

Growth Hormone Deficiency

What is growth hormone deficiency (GHD)?

Growth hormone is made and released by the **pituitary gland** (located in the brain) then delivered to different parts of the body. It is important for bone growth and strength, muscle development, and sugar and fat metabolism. *GHD* is a condition in which the pituitary gland produces less than the normal amount of growth hormone, which may result in slow growth, short stature, and disturbance of metabolism.

What causes GHD?

GHD occurs when the pituitary gland does not make enough growth hormone. This problem may be **present at birth** and a failure of the pituitary gland to develop properly or by damage to the gland during the birth process. **Most of the time, no specific cause for the GHD can be found. Acquired growth hormone deficiency** can be caused by **damage to or disease of the pituitary** during or after birth. Conditions responsible for this include: inflammation, infection, head injury, surgical damage to the gland, radiation, increased pressure in the chambers of the brain, and tumors.

How is GHD diagnosed?

After other causes of growth delay in your child have been excluded, your child may be evaluated for *GHD*. One frequently measures the concentration of a growth factor, stimulated by *GH*, called **IGF-1** (insulin-like growth factor 1) and/or a protein that carries *IGF-1* around in the blood, called **IGFBP-3** (insulin-like growth factor binding protein 3)- these two substances help regulate how much growth hormone is released by the pituitary gland. The pituitary gland releases growth hormone in **intermittent spurts** at night, during certain stages of sleep. Therefore, drawing a random growth hormone sample during the day is useless. We may also need to perform a **stimulation test**. This test involves taking multiple blood samples from an IV at specific intervals after a medication is given. This medication stimulates your child's pituitary gland to secrete growth hormone. The stimulants used in this office are *Glucagon* (a hormone excreted by the pancreas, which controls the blood sugar levels in the body; it is the opponent of *Insulin*) and *Arginine* (an amino acid in the body). Your child needs to be fasting prior to the test. The test is performed at our office and is 4 hours long.

An **X-ray** of the left hand and wrist will measure your child's bone age. The **bone age** will determine the maturity of your child's bones, compared to your child's chronological (actual or "birthday") age. A child with *GHD* may have a bone age that is much less than his/her chronological age.

An **MRI** (magnetic resonance imaging) scan may be performed to determine the cause of *GHD*. This scan allows the doctor to look at your child's brain and pituitary to check for the size, structure, or a possible lesion.

What is the treatment for *GHD*?

When short stature is caused by *GHD*, **growth hormone replacement therapy** is the treatment of choice. Our office will begin the process to obtain the medication for your child. This includes getting authorization from your insurance, so they will cover the cost of the treatment. A mail order pharmacy will then distribute the growth hormone to you. Human growth hormone is produced synthetically and given by an injection into the fatty tissue just below the skin. Parents or caregivers are taught to give the injection. If your child is old enough, he/she may be taught to give the injection him/herself. Growth hormone needs to be given according to the schedule suggested by your doctor. The best results of therapy are obtained when taken as directed by your doctor.

Side effects of growth hormone are infrequent. In some instances the treatment may unmask **hypothyroidism**. In this case the thyroid hormone will need to be replaced by a pill. We will check the thyroid levels in your child's blood every other visit to make sure your child's thyroid gland is working properly. In rare cases the **growth plate** at the hip may **slip** when children are growing rapidly. This can be treated surgically. Another very rare side effect is an **increase in the fluid that surrounds the brain** and the spine. This may happen about 2 weeks after treatment is initiated. Your child will complain of severe head aches, or nausea/vomiting. If this should occur we will lower the dose of *GH* and slowly taper your child to the correct dose. A skin rash may also occur as an effect of the medication. Growth hormone may increase the blood sugar in patients with diabetes. Your doctor will discuss the effects and side effect growth hormone in detail when treatment is considered.

When will my child need to be seen by the doctor?

Your child's response to growth hormone therapy should be monitored closely by your physician. Frequency of visits is usually every 3 months. At

that time your child will be weighed and measured. The need for adjustment of growth hormone will also be considered. Periodic blood tests and X-rays will also be required for evaluation of treatment. Remember to continue to visit your primary care physician for routine medical care.

Support and resource groups:

Human Growth Foundation

1-800-451-6434

www.hgfound.org

Magic Foundation

1-800-362-4423

www.magicfoundation.org