

LE Magazine April 2004

REPORT

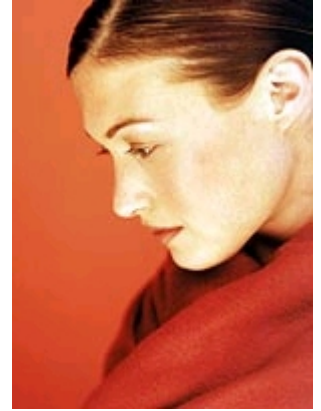
Why Aging Women Need Testosterone

By Edward R. Rosick, DO, MPH, MS

Numerous studies show that maintaining youthful testosterone levels in males confers powerful anti-aging effects. Testosterone-deficient men develop abdominal obesity (pot bellies) and diminished muscle mass, along with a loss of sexual interest and performance ability. Low testosterone is also associated with heart attack, Alzheimer's disease, osteoporosis, and depression.

While doctors are slowly recognizing the benefits of testosterone therapy for aging men, evidence that women also become testosterone deficient is largely ignored. Controlled studies show that slightly increasing testosterone levels in aging women restores sexual drive, arousal, and frequency of sexual fantasies. In fact, low testosterone levels in women of all ages seem to suppress libido and cause sexual dysfunction. Restoring youthful testosterone in women has been shown to improve mood and well being, and to provide many other health-enhancing benefits.

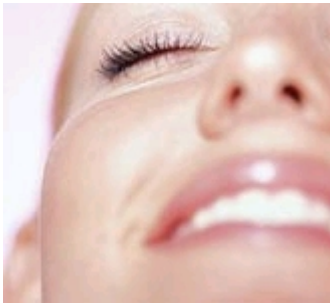
While expensive testosterone drug patches for women are available by prescription, safe and inexpensive natural approaches also can increase testosterone levels in women.



Testosterone in Men and Women

While it is well known that a surge in testosterone production in the testes of boys brings about the changes that lead to manhood, it is not well known that women also produce testosterone (albeit at about one-tenth the level as men) in their ovaries and adrenal glands. As in men, levels of testosterone peak in women in their twenties and decline thereafter. Like men, women not only experience a decline in testosterone production, but also in hormones such as dehydroepiandrosterone (DHEA), which falls dramatically for women after menopause.

Although doctors have known that women produce testosterone, most mainstream physicians have believed that hormones like testosterone are not important for women. Only levels of the "female" hormones progesterone and estrogen were thought to have any significant bearing on a woman's health and well being. Over the last decade, however, more and more evidence has been brought forth suggesting that testosterone is a very important hormone for women, especially in terms of staying fit, lean, and sexually active.



One of the most widely disseminated studies showing testosterone's importance in maintaining a woman's general well being and sexual functioning was published in 2000 in the *New England Journal of Medicine*.¹

This randomized, double-blind, placebo-controlled study examined the effects of transdermal testosterone patches on 75 women aged 31 to 56 years who had undergone a hysterectomy and bilateral oophorectomy (removal of both ovaries). Hysterectomies, with or without an oophorectomy, significantly decrease circulating levels of testosterone. Over three consecutive 12-week periods, the women were given placebo, 150-mcg testosterone patches, or 300-mcg testosterone patches. The un-equivocal result was that women who received 300-mcg patches

showed significant improvement in sexual function, mood, and general well being.

Benefits for Women's Sexuality

Although most mainstream physicians now believe that testosterone replacement in women who have had hysterectomies and/or oophorectomies can enhance their mood and well being, most still scoff at the idea that testosterone replacement is of any use to women who still have their uterus and ovaries intact.

Fortunately for women all over the world, Dr. Susan Davis is one of those rare researchers who are examining the ways in which testosterone supplementation can benefit women, whether or not they have had the aforementioned surgeries. At the Jean Hailes Foundation, a not-for-profit organization in Australia dedicated to women's health issues, Dr. Davis and her colleagues have been studying testosterone's importance in women's overall health. In a 1999 article in the journal *Clinical Endocrinology and Metabolism*, Dr. Davis offered a detailed report on testosterone replacement therapy in both pre- and postmenopausal women.² In women who are post-menopausal or have had oophorectomies, judicious testosterone therapy has produced a direct and sustained improvement in sexual drive, arousal, and frequency of sexual fantasies. Dr. Davis acknowledged that treating women in their twenties and thirties with testosterone for low libido is controversial, but also stated that its use should not be discounted. According to Dr. Davis, testosterone supplementation can significantly benefit young and otherwise healthy women with low levels of testosterone who suffer from low libidos and sexual dysfunction.



In a more recent article published in 2001, Dr. Davis wrote that testosterone appears to be quite important in maintaining a woman's energy level and sense of well being, regardless of her age.³ Low testosterone levels in pre- and postmenopausal women can diminish motivation, induce fatigue, and contribute to low libido. Even women in their twenties who are taking birth control pills may suffer from low testosterone and its effects, as oral contraceptives are known to lower testosterone levels. While studies show that testosterone supplementation in postmenopausal women who have not undergone hysterectomies and/or oophorectomies can significantly improve sexual drive, arousal, and frequency of sexual fantasies, no such studies have been conducted on pre-menopausal women.⁴ Dr. Davis states, however, that "it is the clinical experience of the author [Dr. Davis] that a subset of pre-menopausal women with sexual dysfunction and reduced circulating androgen [testosterone] levels significantly benefits from judicious parenteral testosterone replacement."



Effects on Strength and Fitness

Besides its psychological and sexual effects, adequate levels of testosterone play an important role in helping women maintain a healthy body composition.

While it is known that women begin to gain body fat 10 years before they experience menopause, and that many women gain weight when taking birth control pills, doctors often overlook the role that testosterone can play in helping to ameliorate this weight gain. This is likely because most doctors are uninformed about the use of testosterone replacement therapy in women. In addition, some early studies, now viewed as flawed, linked elevated testosterone levels in women with abdominal obesity (the patients involved had multiple hormonal imbalances that certainly contributed to their obesity). More recent scientific studies, such as one reported in the *Journal of Clinical Endocrinology and Metabolism*, have shown that obese women given low doses of synthetic analogues of testosterone (nandrolone) lost more body fat and subcutaneous abdominal fat, and

gained more muscle mass, than women given a placebo.⁵ The study participants followed a low-calorie diet but did not change their exercise habits; after nine months, those women taking nandrolone had lost twice the body fat and gained six pounds of lean muscle mass compared to women in the placebo group.

Deficiencies May Lead to Heart Disease

Besides helping women maintain lean muscle mass and an enjoyable sex life well into their forties, fifties, and sixties, new evidence points to additional positive effects of testosterone on a woman's health as she ages.

An intriguing report in the *Journal of Women's Health* examined the hypothesis that testosterone deficiency is a key predictive factor for heart disease in aging women or women who have had hysterectomies.⁶ Cardiovascular disease is the leading cause of death in postmenopausal women. Women who have hysterectomies are three times more likely to develop cardiovascular disease compared to women who have not had one. Women who have hysterectomies generally receive estrogen replacement therapy but not testosterone replacement. The study author postulates that this treatment discrepancy is why the incidence of heart disease rises dramatically in these women, and concludes that "the data we have demonstrating cardioprotective effects of testosterone, together with what we know about the loss of testosterone production in both instances of oophorectomy with hysterectomy and in women whose remaining ovarian function has been compromised by hysterectomy, point to testosterone deficiency as a significant factor to the reported increased incidence of cardiovascular risk factors [in women]."



Does Testosterone Inhibit Breast Cancer?

The words “breast cancer” can produce an involuntary shudder in most women, and for good reason: breast cancer is the most common cancer in women, and despite billions of dollars spent on research and treatment since the 1970s, it has been steadily increasing in incidence. It is estimated that in 2004, approximately 300,000 American women will be diagnosed with breast cancer and approximately 46,000 will die from the disease.

Many researchers believe that high estrogen levels are a major risk factor for developing breast cancer, and some have postulated that high testosterone levels in women also may pose an increased risk for breast cancer.⁷ On the other hand, other researchers believe the association between high testosterone levels and breast cancer in some limited studies may reflect that testosterone and estrogen levels are highly correlated in women, as testosterone can be a precursor for estrogen synthesis. Multiple studies now show that testosterone may help guard women against breast cancer. A study in 2000 looked at the effects of testosterone and tamoxifen (a widely used chemotherapeutic agent for breast cancer) on breast cell stimulation.⁸ The study showed that breast cells exposed to estrogen showed cancer-like rapid growth, but showed significantly less growth when also exposed to testosterone. A more recent study published in 2003

also showed that testosterone significantly inhibits breast cell growth, leading the authors to conclude that “.androgens [testosterone] may protect against breast cancer, by analogy with P4 [progesterone] effects upon the uterus.”⁹

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Ways to Increase Testosterone Naturally

Many women are still leery of hormonal supplements such as testosterone. Others do not have the luxury of having a physician who is well versed in integrative therapies. Most mainstream physicians still cling to the idea that testosterone is a man's hormone and supplementing with it has no place in women's health, even with the abundance of scientific evidence showing otherwise. The good news is that there are some proven, natural ways a woman can safely increase her testosterone levels to maintain optimal health into her forties, fifties, sixties, and beyond.

Multiple studies have shown that resistance exercise can increase men's testosterone levels. Some lesser-known but equally impressive studies show that exercise likewise can increase women's testosterone levels, whether they are 20 or 60 years old. A study in 2001 examined the acute effects of resistance exercise in 47 women aged 19 to 25.¹⁰ After just six sets of repetitive motion squat exercises, significant increases were noted in both free and total testosterone levels. A study in 2002 examined the effects of endurance and resistance exercise on hormonal levels, including testosterone, in women 19-69 years of age.¹¹ As in the previous study, testosterone levels increased significantly in women who did either endurance or resistance exercises, regardless of their age. Another study conducted in 2003, which examined the hormonal effects of high-impact physical exercise in 25 early postmenopausal women aged 53-59, showed a significant and acute rise in testosterone levels following exercise.¹²

Like testosterone, DHEA is a hormone that has long been recognized by holistic practitioners as essential for optimal health in women and men. DHEA is secreted into the bloodstream by the adrenals in humans and other primates, and then converted into DHEA sulfate (DHEA-S). Since DHEA's discovery, hundreds of scientific articles have been published on its wide-ranging effects.

DHEA is a precursor to testosterone and estrogen. As with testosterone, DHEA levels peak in women in their twenties and then slowly but steadily decline, dropping by about 10% every decade of life. Some intriguing early studies have correlated the decline in DHEA production with many of the degenerative changes seen in aging in women and men, such as heart disease, cancer, and osteoporosis.¹³

While it is considered physiologically "normal" for DHEA to decline during aging, under certain conditions DHEA levels plummet early in life. Addison's disease, or primary adrenal failure, occurs in about 1 in every 25,000 people. Without functioning adrenal glands, the body cannot produce many important steroid hormones, including DHEA. Standard treatment for this condition has been to replace the missing hormones. Until very recently, however, most mainstream physicians did not replace DHEA. Furthermore, patients with Addison's disease, even those who received standard hormone replacement therapy, consistently report a reduced quality of life with symptoms such as persistent fatigue and depression.



A recent study looked at the effects of DHEA supplementation in patients with Addison's disease.¹³ In this randomized, double-blind trial, 39 patients (24 women and 15 men, aged 25-69) were given either 50 mg of DHEA daily for 12 weeks, followed by a four-week washout period, then 12 weeks of placebo, or vice versa. After DHEA supplementation, blood levels of DHEA rose from subnormal (as would be expected in Addison's disease) to the normal range for young adults. More important, both the women and men taking DHEA showed significant positive psychological changes, including enhancements in self-esteem and mood and a decrease in fatigue.

Besides Addison's disease, other conditions cause a significant decrease in DHEA levels. Adrenal insufficiency is a condition in which the adrenal glands secrete some hormones, but not at normal levels. In a double-blind study of 24 women with adrenal insufficiency, DHEA supplementation (50 mg daily for four months) raised DHEA-S levels to normal.¹⁴ It also increased the women's sense of well being and frequency of sexual thoughts and interest, as well as decreased depression and anxiety.



DHEA Delays Aging's Physical Effects

Because DHEA is at high levels in young adults and then declines precipitously thereafter, there has been great interest in using DHEA as an anti-aging hormone. One of the most widely touted studies that examine DHEA supplementation to counteract the effects of aging was done by researchers at the University of California School of Medicine.¹⁵ This randomized, double-blind, placebo-controlled trial followed 17 women and 13 men, aged 40-70 years, over a six-month period. For three months, they were given 50 mg per day of DHEA, then three months of placebo at bedtime in random order. Within two weeks of starting DHEA, the patients had attained DHEA blood levels of young adults. After three months on DHEA, 82% of the women and 67% of the men reported an increased sense of well being, which included improved quality of sleep, less anxiety, increased energy, and improved ability to handle stress.

DHEA and Optimizing Testosterone

Because DHEA is a precursor hormone for testosterone, it makes sense to think that DHEA supplementation could safely and effectively raise testosterone to optimal levels in women of all ages. A 1998 study examined the effects of short-term treatment of 100 mg per day of DHEA on postmenopausal women aged 52-56.¹⁶ This study showed that after only seven days of supplementation, testosterone levels were significantly increased. Another study, this one a randomized, placebo-controlled trial on

60 perimenopausal women aged 45-55, also examined the effects of DHEA supplementation (50 mg per day) on testosterone and other hormone levels over a three-month period.¹⁷ Again, women who took DHEA supplements had significantly higher testosterone levels than women who were in the placebo group. Finally, a study was done that examined the hormonal effects of DHEA (50 mg per day) on 31 women, aged 50-65 years, over a six-month period.¹⁸ Like the previously cited studies, women who took DHEA had higher levels of testosterone as well as other "beneficial" hormones such as growth hormone, which led the authors of the study to conclude that "DHEA is more than a simple diet supplement or anti-aging product; rather, it should be considered an effective hormonal replacement treatment."

DHEA and Sexual Function

In both pre- and postmenopausal women, DHEA supplementation has been shown in multiple studies to have a positive effect on sexual functioning. A randomized, double-blind, placebo-controlled study published in 1999 examined the effects of 50 mg per day of DHEA in 280 women and men aged 60-79 years.¹⁹ When compared to women taking placebo, the women taking DHEA reported statistically significant improvements in libido, sexual activity, and overall sexual satisfaction. A more recent study published in 2002 in the *Journal of Sex and Marital Therapy* examined the effects of 50 mg per day of DHEA on 111 pre-menopausal women aged 35-55 years over a period of two to six months.²⁰ As in previous studies, in this study women taking DHEA supplements reported significant improvements in sexual function in terms of desire, arousal, lubrication, satisfaction, and orgasm.



Slowly and begrudgingly, mainstream medicine is beginning to realize that those who believe in the power of integrative medicine may be on to something very important. As more studies show that supplements like DHEA and hormones such as testosterone can help women maintain their zest for life (and for sex) throughout their lives, it is only a matter of time until all women, whether or not they have a physician who is well versed in integrative medicine, will be able to receive the medical care and guidance they deserve to live long and healthy lives.

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