

Are You Losing Your Balls!?! New Study Shows Testosterone Levels Declining

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Everyone whose parents or grandparents are still living hears comparisons between the hardships of today's generation versus those of our ancestors. Listening to the tales of old men, we're led to believe that schools were strategically placed so students couldn't approach or depart without having to walk uphill for miles; work hours were much longer, necessitating that employees engage in nonstop labor for days without lunch breaks and sleep; and real men chopped wood or broke stones so efficiently that they made Paul Bunyan and Casey Jones look like sissies.

It's easy to laugh after these discussions, confident in the knowledge that we have advantages over our old folks in the form of superior nutrition, advanced training facilities and rapid-fire information from the World Wide Web. Surely that old saying, "when men were men" is wishful thinking on behalf of the legions of toothless and tattooed veterans who are less impressed with a 400-pound bench press than a denture adhesive that will suspend a bowling ball in the air.

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The Male Experience

Yet, the question lingers in the subconscious like an Oedipal challenge— are we less manly than our fathers or grandfathers? Casting aside cultural and societal differences, the most basic, biological comparison of "manliness" might logically be rooted in testosterone. That familiar steroid is the male sex hormone, held responsible for wars, mating, strength and facial hair— all primary ingredients in the male experience. So, it might be reasonable to rank the generations according to measured testosterone concentrations. This objective measure would end, once and for all, the mocking comparisons between walking three miles in a blizzard and the grueling commutes that can last well over an hour in some cities.

Fortunately, such a study has been published and with all the anticipation of the Academy Awards, it's time to open the envelope and see what generation can boast about having the biggest brass balls.

In the *Journal of Clinical Endocrinology and Metabolism*, an excellent paper has been e-published ahead of print, written by members of the New England Research Institute.¹ Lead author Thomas Travison, PhD, and others have analyzed data available from the Massachusetts Male Aging Study to evaluate changes in serum (blood) testosterone concentrations over time. This study looked at men aged 45-79 during three different time periods (T1: 1987-1989; T2: 1995-1997; and T3: 2002-2004) and compared serum testosterone concentrations. Both total and bioavailable (free) testosterone data were analyzed, and the results were compared across groups (by birth year) and by person over time. This allowed the investigators to look at the differences in testosterone concentration among the various groups at the same time (called a cross-sectional analysis) and differences in an individual's testosterone concentration over the three time points (called a longitudinal analysis). In addition, most interestingly for the generational comparison, the testosterone concentrations for individuals of the same age at the three time points were compared, so a 65-year-old at T1 could be compared to a 65-year-old at T2 (called an age-matched analysis).

Three sets of results were obtained for both total testosterone and bioavailable testosterone—cross-sectional, longitudinal and age-matched. The general pattern was the same for both total testosterone and bioavailable testosterone, so for the sake of clarity, this discussion will just refer to total testosterone results.

Bad News for All of Us

The cross-sectional results looked at all the subjects during the same time period. The data was grouped by the year the blood sample was taken and the comparisons were made by age for all the subjects for that time period. Thus, the 1987-1989 results of all subjects were compared, then the 1995-1997 results, and finally, the 2002-2004 time period. This allowed the scientists to look at the changes in testosterone concentrations due to age (how old the subject was at the time). In all three time periods, a clear decline in testosterone concentrations was present as the age of the subjects increased.¹ In other words, the testosterone concentration of 45-year-old men was greater than 55-year-old men, which was greater than 65-year-old men, and so on.

The cross-sectional decline in testosterone concentration was 0.4 percent per year of age, which means that if two groups of men of different ages have their blood drawn at the same time, the older men's testosterone concentrations will be lower by a factor of 0.4 percent times the age difference.¹

The article demonstrated this point by discussing two groups in the 1987 group. The older men had a median age of 65 and their average testosterone concentration was 5.5 percent lower than another group of men whose median age in 1987 was 56. Thus, at any given point in time, older men generally have lower testosterone concentrations than younger men—sounds good so far for Generation X.

The next set of analyses looked at changes in the same subject over time, (longitudinal analysis). If today's 45-year-old has more testosterone than today's 65-year-old, then it stands to reason that today's 45-year-old will have less testosterone in 20 years when he's 65. In fact, this is true and is the recognized, aging-related decline in testosterone concentration, sometimes called andropause.² The article demonstrated the absolute decrease in testosterone concentration over time by discussing the representative values of one group between T1 (1987-1989) and T2 (1995-1997). The average time span between blood draws was 8.8 years and during this time, the group's testosterone dropped an average of 16.1 percent. This equates to a longitudinal decline of 1.6 percent per year.¹ So, for all healthy men, testosterone concentrations drop rapidly between our mid-50s to mid-60s—bad news for all of us.

So far, we've learned that younger men have more testosterone than older men, but we will all eventually become old men with low testosterone if we live long enough. As interesting as that is, it doesn't directly answer the burning question of which generation could be considered the manliest?

What's Causing Test Decline?

The final set of analyses is the most relevant and interesting. In this set, the researchers compared groups of men at the same age over different times (age-matched decline). In other words, the 65-year-olds of 1987 were compared to the 65-year-olds of 1995. Between these two representative groups, testosterone concentrations fell 11.2 percent from 1987 to 1995. This means that for every year younger a person is, his testosterone concentration is 1.2 percent less for every year's difference when compared to his elder's.¹ If that trend isn't corrected, by the turn of next century, America may be populated by men who resemble the anatomically correct Michael Jackson doll more closely than the GI Joe Cobra Commander. The final tally in the generational challenge (surely laden with Freudian overtures) is that our fathers and grandfathers were indeed manlier than us. The only good news from this study is that our position in the androgenic pecking order is firmly established over our sons and the kids who will date our daughters.

Having settled that, Tom Brokaw got it right when he called the World War II vets "The Greatest Generation." It's time to look more closely at the data and see what exactly these statistics describe, and what it might mean for us as individuals and as members of the American culture.

The rate of longitudinal decline (decrease in testosterone concentration in an individual over time) was 1.6 percent, whereas the cross-sectional difference between the two groups (younger men having higher testosterone concentrations than their elders in blood drawn at the same time) was 0.4 percent.¹ This means that something associated with the way younger generations are aging is causing testosterone concentrations to decline at a rate four times faster than expected! Even more staggering is the revelation that the age-matched difference is three times as potent as the cross-sectional difference, meaning that something undefined is dropping male testosterone concentrations with an effect three times greater than aging.

Again, these results are representative of results seen in all groups studied— it's not the result of exaggeration. Consider the magnitude of this difference. The hormonal change experienced in men today from 45 to 54 is the same as the difference between men aged 45 to 81 just 10 years ago. The health impact of low testosterone is only recently being realized due to a systemic bias against research relating to the possible benefits of testosterone. Low testosterone is strongly associated with depression, cardiovascular disease, muscle and bone loss, erectile dysfunction and many other disorders, including early death.²⁻⁷

The researchers wisely looked at identified causes of low testosterone to see if excluding these factors could correct the dramatic age-matched decline.¹ Many factors were analyzed, including: chronic illness, general health, medications, smoking, BMI (body mass index), employment and marital status. Of these, only increased obesity, increased polypharmacy (using multiple prescription drugs) and decreased smoking affected the results.⁸⁻¹¹ Dramatically, these three factors (obesity, prescription drugs and smoking cessation) substantially affected the cross-sectional and longitudinal declines; the age-matched decline only demonstrated a slight correction. After correction, the degree of difference between the cross-sectional and age-matched declines was even more remarkable. The age-matched decline (the reduction in testosterone concentration seen between men who were 65 in 1987 compared to men who were 65 in 1995) was 10 times greater than the cross-sectional difference. The longitudinal decline (the reduction in testosterone concentration experienced by an individual over the course of time) was 11 times the projected rate!¹

To assure these results weren't artificial or due to an incorrect sample group, possible problems with the study design were ruled out. The investigators considered that some environmental exposure might affect testosterone concentrations, such as Agent Orange in Vietnam veterans. If this is present in younger generations, it would reduce the cross-sectional difference, since the younger men would be hormonally handicapped by the toxin(s). If a toxin is present in older generations, it would exaggerate the cross-sectional difference, as they would appear to be aging more rapidly hormonally. No such toxin was identified in the study.¹

So, even after making every reasonable attempt to account for the measured declines, no explanation could be determined to account for the age-matched decline in testosterone concentration. In fact, the authors noted it's possible that the calculated longitudinal and age-matched declines are low estimates due to survivor bias (meaning that the frail and sick died before reaching the second and third time periods, which would have included more low testosterone values in the later groups).¹

Losing Your Balls?

In fact, a frightening conclusion was reached by the authors. The results indicated that one or several unidentified causes are present and evolving, which resulted in this unanticipated age-matched decline in the American male population.¹ They project that if the trend is real and continues, the prevalence of hypogonadism (and its attendant health consequences) will grow in excess of forecast. Considering the impact of this information on individuals and society, it makes the guidelines of the Endocrine Society even less practical in that they recommend against screening for low testosterone in men.¹² Failing to provide for the diagnosis and optimal treatment of hypogonadism reflects an underlying bias in medicine and public policy. This condition may be a significant factor in the morbidity and mortality of American men, yet it's being purposefully neglected. If doctors and politicians forbade the diagnosis and treatment of menopause, the uproar and political backlash would be extremely formidable. Yet, American men have meekly rolled over and allowed policies out of their favor to exist without voicing a single argument.

Perhaps the men of America are losing their balls and allowing this to happen. It's time for a re-evaluation of public policy. The current political environment is oppressive in regard to testosterone or quality-of-life treatment for men. It's time for men to take action. In his 1951 poem, "Do Not Go Gentle Into That Good Night," Welsh poet Dylan Thomas penned: Do not go gentle into that good night,/ Old age should burn and rave at close of day;/ Rage, rage against the dying of the light.¹³

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