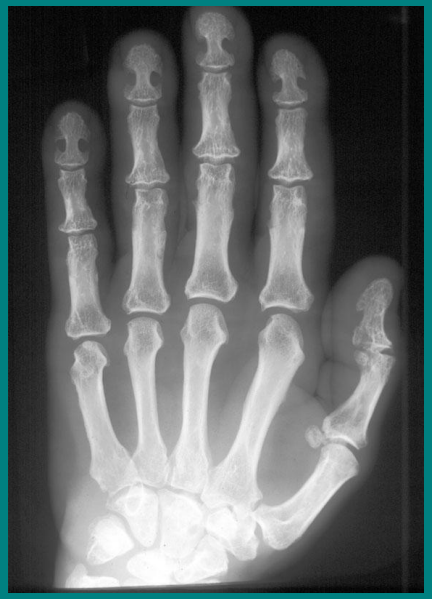
Astana Medical University
Department of internal diseases

Acromegaly



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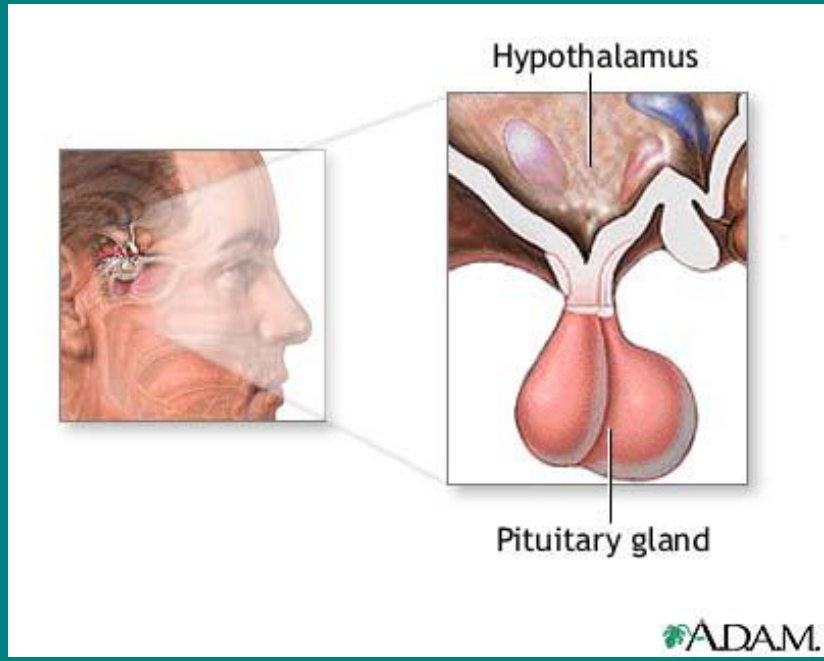
Astana 2016

Description

- A hormonal disorder that results from too much growth hormone (GH) in the body.
- The pituitary gland is what makes GH. In Acromegaly, the pituitary gland produces excessive amounts of GH.
- Usually, this excess of GH comes from tumors called adenomas. Adenomas are noncancerous.



PATHOPHYSIOLOGY

- The primary cause of disease - pituitary adenoma

- hyperproduction of growth hormone

- hyperproduction of insulin like growth factor

Hormonal effects
three key hormone

- **Growth hormone** (somatotropin) - produced and secreted from the anterior pituitary; stimulates growth of bones and soft tissues, and fat mobilization and inhibits glucose utilization
- **Insulin-like growth factor** 1 (IGF) is produced mainly by the liver in response to GH, circulating levels of IGF-1 are directly linked to the levels of GH
- **Somatostatin** - a hormone produced by the hypothalamus, inhibiting the release of GH from the anterior pituitary, and in addition to all known hormones of the gastrointestinal tract

Signs and symptoms

- Most common clinical features are :
- acral enlargement = 86%
- maxillofacial changes = 74%
- excessive sweating = 48%
- arthralgias = 46%
- headache = 40%
- visual deficits = 26%
- fatigue = 26% Weight gain 18%.

Signs and Symptoms

Acromegaly: Greek- “extremities” and “enlargement” = growth of the hands and feet

- Bones actually grow
- Altering of facial features
- Protruding of brow & lower jaw
- Nasal bone enlarges
- Teeth become more spread out
- Joint aches
- Thick and/or course oily skin
- Skin tags
- Enlarged lips and tongue
- Deepening of the voice due to enlarged sinuses & vocal cords
- Sleep apnea
- Excessive sweating
- Skin odor
- Fatigue & weakness
- Headaches
- Impaired vision

Clinical manifestations:

1.Mass effects of the tumor

- Headache
-Visual field defects
-Hyperprolactinemia
-Pituitary stalk section
-Hypopituitarism
-Hypothyroidism, hypogonadism , hypocortisolism

2.Systemic effects of GH/IGF-I excess

-Visceromegaly
-Soft tissue and skin changes
-Thickening of acral parts
-Increased skin thickness and soft tissue hypertrophy
-Hyperhidrosis /Oily texture
-Skin tags and acanthosisnigricans
-Kidney stones 2 Colon polyps

3.Cardiovascular features

-Hypertrophy (biventricular or asymmetric septal)
-Congestive Heart Failure (systolic and/or diastolic)
-Coronary disease Arrhythmias
-Hypertension
-Cardiomyopathy

Clinical manifestations:

4.Metabolic features

-Impaired glucose tolerance

-Diabetes mellitus

-Insulin resistance

5.Respiratory manifestations

-Macroglossia

-Jaw malocclusion

-Upper airway obstruction

-Sleep disturbances

-Sleep apnea (central and obstructive)

-Ventilatory dysfunction

6.Bone and joint manifestations

-Increased articular cartilage thickness

-Arthralgias and arthritis

-Carpal tunnel syndrome

-Osteopenia

7.Other endocrine consequences

-Goiter Hypercalciuria

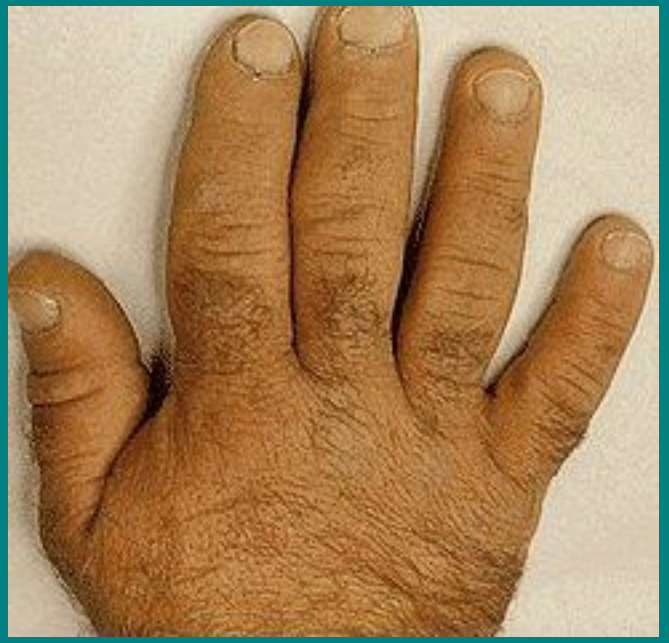
-Galactorrhea

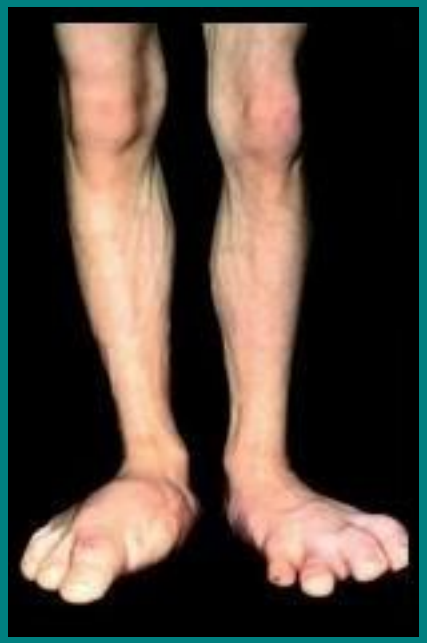
-Decrease libido, impotents

-Menstrual abnormalities

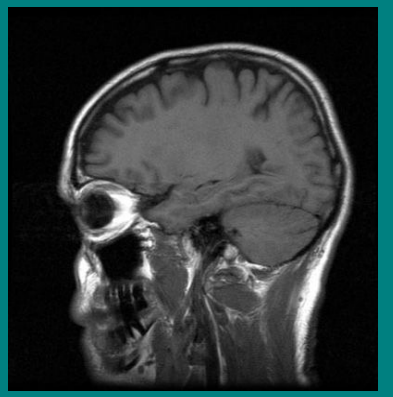
- Overgrowth of bone & cartilage often leads to arthritis. When tissue thickens, it may trap nerves, causing carpal tunnel syndrome. This leads to numbness and weakness of hands.

- Body organs, including the heart, may enlarge.

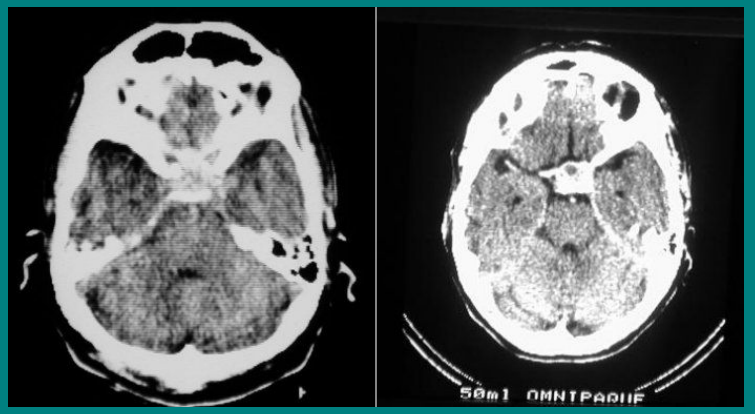




Diagnostic Tests



- Growth hormone blood test
- Oral glucose tolerance test
- CT Scan- of pituitary or other organs, seeking the tumor
- GHRH blood test- useful to detect non-pituitary tumors
- MRI scan- of pituitary or other organs, seeking the tumor



screening test

Growth hormone:

- the criterion of normal levels of GH is the value of G< 1 ng/ml in any sample during the day

Insulin like growth factor:

the IGF-1 always increased in patients with acromegaly

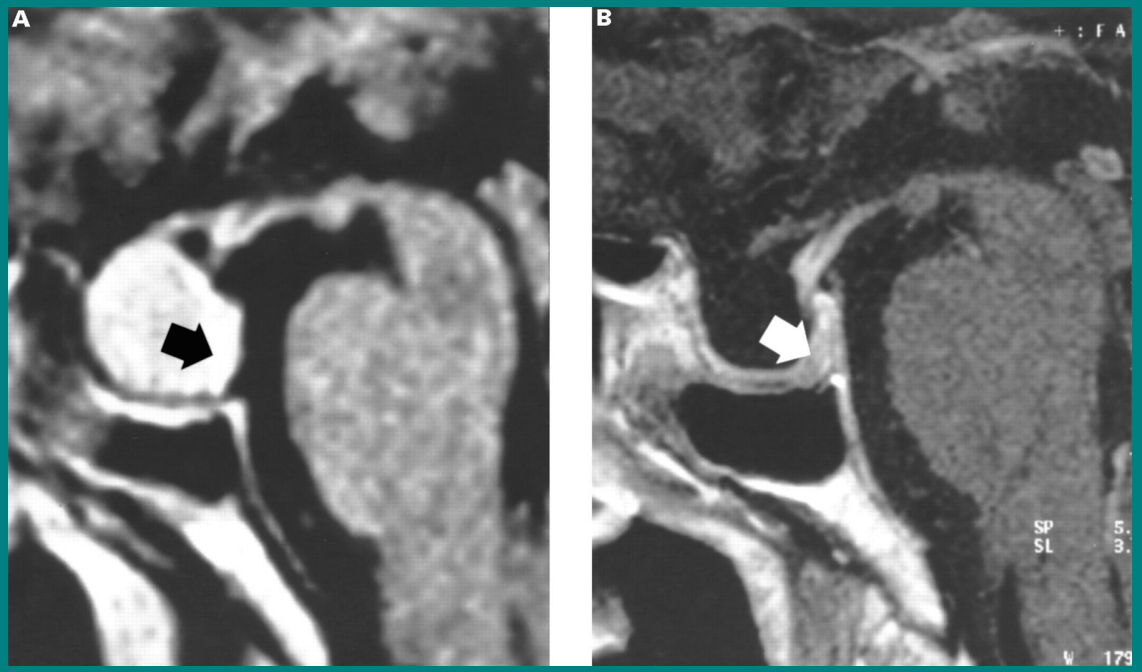
Oral test glucose tolerance

Oral test glucose tolerance

- After oral intake of 75g of glucose glucose level and STG level is measured every 30 minutes for 2 hours
- The diagnosis of acromegaly is confirmed if the min. level of STG is equal to or greater than 0.4 µg/l
- Test combined (+) if, after the glucose load GH level does not fall below 1 ng/ml

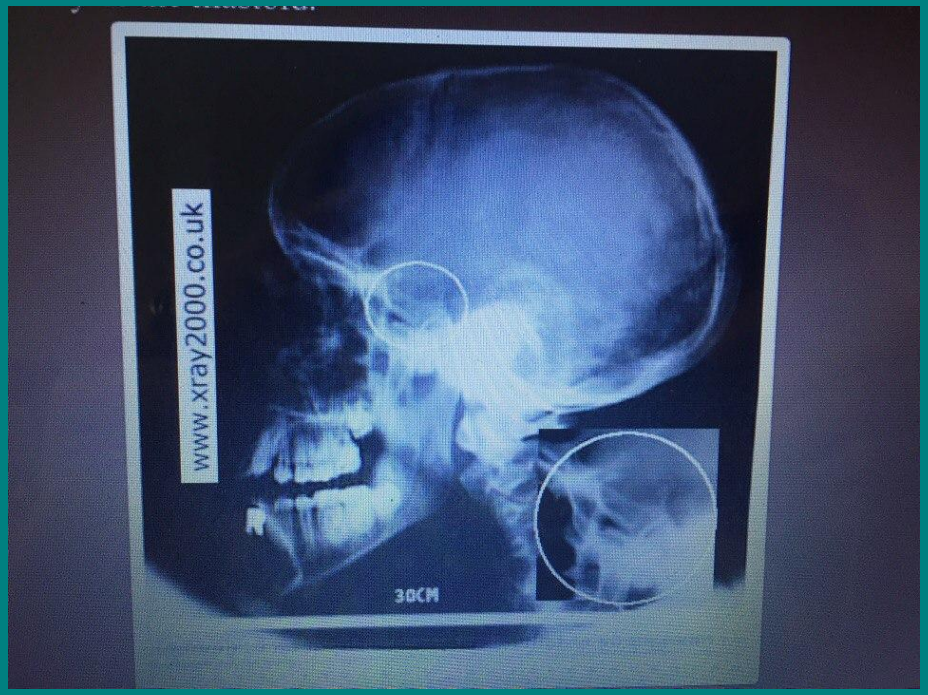
Acromegaly MRI

- MRI 7 below demonstrates an increased size of a pituitary adenoma on the L compared to the normal size pituitary gland on the R after treatment. The ademoma has increased radiodensity , takes up the entire space of the pituitary and is enlarging posteriorly and anterosuperiorly .



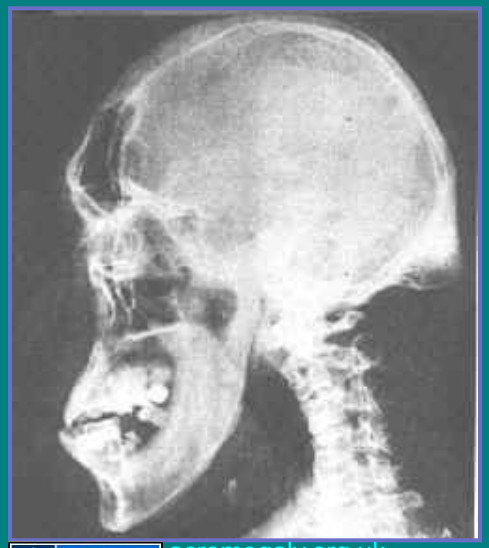
Acromegaly Radiograph

- Radiograph 6 demonstrates increased size of the Sella Turcica , the bony depression of the sphenoid bone the pituitary gland sits inside. The sella turcica has increased in size due to the increased size of the pituitary gland. The mandible also shows increased radiodensity of the mastoid.



Endocrine Images: Acromegaly

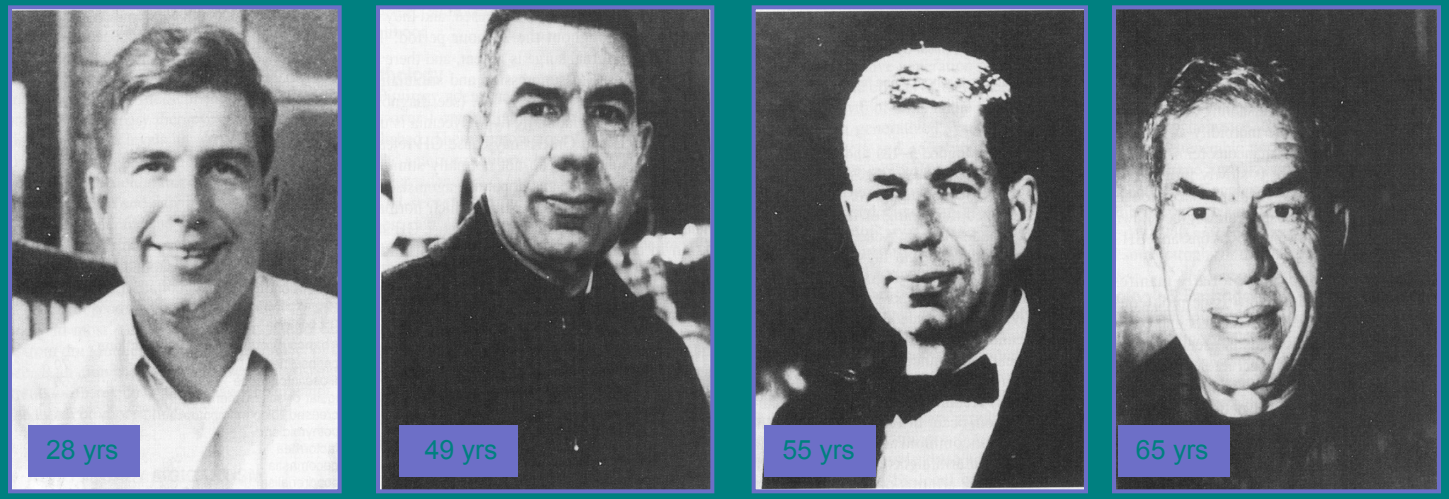
 Andre the Giant by EKavet (Flickr)



 acromegaly.org.uk

Picture of wrestling star Andre the Giant and Skull X-ray of man with acromegaly. Notice the characteristic prominent supraorbital ridge (“frontal bossing”), large jaw, and dental malocclusion with underbite (x-ray).

Endocrine Images: Acromegaly

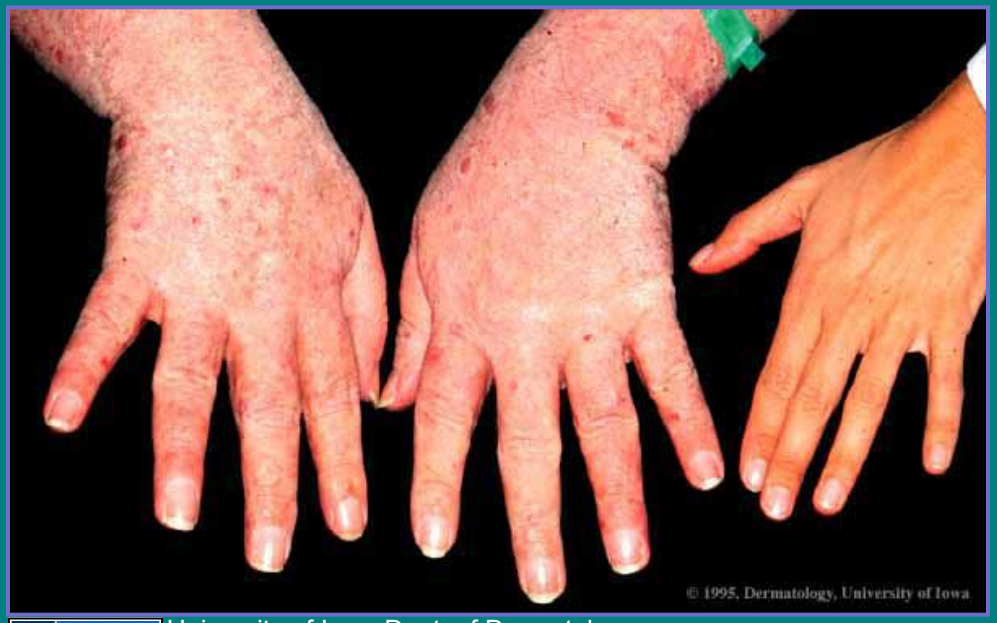


 Greenspan & Strewler, *Basic & Clinical Endocrinology*, 5th Ed., 1997 From Reichlin S. Acromegaly. Med Grand Rounds 1982;1:9

Individual with acromegaly photographed over a 37-year span. Ages in years are in lower left corner of each photograph.

Note that the changes occurring with acromegaly may be very gradual and go completely undetected by the patient or his or her family for many years. It is often only thorough the comparison with old photographs or complaints involving complications of acromegaly, such as sleep apnea, diabetes or dental problems that acromegaly is suspected.

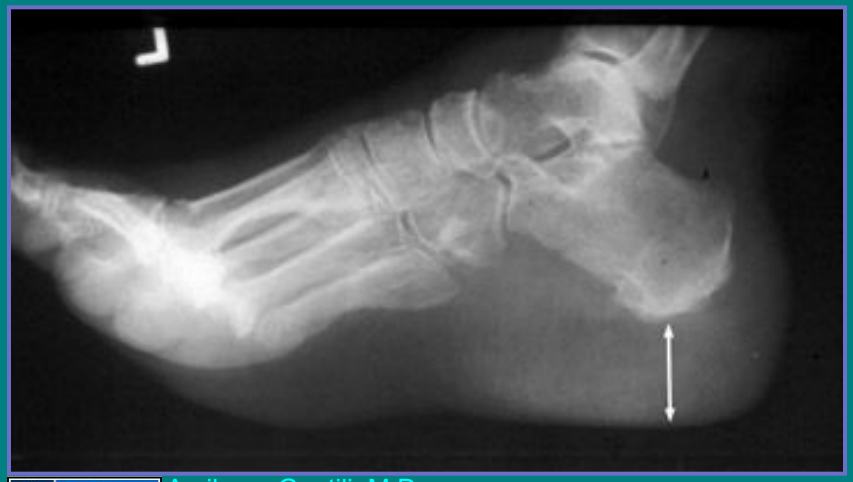
Endocrine Images: Acromegaly



 University of Iowa Dept. of Dermatology

Hands of individual with acromegaly (left) compared to hand of non-acromegalic adult (far right).

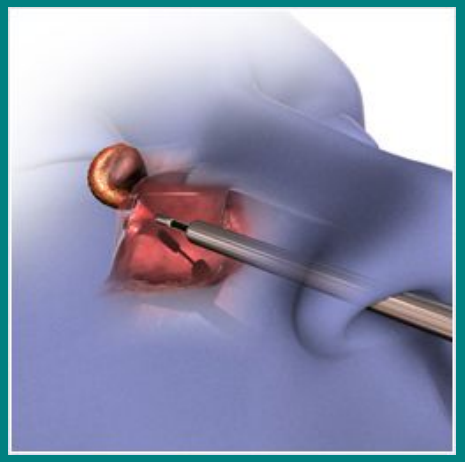
Endocrine Images: Acromegaly



Foot X-ray of Patient with Acromegaly.

Notice the unusually thick "pad" of soft tissue overlying the calcaneus (double arrow). It is said that a good clinical sign of acromegaly is the inability to feel the calcaneus when pressing on the heel.

Treatment



Treat the pituitary gland with:

- Surgery
  - transsphenoidal adenomectomy
- Medical therapy
  - somatostatin analogues
  - dopamine agonists
  - antagonists of growth hormone receptors
- Radiation therapy
  - remote gamma-therapy
  - stereotactic radiosurgery

Stereotactic radiosurgery
octreotide, lanreotide

- an independent method, after surgery or RADIOTHERAPY
- inhibit the secretion of GH, decrease tumor size
- prolonged use cause the formation of stones in gallbladder

Dopamine agonists

bromocriptine, quinagolide, cabergoline

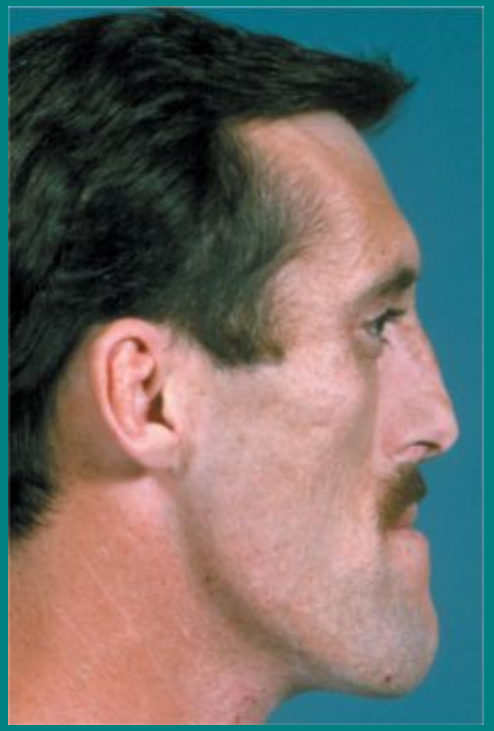
- used for a long time, reduce the secretion of GH
- less effective than somatostatin analogues
- should start with low doses because of the occurrence of nonspecific ulcer in the digestive tract

Antagonists of growth hormone receptors *pegvisomant*

- no effect on the tumor
- need to monitor the level of IGF-1, not GH

Prevention

- Currently there are no methods to prevent Acromegaly.



- Early detection and treatment are the best options as they may prevent the disease from getting worse.

Prognosis

- One in 20,000 people experience this abnormality.
- It is most often diagnosed in middle-aged adults.
- If left untreated, Acromegaly can lead to serious illness and even premature death.

Thank you for your attention