

Over-the-Counter (OTC) Pain Relievers and Fever Reducers

Medicines you can buy without a prescription to relieve mild-to-moderate pain and/or reduce fever contain one or more of the following active ingredients:

- Acetaminophen
- Aspirin
- Ibuprofen
- Ketoprofen
- Naproxen sodium

All 5 active ingredients are similarly effective at relieving mild-to-moderate pain and reducing fever.

These medicines are sold under a variety of brand names. Some products have just one active ingredient and others contain a combination of ingredients designed to treat pain and other symptoms. (For example, pain relievers are often found in cough and cold preparations.)

It is important to read the labels of all products, even brand names that you recognize, as many manufacturers now make products that contain different ingredients than were found in the original preparations.

Some important differences between these medications are:

- Four of the 5 active ingredients (aspirin, ibuprofen, ketoprofen, and naproxen sodium) are nonsteroidal anti-inflammatory drugs (NSAIDs) and can reduce inflammation (swelling) at doses higher than those recommended for OTC use. Acetaminophen does not reduce inflammation at any dose. Although inflammation is commonly associated with pain, it is necessary for proper healing in many cases. For example, inflammation aids the healing of muscle injuries caused by excessive stretching or a direct hit. Not all pain is caused by inflammation. For example, osteoarthritis is painful, but inflammation is usually not present.
 - Aspirin affects the function of platelets, which help to prevent bleeding. People with conditions that can result in bleeding (such as stomach ulcers) or who take drugs that prolong bleeding (such as warfarin) may experience new or worsening bleeding if they take aspirin. The nonprescription NSAIDs do impair platelet function, but not to the extent that aspirin does. Acetaminophen has no effect on platelet function.
 - Largely due to its effect on platelets, only aspirin has been shown to protect against heart attacks. You should not substitute acetaminophen, ibuprofen, ketoprofen, or naproxen sodium for aspirin if you are using it to reduce your risk of a heart attack.
- Aspirin can worsen the symptoms of gout and interfere with drugs used to treat gout. Acetaminophen and the nonprescription NSAIDs do not affect uric acid excretion and can be useful for treating pain associated with gout.
 - Children or teenagers with the flu or with chickenpox should not use aspirin; such use has been associated with the development of Reye's syndrome, which can be life-threatening. To avoid accidental administration to children or teenagers who may have these conditions but have not been diagnosed, it is generally recommended that aspirin be avoided in children or teenagers during the flu and chickenpox seasons. Acetaminophen or a nonprescription NSAID should be used instead.
 - Acetaminophen is safe to use at anytime during pregnancy. Use of nonprescription NSAIDs is not recommended during the third trimester (last 3 months) of pregnancy. Aspirin should be avoided throughout pregnancy as it can harm the mother (eg, cause anemia [low red blood cell count], bleeding, prolonged pregnancy, or prolonged labor) and/or cause birth defects. Pregnant women should always talk to their doctors before taking any nonprescription medicines.
 - Acetaminophen is the preferred medicine for women who are breastfeeding. A small amount of acetaminophen passes into the breast milk, but is not harmful to the baby. Nonprescription NSAIDs can also be used, but are not as safe as acetaminophen.
 - These agents have different side effect profiles (See **Safety of OTC Pain Relievers and Fever Reducers** leaflet).

Safety of Over-the-Counter (OTC) Pain Relievers and Fever Reducers

The active ingredients found in nonprescription pain relievers and fever reducers (acetaminophen, aspirin, ibuprofen, ketoprofen, naproxen sodium) are similarly effective. However, some patients may be at risk for side effects from these medications, including gastrointestinal side effects and effects on the heart, kidneys, and liver.

Gastrointestinal Side Effects

Aspirin, ibuprofen, ketoprofen, and naproxen sodium can cause gastrointestinal side effects such as heartburn, nausea, upset stomach, or stomach pain. Some patients develop ulcers that can interrupt the lining of the gut and result in bleeding. Even though they are considered safe, complications from these medications result in more than 100,000 hospitalizations and thousands of deaths each year. Researchers have identified several factors that increase the risk for developing gastrointestinal side effects. These risk factors include:

- Older age (>65 years)
- History of gastrointestinal problems such as ulcers or bleeding
- Use of “high” doses of aspirin, ibuprofen, ketoprofen, and naproxen sodium; either separately or in combination (even doses within the recommended dosing range can cause gastrointestinal problems)
- Use of aspirin, ibuprofen, ketoprofen, or naproxen sodium with oral corticosteroid drugs such as prednisone
- Use of aspirin, ibuprofen, ketoprofen, or naproxen sodium with drugs that prolong bleeding such as warfarin (Coumadin®)
- Chronic alcohol use (ingestion of more than 3 drinks per day)

Even low doses of aspirin, such as those taken to protect against heart attacks, can cause gastrointestinal side effects in “at-risk” individuals (those with any of the listed risk factors). Contrary to popular belief, “buffered” or “enteric-coated” products do not decrease these risks.

The risk for gastrointestinal side effects with acetaminophen is very small.

Effects on the Kidneys and Heart

Aspirin has been shown to protect against heart attacks and strokes in people with certain risk factors (for example, people who have had a heart attack or stroke in the past). The dose of aspirin used to prevent heart attacks and strokes is lower than that usually used to treat pain or fever. Common doses are 81 mg (one “baby aspirin”) daily or 165 mg (one-half of a regular strength aspirin tablet) daily. No other nonprescription pain relievers have been shown to prevent heart attacks or strokes when administered at recommended doses. People who take aspirin for this purpose should talk to their health-care provider before taking any additional nonprescription pain relievers because these other agents may reduce the protective effect of aspirin on the heart.

Individuals with no underlying health problems are at low risk for experiencing side effects related to the function of their kidneys or heart. However, people who have high blood pressure, heart failure, or reduced kidney function may retain fluids and experience swelling and increases in blood pressure when they use aspirin or other nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, ketoprofen or naproxen sodium. Acetaminophen does not affect the function of the kidneys or heart and should be used instead in such patients.

Effects on the Liver

Excessive doses of acetaminophen can cause liver damage in some patients. Doses most often associated with liver damage are much higher than the maximum recommended adult dose of 4000 mg daily (8 tablets of “extra strength” acetaminophen)

People with liver disease should talk to their healthcare providers before starting any new medicines. Acetaminophen can be used by people who have liver disease, and at recommended doses does not increase the risk for side effects in such patients. Aspirin should be used with caution in people with liver disease, as their risk for toxicity and side effects such as bleeding is greater than that of people who do not have liver disease.

Use With Alcohol

It is generally wise to avoid drinking alcohol when taking any medicine. People who drink alcohol regularly have an increased risk for developing gastrointestinal side effects from aspirin or other NSAIDs such as ibuprofen, ketoprofen, or naproxen sodium. Acetaminophen, when taken at recommended doses, is not likely to produce harmful effects, even among patients who regularly drink alcohol.

Choosing an Over-the-Counter (OTC) Pain Reliever or Fever Reducer

Nonprescription pain relievers can be used to treat mild-to-moderate pain resulting from a variety of conditions. This leaflet discusses their use in some of the most common pain-causing conditions.

Osteoarthritis

Osteoarthritis is the most common form of arthritis and typically affects the hands and weight-bearing joints such as knees, hips, feet, and the back. People of all ages can have osteoarthritis, but it is most common in older people. Pain in osteoarthritis is caused by the breakdown of bone in the joints. Unlike rheumatoid arthritis, there is very little inflammation.

The American College of Rheumatology recommends acetaminophen as initial drug therapy for osteoarthritis. Acetaminophen has been shown to relieve mild-to-moderate pain in patients with osteoarthritis, is generally safe and well tolerated, and is relatively inexpensive.

Aspirin and other nonprescription, nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, ketoprofen, and naproxen sodium can also be used to treat mild-to-moderate pain of osteoarthritis. Older individuals and people who have underlying health problems such as stomach ulcers, kidney disease, heart disease, high blood pressure, or alcoholism are more likely to experience side effects from these medicines than younger, healthy people. Patients taking certain other medicines such as prednisone or warfarin, along with NSAIDs, are also more likely to suffer from side effects than people who are not taking these drugs.

Dysmenorrhea (Menstrual Cramps)

Menstrual cramps are usually caused by the release of naturally occurring substances such as prostaglandins and vasopressin that can affect the activity of the uterus during menses. In some women, cramps result from disease of the reproductive organs that may require treatment other than pain relief. For this reason, all women who develop menstrual cramps should discuss them with their doctors before starting any treatment.

Oral contraceptives (birth control pills) are often used to treat menstrual cramps. They block ovulation and prevent the release of naturally occurring substances that affect the uterus and cause pain.

Nonprescription NSAIDs (ibuprofen, ketoprofen, naproxen sodium) can also be used to relieve mild-to-moderate pain that occurs with menstrual cramps. These medicines can cause side effects. People at greatest risk for side effects include older people and people with underlying health problems such as stomach ulcers, kidney disease, heart disease, high blood pressure, or alcoholism. Patients taking certain other medicines such as prednisone or warfarin, along with NSAIDs, are also more likely to suffer from side effects than people who are not taking these drugs.

Headaches

There are 3 main kinds of headache:

- Migraine headache
- Tension-type headache
- Cluster headache

Nonprescription medications may provide headache relief in some patients. Clinical studies have shown that aspirin, aspirin/caffeine combinations, ibuprofen, and naproxen sodium can provide adequate headache relief in some patients. Acetaminophen is indicated for tension-type headaches.

Patients who suffer from headaches (or pain) regularly or for prolonged periods should talk to their doctors to have their condition diagnosed. Frequent headaches can often be prevented with proper prescription medicines.

Sprains and Fractures

Sprains (ligament tears) and fractures (bone injuries) are associated with pain and inflammation. Many experts recommend using pain medicines that do not interfere with inflammation, as it is an essential part of the healing process. When exceeding nonprescription recommended doses, aspirin and nonprescription NSAIDs block inflammation; acetaminophen does not.

Muscle Injuries

There are 3 main types of muscle injuries:

- Injuries caused by excessive stretching of the muscle (often called “pulled” muscles)
- Injuries caused by a direct hit or blow
- Injuries associated with intensive abnormal repetitive muscle use (such as running a marathon)

Muscle injuries caused by excessive stretching or a direct hit require inflammation for healing. Others such as muscle soreness associated with abnormal repetitive use (such as running a marathon) are associated with limited inflammation.

Acetaminophen should be considered first-line treatment for patients with muscle injuries, as it can provide pain relief without affecting inflammation that aids the healing process. Other nonprescription pain relievers can inhibit inflammation, but only when taken at doses higher than those recommended on the package labels.

Tendon Injuries

Tendon injuries such as “tennis elbow” are usually caused by degeneration (break down) of the tendons and can be very painful. There is usually little or no inflammation.

Pain relief is important, as it allows continued use, which can prevent further degeneration. Aspirin and nonprescription NSAIDs may provide adequate pain relief in some patients. Anti-inflammatory effects, such as those that can occur with prescription doses of NSAIDs (higher than nonprescription doses) may actually impair the healing process.