

NEW SERIES OF JUST DO IT

GREAT ATHLETIC TRAINING EXERCISE SERIES

Do it Right!
Exercises you Should Do

I'm always looking for the best exercises (strength and conditioning) to prevent injury and sustain performance for the athletes I work with.

In a series of *Just Do Its* I will go over some of my favorites exercises and the reasons why.

But before I do I will try to answer the question - does strength and conditioning help prevent injuries?

- It is definitely clear that it helps reduce sports injuries.
- It is less clear if it helps reduce running related injuries.
- It is extremely clear that strength and conditioning is vital in restoring function after many sports related injuries.

See next page for further details. **Look for our next article concerning if strength and conditioning improves performance.**

Strength and Conditioning does help prevent sport injuries according to multiple studies (review). One review suggested consistently favorable estimates for all injury prevention measures except for stretching. It was shown multiple types of conditioning, especially strength/resistance training, reduced sports injuries to less than **1/3 and overuse injuries could be almost halved**. How does it do this? Research indicates that resistance training promotes growth and/or increases in the strength of ligaments, tendons, tendon to bone and ligament to bone junction strength, joint cartilage and the connective tissue sheaths within muscle. Studies involving humans and animal models also demonstrate resistance training can cause increased bone mineral content and therefore may aid in prevention of skeletal injuries. Not only does it help prevent injuries but strength training is key in aiding the healing process of soft tissue injuries like tendonopathy. That is why it is a main modality used in physical therapy for many conditions. Many therapist and trainers also strength screen athletes and if there is any imbalances resistance training may then be performed to correct the imbalance and therefore reduce the incidence of injury.

There is a high incidence of injuries with running. Unlike with sports it is less clear if strength and conditioning can help in preventing running injuries. One study suggests no benefits of an 8-week concurrent strength training for running economy and coordination of recreational marathon runners despite a clear improvement in leg strength (study). The authors did suggest that insufficient sample size or a short intervention period may explain the results of no benefit. Another study looking at strengthening in conjunction with marathon training, since there is a high prevalence of injury among first-time marathon runners. It found that self-directed strength training program did not decrease overuse injury incidence resulting in marathon non-completion (study). Another survey study suggested that strength and conditioning did not seem to confer a protection against the number of injuries that runners experienced. So does this mean strength and conditioning does not help? No it does not, these studies were inconclusive. All the authors said more research needs to be done in this area. An interesting study found when runners reach a certain age that they loose up to about 5% in muscle strength in the legs each year (study). The authors state that their data support newer exercise guidelines for older Americans to perform resistance training and it to be an integral component of a fitness program and that running alone was not sufficient to prevent the loss in muscle strength (dynapenia) with aging. This decrement may lead to injury and decrease in performance.

The bottom-line when it comes to injury and preventing re-injury ultimately the way for good recovery with many muscular skeletal issues is strengthening. It is one of the major modalities that really is impactful that is used by physical therapists and it is typically the major treatment in many cases where physical therapy is warranted. During recovery from a muscle strain, tendon issue, or ligament sprain latest suggestion is to stay active to prevent surrounding muscles from weakening versus in the distant past it was to complete rest. Currently in cases of some injuries training consists of high load strengthening exercises to build up supporting muscles to help reduce the risk of another muscle strain or tendon injury. So if it is used to help injured muscles it must stand to reason that strengthening may help prevent injury. Many of the exercises listed in this series helps restore function and prevent injuries.

Does strength and conditioning improve performance in sports?

Bottomline: Strength and Conditioning improves performance in many skills that are used in most sports (speed, agility, jump), but it is not clear if it improves performance in skill related sport sports. It does in sports like track and field, swimming, and throwing type sports (study).

There is much research that supports the notion that greater muscular strength can enhance the ability to perform general sport skills such as jumping, sprinting, and change of direction tasks according to reviews of the research. There is further research indicates that stronger athletes produce superior performances during sport specific tasks. Greater muscular strength is strongly associated with improved force-time characteristics that may contribute to an athlete's overall performance. Greater muscular strength allows an individual to potentiate earlier and to a greater extent, but also decreases the risk of injury as previously mentioned. That is why sport scientists and practitioners, like the FitTec group, may monitor an individual's strength characteristics using isometric, dynamic, and reactive strength tests and variables to help direct programming. This review states that it appears that there may be no substitute for greater muscular strength when it comes to improving an individual's performance across a wide range of both general and sport specific skills while simultaneously reducing their risk of injury when performing these skills. Again these studies looked at skills that are similar to the motions in sports (such as speed, agility, and jumping), but actual sport performance was not measured. Another review suggest it is not that clear about strength training improving performance. In this review the evidence regarding an answer to the causal question, “Does increasing an athletes’ strength improve sports performance?”, was discussed using the Applied Research Model for the Sport Sciences (ARMSS) to frame the problem and to answer. **Results: Muscular strength typically differentiates elite and non-elite athletes, and is correlated with proxy measures of sports performance (jump, run, agility tests). However, there is insufficient evidence to make a definitive statement regarding the causal effect of muscular strength upon sports performance.** Conclusions: Considering the ARMSS, evidence is lacking whether improving muscular strength is causally related to sports performance. Present evidence is primarily observational and cross-sectional, experimental evidence is limited and focused upon proxy measures of sports perform from the studyance, primarily conducted in small samples, and with little consideration regarding meaningfulness of effects. In other words tests similar to parts of an athletes performance were used to test whether strength and conditioning improves an athletes performance so you can not definitively say there is a causal relationship. A study that points how it may not improve performance is NFL Combine Results and NFL success. The study found no consistent statistical relationship between combine tests and professional football performance, with the notable exception of sprint tests for running backs. The combine consists of series of drills, exercises, interviews, aptitude tests, and physical exams designed to assess the skills of promising college football players and to predict their performance in the NFL. Sports which are speed based like running (see next page) and swimming strength and conditioning does aid performance. One systematic review of swimming showed that combined swimming and strength training regimen seemed to have a better effect on swimming performance than a swim only.

Does strength and conditioning improve run performance?

It is very clear that strength training may help in run performance. A 2016 meta-analysis of multiple studies on the impact of strength training on running found a “large beneficial effect” on running economy — the ability to use less oxygen at the same pace — three to four percent less, which is considerable in terms of performance. Most of the five studies included two to three strength sessions per week at low- to moderate-load in the range of 40 to 70 percent of one-rep max. In general, the studies involved two to four different exercises plus plyometric jumps and sprints. The bottomline, when you look at all this research, you can not do one sole conditioning activity to be prepared for a sport (example: running). You need to develop a fitness plan that includes cardiovascular exercise, strength training, balance, and mobility/flexibility. This will help decrease your chance of injury and improve performance.