

the **CrossFit** JOURNAL ARTICLES

Sex, Appearance, and Training

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To quote a famous fitness author, “Women are not a special population. They are half of the population.” But they respond to heavy physical stress differently than the other half of the population. Despite this fact, women get the best results when they train for performance, because even though there are differences between men’s and women’s response to training, there is no difference in the quality of the exercise needed to produce the stress that causes adaptation. In other words, silly bullshit in the gym is silly bullshit, for both sexes.

The women’s “fitness” industry has been around a long time. “Figure salons” were common in the 1960s, and my first job in the industry in 1977 was at a club

that alternated hours for men and women. We had separate staff, with the women’s shift working Monday, Wednesday, and Friday and the men’s staff basically working Tuesday, Thursday, and Saturday, which pretty much precluded any 3-on/1-off training. But the women didn’t train anyway. They exercised, toned, firmed, and sculpted. They were required by the club to train in tights (which the club sold), and sweating was strongly discouraged because exercising this hard was 1) apt to build bulky muscles, 2) caused the exerciser to make too much noise and that, combined with the sweat, might 3) intimidate the other ladies.

At the time the men’s “program” wasn’t much better, but training hard was a matter of pride in the Nautilus

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room and our members suffered from no lack of effort or exertion; rather they were the victims of our staff's inexperience and ignorance of exercise science. The women's program suffered from an entirely different problem: the perception that women were absolutely, inherently, and permanently different from men, to the extent that any program of physical exercise had to be different from men's programs, right down to the molecular level. Both suffered from an emphasis on appearance (typically "masculine" or conventionally "feminine") rather than performance.

Men and women do in fact respond differently to training, but not in the ways that the industry, the media, and popular culture have presented as fact. Furthermore, and quite importantly, both the real, actual differences and the ridiculous, supposed differences between men and women have created a lot of the aforementioned silly bullshit in the gym, the net effect of which has had a particularly detrimental effect on women's training.

Women's collegiate and professional athletics and its participants have for many years held the answers to the questions most women ask about exercise, answers that have gone fastidiously ignored by the figure salon industry. The results, in terms of both performance and aesthetics, admired by the vast majority of women had been and continue to be routinely produced by advanced athletics programs, yet "body sculpting" sessions—low-intensity machine-based circuit training classes, the 1980s equivalent of most modern Pilates and yoga classes—were the approach sold to the public. Now, as then, "easier" is easier to sell.

The fact is that aesthetics are best obtained from training for performance. In both architecture and human beauty, form follows function. Always and everywhere, the human body has a certain appearance when it performs at a high level, and depending on the nature of that high-level performance, this appearance is usually regarded as aesthetically pleasing, for reasons that are DNA-level deep. The training through which high-level performance is obtained is the only reliable way to obtain these aesthetics, and the only exceptions to this method of obtaining them are the occasional genetically-gifted freaks—people who look like they train when they were just born lucky. As a general rule,

if you want to look like a lean athlete—the standard that most active people strive to emulate—you have to train like an athlete, and most people lack the "sand" for that.

Despite this unfortunate truth (most truths seems to fall into this category), the fitness industry continues to sell aesthetics first, as though it is independent of performance. The focus is always on appearance, as though that can actually be trained for. Think about it: how many leg extensions do you do, and with what weight, to make your quads just look better? I know how to make your squat stronger, but how do you program Bun Blaster sets and reps for a tight ass? Exactly how does one go about obtaining a great glute/ham tie-in? I may be able to double your pull-ups in a month, but I don't know how to give your back that V-shape everyone craves without increasing your pull-ups. Every single aspect of programming for resistance training that works at all does so because it increases some aspect of performance, and appearance is a side-effect of performance. Appearance can't change unless performance does, and the performance changes are what we quantify and what we program. We pretty much know how to improve that, but the industry is based on the fiction that appropriate training proceeds from an assessment of aesthetics. Your appearance when fit is almost entirely a function of your genetics, which are expressed at their best only when your training is at its highest level, and this level is only obtainable from a program based on an improvement in your performance in the gym. And the best improvements in the gym occur when participating in a program that looks more like performance athletics—the kind of training done by competitive athletes—than one that looks like waving your arms and legs around on a machine or slowly rolling around on the floor.

With that in mind, and counter to the conventional industry wisdom, here are some more unfortunate truths:

- Your muscles cannot get "longer" without some rather radical orthopedic surgery.
- Muscles don't get leaner—you do.
- There is no such thing as "firming and toning." There is only stronger and weaker.

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- The vast majority of women cannot get large, masculine muscles from barbell training. If it were that easy, I would have them.
- Women who do look like men have taken some rather drastic steps in that direction that have little to do with their exercise program.
- Women who claim to be afraid to train hard because they “always bulk up too much” are often already pretty bulky, or “skinny fat” (thin but weak and deconditioned) and have found another excuse to continue life sitting on their butts.
- Only people willing to work to the point of discomfort on a regular basis using effective means to produce that discomfort will actually look like they have been other-than-comfortable most of the time.
- You can thank the muscle magazines for these persistent misconceptions, along with the natural tendency of all normal humans to seek reasons to avoid hard physical exertion.

You already know all this, or you wouldn't be reading at this rarified level. All enlightened physical culturists of the twenty-first century know that women and men train basically the same for performance improvement and the resultant physiques. But significant differences do exist between men and women in terms of performance and real strength and conditioning training for that performance. This is why men and women do not compete against each other in varsity and professional sports. These differences must be understood and appreciated if training programs for women are to be realistic and effective.

It is ironic that the most pervasive fear voiced about barbell training by women in the general public is the very thing which is prevented from happening by the primary factor distinguishing men's and women's performance abilities. Women don't get big muscles because they don't have the hormones to build them, and differences in hormone profile between men and women are the primary reason that male and female performances are different.

There are several aspects of female performance that are different from those of men, all of which depend on neuromuscular efficiency, and all of which are a direct

result of lower testosterone levels and the effects that testosterone has on motor unit recruitment, central nervous system excitation, and other neuromuscular factors. These endocrine/neuromuscular effects, more than any social factors resulting from differences in upbringing, account for the differences in male/female performance; social factors can be overcome, physiology cannot.

For instance, women can perform a 5-rep max lift (5RM) with a higher percentage of their 1RM than men, because they cannot as efficiently demonstrate absolute strength at the level of 1RM intensity. I have observed this in the gym repeatedly over decades of working with motivated female athletes. A max single, carefully titrated up to failure with small incremental increases for an accurate and precise measure of where that max actually was, always turned out to be much closer to the previously determined 5-rep max than experience with training men would suggest it would be. Quite frequently, her 1RM was only seven pounds heavier than her 5RM. This seemed strange at first, but I eventually quit arguing with the universe and learned to take this into account when testing and programming trainees.

It is also germane to handling lifters at meets. I made a terrible mistake many years ago at a powerlifting meet with a third-attempt pick for a female lifter. It was too heavy because I had based it on her second attempt as though she were a he, and she most definitely was not. If a 5RM is closer to a max single in women than men, a 2RM—a decent second attempt deadlift—is too. She missed that third attempt and first place as a result of my inability to better apply what I actually knew, and I'm still sorry, Rosellen.

This important difference in the expression of strength is most likely the result of the efficiency with which motor units can be recruited, an ability associated with the neuromuscular effects of testosterone on nervous system function. It is displayed in essentially all vertebrates and recognized throughout zoology as a predictable factor in animal behavior.

Women can also continue to produce eccentric contractions after concentric failure long after men fail eccentrically. This is probably because they have less completely fatigued themselves at positive failure,

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and subsequent negatives are not being done from as depleted a position as a male's would be. Several years ago I was training a gal who thought she might like to be a bodybuilder, and we were playing around with some seated behind-the-neck presses one afternoon. She was fairly strong and was doing a high-rep set with 75 pounds. She had done nine reps done when I decided to see how tough she was. She got to failure at ten, about where I had guessed she would, and I started giving her negatives—helping her from the bottom back up to lockout and letting her lower it under control. I expected her, like an average guy, to get another three or four. After she did 15 more and finally slowed down to where I could call her set finished, I decided she was pretty tough. But later, after other women showed me the same ability, I decided she was about average for a woman.

This is caused by the same neuromuscular factors that control concentric strength expression. The ability to create very high levels of motor unit recruitment also produces the capacity to create commensurately high levels of fatigue. If you use up all your ATP doing concentric work—because you can produce enough contractile intensity to do so—you won't have enough left to do many more eccentric contractions, and vice versa.

Explosive movements such as vertical jump that demonstrate power and its requisite high levels of motor unit recruitment are very typically performed by women at lower levels of proficiency than men of the same size. Field events, tennis, basketball, weightlifting, and all sports that inherently involve an explosive performance component, exhibit a high degree of sexual dimorphism, to the extent that the best women in the world can often be beaten by varsity high school or college freshmen and sophomore men. Even cyclic activities that require high levels of motor unit recruitment at short repeated intervals, like sprinting and sprint cycling, also display sexual differences. The effects of testosterone are indeed profound, and often tempting.

In addition to these neuromuscular effects, muscle mass differences between men and women explain the profound disparity in upper-body strength between the two sexes, even among equally well trained and conditioned athletes of the same size. These differences

%IRM	Subjective Difficulty		
	Easy	Moderate	Hard
100	---	---	1
90	---	1	3
80	3	5	8
70	5	8	10
60	8	10	15
50	12	20	25+
	Low	Moderate	High

Adaptive Stimulus

Table 1. The difficulty of a repetition scheme is a function of both the intensity and the volume used. Completion of a set of 3 repetitions with 90% IRM is hard, as is a set of 15 with 60% IRM. As such, a 60% training session with 15 repetition sets cannot be considered any more of a recovery workout as 3 repetitions with 90%. Recovery during periodized training requires a reduction in weight used coupled with a maintained or reduced repetition number. For example, if you are using 3 repetition sets to train for strength, 90% would be a hard workout that would help induce strength adaptation. Doing 3 repetitions with 70% would be considered an easy workout, one that will allow for recovery.

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60	10	12	15
50	15	25	25+
	Low	Moderate	High

Adaptive Stimulus

Table 2. The women's version of Table 1, illustrating the difficulty of a rep scheme as it varies with volume and intensity. (Tables from Rippetoe & Kilgore, *Practical Programming for Strength Training*.)

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are due entirely to differences in testosterone levels. Throwing, pressing, upper-body lifting at work or in training for other sports, as well as gymnastics, golf, and swimming all display marked differences in performance between men and women.

In fact, the extent to which the gap in performance between females and males of comparable body weights narrows is generally explainable by higher-than-usual testosterone level in that particular female. This may be due to exogenous hormone administration (the magazine way) or naturally-occurring abnormally high levels. Or it may be due to an adaptation to continued high levels of workload through an increase in endogenous production of either testosterone or dihydroepiandrosterone sulfate, a slight increase that beneficially affects recovery and performance without the pubescent-male side effects. The data on this is not terribly good, but then again, neither are the studies, which tend to use isolation machine exercises as the stressor.

There is such a profound difference in male and female testosterone levels that the strength differences between men and women are almost entirely accounted for by hormone level, whereas the differences among males—say between pro athletes and actuaries—are, while hormonal to a certain extent, more attributable to other factors.

Such big differences in male and female performance might seem to bolster the fitness industry's position on the necessity of sex-specific programs, exercises, and facilities. But I already bragged on your enlightenment, and we all know that it makes as little sense for women to exercise in ineffective ways as it does for men. This is due to the fact that sexual differences do not constitute a major division in physiology; men and women are not as different as, for instance, sea anemones and wombats. Hormones are very powerful substances. They are banned by the USOC for this reason, not because they are dangerous. Hormones administered to two otherwise identical organisms can cause major changes in the organisms' morphology, but these changes are still pretty much just a matter of degree, not of basic pattern. Men and women both recruit motor units into the same patterns of muscular contraction, albeit

at different levels of efficiency. Physiologically, Andy Bolton and your grandmother operate the same way, in the same sense that Great Danes and Chihuahuas are both dogs. In both cases, stress demands a response, and that response is determined by the basic physiology of the organism. It is the degree and efficiency—not the nature—of that response that varies with the hormonal status of the organism. Testosterone produces a more robust strength-enhancing response, and that is why testosterone and its analogues are often used by athletes to enhance training. Gentlemen, I suppose this means that we are cheating.

It also means that the type of stress that causes the most profound adaptation will be the same for both sexes, and only the degree of the adaptation will vary. Squats work better for everybody than leg extensions, leg curls, and Bun Blasters because of the quality of the stress they produce. Squats are performed with the same muscles by everybody, they are hard for everybody—hard enough to produce system-wide stress for everybody—and this is why they work for everybody. Men are more efficient at responding to the stress of squats in terms of elevated testosterone levels, and in this respect men can get stronger and bigger faster than women. But women aren't served well by using less efficient ways to produce stress because they respond to it less efficiently—on the contrary, a less efficient response means that it is more important to use quality training methods. It must be listed with the Unfortunate Truths that squats are still the best exercise for women to train with barbells, just like they are for men.

Barbell exercises that demand strength, balance, power, coordination, and mental focus produce a type of stress—and therefore a type of adaptation—that is superior to either low-intensity floor exercise or isolation-type machine exercise. The stress is the stimulus that causes the adaptation, and the quality of the adaptation is thoroughly dependent on the quality of the stress. An exercise that does not involve balance cannot cause an improvement in balance. Likewise, if bone density, power, agility, coordinated strength, and mental focus are parameters that need improvement, the stress that causes the adaptation must specifically tax those parameters or they will not adapt. This simple fact is ignored—or perhaps more realistically,

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misunderstood—by the fitness industry, and thus the value of squats, deadlifts, presses, cleans, and combinations of barbell movements with gymnastics skills and track and field athletics goes unappreciated.

It would also complicate business. It's very hard to find staff qualified to train members at optimal levels of skill and intensity. (Hell, it's hard to find people who will just come to work and clock in.) And it will be as long as the standard employment model of the industry is the minimum wage college kid. Qualified coaches generally get paid more than health clubs are willing to spend, and as long as the public demands no more it will get no more. If prospective members got in the habit of asking for functional training, the industry would shift in that direction. As long as the market for treadmills and Pilates is strong, that's what will be for sale; when intense, effective exercise becomes more popular, the market will find a way to offer it. Right now it seems to be a matter of education.

There are signs that this paradigm may be breaking down. As CrossFit grows and it becomes harder to ignore the results of honest work done at high intensities, the media are taking notice. They now periodically feature

health-related stories on the benefits of weight training versus aerobics-only programs, and boot-camp-type classes are now available at YMCAs all over the country, thus exposing more women to the idea that maybe harder does in fact work better.

The interesting thing is that everybody really already knows this, because there are few examples in life that don't follow the basic rules of the universe, the ones that dictate the behavior of everything. One of the most basic of those rules is that, with the exception of the occasional lottery winner, you pretty much get out of an effort what you put into it. We're all quite familiar with this reality, although we are often willing to believe people who tell us otherwise, about exercise and about life. The sooner everybody—both halves of the population—accepts the fact that effective exercise is more like training for athletics and less like lying around on the floor, more about performance and less about appearance, the sooner it will be understood that women really don't need their own figure salon.



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