

Endocrine System History & Examination

TUCOM

Internal Medicine

4th year

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ANATOMY:

The main endocrine glands are the pituitary, thyroid, parathyroids, pancreas, adrenals and gonads: testes and ovaries. These glands synthesise hormones which are released into the circulation and act at distant sites.

Disease may result from excessive or inadequate production of hormones, or target organ hypersensitivity or resistance to the hormone.

Although some endocrine glands, e.g. parathyroid glands and pancreas, respond directly to metabolic signals, most are controlled by hormones released from the pituitary gland.

History - Endocrine System

Presenting complaint

1- Alimentary changes

- Change in body weight: Weight loss: Hyperthyroidism, Type 1 diabetes mellitus, adrenal insufficiency, hypopituitarism and anorexia nervosa
- Weight gain: Simple obesity, primary hypothyroidism, polycystic ovary syndrome (PCOS), Cushing's syndrome or hypothalamic disease).
- Appetite: loss of appetite and neusea (Addison's or severe hypercalcaemia). Increased appetite (thyrotoxicosis).
- Diarrhea (thyrotoxicosis, Addison's, diabetic autonomic neuropathy)
- Constipation (hypothyroidism, hypercalcemia, diabetic autonomic neuropathy).

Urogenital changes

- Polydipsia (excessive thirst) and Polyuria: Diabetes mellitus or insipidus, hyperparathyroidism, Conn's syndrome
- Menstrual disturbance: PCOS, hyperprolactinaemia, thyroid dysfunction, pituitary diseases).
- Impotence (hyperprolactinemia, hypogonadism, acromegaly, primary or secondary hypogonadism, diabetes mellitus)

Skin changes

- Change in skin and mucosal pigmentation and character: Coarse dry skin in hypothyroidism. Excessive pigmentation and/or vitiligo (areas of depigmented skin) in Addison's disease. Soft-tissue overgrowth and skin tags in acromegaly. Acanthosis nigricans (velvety thickening and pigmentation of the major flexures, especially the axillae and groins) in obesity, and type 2 diabetes. Dryness in hypothyroidism.

- Increase sweating in hyperthyroidism, pheochromocytoma, acromegaly or during hypoglycemic attack). sweating after meals (*gustatory hyperhidrosis*) may occur in patients with diabetic autonomic dysfunction.
- Flushing of face may be a feature of carcinoid tumours of the gut and usually indicates extensive disease with hepatic metastases. Physiological at the time of the natural menopause
- Temperature intolerance – in hyperthyroidism (heat) and hypothyroidism (cold)

- Change in facial/body hair growth and distribution in hypogonadism, hypopituitarism, adrenal insufficiency, androgen excess. Hirsutism is the excessive growth of thick terminal hair in an androgen-dependent distribution (upper lip, chin, chest, back, lower abdomen, thighs) in women. Pathological causes of hirsutism include: Polycystic ovary syndrome, Late presentation of congenital adrenal hyperplasia, Androgen-secreting ovarian or adrenal tumours.

Nervous changes

- Nervousness, irritability (thyrotoxicosis).
- Fatigue (hypothyroid, DM, Addison's, acromegaly).
- Headaches (hypoglycemia).
- Seizures (hypoglycemia).
- Visual loss (acromegaly, DM).

Stature

- Short stature Constitutional, non-endocrine, systemic disease (e.g. coeliac disease), growth hormone deficiency
- Tall stature: Gigantism, Marfan's syndrome, Klinefelter's syndrome). Hand, skull bony growth (acromegaly).

Past medical, surgical history

- Congenital problems.
- Goiter, thyroid problems.
- Thyroid surgery, radiation.
- Parathyroid, pituitary surgery.
- Tuberculosis and HIV infection are associated with adrenal insufficiency.

Drug history

- Excessive corticosteroid exposure causes cushingoid features and dopamine antagonist drugs such as haloperidol and domperidone cause hyperprolactinaemia.

Family history

- Thyroid disease and diabetes mellitus may run in families.
- A family history of organ-specific autoimmune disease (e.g. pernicious anaemia, vitiligo, Addison's disease)
- Multiple endocrine neoplasia syndromes are rare autosomal dominant conditions characterised by hyperplasia, adenoma formation and malignant change in multiple endocrine glands
- Renal calculi: primary hyperparathyroidism, an important cause of renal stones, may be familial, occurring either as an isolated disorder or as a part of the syndrome of multiple endocrine neoplasia

Examination of endocrine system

General appearance

- Conscious state: confused in hypoglycemia, shock during Acute adrenal crisis, hypertensive encephalopathy. restless and agitated (hyperthyroidism) or slow and lethargic (hypothyroidism)
- Characteristic syndrome appearance.
- Measuring weight, height and body mass index (BMI)
- Stature.
- Weight: signs of weight loss. If the patient is obese, is the adiposity centrally distributed (Cushing's syndrome and growth hormone deficiency)?

Skin

- Examine the entire skin surface, looking for abnormal pallor (hypopituitarism), or pigmentation (Addison's disease). Vitiligo may also be found in Addison's disease or other organ-specific autoimmune disorders. Violaceous striae and plethora (Cushing's or carcinoid syndrome)
- Abnormal dryness of the skin and coarseness of the hair are found in hypothyroidism. Localized thickening of the dermis on the anterior aspects of the legs, a pretibial myxoedema in Graves' disease.

- Is the body hair normal in quality and amount? Look for hirsutism in females with menstrual disturbance, especially on the face, chest and abdomen (polycystic ovary syndrome (PCOS))

Hands and arms

- finger-clubbing (*thyroid acropachy* a rare manifestation of thyrotoxic Graves' disease). Palmar erythema in thyrotoxicosis. Examine the hands for Hotness and fine tremor (hyperthyroidism). Excessive sweating, soft tissue overgrowth, big hands (acromegaly). Skin crease pigmentation (Addison's disease). Wasting of the thenar muscles due to carpal tunnel syndrome (hypothyroidism, acromegaly). Patients with Cushing's syndrome often have thin, fragile skin.

- Selective shortening of the fourth and fifth metacarpals in (*pseudohypoparathyroidism*)
- Assess the pulse rate, rhythm and volume. Tachycardia and atrial fibrillation may suggest thyrotoxicosis.
Bradycardia in hypothyroidism
- Record the blood pressure. Hypertension is a feature of several endocrine conditions, such as phaeochromocytoma and Conn's syndrome (primary hyperaldosteronism). Check for postural hypotension with lying and standing blood pressures if you suspect adrenal insufficiency or autonomic dysfunction.

- Trousseau's sign (hypocalcemia): Occlude brachial artery for 3 min using BP cuff. See if carpal spasm is induced.
- Proximal weakness (*proximal myopathy*) in thyrotoxicosis, glucocorticoid excess and vitamin D deficiency.
- Tendon reflexes will be abnormally brisk in thyrotoxic patients and may show a slow relaxation phase in hypothyroidism
- Axillae: Acanthosis nigricans (acromegaly). Axillary hair loss (hypopituitary). Skin tags (acromegaly).

Face

- Endocrine facies: Acromegaly. Cushing's syndrome. Graves' disease. Hypothyroidism. Addison's disease. Hypopituitarism. Pseudohypoparathyroidism.
- Acne. oily or sweaty skin. Hirsutism.
- Examine the eyes in all thyroid patients for external inflammation, proptosis, diplopia and visual function. Assess visual acuities and fields in patients with suspected pituitary tumours, to detect bitemporal hemianopia due to compression of the optic chiasm. Examine the fundi for optic atrophy in patients with longstanding optic pathway compression. Eye fundus for diabetic retinopathy. Corneal calcification, evident as a narrow band on the medial or lateral border of the cornea indicates long-standing hypercalcaemia

Eyes signs in thyrotoxicosis: Startled eye looking

- The sclera visible between the lower eyelid and the lower limbus of the cornea (exophthalmos). Most patients have bilateral exophthalmos with unilateral prominence.
- Lid retraction (the sclera above the upper limbus of the cornea will be seen)
- Check for lid lag: ask the patient to follow your index finger as you move it from the upper to the lower part of his visual field. Delay between the descent of the upper eyelid in relation to that of the eyeball is lid lag.
- Look at the patient's eyes from behind and above for proptosis.
- Check for extraocular movements and comment on the cornea. Conjunctival swelling and redness (chemosis)

- Chvostek's sign: gentle percussion over the proximal part of the facial nerve (as it exits from the parotid gland), evokes involuntary facial muscular twitching.

Mouth: Buccal pigmentation (Addison's). Tongue enlargement (acromegaly).

Neck

- Look for the JVP
- Scars of surgery (often missed by candidates)
- Inspect buffalo hump (Cushing's).
- Palpate supraclavicular fat pads (Cushing's).
- Inspect webbed neck (Turner's).

The thyroid gland

- Inspect the neck from the front. Give the patient a glass of water and ask him to take a sip. Look for a swelling while he swallows.

- Ask the patient to sit with the neck muscles relaxed and stand behind him. Place your hands gently on the front of the neck, with your index fingers just touching. Ask him to swallow a sip of water and feel the gland as it moves upwards. Some patients find neck palpation uncomfortable, so be alert for any signs of distress.
- Note the size, shape and consistency of any goitre and feel for any thrill.
- Measure any discrete nodules with callipers. Record the maximum neck circumference of a large goitre using a tape measure (objective measurements are useful for long-term follow-up).

- **Palpate cervical lymph nodes. Feel the carotid arteries. Palpate for tracheal deviation**
- **Test sternomastoid function (this muscle may be infiltrated in thyroid malignancy).**
- **Pemberton's sign: on raising the arms above the head, patients with retrosternal goitres may develop signs of compression, such as suffusion of the face, syncope or giddiness**
- **Percuss for retrosternal extension**

- Auscultate with your stethoscope for a thyroid bruit. A thyroid bruit may be confused with other sounds: bruits from the carotid artery or transmitted from the aorta are louder along the line of the artery. Transient gentle pressure over the root of the neck will interrupt a venous hum from the internal jugular vein.

Abnormal findings

Shape, surface and consistency

- Symmetrical, smooth and diffuse not tender thyroid enlargement in simple goitre and Graves' disease
- Single nodule in single nodular goiter. Multiple nodule in multinodular goitre. Irregular and very hard consistency suggests malignancy.
- Large firm lymph nodes near a goitre suggest thyroid cancer
- Diffuse tenderness is typical of viral thyroiditis. Localised tenderness may follow bleeding into a thyroid cyst

Mobility Most goitres move upwards on swallowing Very large goitres may be immobile, and invasive thyroid cancer may fix the gland to surrounding structures

Thyroid bruit indicates Graves' disease

Chest

- Dehydration and Kussmaul respiration in ketoacidosis. Pigmented nipple (Addison's). Male gynecomastia (Cushing's). Sings of heart failure may be found in thyrotoxicosis

Abdomen

Purple striae (Cushing's). Disproportionate abdominal fat (Cushing's).

Genitalia: Atrophy. Virilisation.

Legs

- Peripheral neuropathy (DM). Necrobiosis lipoidica on the shins of diabetic patients. diabetic foot. pretibial myxoedema. proximal myopathy with hyper-reflexia.

Acanthosis nigricans





Graves' hyperthyroidism. Thyroid acropachy.

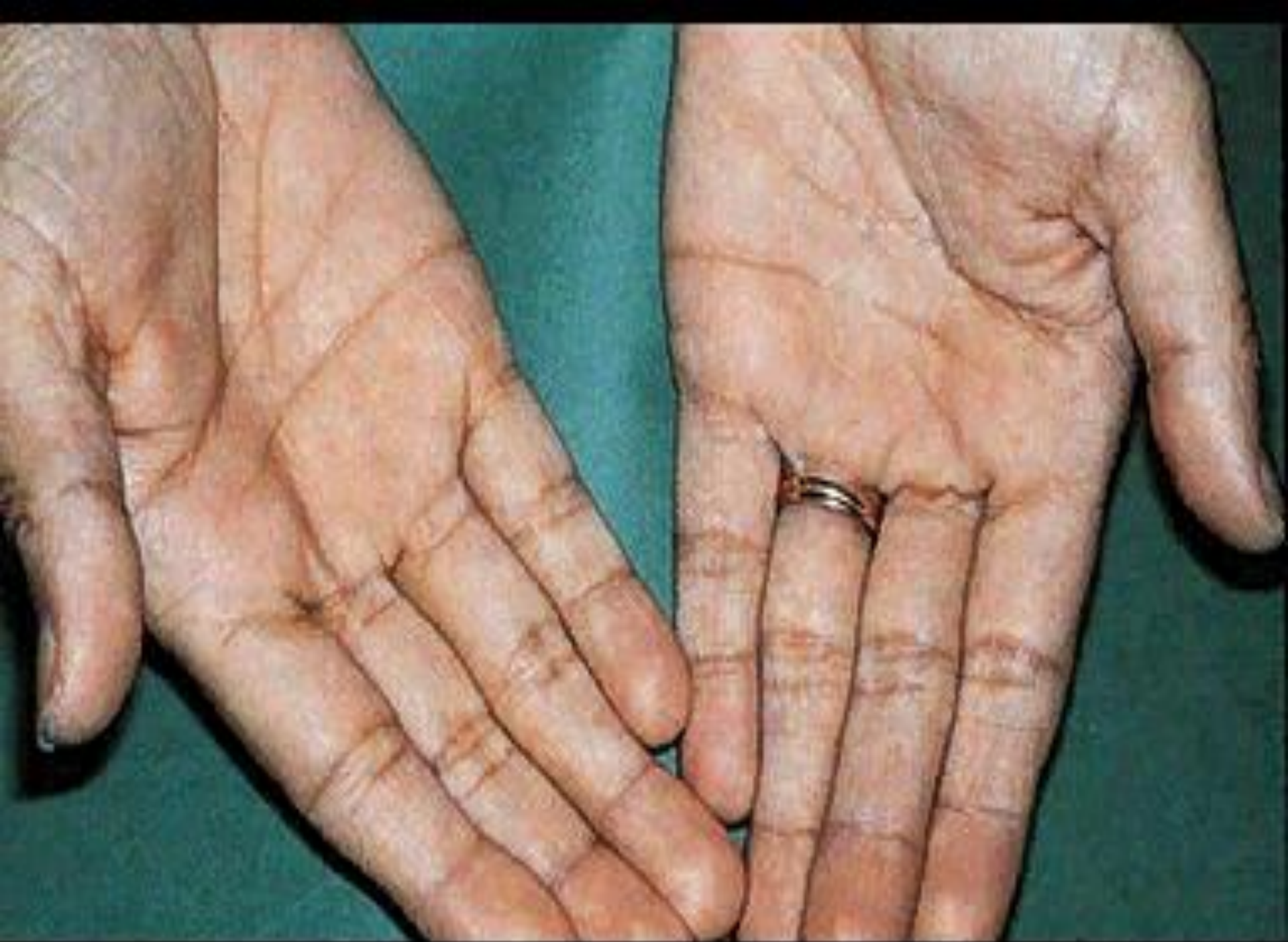


Parathyroid disease. 'Brown tumour' of the phalanx (middle finger) in hyperparathyroidism.



The hands in pseudohypoparathyroidism. Note the characteristic shortening of the fourth and fifth metacarpals.



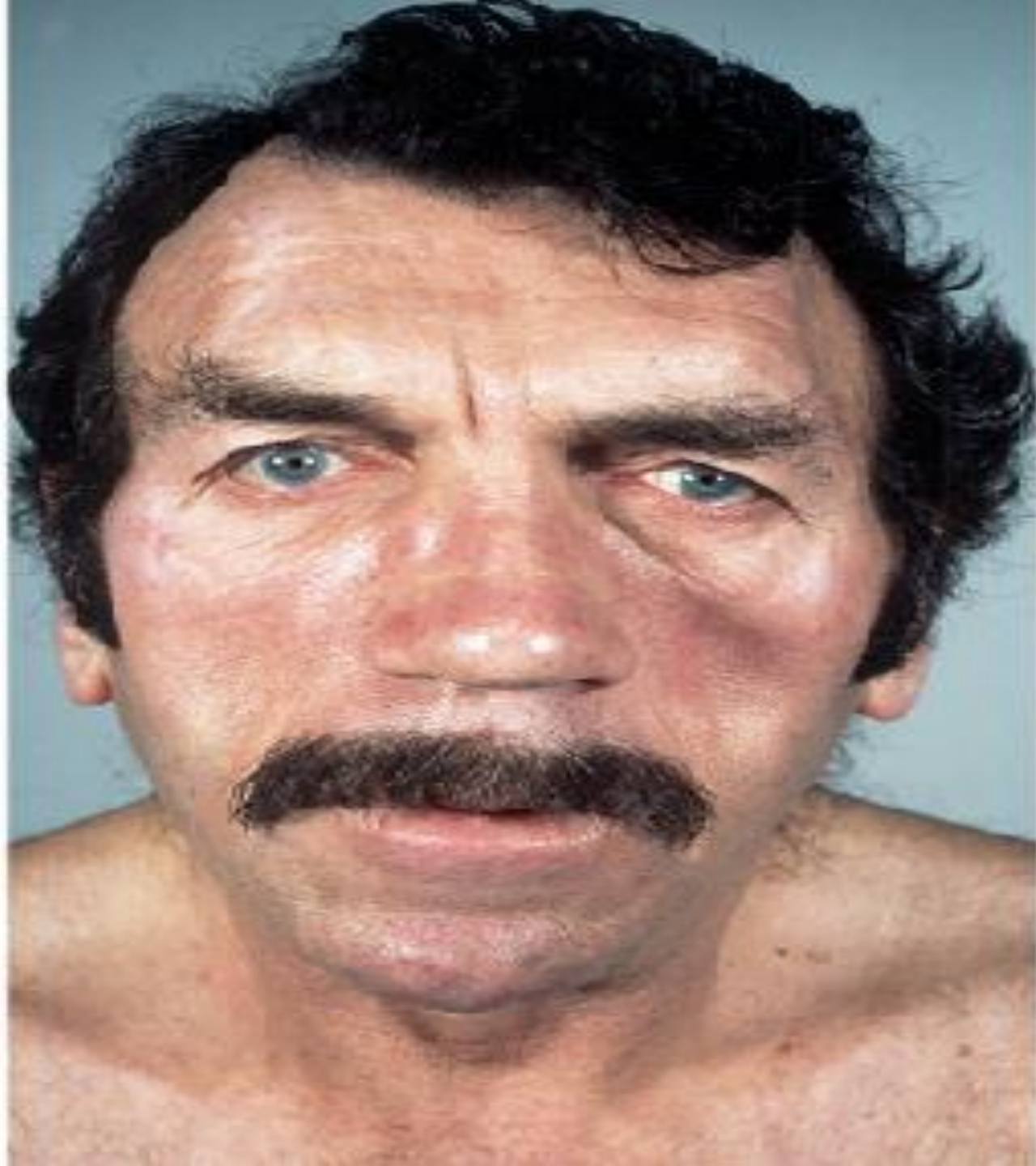




**Hypopituitarism due to a
pituitary adenoma. Absent
axillary hair.**



The facial appearance of acromegaly. There is overgrowth of the facial skeleton,



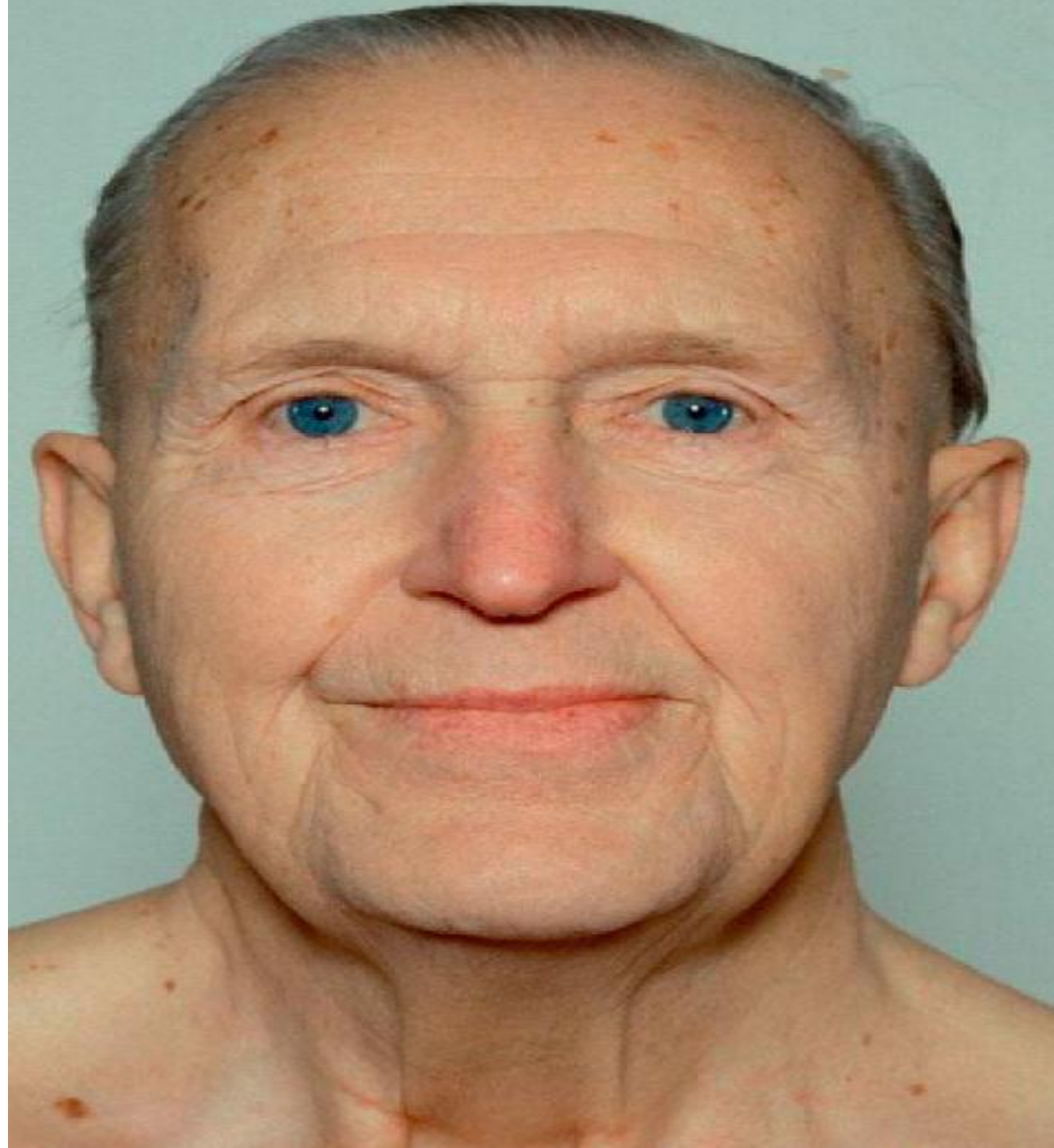


Graves' hyperthyroidism Typical facies



Hypothyroidism. (A) Before treatment. (B) After levothyroxine replacement.

Hypopituitarism.
Hypopituitarism due to a
pituitary adenoma (note
the fine pale skin





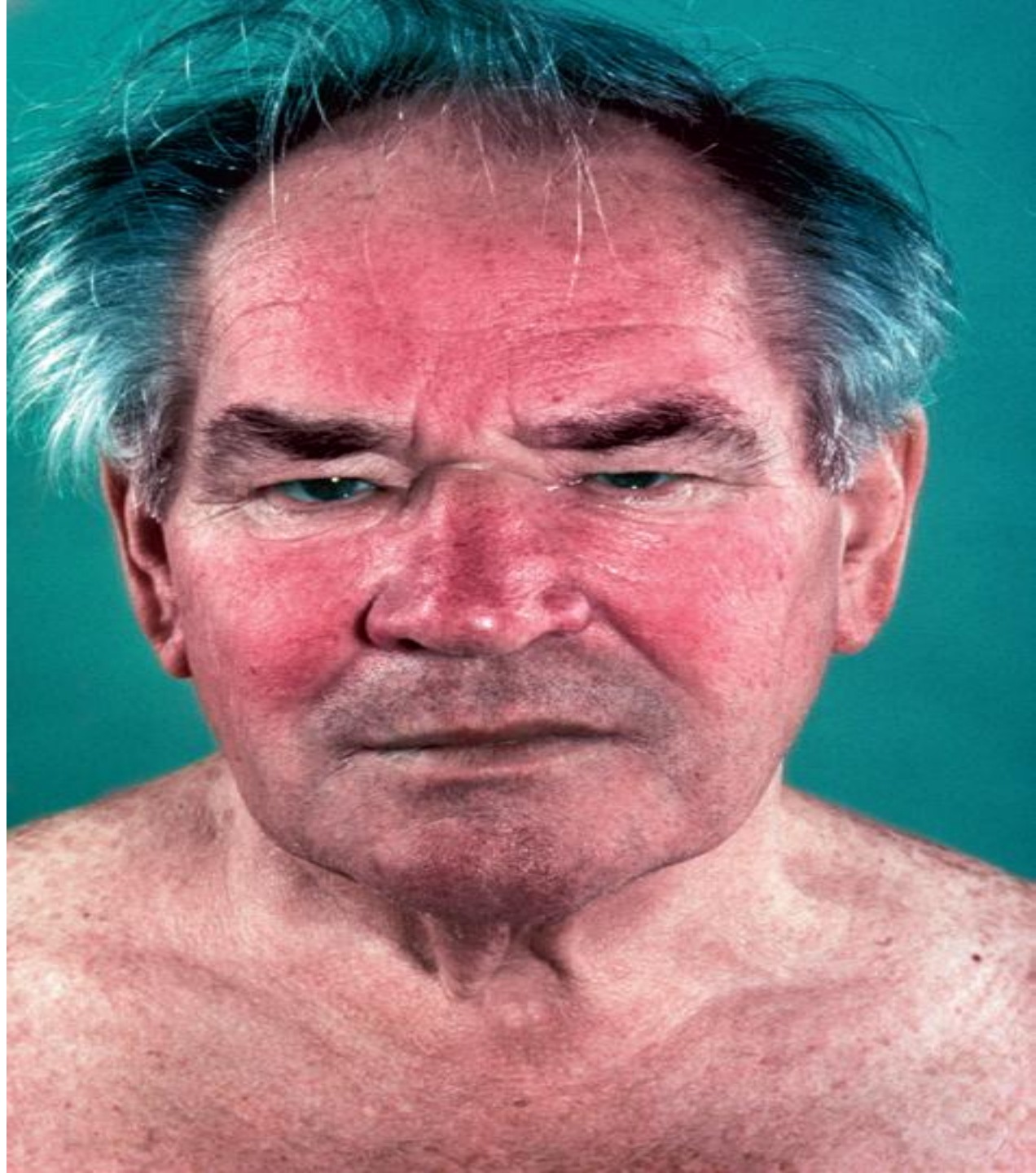
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Vitiligo





**Carcinoid syndrome.
Flushing and
telangiectasia of the
face.**







Lid retraction and proptosis in a patient with thyrotoxic Graves' disease.



Severe inflammatory thyroid eye disease



Corneal calcification (band keratopathy) in a patient with long-standing hyperparathyroidism







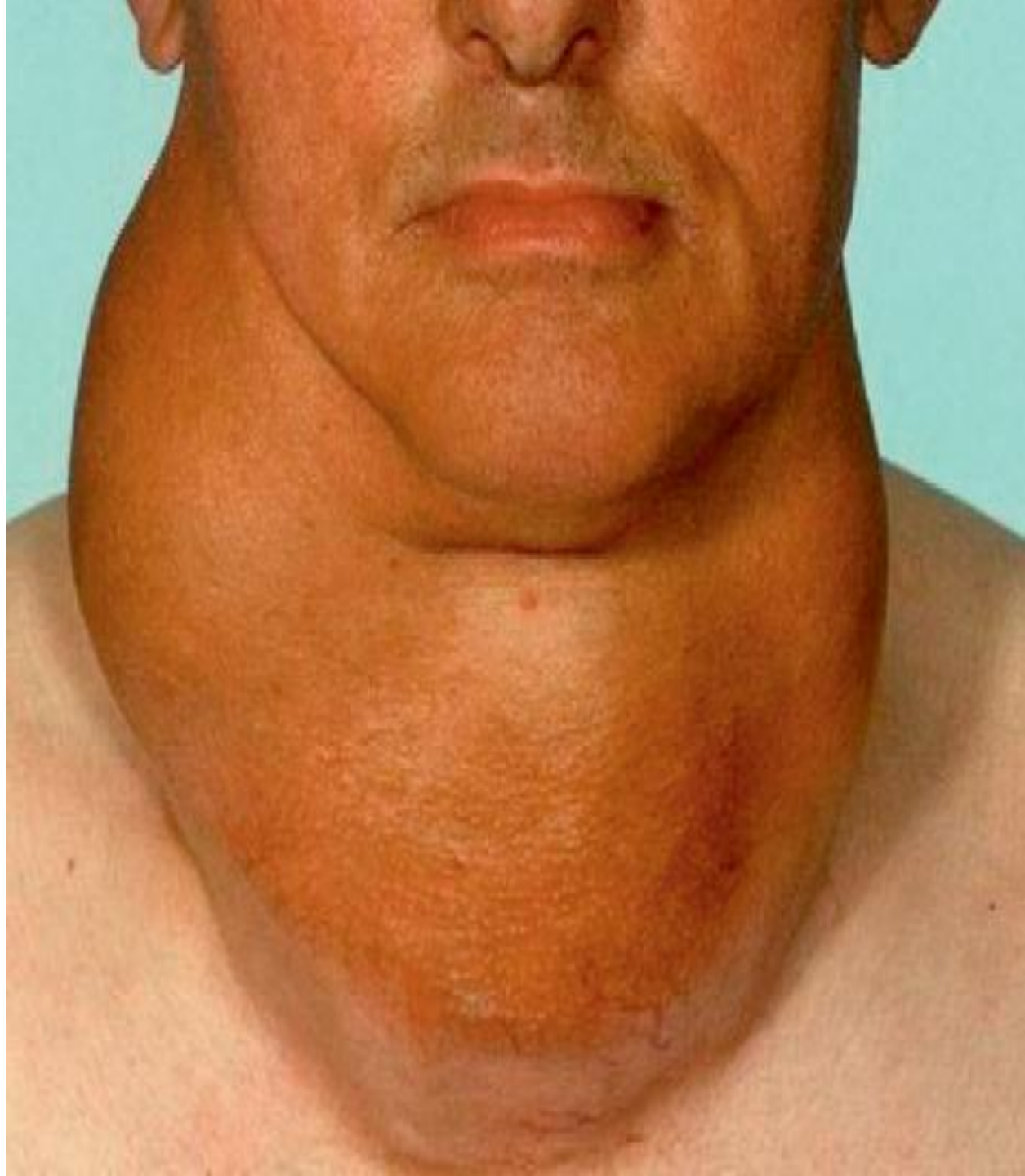


Diffuse goitre – Graves' disease

**Uninodular goitre
– toxic nodule**



Multinodular goitre

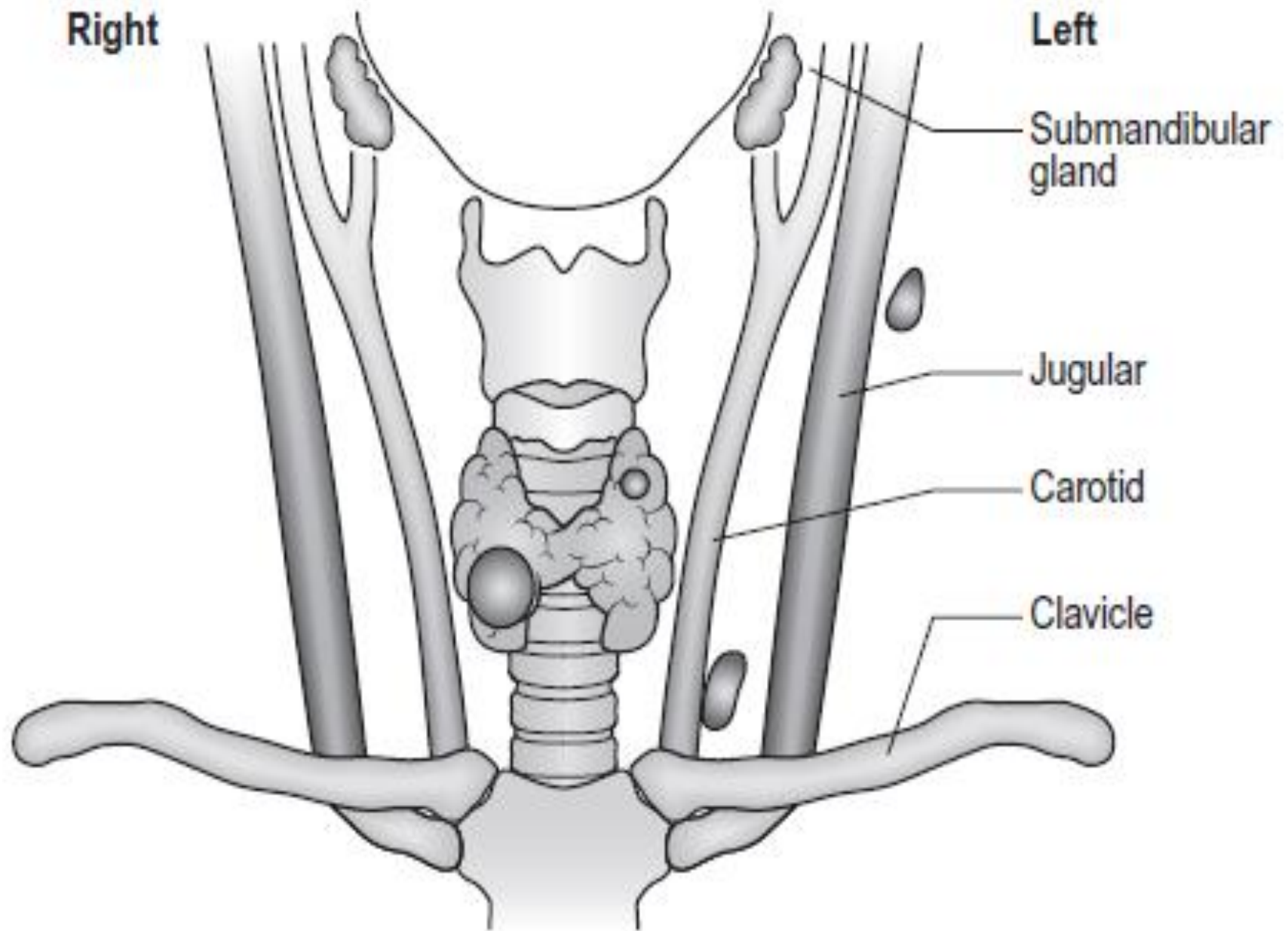




A large multinodular goitre. Note the asymmetrical growth of the nodules.

**Thyroid cancer.
Papillary thyroid
cancer with
regional cervical
lymphadenopath
y**





Cervical map helps in communicating anatomic relationships and serves as a reference for follow-up examinations.



Gynaecomastia. There is enlargement of both breasts in this man



Graves'
hyperthyroidism.
Pretibial
myxoedema



Diabetes and the skin. Necrobiosis lipoidica





Diabetic foot complications. (A) Infected foot ulcer with cellulitis and ascending lymphangitis. (B) Ischaemic foot – digital gangrene. (C) Neuropathic ulcer (pressure ulcer below metatarsal head).

Thanks