

functional HA or anorexia nervosa, hormone replacement alone may not be sufficient to restore or maintain bone density. Patients with hypogonadotropic hypogonadism who are interested in fertility require treatment with both exogenous FSH and LH. Patients with POI can consider oocyte donation, which has a high rate of success in this population, although its use in women with Turner's syndrome is limited by significant cardiovascular risk in pregnancy.

POLYCYSTIC OVARIAN SYNDROME The diagnosis of PCOS is made in adult women using the Rotterdam criteria: irregular menses (<8 menses per year), clinical or biochemical hyperandrogenism (elevated total or free testosterone, modified Ferriman-Gallwey score >4–6 depending on ethnicity, see [Chap. 394](#)), and polycystic-appearing ovaries on ultrasound (≥ 20 antral follicles or ovarian volume $\geq 10 \text{ cm}^3$ in at least one ovary). The presence of two of the three criteria will confirm the diagnosis, resulting in different phenotypes, namely, hyperandrogenic or non-hyperandrogenic. PCOS is a diagnosis of exclusion, and other etiologies for irregular menses and hyperandrogenism should be excluded (hypothyroidism, hyperprolactinemia, adrenal sources for hyperandrogenism). Diagnosis in adolescents maybe difficult to establish, and it is recommended to wait at least 3 years after menarche before confirming the diagnosis. In adolescents, the diagnosis is based on irregular menses and hyperandrogenism criteria only, as the ultrasound criteria are not established for this age group. The prevalence of obesity is high in PCOS and significantly increases the risk of comorbidities including metabolic syndrome, type 2 diabetes, dyslipidemia, and hypertension. The failure of regular ovulation results in irregular menses and increased risk of endometrial hyperplasia and endometrial cancer (two- to sixfold increased risk). Abnormalities in GnRH pulsatility result in elevated LH and increased production of ovarian androgens. Insulin resistance associated with PCOS may also contribute to increased insulin-stimulated ovarian androgen production. An alternate source of androgens, namely 11-oxygenated androgens, has also been shown to be elevated in women with PCOS. Genome-wide association studies in diverse populations and PCOS phenotypes have identified several loci