



with treatment, improvement is often gradual and some symptoms may take months to completely resolve.

The type of steroids used to treat MS relapses are called glucocorticoids. They belong to a larger class of steroids called corticosteroids. These medications are designed to mimic cortisol, a hormone produced by the adrenal glands, which has anti-inflammatory effects. Several



different corticosteroids are used to treat MS relapses. Some can be taken orally, while others are administered via an injection or intravenous (IV) infusion at a clinic or hospital. These drugs have been used to treat MS since the 1940's. They are also used to treat other health conditions in which inflammation plays a role, such as asthma and severe allergy attacks.

### **Steroids Used to Treat MS Relapses**

**Methylprednisone** (methylprednisolone) is frequently administered as an infusion (Solu-Medrol). This is sometimes followed by a course of oral steroids for 1 or 2 weeks, during which the dose is slowly decreased. Methylprednisone can also be taken orally (Medrol), or as an injection (Depo-Medrol, Solu-Medrol). Depo-Medrol has a slower onset and longer duration of action, so it may not be as useful for acute flare-ups. Of note, while IV administration is the most widely used, a [recent study](#) suggests there is no significant difference between oral and IV methylprednisone in terms of efficacy and safety for treating MS flares.

**Prednisone** is an oral medication that is often used for mild to moderate MS relapses. As mentioned above, it is also used to taper off of IV steroids. Interestingly, a [2021 study](#) suggests that a prednisone taper following IV methylprednisone showed little benefit in people with MS being treated for an exacerbation.

**Decadron** (dexamethasone) was approved for the treatment of MS relapses in 1958. It is taken orally, either as a liquid or a tablet.

**Celestone** (betamethasone) is an injectable drug. It is also available in other forms, but those forms are rarely used to treat MS.

MS is a very individualized disease, with no two people having the exact same experience or symptoms. MS relapses are unique, too. Symptoms differ from person to person and from one relapse to another, depending on the nerves that are affected. There is also great variability in the degree to which relapses respond to corticosteroids. As a result, it's difficult to predict how fast or how completely these medications will work for an individual. Steroid therapy is often used repeatedly over the course of a person's disease. As a general rule, corticosteroids become less effective with subsequent treatments.

Occasional use of steroids is usually well tolerated, but these drugs can cause unpleasant side effects, depending on the dose and how long they are taken. Some may occur immediately and others with chronic use. For longer-term prescriptions, doctors may taper down dosages gradually to get them as low as possible without the return of MS symptoms. The pros and cons of treatment should be weighed on an individual basis and discussed with one's healthcare provider.



## Steroid Side Effects

### **Short-term**

Most short-term side effects of corticosteroids resolve quickly after treatment ends. It isn't uncommon to experience a metallic taste in the mouth during an infusion. One may also have a surge of energy that can make it difficult to sleep or even to sit still and rest. Steroids can also cause temporary mood and behavior changes. Other potential short-term effects include acne, rash, facial flushing, swelling of the hands and feet, headache, increased appetite, increased blood glucose, high blood pressure, heart palpitations or back pain.

### **Long-term**

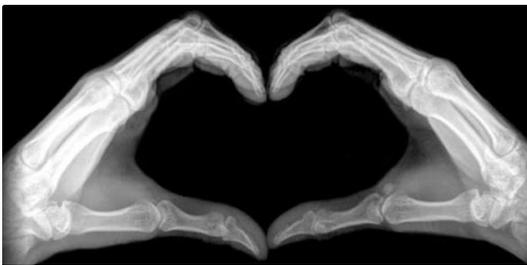
Individuals taking corticosteroids for a longer period of time may produce less cortisol on their own which can result in a variety of symptoms, such as severe fatigue, loss of appetite, nausea and muscle weakness. Other long-term side effects include cataracts, increased pressure in the eyes (glaucoma), ulcers, heart disease, diabetes, a round face ("moon" face), weight gain, increased risk of infections, thinning bones (osteoporosis) and fractures, thin skin, bruising and slower wound healing.

There are a number of ways to ease the side effects of these medications. It is essential for those taking steroids to eat a healthy, low cholesterol diet and to stay as active as possible. This is not only a good idea for general health, but also helps to minimize the risk of heart disease and diabetes from long-term steroid use. If possible,



avoid caffeine, chocolate, and foods that are acidic, fatty or high in sugar content. It's a good idea to stay hydrated by drinking a lot of water. Watching salt intake can ease water retention and swelling. [Research](#) suggests that potassium intake reduces blood pressure. Individuals with hypertension may benefit from eating [potassium-rich foods](#). Proactively filling up with healthy food, such as fruits and vegetables, may decrease food cravings. Exercise also helps to keep excess weight off, with an added benefit of building bone mass (and preventing osteoporosis).

Other strategies to prevent bone loss from steroid treatment include taking a calcium supplement or eating [calcium-rich foods](#). Limiting smoking and alcohol consumption may also be helpful. Getting enough vitamin D is important for bone health. It's a good idea to have vitamin D levels checked to see if supplementation is necessary. To preserve its integrity, many doctors recommend having a bone density test at the beginning of, or before, steroid therapy



(especially if the steroid dose is high or treatment is prolonged). Those with low bone density may be put on [bisphosphonate medications](#). This testing can be repeated over the course of treatment to assess the effectiveness of measures to prevent bone loss and make adjustments, as necessary.

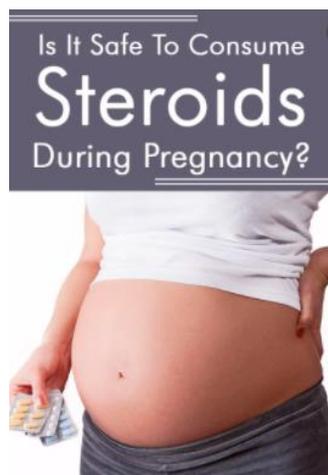
Because of their gastrointestinal side effects, it's important to take steroid pills with food. If treatment causes stomach upset or ulcers, there are a number of [over-the-counter medications](#) that may be of benefit. Eating [bland foods](#) or adding protein to a meal may also help settle the stomach. Consuming ginger tea (or even ginger candies) is another way to reduce this type of discomfort. Some people find peppermint to be soothing. It may also help to eat smaller, more frequent meals.

The use of lotions to keep the skin moisturized is often helpful during steroid treatment. Eating [foods high in Vitamin E](#) can also help with skin issues. [Sleep medications or sleep aids](#) can be used to get a good night's sleep during treatment. It may also help to take steroids in the morning to reduce their effect on sleep later at night. Letting family and friends know about the temporary effect steroids have on mood may help everyone ride the ups and downs a bit more smoothly.



It's important to follow a doctor's instructions at the end of steroid treatment. These medications can affect the natural production of cortisol, especially if they are taken for a prolonged period of time. Stopping or tapering them too fast may cause withdrawal symptoms, such as body aches, muscle and joint pain, fatigue, lightheadedness, weakness, confusion, drowsiness, headache, loss of appetite, weight loss, peeling skin, nausea, upset stomach and vomiting.

Some medications cause negative interactions if used with corticosteroids, including [blood thinners](#), [anticonvulsants](#) and [non-steroidal anti-inflammatory drugs](#) (NSAIDs). Steroids can make the liver less sensitive to insulin. Individuals with diabetes should be extra vigilant about monitoring and controlling their blood sugar while taking them. If one's steroid and diabetes medications are prescribed by different doctors, it's important that both are aware so they can coordinate treatments. Because steroids have the potential to raise blood pressure, individuals with hypertension should have it monitored regularly while taking them. Corticosteroids



should be used with caution in pregnant women. According to a [2020 literature review](#), women in their first trimester of pregnancy should avoid taking these medications because they increase the risk of miscarriage and birth defects. Results show IV methylprednisone is a better option for pregnant women than oral prednisone because the body processes the IV drug before it crosses over the placenta. Data suggest that dexamethasone and betamethasone shouldn't be used during pregnancy at all. The researchers conclude that steroid use during pregnancy should be restricted to treating relapses that substantially affect daily function.

It's important to determine the cause of an MS relapse before taking steroids. It may be due to an underlying condition that is treatable (for example, an infection). While these medications do provide temporary relief from MS symptoms, they do not treat the disease itself and they have significant side effects. Comorbidities and certain medications may increase the risk of severe side effects from steroid use. To minimize this risk, people with MS should discuss their medications and other health conditions with their doctor before beginning treatment.