

## CLINICAL PRESENTATION

Low testosterone levels can affect a patient's general, sexual, physical, and psychological health. In [Table 71-1](#), these symptoms are grouped according to their specific relation to androgen deficiency. Various studies have categorized and used the symptoms of androgen deficiency in different ways. For example, one clinical trial looking at the incidence of androgen deficiency defined the syndrome as the presence of 3 of 12 clinical symptoms combined with a low serum FT or TT level, whereas, in a similar trial, patients were considered to be androgen deficient if they had a low testosterone and exhibited three specific sexual symptoms. The guidelines simply state that clinicians should use the different symptoms as means to decide whether to check a patient's serum testosterone level. According to the guidelines, a patient with treatable androgen deficiency must have at least one symptom. The symptom most closely associated with androgen deficiency is decreased libido.

## DIAGNOSIS

For several reasons, the diagnosis of androgen deficiency is not straightforward. By the very simplest of definitions, it requires a low serum testosterone level in conjunction with at least one clinical symptom. Most clinical guidelines suggest measuring a TT in any adult man who has symptoms associated with androgen deficiency. In general, recognizing that laboratory standards may differ, if the TT level is greater than 350 ng/dL (12.1 nmol/L), the patient does not have androgen deficiency; if the TT is lower than 200 ng/dL (6.9 nmol/L), then a symptomatic patient is considered to have androgen deficiency. If the TT level falls between those two values, FT should be assessed, and low values (typically 5 to 9 ng/dL) indicate androgen deficiency. FT tests are not recommended initially because of their greater cost. In addition, screening of asymptomatic men for low testosterone is not medically necessary.

In men with borderline testosterone levels, repeat measurement of a morning testosterone level is warranted because there is significant day-to-day variability and testosterone levels vary on a circadian rhythm. Ideally, levels should be checked within 4 hours of waking (usually between 7 and 11 A.M.), when testosterone levels are highest. It is not necessary to fast before a testosterone laboratory test; however, in a study from 2013, there

was a 25% reduction in TT levels in healthy men 60 minutes after an oral glucose tolerance test. Strength training also transiently decreases serum testosterone levels in healthy men (but typically not outside the normal range).

Testosterone levels should not be checked during acute or subacute illness. However, physicians should have a lower threshold to check the testosterone level in patients with chronic illnesses that are known to cause a symptomatically lower testosterone concentration, such as diabetes mellitus, chronic obstructive lung disease, inflammatory arthritic disease, renal disease, human immunodeficiency virus (HIV)-related disease, obesity, metabolic syndrome, and hemochromatosis. In fact, one guideline states that all patients who have a pituitary mass, HIV-associated weight loss, or a low-trauma fracture should have their testosterone level checked regardless of symptoms.

In addition, one guideline recommends checking LH levels to rule out secondary hypogonadism in all patients, whereas another recommends that LH and prolactin should be measured only in patients with TT lower than 150 ng/dL (5.2 nmol/L). In patients with disease processes (e.g., obesity, hepatitis and hyperthyroidism) that are known to alter the level of SHBG, it may be prudent to initially check FT rather than TT.

Men being considered for testosterone replacement should have their prostate-specific antigen (PSA) level measured and a digital rectal examination (DRE) performed to assess the prostate. If either is abnormal, referral to a urologist should be considered. [Table 71-2](#) provides helpful guidelines for evaluating possible androgen deficiency.

## TREATMENT

Testosterone therapy is recommended for men with androgen deficiency, and the goal of therapy should be to maintain secondary sex characteristics and improve sexual function, sense of well-being, and bone mineral density. In addition, metabolic and cardiovascular benefits are suggested by available data. Before starting treatment, clinicians should obtain baseline hematocrit and PSA levels.

There are at least nine different types of testosterone replacement formulations. In the United States, the most commonly used forms are testosterone enanthate or cypionate by intramuscular (IM) injection, transdermal testosterone patches, testosterone gels, and implantable timed-release pellets. Because of the

**TABLE 71-1** SIGNS AND SYMPTOMS OF ANDROGEN DEFICIENCY

SPECIFIC SIGNS AND SYMPTOMS	LESS SPECIFIC SIGNS AND SYMPTOMS
Reduced sexual desire (libido) and activity	Decreased energy and self-confidence
Decreased spontaneous erections	Feeling sad, depressed mood
Breast discomfort, gynecomastia	Poor concentration and memory
Less axillary and pubic hair and less shaving	Sleep disturbance and sleepiness
Very small or shrinking testes	Mild anemia (normochromic, normocytic)
Infertility and low sperm count	Reduced muscle bulk and strength
Height loss and low bone mineral density	Increased body fat and body mass index
Hot flashes and sweats	Diminished physical or work performance

**TABLE 71-2** ANDROGEN DEFICIENCY DIAGNOSIS DO'S AND DON'TS

Do check total testosterone (TT) in every symptomatic adult male >40 yr
Do confirm borderline tests with a repeat measurement
Do check in the morning
Do have a lower threshold to check testosterone in patients with certain chronic illnesses
Do consider measuring prolactin and LH level in patients with very low testosterone
Do consider checking hematocrit and PSA levels with the testosterone level to decrease blood draws
Don't check the testosterone level during acute or subacute illness
Don't start with measurement of free testosterone in most cases (\$\$\$)
Don't monitor testosterone treatment with measurements of free testosterone (\$\$\$)
Don't consider testosterone replacement in a patient trying to father a child

LH, Luteinizing hormone; PSA, prostate-specific antigen.

