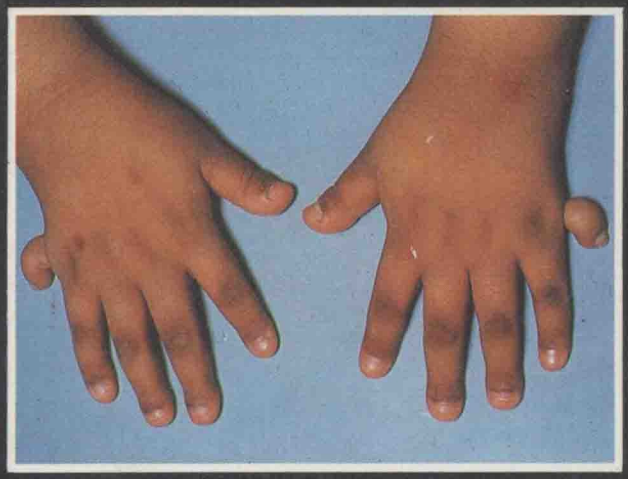
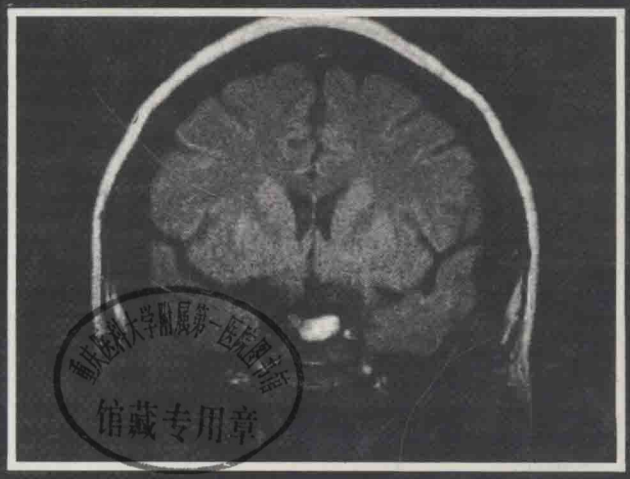
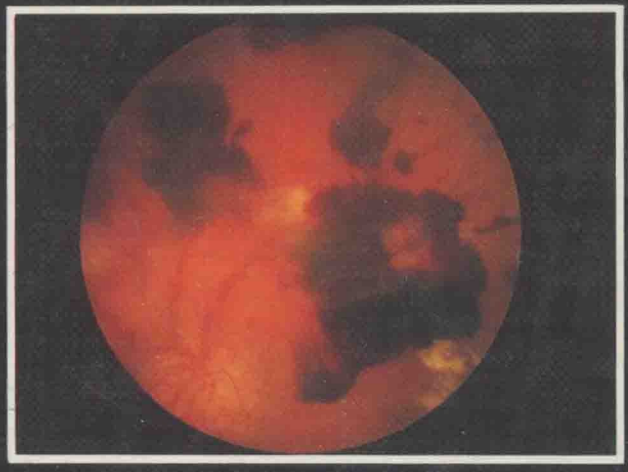
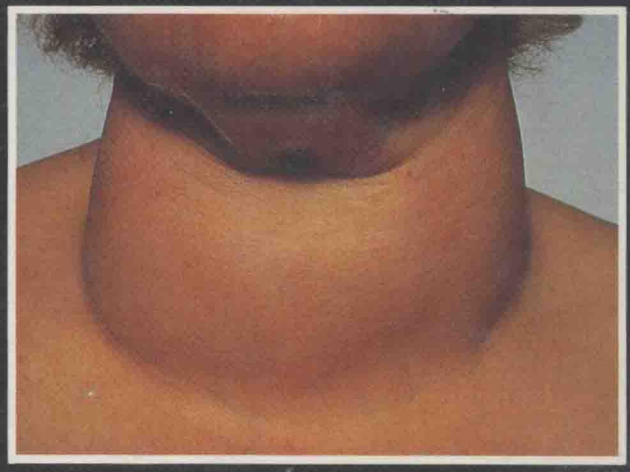
Color Atlas of
ENDOCRINOLOGY
Second Edition

R. Hall • D.C.Evered









Color Atlas of

ENDOCRINOLOGY

Second Edition

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Contents

Introduction

The objective of this Atlas is to illustrate the clinical features of endocrine disease and the many related disorders which are commonly referred to endocrine clinics.

Endocrinology is a specialty with a large but variable visual content. Some topics, including the most prevalent endocrine disorders, such as diabetes mellitus and thyroid, adrenal and pituitary diseases have many features which can be clearly illustrated, whereas others, including aldosteronism and phaeochromocytoma have very few visual features that can be demonstrated by clinical photographs. We have, therefore, overcome this problem by introducing line diagrams to accompany the photographs and the text.

The emphasis of this book is on clinical presentation, diagnosis and the improvements which may be seen with treatment. This new edition has been very substantially revised. The text has been extensively rewritten and now provides much fuller coverage of the clinical features of endocrine and related disorders than the first edition. The number of illustrations has been increased from 500 to nearly 1,000, and over 70 per cent of these are entirely new. It is effectively a new book.

It is intended that this volume will be of practical value for all those concerned in the management of patients with endocrine diseases. It will also provide an invaluable guide for undergraduates and postgraduates preparing for graduation and for higher qualifications in medicine: clinical examinations frequently include endocrine cases.

R. Hall, D. C. Evered

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Chapter 1
Hypothalamus and pituitary

Introduction

The hypothalamus lies at the base of the brain and is connected to the pituitary by the pituitary stalk. Its major role is as a centre integrating and coordinating pituitary function, thermostasis, water, mineral and calorie balance, and sexual and reproductive activity. There are no neural connections between the hypothalamus and the anterior pituitary, and the hypothalamus influences and regulates pituitary function through the hypothalamo–hypophyseal portal system. The hypothalamus secretes a number of regulatory factors (releasing or inhibiting hormones) — see Table 1.

Table 1.

Hypothalamic hormones	Pituitary hormones
Thyrotrophin releasing hormone (TRH)	Thyrotrophin (TSH) Prolactin
Gonadotrophin releasing hormone (GnRH)	Luteinising hormone (LH) Follicle stimulating hormone (FSH)
Somatostatin Growth hormone releasing hormone (GHRH)	Growth hormone (GH)
Corticotrophin releasing hormone (CRH)	Corticotrophin (ACTH)
Dopamine	Prolactin

A number of other weak interactions occur between the hypothalamic and the pituitary hormones, but these appear to be of little physiological significance. Somatostatin is also secreted by many tissues which are not of neural origin and exerts a local paracrine action.

The posterior pituitary is not a discrete endocrine gland but merely the distal part of an endocrine neurosecretory system, which also includes various hypothalamic areas. The antidiuretic hormone is secreted by the supraoptic and paraventricular nuclei and passes down the neurohypophyseal tract linked with neurophysin to be stored in the posterior lobe and then secreted into the general circulation.

Diseases of the hypothalamus and pituitary

Disturbances of secretion of the hypothalamic regulatory hormones

Deficient production of the hypothalamic hormones commonly results from tumours (particularly craniopharyngiomas, chromophobe adenomas and secondary carcinomas), granulomatous disorders (histiocytosis X, tuberculosis and sarcoidosis) or trauma. The deficiencies may lead to a variety of pituitary hormone deficits but, in general, luteinising hormone and growth hormone production are affected early, often in combination with hyperprolactinaemia, and the secretion of the other pituitary hormones is often conserved until later in the course of the disease. Hypothalamic disorders are frequently associated with diabetes insipidus, and visual field defects may occur particularly if a hypothalamic tumour is present. Other disturbances of hypothalamic function may occur, including disturbances of appetite and thirst, altered thermostasis and abnormal sleep patterns. The major clinical features of failure of secretion of the hypothalamic hormones, however, result from the secondary failure of the pituitary hormones and these disorders will, therefore, be considered together as disturbances of hypothalamic–pituitary function.

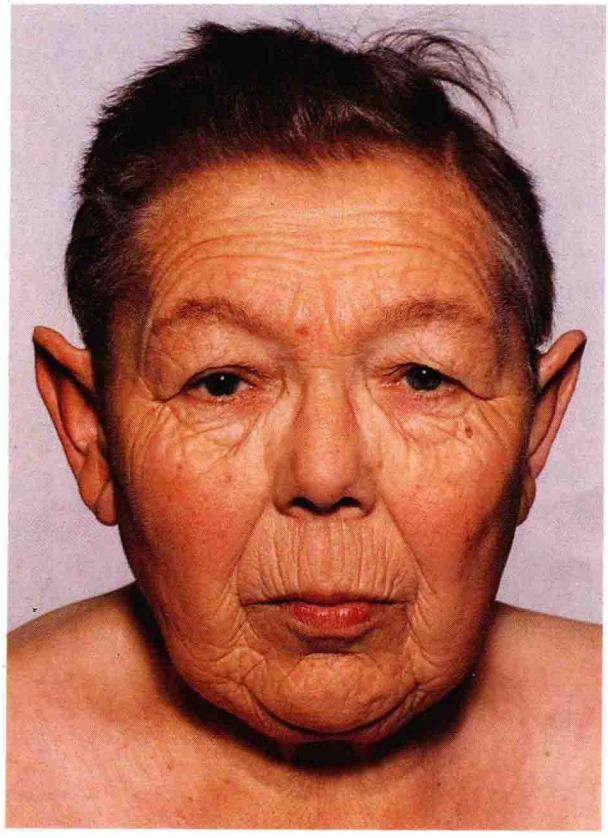
Overproduction of certain hypothalamic hormones may be responsible for certain conditions, but these are rare. Ectopic production of corticotrophin releasing hormone has been reported as a rare cause of Cushing's disease resulting from bilateral adrenal hyperplasia, and production of growth hormone releasing hormone from a peripheral carcinoid tumour may very rarely cause acromegaly. Early production of gonadotrophin releasing hormone may be responsible for the precocious puberty seen in polyostotic fibrous dysplasia (Albright's syndrome). These conditions are dealt with in the section on hypothalamic–pituitary disease, and also in Chapters 5 and 9.

Clinical features of hypothalamic–pituitary disease

The six common presentations of hypothalamic–pituitary disease are as follows:

- Partial or complete failure of pituitary hormone production (**1**)
- Acromegaly (**2** and **3**) or gigantism
- Cushing's syndrome (**4**)
- Galactorrhoea (**5**)
- Diabetes insipidus
- Pituitary or hypothalamic tumour — which may be asymptomatic, or associated with any of the endocrine problems listed above, or the cause of pressure effects on adjacent structures. Illustration **6** shows an enlarged pituitary fossa on a lateral skull radiograph in close-up.

1



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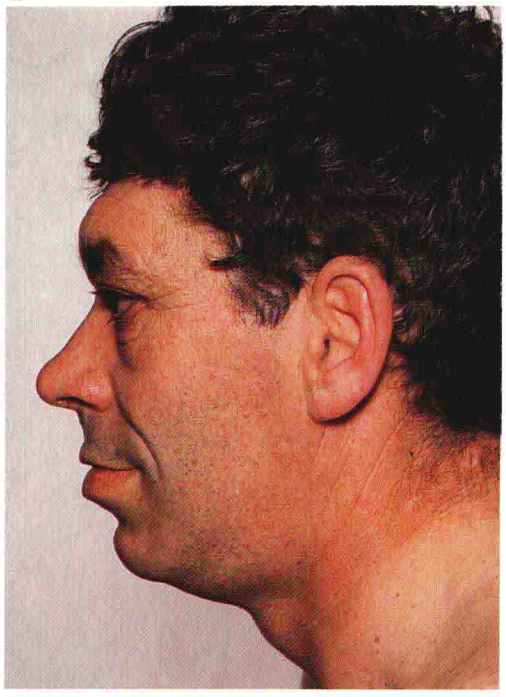

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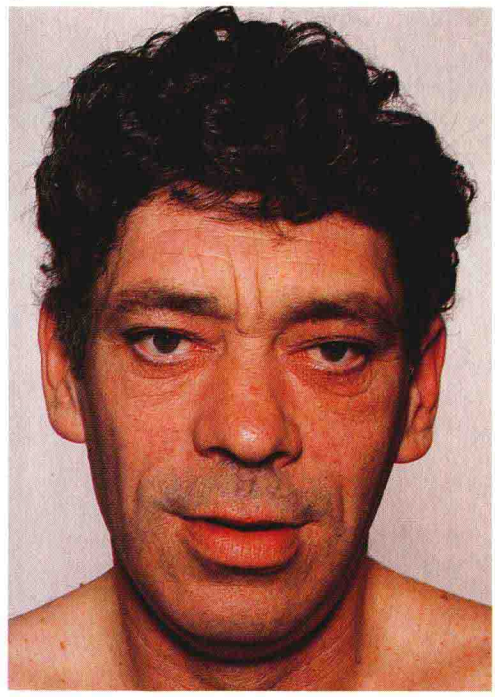

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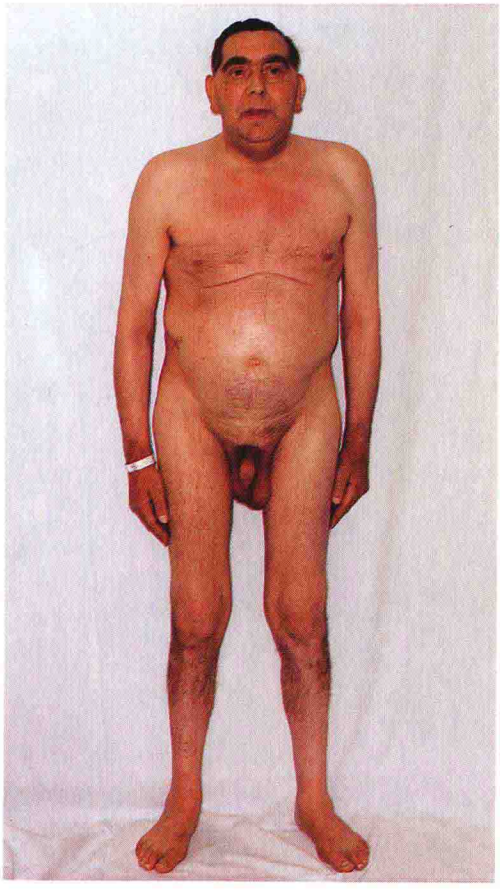

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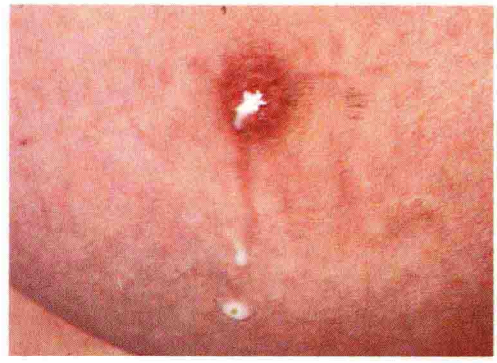

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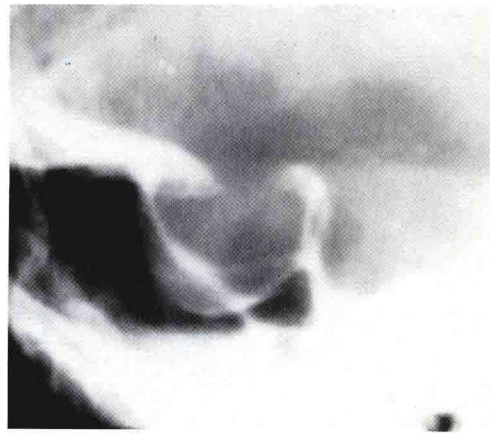
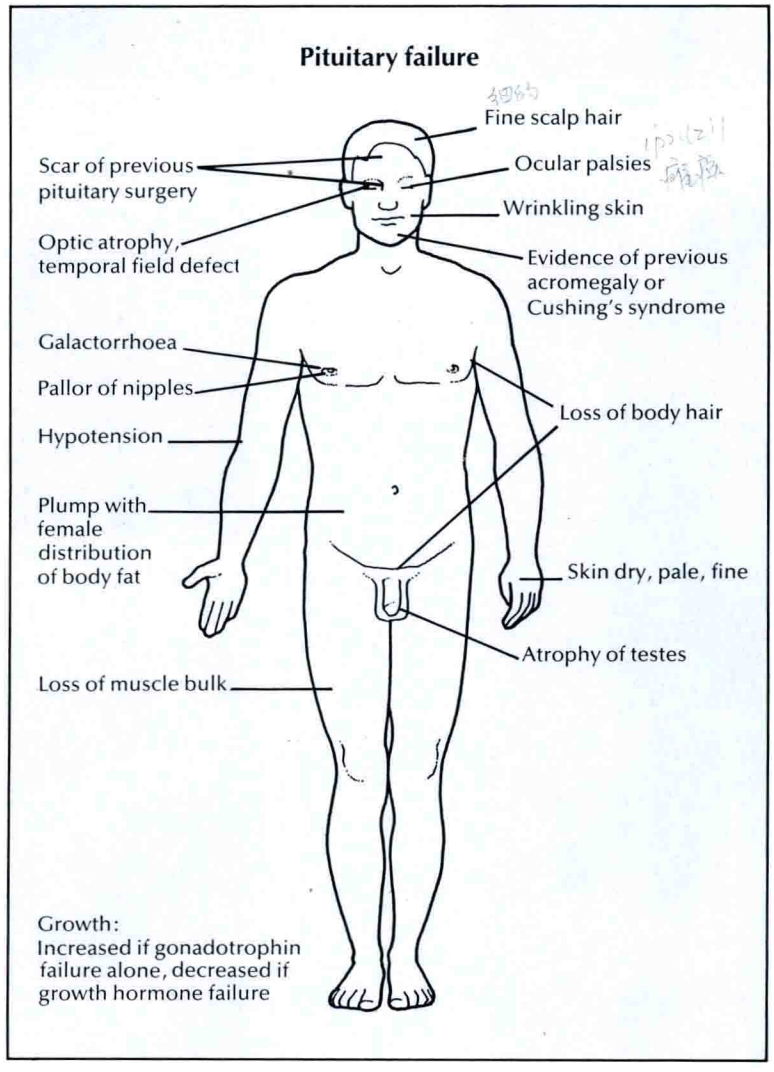


Pituitary failure

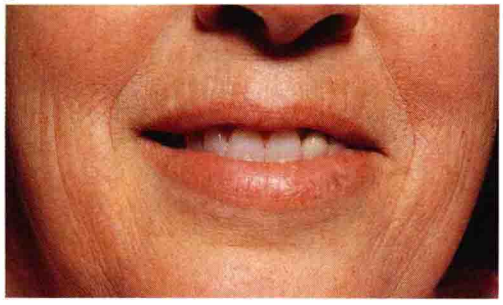
Pituitary failure commonly results from an adenoma, infarction or trauma (or more rarely from a secondary neoplasm, chronic infection, granuloma or lipoidosis). The major clinical features reflect the degree of failure, the pattern of hormonal deficiency and the local effects of the underlying pathology and are shown in **7**. Partial hypopituitarism is much commoner than panhypopituitarism.

7



Gonadotrophin failure occurs early in pituitary disease and thus impotence in the male and amenorrhoea in the female are common early symptoms. The clinical features include fine wrinkling of the skin round the mouth (**8** and **9**), loss of facial (**10**) and body hair (**11** and **12**), atrophy of the genitalia (**13**) in both sexes and sometimes loss of breast tissue in the female.

8



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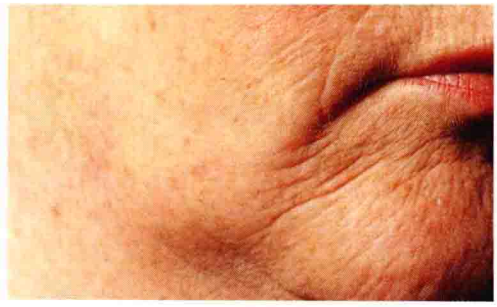

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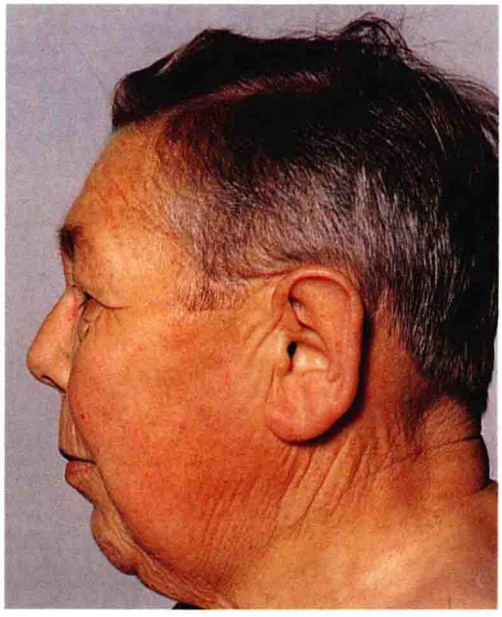

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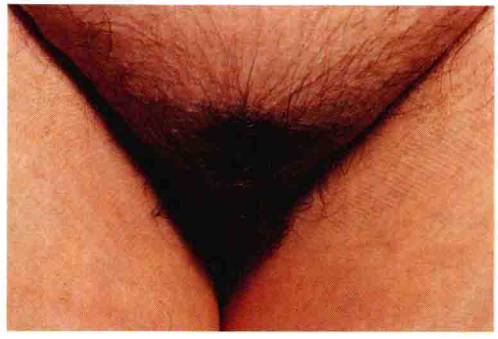

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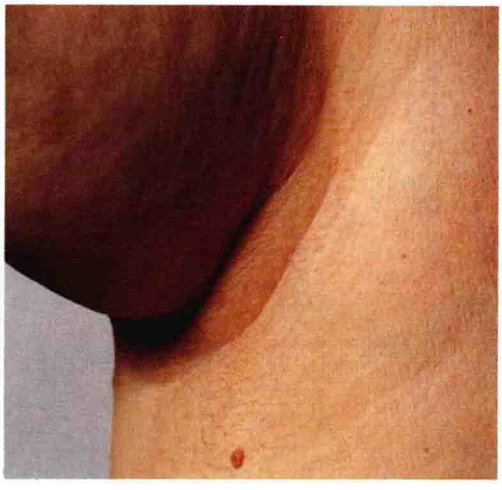

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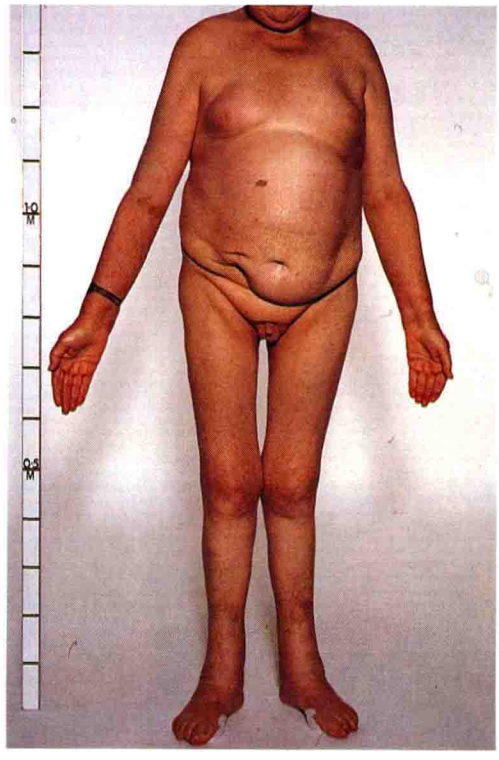

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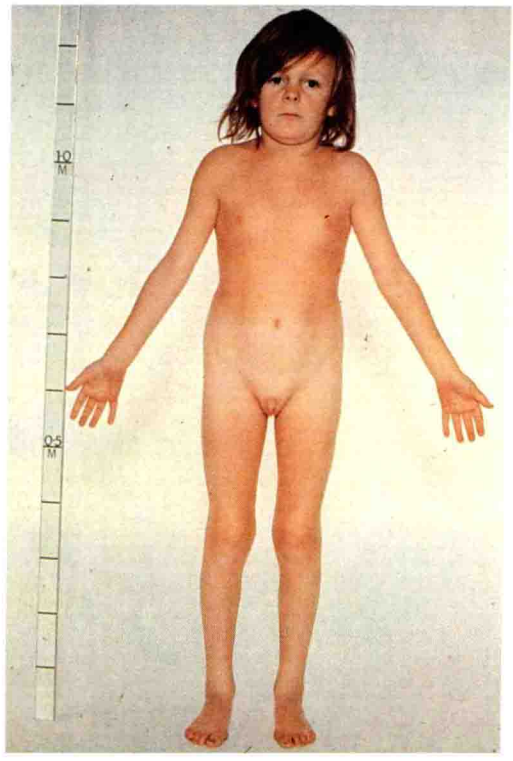
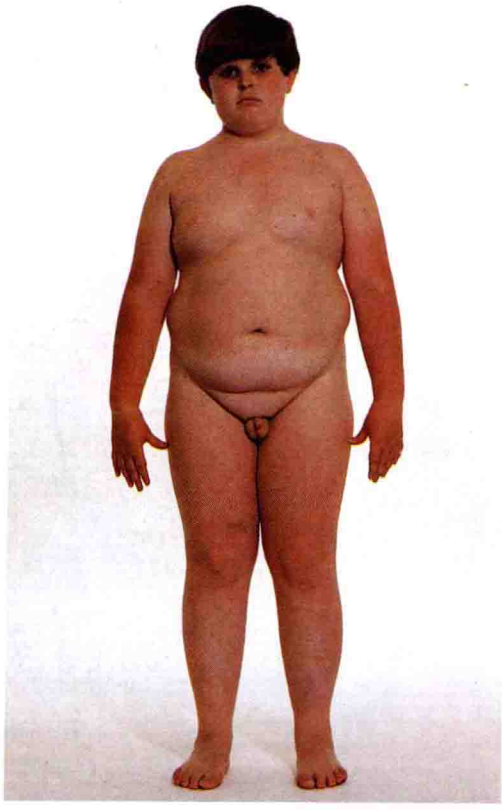


Gonadotrophin failure in childhood leads to failure of puberty (**14**), although this must be distinguished from constitutional delay of puberty which may mimic pituitary failure (**15** — see also Chapter 5), and if growth hormone is normal, excessive linear growth as the epiphyses fuse late. The presence of gonadotrophin failure can be finally established only by the lack of pubertal development over a period of time. Low or normal gonadotrophin levels, in association with the clinical features described above, are not alone sufficient evidence to confirm pituitary gonadotrophin failure. Isolated gonadotrophin deficiency associated with anosmia is seen in Kallmann's syndrome (**16**).

15



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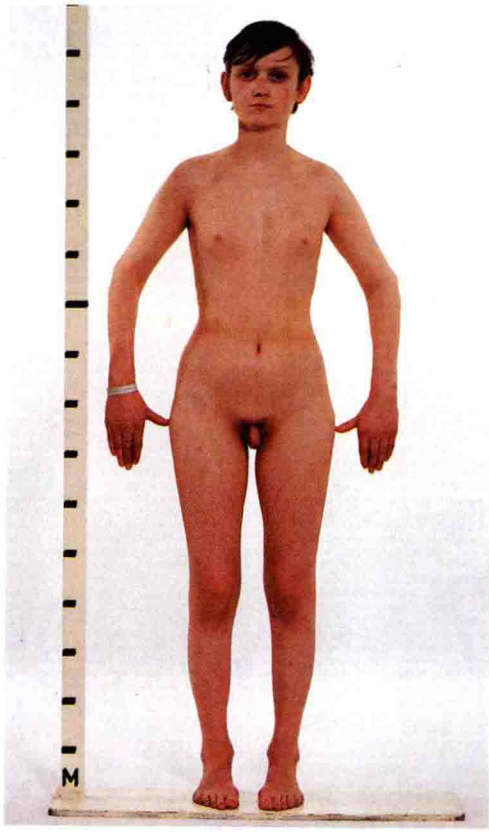
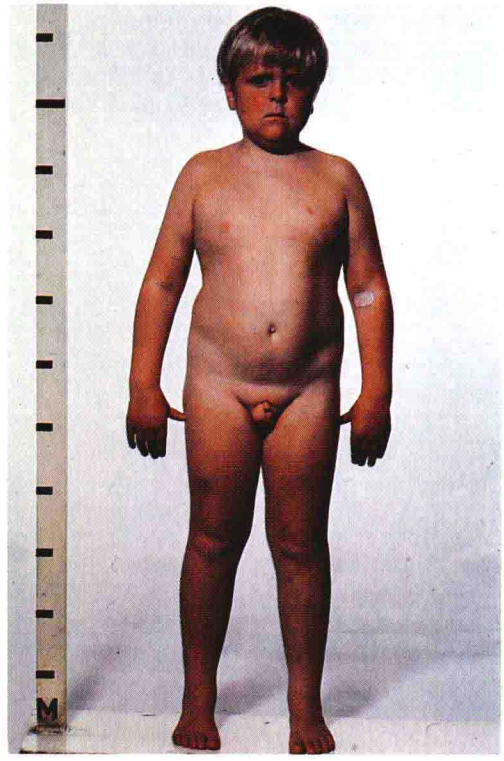


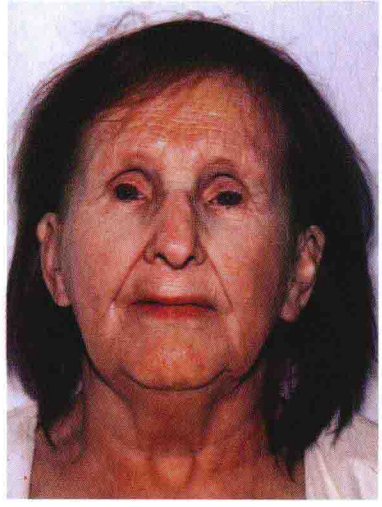
Growth hormone deficiency in children leads to dwarfism and delayed skeletal and dental development. Illustration **17** shows a 10-year-old child with a height of 1.15m (the third centile for a child of this age is 1.24m). Plumpness is common and fine wrinkling of the skin may be seen in the adult even in the absence of gonadotrophin deficiency. Growth hormone deficiency can be confirmed by the finding of low growth hormone levels which do not rise in response to hypoglycaemia (in an insulin sensitivity test) or arginine. Assessing the response to exercise or to meat extract, as has been recommended in the past, are less satisfactory alternatives for testing endogenous growth hormone secretion. Disorders of growth will be considered further in Chapter 2.

17

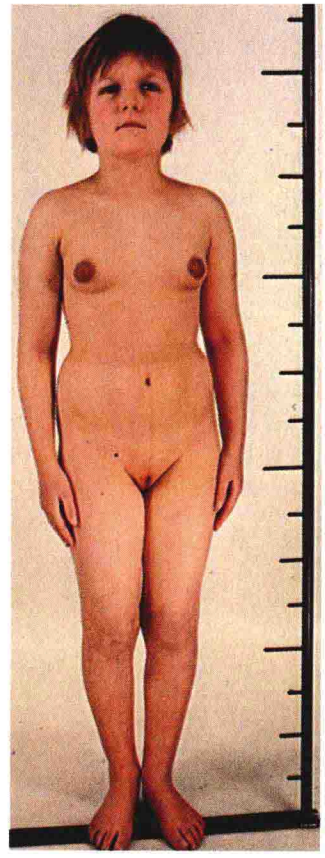


Thyrotrophin (TSH) deficiency will give rise to features similar to those seen in primary hypothyroidism. These include dryness of the skin (**18**), although the skin does not usually become so coarse as in primary thyroid failure. Thyrotrophin deficiency may contribute to growth retardation in children (**19**). It may be difficult to recognise clinically and the diagnosis is confirmed by finding low thyroid hormone levels without elevation of thyrotrophin (although minor elevation of TSH may be seen).

18



19



Corticotrophin (ACTH) deficiency is generally slow in onset leading to weakness, nausea, hypoglycaemia and collapse and coma if severe. Corticotrophin deficiency may contribute to pallor of the skin (**20**). The diagnosis is confirmed by finding low cortisol levels which do not rise adequately in response to hypoglycaemia.

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