



# Child growth and growth hormone

Guide to patients  
and parents



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## To the reader,

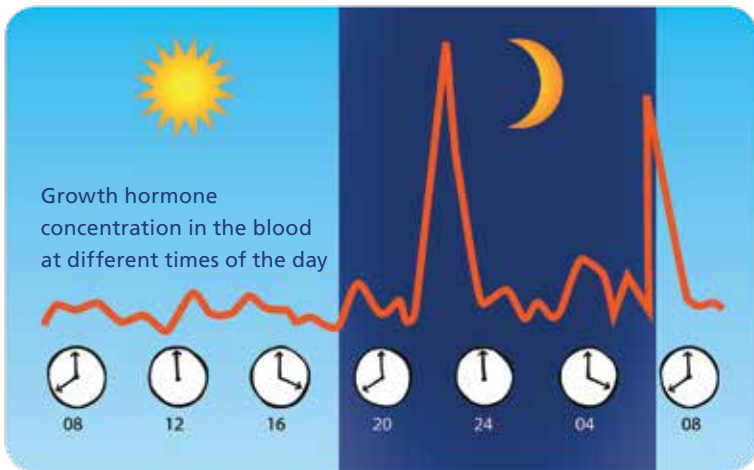
This guide is intended for children, parents and loved ones to provide information on growth hormone therapy. The guide provides general information on child growth, the growth hormone and the treatment of growth hormone deficiency. Medical examinations are used to determine the causes for deceleration of growth. The doctor will assess the need for growth hormone therapy based on the results of the examinations.



# Child growth and growth hormone

Children usually inherit the growth characteristics of their parents. Children grow on average about 6 cm per year from the age of about two to the beginning of puberty. Growth usually proceeds consistently with the child's own growth curve, and the reasons for any abnormal growth are determined with medical examinations.

A child's growth can be divided into three stages. The rapid growth in the first two years is very closely linked to nutrition. For the next 10 years or so, growth will mainly depend on growth hormone production. While growth hormone secretion decreases slightly during the infant's first years of life, it remains high throughout childhood until it reaches its peak during the growth spurt at puberty. When growth stops after puberty, growth hormone secretion gradually decreases and remains at a lower level.



When we reach our full height, the body's growth hormone production is reduced. However, it does not stop completely because growth hormone is still important for cell function and our overall well-being.

Deceleration of growth is often caused by low or absent secretion of growth hormone. But some children have some other kind of condition that prevents them from growing normally. It is therefore important to identify the causes of growth deceleration.

Growth hormone is a protein produced by the pituitary gland in the brain. The hypothalamus, which is in the brain, ensures that the pituitary gland produces growth hormone and secretes it into the bloodstream. Growth hormone production in the pituitary gland is at its highest at night and during sleep.

As the name suggests, growth hormone is important for growth, but together with the other hormones it also has a significant impact on our well-being. Growth hormone also influences muscle development and the breakdown of fat in the body.

Growth hormone is not the only factor controlling the growth of a child. Many other hormones, a healthy diet and general well-being also support a child's growth and development.

*Said by a child: "Mum, can I have that magic injection again?"*

## Growth hormone therapy

Growth hormone treatment is only started after a medical examination. A child's growth and development as well as the effectiveness of growth hormone therapy is monitored in regular outpatient visits throughout the treatment. The adequacy of the growth hormone dose is regularly checked. The doctor will first adjust the dose to the weight of the child and change the dose as growth progresses. Blood tests provide information on levels of hormones and other components and features of the blood that are relevant for the treatment.

The growth hormone is produced biosynthetically. The hormone has the same effect as the growth hormone produced by the body.

Because growth hormone is a protein, it cannot be given orally as liquid or tablets because it would be broken down by stomach enzymes. The growth hormone is given once a day by injection under the skin. The injections are given before bedtime so that the growth hormone treatment resembles the body's own night-time growth hormone production as much as possible.

There are several different growth hormone products available; some are reconstituted from powder and a solvent into a solution and others are ready-to-use solutions. There are also differences in the storage of various products, as some must be stored at room temperature, others in the refrigerator. Growth hormone products must be protected from excessive heat and freezing, as their efficacy and composition may change. Your nurse will guide you in the practical matters related to the treatment.

The effect of growth hormone treatment on a child's growth is usually not apparent until six months after the start of the treatment. It is a good idea to talk about this with your child.



After the start of the treatment, growth is fastest in the first year of treatment as the body tries to correct the growth hormone deficiency. Then the growth rate usually stabilizes, but there are of course individual differences. In addition to the acceleration of growth rate, growth hormone therapy also has other effects. It promotes the division of fat and muscle cells, which reduces the amount of fat cells and increases the amount of muscle cells in the body.

Growth hormone therapy is usually continued for as long as growth is observed. Growth is assessed with regular measurements and by determining a child's bone age with an x-ray of the hand.

Growth hormone therapy is usually well tolerated. Side effects are rare. If significant changes occur in your child's condition, consult your doctor or nurse.

# Administration of the drug

When treatment is started, your nurse will help you in the practical matters. You can practice giving the injections at the outpatient clinic until you feel confident doing it on your own.

The following pages provide general practical instructions about growth hormone therapy. Parents usually inject the growth hormone with young children, but school-age children often want to participate in the administration or inject it themselves.

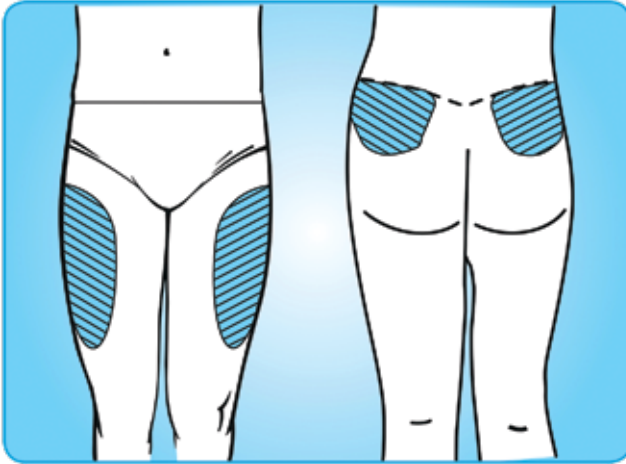
The best time for the injection is before bedtime, so that it becomes part of the routine, like brushing the teeth. This way the injection is also easier to remember. Growth hormone treatment should be administered as regularly as possible. While missing a single injection does not affect growth, missing it regularly can interfere with the growth process. Ask your doctor or nurse for further information.

The injection is usually given in the thigh or buttock. The growth hormone is injected into the subcutaneous adipose tissue, where it is absorbed into the bloodstream. A small bruise may sometimes occur at the injection site if the needle hits a small capillary vein. If a small bump appears under the skin, the injection has not gone deep enough. The injection site must be changed daily.

*“The needles are so thin that the injection does not hurt at all. The 13-year-old takes care of the injections himself without the help of his parents.*

*When the growth hormone therapy is not a big issue in the family, the child won't be bothered by the daily injections either.”*





There is no need to disinfect the injection site: a daily shower is enough.

However, good hand hygiene is important when handling the product. Wash your hands before injecting. Use a new needle for every injection.

## The growth hormone can be obtained from a pharmacy

Growth hormone treatment is one of the treatments Kela reimburses. Your doctor will write a B statement to claim the reimbursement. Growth hormone therapy can be started after the reimbursement granted by Kela. Your doctor will create an electronic prescription, and you can collect the product at a pharmacy. Always check the validity of Kela's reimbursement when you are at the pharmacy. Your doctor will renew the prescription during your control visit.

## Certificates for travel abroad

When travelling abroad, your child must have a certificate stating that he or she is receiving growth hormone treatment. This way you can transport the growth hormone products and equipment safely in your hand luggage. Ask your nurse well in advance for a certificate about your child's growth hormone therapy.

## Use of growth hormone with other drugs and in connection with other diseases

Cortisone therapy may inhibit growth and thus reduce the growth-promoting effect of growth hormone therapy. Other hormonal therapies (e.g. sex hormones and thyroid hormone) may also affect growth. Conventional antiallergics or antibiotics do not prevent the use of growth hormone. Other drugs do not interact with the growth hormone, and common diseases such as influenza and the common cold will not affect the growth hormone therapy.

Your child's doctor and nurse will tell you more about the therapy and help you to provide personalized care.

*"The growth hormone pen is easy to use, the needles are thin, it is easy to learn how to use and the child will get used to the injections very quickly."*





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