Growth Hormone Deficiency

Series N. 2

Patient’s Guide

Average Readability Leaflet

Growth Hormone Deficiency - Series 2 (Revised August 2006)

This leaflet was produced by Fernando Vera MSc and Prof Gary Butler at the Institute of Health Sciences, University of Reading, Reading, UK (August, 2006). Some portions of the text were extracted or modified from the Growth and Growth Disorders Booklet Series (Third edition, 2000)* and may be used in conjunction with these as they provide a choice of leaflets providing the same information, but for people of different ages and reading abilities. The numbering sequence in each series is the same for easy cross-reference. The original leaflet series can be also obtained from the links given at the end.

All illustrations were created and produced by Fernando Vera MSc.

This leaflet is part of the Hormone Disorders Leaflet Series. The following are also available:

Series N 3.	Puberty and the Growth Hormone Deficient Child.
Series N 4.	Precocious Puberty
Series N 5.	Emergency Information for Children with Cortisol and GH Deficiencies and those Experiencing Recurrent Hypoglycaemia.
Series N 6.	Congenital Adrenal Hyperplasia
Series N 7.	Growth Hormone Deficiency in Young Adults.
Series N 10.	Constitutional delay of growth and puberty
Series N 11.	Multiple Pituitary Hormone Deficiency
Series N 12.	Diabetes Insipidus
Series N 13.	Craniopharyngioma
Series N 14.	Intrauterine Growth Retardation or Small Gestational Age
Series N 15.a.	Hyperthyroidism
Series N 15.b.	Hypothyroidism
Series N. 16.	Type 2 Diabetes and Obesity

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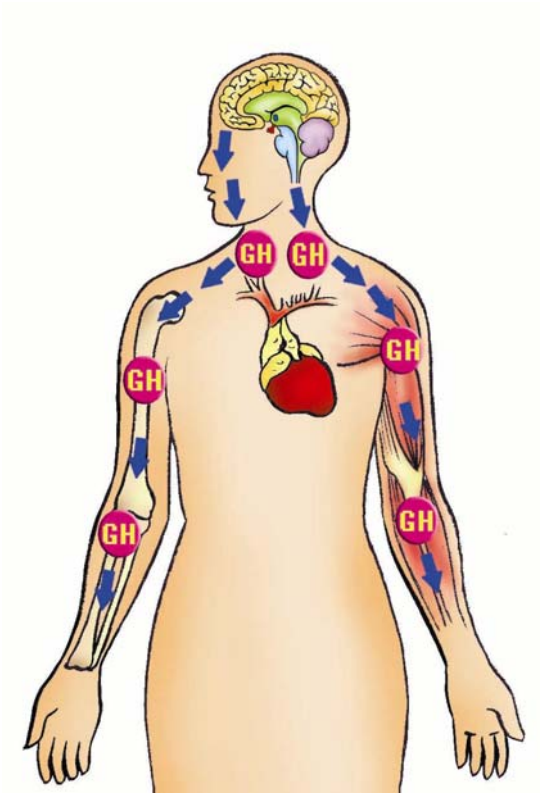
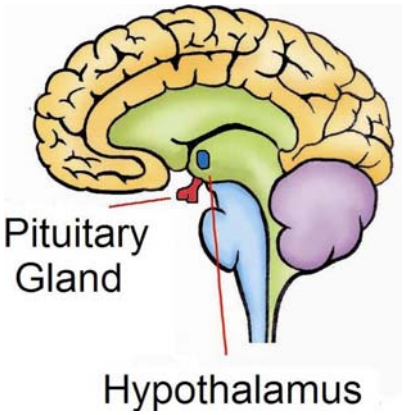
Introduction

This leaflet is intended to provide a better understanding of some aspects associated with Growth Hormone Deficiency. It has been written in general terms and not all of the information provided will apply to you. Hopefully, this leaflet will help you to understand this condition and give you a basis for discussions with your GP and specialist team.

What is Growth Hormone Deficiency (GHD)?

Hormones are messengers used around the body to produce an effect. The role of growth hormone is to control the growth of bones, muscles and organs. This hormone is produced in the brain and released in the blood.





Growth hormone deficiency (GHD) occurs when the **pituitary gland** in the brain fails to produce adequate levels of growth hormone. This is usually due to problems in either the **hypothalamus** or the **pituitary gland**, which are parts of the brain responsible for hormone production.

When a child's growth hormone level is very low or not present, the child is said to be **Growth Hormone Deficient**. When the level of growth hormone production is inadequate, the child is said to be **Growth Hormone Insufficient**.

Treatment for children whose growth hormone levels are deficient or insufficient is widely available.

What are the causes of GHD?

There are many causes of GHD but most remain unknown. Commonly, GH arises from damage to the pituitary gland at birth. This damage could also result from severe head injury. GHD may be hereditary in some cases.

How is GHD diagnosed?

Normal levels of growth hormone fluctuate from hour to hour in the blood. As a result, measuring these levels is a difficult task. Growth hormone is released in a series of “spurts” throughout the day and night especially during sleep. To measure this hormone, blood must be taken when a surge of growth hormone has been provoked, or blood must be frequently taken at various times. Two main tests are used:

- **Provocation tests:** Growth hormone is stimulated and then measured
- **IGF-1 test:** Blood is taken to measure the hormone IGF-1. This is a marker of how much growth hormone the body makes.

These tests give an idea of hormone concentration, which is compared against normal ranges. Normality, however, may vary from test to test. Further examination using other tests such as brain scans are often required.

What is the treatment for GHD?

The primary treatment for GHD is hormone replacement with a synthetic form of growth hormone. This synthetic form is similar to the natural human growth hormone.

What is the dosage, frequency and timing of GH?

The dosage of growth hormone varies according to the weight/size of your child. This means that the dose given to your child will increase, as he/she gets older and larger.

Growth hormone is usually prescribed to be taken daily, by subcutaneous injection. It’s recommended to be injected in the evening, just before bedtime.

What is the Injection dosage?

The dosage of growth hormone can be confusing. This is due to the different measurements used by manufacturers. Since the amount of diluent required to mix an amount of growth hormone may vary between products, it's not possible to provide standard conversions. The older units of growth hormone have now changed to a mg basis (3 international units = 1mg). Some pharmaceutical companies produce syringes marked in units or mg of GH, and not mls, which may add further confusion.

It is important that your consultant has quoted the dosage in **terms you understand**, preferably in both mg/units and mls. If you are unclear about this, do ask your consultant.

How is growth hormone stored?

Growth hormone should be kept cool, usually in a refrigerator (but not too near the freezer compartment). Information can be found about each type of growth hormone. The drug is more affected by heat and won't work so well. This information varies from product to product. Read the advice given in the leaflet that comes with your growth hormone.

What are the different forms of growth hormone injection?

The following devices are used to deliver growth hormone injections:

- **Pen Injector Systems:** Their appearance resembles a large writing pen which contains a cartridge of growth hormone. They offer the convenience of pre-measured doses. Children find them both practical and attractive.

- **Auto-injection devices:** Auto-injection devices completely enclose the needle and syringe so they cannot be seen. At the touch of a button the needle is inserted through the skin and the growth hormone is automatically injected. This is a quick and usually painless procedure.

- **The Hypoguard Injector:** This device uses insulin syringes and conceals the needle. They have helped parents experiencing difficulties with injecting younger children and children injecting themselves.

- **Needle free injector:** In this device, the growth hormone is squirted trough the skin using a high-pressure air injector. No needle is used. Sometimes it may hurt a little or leave a bruise.

What about injections during illness? (and missed injections)

Growth hormone should be continued during illness. However, if your child is too ill to inject without considerable upset, and you miss a day or two, don't worry. Only consistent missed injections will effect growth. It's extremely important that **no** injections are missed if your child has low blood sugar associated with GHD.
If your child has **multiple pituitary hormone deficiencies (MPHD)**, treatment during illness is more complex. Nevertheless, continuation of some growth hormone treatment will be helpful.

What about treatment in puberty and adulthood?

About half of children who have growth hormone deficiency usually have other hormone deficiency affecting sexual development. This will require additional treatment to initiate puberty.

In adulthood, growth hormone treatment may still be given. This is because growth hormone may help aid to prevent osteoporosis (brittle bones) and boost general well being.

What are the side effects of growth hormone therapy?

A few patients report a localised skin reaction or lumpiness at the site of injection. This can usually be treated by varying the injection site.

There are few side effects of growth hormone treatment. One known side effect is an increased fluid pressure in the brain. This is known as **benign intercranial hypertension**. If this occurs, growth hormone treatment will be stopped and this condition should disappear. Treatment will then be restarted at new doses to avoid any further problems.

What are other sources of useful of information?

The goal of this leaflet was to provide a basic overview of GHD. Further information can be found in the following sources:

- **European Society for Paediatric Endocrinology**
  ESPE Secretariat, BioScientifica
  Euro House 22 Apex Court Woodlands, Bristol BS32 4JT - UK
  Telephone No: + 44 (0) 01454 642208
  Internet: http://www.eurospe.org/
- **British Society for Paediatric Endocrinology and Diabetes**
  BSPED Secretariat, BioScientifica
  Euro House 22 Apex Court Woodlands, Bristol BS32 4JT - UK
  Telephone No: + 44 (0) 01454 642208
  Internet: http://www.bsped.org.uk/
- **Child Growth Foundation**
  2 Mayfield Avenue, Chiswick London W4 1PW UK.
  Telephone +44 (0) 20 8995 0257
  Internet: http://www.childgrowthfoundation.org/

You can also consult your doctor or nurse for additional information in your local area.