

Best of the Best

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Do Steroids Increase Tendon Rupture Risk?

Health

experts often list tendon rupture as a risk of anabolic steroid use based on clinical reports of athletes treated for tendon injuries who also took steroids. Several anecdotes do not constitute data! German scientists reported the case of a 29-year-old professional soccer player who ruptured his patellar (knee) tendon and both Achilles tendons within 18 months. He had taken steroids for three years before the injuries and used them to promote healing following each surgery. They concluded that steroids are linked to a high number of unrecorded cases of tendon injury in athletes and the drugs might interfere with healing following tendon surgery. Well-controlled studies found that anabolic steroids actually strengthen tendons (Am J Sports Med, 32:934-43, 2004; Int J Sports Med, 21: 406-11, 2000). Why do we have clinical reports linking steroids to tendon ruptures in athletes, yet experimental studies showing that anabolic steroids strengthen tendons? Athletes who use steroids are usually highly motivated and more likely to ignore the pain of early tendon injury. They probably would have sustained the injuries if they hadn't taken the drugs. (Unfallchirurg, 111: 46-49, 2008)

New Anabolic Drug? Scientists Develop Myostatin-Blocker

Myostatin regulates the growth of muscle cell contractile proteins (myofibrils) and muscle development during growth. Hormones and growth factors such as growth hormone, testosterone, insulin, and IGF-1 promote muscle growth. Myostatin prevents muscle fibers from growing too much. Physicians and athletes have relied on muscle growth factors to increase muscle size and strength. An alternative strategy is to block myostatin, which would allow unimpeded muscle growth. Researchers from Ohio State University found that mice given a single dose of the myostatin-inhibitor follistatin increased body mass and strength. The treatment increased skeletal muscle size throughout the body but did not affect heart muscle. A single dose of follistatin continued to increase strength for 60 days, and the increased strength persisted during the 560-day experiment. This study showed that follistatin inhibited myostatin and increased strength and muscle mass in animals. The drug is available to research labs, so some athletes will probably use it in the Olympics this summer. (Proceedings National Academy of Sciences, 105: 4318-4322, 2008)

Testosterone Supplements Decrease Abdominal Fat In Aging Men

Andropause— a gradual decrease in blood testosterone and biologically available free testosterone— is a significant health issue in aging men. It is linked to heart disease, type 2 diabetes, depression, loss of muscle and bone mass and decreased sexual performance. It is not as obvious as

menopause (permanent cessation of menstruation in women), so many physicians don't consider it a significant health issue. Landmark studies by researchers such as Shalender Bhasin and Tom Storer found that aging men increased muscle mass, decreased fat and improved quality of life from testosterone supplements. Australian scientists showed that aging men (55 and older) decreased abdominal fat and increased muscle mass without side effects following 12 months of low-dose testosterone therapy (nighttime testosterone patch). Abdominal fat deposition is part of the Metabolic Syndrome—a group of symptoms linked to heart disease that include insulin resistance, high blood pressure, abnormal blood fats, type 2 diabetes, inflammation and blood-clotting abnormalities. This was another study showing the benefits and low risk of testosterone therapy in aging men. (Journal Clinical Endocrinology Metabolism, in press; published online October 16, 2007)

Growth

Hormone Reduces Abdominal Fat And Increases Muscle Mass In Middle-Aged Men

Researchers and physicians do not agree on the medical benefits of growth hormone for retarding the aging process and improving the quality of life in older adults. Growth hormone is a popular drug with middle-aged and older adults because it increases muscle mass, strength and exercise capacity and decreases fat. A study from the Pennington Biomedical Research Center in Baton Rouge, LA found middle-aged men who took growth hormone supplements for six months showed increases in weight and lean body mass (mainly muscle and bone) and an 8.8 percent reduction in abdominal fat. Growth hormone increased resting metabolic rate by nearly 200 calories per day. This study showed that growth hormone therapy was effective for increasing muscle mass and decreasing fat in marginally overweight middle-aged men and could be an important therapy for improving the quality of life in older adults. (Journal Clinical Endocrinology Metabolism, 92: 4265-4270, 2007)

Andriol

Testocaps Absorbed Best With A Meal

Andriol Testocaps (testosterone undecanoate) is an oil-based oral testosterone that is absorbed by the intestinal lymphatic system. The lymphatic system is a network of vessels that transports fluid, proteins, fat and scavenging cells to the bloodstream. Ordinarily, the liver inactivates oral testosterone rapidly. Drug makers got around this by modifying the molecule so that it stayed in the system longer or suspending it in oil and injecting it into muscle. Oral drugs, such as Dianabol, were toxic to the liver in high doses, and testosterone esters such as testosterone enanthate required regular injections. Testosterone undecanoate contained in Andriol is absorbed through the lymphatic system and bypasses the liver, which raises blood levels of the hormone. Andriol is an oral form of testosterone that produces elevated blood levels of testosterone for about 4 to 6 hours. Dutch researchers showed that the fat content of meals was important for maximum testosterone absorption. Little testosterone was absorbed following low-calorie, low-fat meals. Meals containing at least 18 grams of fat were optimal for testosterone absorption. Andriol is a good choice for testosterone replacement because it is not toxic to the liver, is only minimally converted to estrogen, and doesn't require muscular injections. (Clinical Endocrinology, 66: 579-585, 2007)

Nandrolone Could Cause Liver Problems

Most bodybuilders are well aware that oral anabolic steroids are toxic to the liver. So, many use injectable drugs such as nandrolone because they feel they are more liver-friendly. Brazilian researchers, in a study on rats, found that low, normal and high doses of nandrolone administered for five weeks increased key liver enzymes (aspartate aminotransferase, AST; alanine aminotransferase, ALT; and alkaline phosphatase, ALP). Changes were highest in the high-dose group, but liver function tests remained within the normal range in all groups. The authors concluded that administering higher than clinical doses could damage the liver. There are no long-term studies showing the effects of nandrolone or any other anabolic steroid on liver function. (Medicine Science Sports Exercise, 40: 842-847, 2008)

Merck Signs \$500 Million SARMs Deal

The next generation of anabolic steroids will be selective androgen receptor modulators (SARMs) that target androgen receptors in specific tissues, such as muscle or bone. SARMs are the Holy Grail of anabolic chemicals because they build muscles without affecting other organs or tissues. Pharmaceutical giant Merck & Company signed a \$500 million deal with another drug company GTX to develop, test and market a SARM called Ostarine that selectively targets skeletal muscle, but does not affect the liver or prostate. It has been used initially in early clinical trials to treat muscle wasting in cancer patients. The drug will be useful in older adults experiencing bone or muscle loss, patients suffering from trauma or degenerative diseases, and undoubtedly in athletes trying to improve performance. SARMs represent an evolution in anabolic drugs. Current anabolic steroids (including testosterone) bind and activate androgen receptors throughout the body and their effects are not specific to any tissue. While they turn on protein synthesis in muscle, they also affect androgen receptors in the prostate, sex organs, heart, liver, skin and brain, which cause unwanted effects in non-target tissues. General receptor binding causes side effects such as acne, prostate enlargement, thickening of the blood and masculinization in women and children. SARMs will target specific androgen sites in muscles and not bind to receptors in other tissues, which will minimize side effects and improve the usefulness of the drugs. The drugs exist, so it is likely that some athletes have been using them in preparation for the Beijing Olympic Games this summer. (in-Pharma Technologist.com, July 11, 2007)

Most Steroid Users Take Drugs For Self Improvement

Lawmakers passed the Anabolic Steroid Control Act to discourage teenage athletes from using steroids. Since 1984, more than 10 studies found that steroid use in high school students has never been higher than 4 percent. According to a study by Jason Cohen and colleagues, the average nonmedical user of steroids is in his early 30s and takes the drugs for self-improvement. Most steroid users seek to increase strength, muscle mass and physical attractiveness and decrease body fat. They follow structured diets and

exercise programs and do not play sports. Most are well educated and employed and take the drugs as part of a health-centered lifestyle. According to the Drug Enforcement Administration, the possession or sale of anabolic steroids without a valid prescription is illegal and carries a maximum penalty of one year in prison and a minimum \$1,000 fine. This law is bad public policy that targets hard-working tax-paying Americans trying to improve themselves. (Journal International Society of Sports Nutrition, in press; October 2007)