**HEALTH-RELATED ISSUES**

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Cardiovascular Issues

The medical community has traditionally thought of resistance training as a very poor way to improve cardiovascular health. This conclusion was based on observations of weight training performed in a traditional fashion. The training was done in much the same way as you might see it performed in a commercial gym. Sets of exercise were done in a submaximal fashion and long rest periods between exercise were allowed. With exercise done in this fashion, it is little wonder that little was seen in the way of cardiovascular improvements. As a result of these observations, most exercise authorities tended to recommend steady state activities like jogging, and recommended against strength training all together. At best, they felt that any strength training program should at least be supplemented with traditional steady state activity. Despite numerous recent studies touting the cardiovascular benefits (and safety) of high intensity resistance training, many physicians and exercise experts still insist on making steady state activity the core of an exercise program. (Ref: 1-5).

I must admit that I am still very much in the minority on this issue, but I do not believe any traditional aerobic activity is necessary if *properly performed* resistance training is being used. Indeed, the only way one can get at their cardiovascular system for training purposes is by performing mechanical work with muscle. The heart and blood vessels service the skeletal muscles, *not* the other way around. The higher the quality of the muscular work being performed, the greater will be the stimulus on the cardiovascular system. The greater the cardiovascular stimulus, the more profound and well preserved will be the body's cardiovascular adaptation. This argument applies for adaptations that occur within the heart and blood vessels themselves. These are termed *central adaptations*. These adaptations within the cardiovascular system occur because of demands placed by the working skeletal muscles.

Equally important in cardiovascular health are *peripheral adaptations*. These are adaptations that actually occur within the working muscles that have indirect benefit for the cardiovascular system. The reason a frail 80 year-old gets more winded climbing a flight of stairs is not necessarily because their cardiovascular system is weak, it may be more due to the fact that their muscles are weak. A muscle is divided into segments called motor units. A motor unit is a group of muscle fibers all supplied by one motor nerve. If a motor nerve sends a signal to a motor unit, all the fibers in a motor unit will contract with 100% effort. Let us say that it takes a hundred units of work to climb a flight of stairs. If our 80 year - old's motor units all contain one unit of strength, it will take 100 motor units to provide 100 units of strength to get up the stairs. The 80 year-olds's heart will have to pump hard enough to support the working of 100 motor units. If, however, my motor units each have two units of strength, it will only take me 50 motor units to provide 100 units of strength. My heart will have to pump hard enough to support the working of 50 motor units. If, through proper strength training, I double my strength; then each motor unit will have four units of strength. At this level, I will only have to recruit 25 motor units. At this level of strength, my perceived effort is much lower. Now, there are other factors involved that make this example imperfect. Increasing muscle size, means more weight may have to be carried, or the body's cooling efficiency will be slightly less. However, the general idea still holds true. Proper exercise not only

stimulates central cardiovascular changes, it stimulates peripheral, muscular changes which allows you to do more work with less stress to the cardiovascular support system.

At this time there are many exercise experts who disagree with my stance on dropping aerobics. If you are anxious about giving up aerobics and want to keep on doing them until the controversy is settled, you can do so. I just suggest that you allow for adequate recovery. Allow a day or two off after your SuperSlow workout and a day before your workout. If you are going to partake of aerobic activity, make sure it is something you enjoy, because enjoyment is aerobics' most redeeming characteristic and is something you won't find in your SuperSlow workout.

Bone Density/Osteoporosis

There has been a lot of interest in strength training's role in the treatment and prevention of osteoporosis. Osteoporosis research was one of the major reasons SuperSlow was developed. The medical literature is full of research articles on this topic, and the sheer volume of material can be overwhelming. This is particularly true because many studies come to contradictory conclusions. What seems to pan out is that strength training may not have much effect on total body bone mineral density or even spinal column bone mineral density, but increases in bone mineral density are seen at critically important sites like the intertrochanteric region of the hip. (Ref: 6).

Some research shows an increase in regional bone mineral density with the incorporation of high impact exercise (such as running or step aerobics). The problem, however, is the degree of impact needed to stimulate increased bone density is too much for the joints. The resulting arthritis from such high impact activities will prevent you from doing any meaningful activity. As such, you will ultimately lose bone and muscle. Be careful to take this research in context. My advice is to avoid high impact activities all together.

My personal take on this topic is that bone mineral density may be a much less important issue if your muscles are strong.

A normal adult spinal column, with peak bone mineral density, can sustain only 22 Newtons of compressive force when it is devoid of its supporting musculature. This is about the weight of a can of soda. Conversely, if the spine's supporting musculature is strong, a very significant degree of bone thinning can be tolerated. If you look at a group of elderly women with "dowager's humps"(the hunching of the upper back due to vertebral body fractures), you will find bone mineral density that is all over the map. Some will have severe osteoporosis, while some will have bone mineral density that tests in the normal range. What all these women will have is a very significant degree of muscle loss, particularly in the muscles between the shoulder blades and upper spine. With the loss of tension produced by these muscles, the forward pulling forces of the head, shoulder girdle and arms gradually causes collapse of the anterior (front) aspect of the spine. If these muscles had been prevented from wasting away through proper strength training, this vulnerable area could have been protected from this kind of damage. Muscles not only produce movement, they are also able to absorb large amounts of force. When big, strong muscles are able to absorb forces, these forces never make it to the bones and joints where they can do damage. Strength training's major contribution in osteoporosis is not, in my opinion, increasing bone mineral density. Strength training's major contribution is to maintain muscle mass that can absorb forces to a degree that even the most

critical areas of the skeleton are protected.

Other Health Benefits

The medical literature is full of articles showing many other benefits of strength training. Studies show improved mood, improved insulin sensitivity, improved blood lipid profiles, less risk of falls in the elderly, and decreased risk of colon cancer because gut motility correlates with muscle mass. These topics are all interesting, but are outside the scope of this book. The concept to keep in mind is this: muscles truly are the window to your body. They are the mechanism by which we can stress and stimulate all of the body's support systems (cardiovascular, respiratory, skeletal, metabolic, endocrine, etc.). The higher the quality of the muscular work in your exercise, the greater the effect on all of your body's systems.

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