, NIH launched the Helping to End Addiction Long-Term (HEAL) Initiative to address the shortage of effective medications for chronic pain and other issues contributing to the opioid crisis.

Some of the research funded by HEAL will focus on understanding how chronic pain develops. A better



Wise Choices Dealing Safely With Pain

Things you can do if you’re prescribed an opioid:

- Ask if there are ways besides opioids to relieve your pain.
- Make sure your healthcare provider knows about all other medications you are taking.
- Let your healthcare provider know if you or others in your family have had any problems with addiction, such as with alcohol, prescription medications, or illicit drugs.
- Ask about the risks of taking an opioid.
- Ask how to take the opioid and how long you should take it.
- Never use alcohol when taking an opioid.
- Store opioids in a safe place out of sight and out of reach of children, preferably in a locked cabinet.
- Dispose of leftover prescription medicine quickly and properly.

understanding of how acute pain becomes chronic could reveal new treatment targets.

Researchers funded by HEAL also hope to learn how to predict who will develop chronic pain from acute pain. This information could be used to guide early pain management, Oshinsky explains. HEAL will fund research into new treatments for opioid misuse and addiction as well.

More options for pain management could help doctors better personalize pain treatment. “It could be a little more like precision medicine, where you try to identify what flavor of pain the patient has, and then match the treatments we have available to the needs of that patient,” Williams explains. ■



Web Links

For more about managing pain, see “Links” in the online article: newsinhealth.nih.gov/2018/10/managing-pain

Pain in the Ear

Fending off Ear Infections

Being up all night with a child crying from the pain of an ear infection can be a nightmare. But it's not uncommon. Most children in developed countries get at least one ear infection by the age of five.

Most ear infections happen in the middle ear, the part of the ear behind the eardrum. The middle ear is connected to the upper part of the throat by the eustachian tube. It normally lets fresh air into your middle ear and lets fluid drain out.

After a cold or other infection, the virus or bacteria that caused the illness can spread to the middle ear. When this happens, the eustachian tube can swell up or become blocked with mucus. This can trap the germs and cause an ear infection. The trapped germs can cause more swelling and fluid buildup. That's what causes the pain of an ear infection.

Why do so many young children get ear infections? "In younger kids, the eustachian tube, as well as the **immune system**, are still developing. Some kids might also have an underactive immune system that can't fight the infection," explains Dr. Michael Hoa, an ear, nose, and throat specialist and researcher at NIH.

In older children and adults, the eustachian tube is large and slanted to drain fluid from the middle ear. In younger children, this tube is narrower and more level, so it's more likely to get blocked.

If the pain won't go away or your child has fluid coming out of their ear, you should visit a doctor. Ear infections can also make a child



fussy, cause a fever, or create trouble hearing.

Many ear infections don't need to be treated. They often clear up on their own.

"There is a huge push not to overprescribe antibiotics," Hoa says. Bacteria can become resistant to the effects of these drugs. So doctors try not to give them, except for severe cases.

When drugs are necessary, it's important that they be taken for the full time your doctor tells you. But it's not always easy to get young children to take medications.

A recent NIH-funded study tested whether antibiotics could be taken for less than the standard 10-day treatment. Unfortunately, the shortened treatment didn't work as well and had no benefits.

NIH-funded researchers are now looking for better ways to treat an ear infection. One group is testing injectable gels to deliver medication right into the ear canal.

One major cause of ear infections is a type of bacteria called *Haemophilus influenzae*, or *H. influenzae*. These bacteria can cluster together to make a biofilm, a thin, slimy coating that your body has a hard time getting rid of. Even antibiotics can be ineffective against them. Ear infections that keep coming back often involve biofilms.

A vaccine introduced in 1987 already prevents ear infections caused by one strain of *H. influenzae*. Researchers are working on developing vaccines to protect against other strains. They're also looking at what specific nutrients *H. influenzae* needs to grow the biofilms. Restricting those nutrients may be a new way to fight these bacteria.

If your child has repeated ear infections or trouble hearing, your doctor may suggest draining your child's ear with small tubes to help maintain a healthy environment.

Ear infections aren't contagious. But there are things you can do to lower your chances of getting one. See the Wise Choices box for tips on preventing ear infections. ■



Wise Choices

Ways to Help Prevent Ear Infections

- Stay up to date on vaccinations, including an annual flu shot.
- Wash your hands often.
- Avoid close contact with people who have a cold or other illness.
- Avoid secondhand smoke.
- Never let your baby sleep with a bottle. The liquid may accidentally enter the ear.



Definitions

Immune system

The system that protects your body from invading viruses, bacteria, and other microscopic threats.



Web Links

For more about ear infections, see "Links" in the online article: newsinhealth.nih.gov/2018/10/pain-ear



Health Capsules

For links to more information, please visit our website and see these stories online.

Birthing Options for Full-Term Pregnancy

A study found that, for healthy pregnancies, inducing labor after full term (39 weeks) rather than waiting for natural labor doesn't increase the risk of major complications for newborns.

Being inside the womb for a full 39 weeks is important for a baby's development. A baby's brain nearly doubles in size during the last few weeks of pregnancy. The lungs and liver are still developing too.

Once a woman has reached full term, her doctor may suggest inducing labor for different medical, or non-medical, reasons. Sometimes the mother will request an induced

labor if she's uncomfortable in her final weeks.

Prior research has shown that inducing labor before 39 weeks of pregnancy puts the baby at risk of serious health problems. Researchers wanted to find out if inducing labor at full term also puts a baby at risk of serious health problems. They also wondered if it increases a woman's chance of needing a surgery called a cesarean section, or C-section.

The team enrolled 6,000 pregnant women in the study. Participants were randomly assigned to two groups. Half of the women waited

to have a natural labor. The other half were induced at 39 weeks.

The two groups of babies had similar survival rates and chances of serious health problems, such as needing help with breathing, having a seizure, or getting an infection. Inducing labor also reduced the mothers' chance of a C-section and lowered their blood pressure.

"Induction at 39 weeks should not be routine for every woman, but it's important to talk with their provider and decide if they want to be induced and when," says study leader Dr. William Grobman of Northwestern University. ■

What Are Electronic Cigarettes?

Electronic cigarettes are battery powered devices that people use to heat liquid into a vapor that can be inhaled. They're also called e-cigarettes, e-cigs, or vapes.

The inhaled vapor may contain nicotine (the addictive drug in tobacco), flavorings, and toxins—including ones that cause cancer.

The government controls e-cigarettes as tobacco products. This means you must be at least 18 to buy

them in the U.S. Despite that, e-cigarettes are more popular among U.S. teens than any other form of tobacco. In 2017, about 1 in 5 twelfth graders reported "vaping" nicotine.

Youth who use nicotine are at risk of long-term health effects. Nicotine affects the development of the brain's reward system and brain circuits that control attention and learning. Continued use of nicotine can lead to addiction and raise the

risk for addiction to other drugs.

Some people believe that e-cigarettes can help them quit smoking tobacco. Researchers are testing whether this may be true. However, nicotine patches and many other FDA-approved quit aids are available now to help people quit smoking.

Learn more at drugabuse.gov/publications/drugfacts/electronic-cigarettes-e-cigarettes. ■



Featured Website

Lab Test Information

medlineplus.gov/labtests.html

Ever wondered why your doctor suggests a certain lab test? Learn about more than 100 common lab tests, such as the blood glucose test,

complete blood count, and vitamin D test. Visit this site to look up what a test may be used for, and what the results may mean.

Lab Test Information 📄 📱 📧

Learn about your laboratory tests, including what the lab test is used for, why your doctor ordered it, how the test will test, and what the results may mean. A laboratory test checks a sample of blood, urine, other body fluid, or tissue to get more information about your health. Your doctor may order these tests as part of a routine checkup, to check for certain diseases and conditions or to monitor your health.

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A

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- Alpha-Fetoprotein (AFP) Test
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- Amylase Test
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- Anion Gap Blood Test
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