

Chapter 17

Anti-Aging Olympic Sports Medicine Training Techniques

Robert Goldman Ph.D., FAASP, D.O., FAOASM

Chairman, American Academy of Anti-Aging Medicine (A4M; www.worldhealth.net)

ABSTRACT

Male and female athletes are performing at levels thought unachievable in the past. Yesterday, athletes did not have the physiology, the knowledge base, or training techniques to go to such levels that drive, perspiration, and inspiration could reach. Sports medicine is exciting because it is the predecessor of anti-aging medicine. Back in the old days of physical culture, people did not have a knowledge base of what we know today about sports medicine, nutrition, resistance training, and physiology. Today, we have such a wider breadth of knowledge of how the body functions and what we can do to enhance its physiological capabilities. And that is why our capabilities are so much greater today. The aim of this paper is to discuss the basics of resistance training, and its impact upon sports medicine and anti-aging medicine.

INTRODUCTION

Most athletes have a mind image of what they can be, what they should be, and how they can get to where they want to go. Genetics does play a part, and genetically superior individuals like Arnold Schwarzenegger and Lou Ferrigno are a good example of this, but they also train very, very hard to keep their body at the peak of fitness. Men tend to see a younger, leaner, more muscular image of themselves when they look in the mirror front of the mirror. This is where the confusion comes in, because many of us have a preconceived notion of who we are. What we have to do is take that mind image and put it in a more realistic sense of what are we really dealing with and what our achievable goals are. So, how do we enhance our potential? What are some of the basics?

In the early days of physical culture, people did not know what we know today about sports medicine, nutrition, resistance training, and physiology. We have such a wider breadth of knowledge of how the body functions and what we can do to enhance its physiological capabilities. And that is why our capabilities are so much greater today.

BASIC TRAINING PRINCIPLES

Exercise is the first major anti-aging pillar and the first-line major anti-aging magic pill. It is something that everyone can do. But what are some of the specifics of training principles? First, we have range of motion. It is very important when you train to go through that full range of motion. A lot of people go those these half-jerky ranges when weight training, but by not going through the full range they are not building strength throughout that range of motion. Ensuring that you go through the full range of motion also helps to combat against some of the osteoporotic changes that occur. As well as a range of motion, we also have balance and symmetry. Training one side unilaterally over the other is very common. Sports like tennis involve unilateral motion. This means that you will get very strong in one arm and not balanced in the other. Thus, it is obviously important to be cognizant of that. Another thing is that people will work on their abdominal muscles because they want a flat abdomen, but they will forget about their lower back and then they end up with forward-flexing muscle spasms that cause one to become forward-bent and then they cannot function properly. So we must always work towards balance and proper biomechanic function.

There are a few different types of muscle contraction. One is called isometric contraction: iso meaning same, metric meaning length. Therefore, an isometric muscle contraction is where the muscle remains the same length no matter how much force is put against it. It is like pushing against an immovable force, for example pressing against a solid wall. Then we have isotonic contraction: iso meaning same, tonic meaning tone. Thus, an isotonic muscle contraction is where the same tone in the muscle is maintained throughout the range of motion. This is the type of muscle contraction that the majority of machines in fitness clubs are designed for.

One of the rules of training when trying to build muscles is always work weak points first. Always work the muscle groups that you have the most difficulty training first, because by the end of your workout you will be fatigued and then you may not want to train those more difficult muscles. Remember,

symmetry is key in terms of not only right to left and front and back, but also upper to lower. Balance is also a very, very key mode in a training program. We need to be able to have unilateral balance and bilateral balance in order to do activities properly, and we must not allow ourselves to lose flexibility. Flexibility without strength means loose joints and loose ligaments, which are basically an accident waiting to happen.

Exercising the Neck

The head is the center of balance in the body. When we move the head we change the whole center of gravity, we change the whole spinal curvature. Neck muscles can be trained very easily, instead of just rotation, forward and back, isometric training is a good way to train. The neck will respond very strongly to simple exercises that can be done just by pressing the hand against the head and going through the different angles and ranges of motion. This can be done with isotonic and isometric contraction training. It is important to have a strong neck, as strong neck muscles will improve your balance and your stability throughout the different ranges of motion and through the different activities that you may be involved in.

Moving down the body from the neck, we go into the trapezius. We want to put that muscle through the full range of motion. Certain exercise and fitness resistance devices in the past were made with chains and cords, and they used to say that the exercises had to be done very slowly - three seconds up and four seconds down. The reason they said this was because people were going so fast they were breaking the chains. So, there is no need to go slow, but you do want to go through a range of motion where you are comfortable and able to fully flex the muscle. The trapezius is of course connected to the neck, and it is very important because it will add additional strength to the shoulder girdle, and therefore lifting capabilities and punching capabilities.

The Shoulders

Next are the shoulders. Lateral raises are the focus here, and more weight is not better. It is important to realize with any weight resistance training, that if we throw the weight up, it will come down; we must control them. If a person lifts a weight in such a way, then they are dealing with acceleration, gravity, and inertia, and they will have to use their joints and ligaments to stop the weight. That is how people get injured lifting weights. It is not how you do it or how fast you do it, what weight lifting is about is the mechanism, and biomechanics, and the speed at which you do it. You must control the resistance, do not allow it to control you. Slow, controlled movements are the key. The same is true with lateral raises. If you throw your weight up, that inertial force is going to snap it back down. And, again, that is when you end up with injury potential. Again, you can't do these things unless you go through slow, deliberate maneuvers and you need a strong shoulder girdle for many different types of sporting activities.

Exercises that are good for the shoulders are the lateral raise and the overhead shoulder press. We suggest you do one to three sets of eight to twelve repetitions. If you want muscle definition, do between six and fifteen repetitions. If you want more muscle bulk, you should do three to five sets and then once per week, if you are a trained athlete you should do a one rep maximum (1RM) in order to see how much your strength has achieved. So here we have the overhead press. We suggest that people also use dumbbells because if you use weight machines you are in a locked biomechanic mode. You have a certain range of motion you are going through and you can't adjust it. With dumbbells or with free weights, you have to stabilize the muscle and you have to control the actual path that the weights are going through. It is the same with cables. A combination of machines and free weights is what is usually suggested.

The Arms

Arms, of course, are very important in athletics for grabbing, pulling, punching and so on. The triceps and biceps are the main muscle groups here. Again, it is very important to exercise through the full range of motion. If you do not exercise through the full range of motion there is a greater risk of muscle tears. This is especially true in sports like football and basketball, where a lot of reaching is required. If they don't have the strength when they are reaching to catch the ball, or grab other athletes, that lack of strength can set them up for injury. Males as well as females need to obey these basic principles of range of motion.

Curls of course are a very simple and easy exercise. If a patient does not have weights they can use blocks, they can use soup cans, they can use any item that will lend additional resistance but again, they need to move through that full range of motion. What they should also do is concentrate on flexing the bicep as they come up and when they come down, flexing and hyper-extending just a bit so that they flex their triceps. Curls can be done in a straightforward motion, and they can also be done by turning in and turning out, and this works different areas of the biceps. Overhead pulls are a simple way to exercise the triceps. As we get older we lose the muscle tone under the arm, it becomes less firm. However, there are exercises that can prevent this, for example standing in the forward bent position and lifting the arm backwards.

The Upper and Lower Back

The upper back contains a very important muscle group. In the old days, when athletes exercised the upper back they used to pull behind the neck. This is a no-no in exercise now because when you pull down behind the neck you get a hyper-flexion of the neck, and that was causing a lot of neck injuries. Therefore when exercising the upper back it is very important to only pull in front of the neck.

Training the lower back is critical. The basic rack pull down is the exercise of choice here. By changing the angle of the pull, we are now able to adjust which part of the latissimus dorsi we are working on. Now we have the seated row where you are in a seated position and you pull directly into the chest. What tends to happen is that people don't pay attention to head and neck positioning. If the head is allowed to tilt forward or to swing back, the whole biomechanics of the maneuver is lost. Pull downs and forward pulls and seated rows are good. These exercises can also be done with a dumbbell. The latissimus dorsi is very important for forward motion, for pulling, for hitting, for striking, or for grabbing other athletes.

The Chest

There are a whole host of exercises for the chest: the simple bench press, lat flies, and lat pulls. Again, slow, controlled movement is what we want. By changing the angle of where you are doing the bench press exercise, you will train different areas of the pectoralis major and minor. Chest exercises are very popular among athletes when they are first doing their weight training. Flies are now being done at different angles instead of supine. Now they are also being done at a straight angle, which again, is working different areas of the chest muscles. One to three sets of six to 12 repetitions of both flies and bench press exercises, two or three times a week is enough to train the chest muscles.

Dips, which were popular in the old days, are increasing in popularity due to the fact that machines are now being made that allow dips with weight assist. Dips are good exercise, because they build strength and flexibility throughout the whole range of motion. Furthermore, it is possible to train the shoulders by not going all the way down and just lifting your body up and down off of the machine.

The Core

The core is the torso of our body. Many people are overly concerned about their abdominal muscles and they forget about the erector spinae. The end result is that their abdominal muscles get too strong for the rear, and they end up with either a psoa spasm or some kind of flexion injury. The core is where all your power goes. Whether you play golf, tennis, or do martial arts, the core is extremely important. If you do martial arts, you swivel the hips and the torso. If you are a tennis player, or a golfer, you also swivel the hips, and there is tremendous power behind that swivel. So, the core is where all the force and power is in the body, and core training is critical to any sports training or sports rehabilitation program. Of course we are training the rectus abdominus, and that is where the power is. The rectus abdominus is like a band wrapping around the abdominal cavity, and athletes sometimes tend to focus on their extremities, arms and legs, and forget how critically important the core system is for training.

There are a number of ways that people can train their core, and there have been a number of things that have changed in core training. In the past, we used to straight leg sit-ups. Straight leg sit-ups are the worst thing in the world for your back. You are recruiting the soleus muscle far too much, and all that you will end up doing is injuring the lower back. Now, most sit-ups are done with a bent leg. A common exercise for the core is sitting on the bench and raising the knees or bringing the knees up towards the chest.

A wonderful device for training the core is the Swiss army ball, or exercise ball, and this is very popular all through the sports medicine world. People now use this for back training. These balls enable us to do erector spinal training, forward flexion, hyperextension, and back flexion. The Swiss army ball enables us to train the body, and train the tiny muscles by doing things differently. For example, if you do a simple push-up using a Swiss army ball you have to balance the lower torso by using the tiny muscles in the shoulders, elbows, hands, and hips because now a push-up is a more challenging motion and you have to utilize other muscles in order to stabilize. The same thing applies with sit-ups. Add a Swiss army ball to the equation and not only are the abdominal muscles being exercised, but also the stabilizing muscles in the hips and the torso.

There are a variety of ways to address this core system, and this includes reverse torso curls and forward torso curls, they are very easy to do and probably the best protective mechanism against low back pain. When doing forward torso curls you should not sit all the way up; all that you have to do is curl the torso enough in order to contract the abdominus rectus. We also bend the knee in order to knock off the psoas muscle. With reverse torso curls, we are merely just taking the last few spinal segments, lumbar segments and sacrum off of the ground, holding for one to three seconds and then slowly coming down.

Lower Extremity Training

Lower extremity training is important for a number of reasons. Patients tend to fall down, especially in cold areas where there is snow and ice, because they do not train their lower extremity. They do not train from the knee down. Tibialis anterior, posterior, the gastrocnemius, and the soleus muscle, they don't train them. It is important to warm up before beginning a weight training regimen. If you are not going to go through a full stretching mode, what you need to do is go through the full range of motion in the joints that you are going to train, and then do the resistance training. Otherwise if you go right into weights with too much resistance, you will damage the joint as well as the muscle by putting too much resistance on it too quickly.

A good exercise for the legs is the forward lunge. It is very popular because it not only trains the buttocks but also the rear of the leg as well. Simple leg curls are great because they exercise the muscle through the full range of motion. In the past the benches for leg curls used to be made flat. So what would happen is people would curl their legs and their hips would shoot up off of the bench. Now, benches are built at an angle so that the hips are locked in more closely and the tension and resistance is focused on the rear of the leg. Leg presses are not as popular as they used to be, and with senior patients you have to be a bit more cautious. People have a tendency to put too much weight on these machines, which is a dangerous maneuver.

A simple device that is used at the Olympic Training Center is a balance beam. The beam is similar to that you see in the Olympic Games where gymnasts perform handstands upon them, except that it is thinner. You train on the beam by walking along it. This trains the tiny muscles in the knees, the ankles, and the feet, and it is actually quite effective. Basketball players train by going back and forth across each other on beams. And sometimes we'll put two basketball players opposing each other, and they'll go crossing their legs back and forth and then they'll start throwing a basketball at each other, going back and forth. It gets more challenging. We can also put rubber roof tiles under the beams, so the beams wobble when they're going back and forth. The beam is also very useful in martial arts.

Lower extremity training is critical for sport, whether it be gymnastics, football, soccer, and so on, because it is that extra degree of balance and stability that will allow someone to compete effectively and not fall down, not go out of bounds, make that catch, make that kick, and so on. Good exercises for the calf muscles are seated calf raises and standing calf raise. Again, we want slow controlled movements. However, these exercises are not for everybody. Calf raises are not suitable for people who suffer from low back pain, we suggest that they wrap one leg around the other leg and just do toe raises up and down off the end of a platform.

CONCLUSION

Balance and stability are crucial in all sporting activities. Utilizing isotonic and isometric training and noticing the progression of our strength and capabilities is what we should strive towards. If we think about the athletes of the past, it shows us how far we have really come. The average athlete of today would be able to beat the elite athletes of several decades ago. We are seeing a remarkable increase in the capability of athleticism, and we are seeing more and more of this because of the improvements in our knowledge of nutrition and training and diet. In the past, athletes didn't even want people to know that they lifted weights. In fact, coaches used to tell athletes not to lift weights because they said it would enlarge the heart, and doctors used to tell athletes not to lift weights because it would make them muscle bound. Now, there is no sporting team in the world that does not do resistance training. Today, athletes must train very diligently and very intelligently, and they have to be involved in a training program year round.

The basics of training are just as much a key part of an anti-aging program as hormone replacement, nutraceuticals, cogniceuticals, and all the other things that we explore in anti-aging medicine. Training the mind is just as important as training the body. Athletes and patients need to be excited about their capabilities, they need to know how they can progress, and how far they can go. And some of them really need a little extra help. Anti-aging medicine does work. It is highly functional. Anti-aging medicine is an enhancement towards maximum performance no matter how old a patient is, and as anti-aging physicians we can help our patients to achieve everything they want to achieve.

ABOUT THE AUTHOR

Dr. Robert Goldman is physician co-founder of the anti-aging medical movement and of the American Academy of Anti-Aging Medicine (A4M), a non-profit medical organization dedicated to the advancement of technology to detect, prevent, and treat aging related disease and to promote research into methods to retard and optimize the human aging process.

Correspondence: Postal c/o American Academy of Anti-Aging Medicine; 1510 West Montana Street; Chicago, IL 60614 USA.

