

RECOVERY

Managing Pain With Medications After Orthopaedic Surgery

After orthopaedic surgery, your doctors and nurses will make every effort to control your pain. While you should expect to feel some discomfort, there are several options available to your doctor to manage and relieve pain.

Many types of medicines are available to help control pain, including opioids, non-steroidal anti-inflammatory drugs (NSAIDs), and local anesthetics. Medications can help you feel more comfortable, allowing you to start moving sooner, get your strength back more quickly, and recover from surgery faster.

Because of concerns regarding opioid use, alternative approaches, such as medical hypnosis and acupuncture, are being used more often as surgeons and their patients increasingly choose these methods to supplement conventional medicine. A combined approach to pain management is often the best option because it allows the surgeon to tailor pain control methods to each individual patient.

To effectively manage your pain, your surgeon will consider several factors that are unique to you and your situation. That is why it is important for you to openly discuss your fears and expectations, as well as your past experiences with pain control, with your doctors and nurses.

This article focuses on the medications used to control pain after orthopaedic surgery. To learn more about alternative approaches to supplement a pain management program: [Alternative Methods to Help Manage Pain After Orthopaedic Surgery/\(en/recovery/alternative-methods-to-help-manage-pain-after-orthopaedic-surgery/\)](https://orthoinfo.aaos.org/en/recovery/alternative-methods-to-help-manage-pain-after-orthopaedic-surgery/)

Opioid Analgesics

Opioids are effective medicines used for moderate to severe pain. When taken as prescribed, they can be especially effective for managing short-term pain after surgery.

Individual providers and medical facilities may have different policies, procedures, and pain control options available. In most cases after surgery, oral (PO), intramuscular (IM), or intravenous (IV) opioids will be prescribed. Oral medications are usually the preferred prescribed route for use when you return home.

Opioid Dependency

Be aware that although opioids help relieve pain after surgery or injury, they are a narcotic and can be addictive. It is important to use opioids only as directed by your doctor. As soon as your pain begins to improve, stop taking opioids. Talk to your doctor if your pain has not begun to improve within a few days of your treatment.

Types of Opioids

Natural opioids are among the world's oldest known drugs and are made from the dried "milk" of the opium poppy plant. There are also other types of opioids that are made artificially in a laboratory. These types are called synthetic or semi-synthetic opioids.

How Opioids Work

Whether natural or synthetic, all opioids work by binding to opioid receptors in the brain, spinal cord, and gastrointestinal tract. When these drugs attach to certain opioid receptors, they block the transmission of pain messages to the brain.

Opioids can do this because they look just like your body's natural painkillers, called endorphins. This similarity in structure "fools" receptors and allows the drug to activate the nerve cells, flooding the area with dopamine, a natural substance that affects the pleasure center(s) of your brain to cause euphoria or pleasant feelings. Large amounts of dopamine are released as the opioid activates the nerve cell, which produces the "opioid effect."

Advantages and Disadvantages of Opioids for Pain Management

Opioids work rapidly to block pain and also change the way your brain perceives pain. The pain relief they provide allows you to be more active during the day and get more rest at night.

Opioids are effective when given through a variety of routes, such as by mouth, through the skin, under the tongue, and directly into the bloodstream. They do not cause bleeding in the stomach or other parts of the body.

Opioids can cause a range of side effects, such as:

- Drowsiness
- Confusion
- Difficulty breathing
- Nausea
- Difficulty passing urine
- Constipation
- Itching

All of these side effects are treatable by your doctor.

A serious disadvantage of opioids is the potential for dependency. Numerous studies have exposed the addictive consequences of opioid misuse.

Methods of Opioid Treatment

During some surgeries, an anesthesiologist or nurse anesthetist uses opioids in combination with other prescription drugs to sedate you and help keep you asleep. Opioids may also be given in the surgical recovery room to control pain as you wake from anesthesia.

There are several options for further pain relief after you leave the recovery room:

Oral opioid medication. Because of the increasing concern regarding opioid overuse, the current trend is to use oral opioid medication for pain control after surgery. When taking the medication by mouth, smaller amounts are absorbed through the stomach and intestinal tract over a period of time, which can provide extended pain relief without giving more medication than is needed.

The same oral opioid medication that is administered in the hospital or surgical center can be gradually tapered and discontinued soon after you return home.

Patient-controlled analgesia (PCA) pump. In some cases, doctors provide opioid medicines after surgery with a PCA pump. This allows you to press a button to release a small amount of medicine through an intravenous (IV) tube when you begin to feel pain.

The PCA pump is programmed to deliver the medication in the correct dose for you as prescribed by your doctor. After each dose, you must wait a prescribed amount of time before you can give yourself another dose. If you press the button too soon, the PCA device will not deliver medication. This way, there is no risk that you will receive too much pain medicine.

Opioids and Over-the-Counter Drugs

Some forms of pain medication combine the opioid drug with other pain medicines like acetaminophen and aspirin. If you take acetaminophen or aspirin in addition to pain medicine your doctor has prescribed, you may unintentionally receive dangerously high doses. This can cause serious problems, especially for people with liver or renal disease.

Be sure to talk with your doctor about all your medications -- even over-the-counter drugs, supplements, and vitamins. Depending upon the pain medicine you have been prescribed, any of these may have potential to cause a harmful reaction. Your doctor will tell you which over-the-counter medicines are safe to take while using the prescription pain medication.

Non-steroidal Anti-inflammatory Drugs

Non-steroidal anti-inflammatory drugs (NSAIDs) reduce swelling and soreness and are often used alone for mild to moderate pain. To manage the moderate to severe pain after surgery, NSAIDs are often used in combination with opioids. Some examples of NSAIDs include aspirin, ibuprofen, and naproxen.

How NSAIDs Work

NSAIDs work by preventing an enzyme (a protein that triggers changes in the body) from doing its job. The enzyme is called cyclooxygenase, or COX, and it has two forms. COX-1 protects the stomach lining from harsh acids and digestive chemicals. It also helps maintain kidney function. COX-2 is produced when joints are injured or inflamed.

COX-1 and COX-2 enzymes play a key role in making prostaglandins, which cause pain and swelling by irritating your nerve endings. By blocking the COX enzymes, NSAIDs essentially stop your body from making too much prostaglandin, and therefore reduce pain and swelling.

Advantages and Disadvantages of NSAIDs

NSAIDs produce fewer side effects when compared to opioids. After surgery, using NSAIDs may reduce your need for opioid medications and, therefore, reduce opioid side effects like constipation and drowsiness. NSAIDs also do not lead to addiction or dependence. NSAIDs alone, however, will not relieve the moderate to severe pain you may have after surgery.

Traditional NSAIDs block the actions of both COX-1 and COX-2 enzymes, which is why they can cause stomach upset and bleeding, and are associated with ulcers. Aspirin and ibuprofen are common traditional NSAIDs.

COX-2 inhibitors are a special category of NSAIDs. These medications target only the COX-2 enzyme that stimulates the inflammatory response. Because they do not block the actions of the COX-1 enzyme, these medications generally do not cause the kind of stomach problems that traditional NSAIDs do. COX-2 inhibitors, however, have possible cardiac side effects.

Centrally Acting Non-opioids

Acetaminophen

Like NSAIDs, acetaminophen may be used after surgery to reduce the amount of stronger, opioid medications you need to control pain. Acetaminophen is often combined with opioid medicine in a tablet form. When taken in tablet form, opioids are not easily absorbed by the body. But when combined with acetaminophen, the medication absorbs easily and effectively relieves moderate to severe pain after surgery.

Acetaminophen does not interfere with the COX-1 or COX-2 enzyme to reduce pain, so does not have anti-inflammatory properties. Scientists believe that acetaminophen relieves mild to moderate pain by elevating your body's overall pain threshold. It lowers your fever by helping your body eliminate excess heat.

Used alone, acetaminophen works well for headaches, fever, and minor aches and pains, but does not reduce the inflammation and swelling that might accompany a muscle sprain.

Tramadol

Tramadol is a synthetic opioid, which means that it is made in a laboratory and modeled after a popular opioid called codeine. Although it is technically an opioid because of its structure, the way it works in your body sets it apart from all the other opioids previously discussed.

Tramadol relieves pain through two totally different methods. In one sense, tramadol works in the brain and spinal cord to change the way the body senses pain (like a traditional opioid). However, tramadol also works in a similar manner as some antidepressant medications, by interfering with the regulation of certain neuro-chemicals (serotonin and norepinephrine). When the amount of these chemicals is changed, it becomes difficult for pain messages to be relayed from one nerve cell to the next. Therefore, it reduces the amount of pain you feel.

Although tramadol alone is helpful for treating moderate pain, it is most effective when used in combination with acetaminophen or NSAIDs.

Just like any other drug, tramadol is associated with side effects, including dizziness and seizures.

Local Anesthetics

Local anesthetics block pain in a small area of the body. In orthopaedic surgery, they may be used as anesthesia during a procedure, or as part of a pain management program after surgery.

For pain management, local anesthetics are given in a shot (or multiple shots) near your surgical incision, or as an epidural through a small tube in your back. These medicines work by blocking the pain signals that travel along the nerves to your brain.

Local anesthetics do not cause the side effects of drowsiness, constipation, or breathing problems that you get with opioids. In orthopedic surgery, the most commonly used local anesthetics include lidocaine, bupivacaine, and ropivacaine.

Using local anesthetics carries the risk of a possible allergic reaction and may cause nerve damage, muscle spasms, and convulsions. For the most part, side effects can be avoided when you share your complete medical history with your doctor.

Regional Anesthetics

Regional anesthetics offer the advantage of providing anesthesia during surgery and pain relief for several hours afterward.

Medication is injected around the nerves in the part of your body having surgery.

The medication can block feeling and movement in the lower part of your body (spinal, epidural) in one of your arms (intra-scalene, supraclavicular, axillary) or one of your legs (femoral, sciatic).

Often, you can remain conscious during the procedure and require only light sedation. Other times, regional blocks may be used to supplement general anesthesia. Either way, you will have little or no pain when you wake up.

Spinal and Epidural

Spinal and epidural anesthesia are *neuraxial* blocks. They block feeling and movement below the level at which they are given, typically the lower portion of the spine. They can numb the area from the lower abdomen and pelvis down to the toes.

A spinal is given as a single injection of a local anesthetic or morphine directly into the spinal canal. Since it is only a single injection its effect will last for the duration of the procedure but only a few hours afterward.

Epidural anesthesia is given in the space around the spinal canal. The canal itself is protected by a lining membrane called the dura. The medication will pass through the dura and reach the spinal nerves. A small tube or catheter may be placed in the space around the dura and left in place for one or two days after surgery. Medication may then be given at intervals through the catheter.

Epidural anesthesia often has less effect on the motor nerves than spinal and will allow for some function and mobility even when the catheter is in place.

In addition to orthopaedic procedures, epidural anesthesia is often given to women during childbirth.

The most common side effects of giving opioids via the spine are nausea and severe itching. The most serious side effect is respiratory depression, which means that your breathing slows down and becomes shallow. Although this rarely happens, your surgical team will closely monitor you for several hours in order to prevent or address all side effects.

Extremities

Regional anesthetics can also be used to numb up a smaller area such as your arm or leg.

In the upper extremity the most common blocks are

- **Intra-scalene.** Given at the base of the neck to numb up your shoulder and arm
- **Supraclavicular.** Given above your collarbone to numb up your shoulder and arm
- **Axillary.** Given into the axillary area (armpit) for procedures in your arm below the level of the shoulder

In the lower extremity the most common blocks are

- **Femoral.** Given in the groin area to numb the front of your thigh and knee
- **Sciatic.** Given at the back of your knee to numb your lower leg, foot, and ankle

As with an epidural, a catheter may be left in place following intra-scalene, supraclavicular, or femoral nerve blocks. It is used to provide pain relief for 24 to 48 hours following knee or shoulder surgery before it is removed by the anesthesiologist.

Many anesthesiologists now use ultrasound technology to help guide placement of the needle or catheter before medication is injected around the nerves. An image on a monitor shows the nerves, muscles, arteries, and veins in the affected area. This allows the anesthesiologist to make sure the medication is injected into the right place.

Ultrasound is most commonly used for blocks involving the upper and lower extremities. Because it is not an x-ray there is no radiation exposure from the procedure.

Combined Approach to Pain Management Medications

There are many different pain medications (opioids, NSAIDs, anesthetics), and different methods for giving them (injections, tablets, epidurals). In orthopaedic surgery, there has been a recent trend toward combining different medicines with different methods to produce the most effective pain relief. In addition to improved pain management, a combined approach can reduce opioid use and the side effects associated with it.

Doctors and researchers continue to investigate new methods of pain management in order to improve surgery recovery times and help patients return to all their normal activities as quickly and safely as possible.

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