I. The problem: The most common sports injuries in the aging athlete are ankle sprains, shoulder and rotator cuff problems, shin splints, Achilles tendonitis, pain in the front of the knee, elbow problems and low back pain. Fortunately, the body is very good at repairing itself, but as we age, that changes and the body takes longer to recover.

a. Loss of bone—after age 40, bone mass declines.

b. Decrease in flexibility. This is caused mainly by changes in the body’s connective tissue, combined with arthritis. Lack of flexibility means that our knees, hips, and other joints must bear greater stress during exercise, rather than dissipating it to surrounding tissues, such as nearby muscles, as we did when we were younger. This stress can gradually destroy the joints, cause back pain, Achilles tendonitis, plantar fasciitis, etc.. After age 30, humans start losing muscle mass and. Tendons, less elastic and are easier to tear.

c. Nervous system
With aging there is a marked decline in blood flow to the brain, which is associated with a decrease in reaction time. Our sense of balance also deteriorates with aging.

d. Pulmonary—VO2 max declines steadily and predictably as we age, on average approximately 1.5% per year. VO2 max makes an excellent measure of physiological rather than chronological aging.

II. What is “Younger”? 30’s to mid 50’s??

Chronologic age not equal to physiologic/metabolic age. Determine where are they are physiologically/metabolically.

The 70 y.o. tennis player is in better shape than the 20 y.o. couch potato. Is it because the body is changing or the athlete just more sedentary??

Deterioration of sporting performance has been reported to begin at 35 years of age (Bortz & Bortz, 1996).

Key question: Are the changes in our bodies due to aging or to lifestyle?

What’s normal and abnormal aging? Is a slow down inevitable?

Secondary to “Low T”, glycosylation of tissues, dietary deficiencies, normal aging?

Or is it a training problem? Inflexible, weaker

Or both?

III. What does science tell us?

The main limitation of the research investigating the effects of aging on muscle damage and muscle recovery has been the potential confounding influence of decreased habitual activity levels that often occur in conjunction with increasing age (Lowe, Warren, Snow, Thompson, &
Thomas, 2004). Training older individuals acutely or throughout the life span results in significant functional benefits and potential protection from exercise-induced muscle damage (Close, Kayani, Vasilaki, & McArdle, 2005).

Studies conducted since the 1970s have suggested that the loss of muscle mass—a (sarcopenia) and a primary deterrent to high-level athletic performance—is inevitable with age (lose at least 1 percent of their muscle mass per year starting as early as age 40; this loss accelerates after 65). Other studies showed that, at a molecular level, the muscle tissue that remained was different.

**Here’s the catch:** These studies focused on **sedentary** older people. When scientists recruited **active** older people—and specifically when they studied masters athletes—the results were quite different. In one representative study published in May 2010, Canadian scientists biopsied the leg muscles of both 20-somethings and adults in their 60s and 70s, some of whom were sedentary and some physically active. The muscles of the active older people contained almost as many healthy, robust mitochondria as did the muscles of the young people. The **sedentary** older people, by contrast, had markedly fewer functioning mitochondria than the youngsters. Many of the supposedly unavoidable and debilitating physiological effects of aging are illusory. **Being sedentary is much more of a risk factor for extreme declines in muscle mass, strength, and endurance than is simply being past middle age.!!**

A virtual lack of any research investigating the recovery of functional performance in well-trained aging athletes presents a unique challenge to any review on this topic. Therefore, any future research into the effect of age on fatigue and recovery should attempt to closely control for the training status of participants and employ exercise models representative of typical athletic training or competition.

### IV. Prevention of injury

**Training:** Fortunately, the body is very good at repairing itself, but as we age, that too changes and the body takes longer to recover. You need to decrease the repetitive impact to your body, particularly your joints, to continue to enjoy the game with fewer aches and pains. How you perform your sport makes a difference in how your body adapts to it when you age. Modify your sport as you can.

Work on flexibility and strength: conditioning and increasing muscle mass, the body is able to better absorb repetitive impacts. Cardiovascular fitness must raise the heart rate with exercise. Older athletes should do extra warm-up and flexibility exercises in order to prevent injury. As with all stretching exercise, these should be performed with a steady and smooth motion. Good idea to add balance exercises to the workout regimen.

**Dietary:** Glycosylation of soft tissues from high carb diets. Does it effect flexibility, power, structural stability of tissues?

**Supplements:** hot topic...proven efficacy? Anti-oxidants, hormones?

### V. Can we maintain/improve our physical condition as we get older?

The work becomes harder, year by year; the dedication must be sturdier. You have to practice fairly intensively if you want to maintain your aerobic capacity and performance with age: short, hard, repeated bursts of exercise, such as sprinting for a quarter mile, resting for a few minutes, then sprinting again if you want to be competitive.

The other hard reality of aging for most athletes is that you simply cannot work out and race as
often. You need more rest, for reasons that science has not fully explained. The cause maybe some combination of falling \( V_{0.2\text{max}} \) and subtle changes in muscle composition and body metabolism.

Start slowly...find your sport...give it time. **Must be sustainable!!**

Athletic capacity may be sustained well into advanced age, and many of the physiologic consequences of aging may be **mitigated or reversed by regular exercise**. **Most injuries in older athletes are chronic and overuse injuries that result in diminished flexibility and endurance.** In addition, many aging athletes have medical and musculoskeletal problems that mandate tailoring athletic activity

**Slow down rehab post injury?**

**Patient education**
**Dietary- get away from high glycemic index diet!!** Glycosylation of soft tissues.

A hot research topic in medicine today is the possible **role of testosterone and growth hormone in causing age-related muscle loss**. Though naturally occurring in the body, these hormones decline dramatically with aging. So far, studies have found that giving older people human growth hormone causes an increase in muscle mass, but not necessarily any increased strength or improved function.

**VI. Advice for the Aging Athlete**

**a. Decrease the repetitive impact to your body**, particularly your joints, to continue to enjoy the game with fewer aches and pains. Modify your sport as you can. Switch from singles tennis to doubles, from running to bicycling, or from advanced ski hills to the more basic slopes. You may not be able to play three times a week anymore because that doesn't give the body enough time to repair itself.

**b. Work on your flexibility and strength.** Conditioning and increasing muscle mass, the body is able to better absorb repetitive impacts. Using a heavy weight with fewer repetitions (about 12) will build more muscle mass, but also may cause injury. Using lighter weights and about 30 repetitions per exercise is safer and still provides improved strength. Lifting weights damages muscle, but when it is rebuilt, it is stronger than before. You may be able to lift two to three times a week and still play sports and allow your body a chance to heal.

**c. Cardiovascular fitness is important.** Must raise the heart rate with exercise. three to five days a week, 20 minutes a day, to get your heart rate between 60 and 80% of your maximum...should involve the legs (running, walking, tennis, bicycling, stairmaster, etc.) because legs have large muscles and require a lot of blood to work. Research has shown that several short exercise sessions, such as climbing stairs, during the course of the day have the same effect as one long bout in lowering triglycerides or blood fats.

**Conclusion:**

There is no question that older athletes are more prone than younger athletes to a range of sports injuries. This is no reason, however, for older people to avoid physical activity. Most sports injuries can be prevented or treated with a combination of preparation, targeted exercise
and conditioning, and common sense. Almost all studies suggest that active, but not excessive, enjoyment of a variety of sports and exercise can give older people both a better and a longer life. Science has proven that life does not begin at 40, but it has also demonstrated that it does not have to end there!!

Bibliography:


