

Andropause is the male equivalent of menopause. It is characterized by decreasing energy, vitality, loss of strength, and decreased sex drive. Clinically, what is normally seen is decreasing levels of testosterone, elevated levels of estrogens (estradiol and estrone), increased levels of LDL (bad cholesterol), decreased muscle mass, and accumulation of central fat or adipose tissue. Psychologically, it is common to see a higher incidence of depression and decreased decision making abilities in andropausal men. Low levels of testosterone are linked to increased incidence of heart disease, higher blood sugar level, elevated triglycerides and LDL, an increase in prostate cancers, and earlier than predicted mortality. Unfortunately, serum or saliva measuring of testosterone levels in mature men is more often than not excluded during normal physical exams.

Beginning around age 35, testosterone levels in men slowly start to decline. Unlike menopause in women that makes a rather dramatic appearance, andropause develops slowly over time and often goes undetected. Men don't recognize that declining energy, vitality, and sex drive are related to decreasing levels of testosterone, they just normally assume it is part of aging process. These levels continue to decline at various rates often determined genetically as well as by lifestyle and diet. Exercise tends to increase production of testosterone whereas unhealthy eating, alcohol, and high levels of stress tend to decrease production leading to accelerated andropausal symptoms.

Diagnosis of andropause is somewhat straightforward by measuring testosterone levels in serum or saliva and taking a good patient history. The hallmark of treatment is giving testosterone supplementation but it should be more of a multi-faceted strategy than just giving testosterone. The biochemistry in treating low testosterone levels is far more complicated than just giving testosterone supplementation.

### **Step one**

Treatment of andropause should be the identification and reduction of stressors. Under constant stress either from workplace, home life, physical or emotional insult; the body releases the neurohormone cortisol from the adrenal gland. Cortisol is actually a defense mechanism the body uses to manage stressors but releasing too much or too often causes a whole host of problems. High levels of cortisol decrease production of testosterone as well as interact with insulin to increase fat or adipose tissue deposition especially around the mid section. This adipose tissue is actually biologically active in that it houses the enzyme aromatase. These aromatase enzymes are responsible for the conversion of testosterone to estradiol. So, not only does this lead to reduced levels of testosterone production, but the testosterone that is produced is now being converted to estrogen. Increased estrogen levels lead to greater fat deposition creating a vicious cycle. It is enormously important to find ways for a guy to decrease his stress levels and lower his cortisol production. Exercise, conflict resolution, emotional healing, male bonding, meditation, good sex, are all great ways to raise endorphins, improving a male's sense of well-being and decreasing stress. Sometimes it takes job change, lifestyle change, or a change in home life to decrease the stress. Bottom line... a male needs to regain his maleness and his ability to be in charge. Step one certainly isn't easy but it is vital to the treatment of andropause. Reducing stress is key to successful andropause treatment.

## **Step Two**

Involves measuring hormone levels. Testosterone and estrogen levels should both be measured. Estrogen means both estradiol and estrone (estrone is how the body stores estrogen). This could easily be added on to LDL, triglyceride, and HDL blood work that is done routinely. As a side note, measuring thyroid function TSH, T3, T4, TPO, ferritin, hemocrit, and PSA should be done also at least for baseline levels. High estrogen levels in a guy can cause as many andropausal symptoms as low testosterone and effectively decreasing estrogen levels can be as beneficial as raising testosterone levels. Estrogen puts the brakes on effective testosterone treatment. A common scenario is initial testosterone treatment being successful but losing effectiveness over time leading to increasing the testosterone dose. This again is effective for awhile until elevated estrogen levels (caused from aromatase conversion from testosterone to estrogen) cause treatment failure. This is repeated over and over again leading to treating andropause with megadoses of testosterone with lack of effectiveness and development of female sex characteristics such as enlarged breasts and lack of maleness - certainly not the ideal treatment strategy.

## **Step Three... Begin treatment**

Make sure that adrenal glands are getting nutritional support. I like future formulations by Dr Wilson. My personal favorites are Adrenal Rebuilder and Adrenal Stress Vitamins. You may purchase at our website online store. I also recommend Fish Oil capsules 1-2 gm per day to lower inflammation levels, anti-oxidants such as N-acetylcysteine, Vit E, and beta carotene, and zinc or any good prostate health vitamin. I can't stress enough the importance of having baseline testosterone and estrogen levels prior to treatment. If estrogen levels are elevated, I would begin testosterone treatment very cautiously. I would also consider finding ways to decrease estrogen levels (DIM or any estrogen clearing vitamin that contains DIM) or crysin. I would also consider aromatase inhibitors. Some physicians recommend low dose of femara or arimidex (1/2 tab/week) or some natural aromatase inhibitors (shittake mushrooms, etc)

There are a number of dosage forms for testosterone administration: injectable, topical creams and gels, pellets, and sublingual drops or troches. Injectable testosterone appears to be the most popular. Injections are usually done every 2 weeks. Results seem to be rapid and dramatic but the issue I have is that the doses seem to be supraphysiologic (too high) and I question where this excess testosterone is going. Is it being stored as estrone? Hence the importance of monitoring both testosterone and estrogen levels. Also, the testosterone seems to be rapidly cleared and the patient needs the injection every 2 weeks, so you see kind of a roller coaster ride with testosterone levels rising and falling very rapidly.

Topical creams or gels are another way to deliver testosterone. Commercially available testosterone (androgel or testim) is usually dosed 50-100 mg/day. Testosterone levels increase on this dose but there is no mention of estrogen level changes in the package

insert. Most experts believe that a male in his prime makes 5-10 mg testosterone /day. So why are we giving 50-100 mg? This is being applied topically, so it does not get metabolized by the stomach or liver so why do we need 10X the normal dosage? I would suggest giving a 5-10 mg topical dose and monitoring estrogen and testosterone levels and adjusting upwards/downwards based on results. This seems like a safer approach. The advantage of using creams is the ease in adjusting dose. I know some guys don't like to apply or forget to apply their testosterone cream every morning or 2 times daily, but on the bright side - it is pain free application.

A third method to deliver testosterone is via a pellet. Pellets are small cylinders about the size of a grain of rice that inserted with a device called a trochar into the subcutaneous fat under local anesthesia. Ok that was a mouthful, the long and short of it... lidocaine injection, small incision, insert trochar, shoot in about 8-10 pellets, apply pressure for 5 minutes, apply butterfly bandaid and you are good to go. Bottom line... a relatively quick and painless procedure that needs to be repeated every 5-6 months. Pellets have certain advantages: no cream to apply daily, no 2 week injections, very simple treatment strategy. The pharmacokinetic properties of pellets are pretty interesting (well not really, but let me bore you with them anyway). Each 75 mg pellet delivers approximately 0.5 mg/day, so 10 pellets should deliver about 5 mg/day which is right in line with normal physiology. NO TESTERONE OVERDOSE. They also appear to follow the normal diurnal variation that men normally have. In other words, you tend to get an early morning rise in testosterone consistent with normal physiology. Very cool. It is nice to get that soldier standing at attention when you wake up in the morning. It is a good sign that things are coming back in balance. If you're interested in pellets, I would recommend visiting [testopel.com](http://testopel.com) for more information. Testopel is the only FDA approved pellet on the market. Again, remember the importance of monitoring estrogen, testosterone, PSA. Initially, I would recommend monitoring at 3 months, and then every 6 months if everything appears in normal range. As a side note I would look at the ratio of testosterone to estrogen (the goal is to increase this ratio) If there are no ratio standards from the labs, I would make sure that the testosterone level is in the top 25% quartile and the estrogen (estradiol) is in the low range of normal. I would also make sure that there is no increase in estrone levels (estrogen storage)

The final method of delivering testosterone effectively is via the sublingual route. Testosterone orally at present is not effect because it is rapidly degraded when swallowed. Sublingual testosterone (either drops or troches) in dissolved under the tongue and directly enters the bloodstream similar to nitroglycerin tablets. The normal dosage is 5 mg given 4 times daily. The total 20 mg/day dose is higher because some of the testosterone is swallowed or not effectively absorbed. With this route, you get rapid absorption of testosterone but a rather short acting effect - hence the 4 times per day dosing. Testosterone is a hormone and therefore a somewhat bitter tasting substance which can be a drawback. There are, however, a fair amount of men that prefer this route of delivery.

#### **Step Four**

As we have discussed, step four involves monitoring; measuring estrogen and testosterone levels, paying attention to estrogen accumulation (enlarged breasts, fat deposition around the midsection), as well looking for the positive signs of increasing testosterone levels. Increased muscle mass, increased hair on legs, increased energy and vitality, improved mental alertness and decision making ability, improved sex drive and decreased fat levels are all positive effects when testosterone levels are returned to normal

In summary, low testosterone levels are linked to increased incidence of depression, higher LDL, heart disease, and mortality. By returning testosterone levels to normal while maintaining estrogen levels at the low range of normal, it is possible to improve a male's health as well as his quality of life.