Testosterone Replacement Therapy in the Male Athlete

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Testosterone supplementation in the United States has increased substantially in the past several years. British studies have reported a doubling of the amount of prescriptions of transdermal testosterone from 2000–2010.[1] As we have made further advances in medical treatment, the average life span of the male population has increased. As men mature, the ability to produce testosterone can decrease. This leads to a condition known as hypogonadism. Due to popularity of this treatment and popular beliefs of secondary benefits, individuals are now being tested at a younger age with the hopes that treatment could lead to better athletic performance.

What is testosterone replacement therapy?

Testosterone replacement therapy is a class of focal replacement in which androgens, such as testosterone, are replaced. It is often prescribed to counter the effects of male hypogonadism. It typically involves the administration of testosterone in one form or another, including cream, gel, patch, or injection.

How do testosterone levels deplete?

Testosterone levels normally peak during adolescence and early adulthood. As one ages testosterone levels usually decline about 1 percent per year after the age of 30 or 40. As levels of testosterone decrease, it is important to determine if this decline is due to normal aging or as a condition of hypogonadism. Hypogonadism is a condition where the body is unable to produce normal amounts of testosterone due to a problem within the testicles or with the pituitary gland that controls the testicles.

What are the clinical signs of hypogonadism and low testosterone levels?

Diagnosis requires assessment of symptoms and signs suggesting low testosterone. These manifestations include low libido, erectile dysfunction, decreased muscle mass and strength, decreased bone mineral density, osteoporosis, mild anemia, gynecomastia, sleep disturbance, hair and skin alterations, decreased vitality and energy, and changes in focus and depression. Many times these symptoms are similar to other conditions that can be associated with the aging process. When considering the diagnosis of hypogonadism, excluding the side effects of medications, sleep apnea, thyroid issues, diabetes, and depression is important as these conditions will mimic those found with low testosterone. If these are ruled out, a blood test to measure the levels of testosterone is important.

What are the benefits of testosterone replacement therapy?

Testosterone replacement therapy has been shown to increase male libido. This also has been shown to help with erectile dysfunction. Therapy has also been noted to increase strength and bone density to help prevent osteoporosis. There is also evidence that treatments can aid in controlling blood sugar and this could be important in the prevention and control of diabetes. Testosterone was also shown to be beneficial to heart health with lower levels contributing to heart issues. Keeping testosterone levels appropriate may contribute to prevention of cardiovascular disease.

What are the risks of testosterone replacement therapy?

The risks of testosterone replacement therapy are based upon the age, life circumstances, and other medical conditions of the patient undergoing treatment. There is a risk for prostate cancer or potential worsening of benign prostate hypertrophy, liver toxicity, increased sleep apnea, congestive heart failure, gynecomastia, and infertility. Males considering fathering children should not be started on testosterone replacement therapy.[6]

Testosterone Replacement Therapy and the Athlete

Over the past five years, testosterone replacement therapy has been a hot topic in many sports, in particular boxing, wrestling, and mixed martial arts (MMA). It has also become popular for middle-aged men who are looking for some form of the "fountain of youth" that will allow them to participate in sports at a level they did when they were younger.

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In 1996, an article in the *New England Journal of Medicine* suggested higher than normal testosterone levels could increase muscular size and mass especially when coupled with weight training.[3] In 2003 a second study showed increases in leg muscle strength but had no effect on endurance.[4]

The recent media coverage of testosterone replacement therapy, particularly in MMA, pharmaceutical advertising, and the growing number of sports performance clinics have led to a misconception as to the benefits of athletic performance. Furthermore, there are no studies that show testosterone replacement therapy aids in healing of injuries or surgical interventions.

Nevertheless, testosterone therapy is carefully and closely monitored in professional sporting leagues, as well as the NCAA. Random drug testing looks for specific levels of testosterone in athletes

and what is expected to be an appropriate level. Levels that are higher than normal can lead to suspensions and fines. Many feel that the use of testosterone replacement therapy gives an advantage to athletes in sports such as MMA and boxing where it is not as closely regulated or monitored. It is thought that athletes benefit from increased strength, speed, and endurance. In the past year, there have been highly publicized cases where mixed martial artists have had their licenses stripped due to replacement therapy in states that do not recognize or allow testosterone replacement therapy. Recently, both the Nevada State Athletic Commission and the California State Athletic Commission have issued bans on the use of testosterone replacement therapy in competing athletes. They have both also recommended other states follow with similar bans.

Conclusion

Testosterone therapy replacement appears to be beneficial to those suffering from hypogonadism. However, it is unclear whether testosterone therapy has any benefit to males who are otherwise healthy. There is an unproven belief that these therapies will make individuals feel younger and more active, to allow them to perform better during athletic events. Many times these statements are offered by pharmaceutical advertisements and clinics where secondary financial gain is important. Nonetheless, as of September 2014, testosterone replacement therapy has been under review for appropriateness and safety by the FDA due to the "potential for adverse cardiovascular outcomes." As of early 2015, the FDA stated that neither the benefits nor the safety of testosterone have been established for low testosterone levels.[7] Anyone who is considering testosterone replacement therapy should have a complete physical by a physician and a discussion about the goals and risks of therapy.

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