

Avoiding Injury and Preventing Injury

Arthur Jones

Exercise should help to avoid injury...not cause injury. But it can do either. It can strengthen the muscles and the joints of an athlete to such an extent that the possibility of a directly sports-connected injury is greatly reduced.

OR...if improperly performed, it can cause an injury that might never have occurred on the playing field.

Exercise can CAUSE INJURY in at least two different ways...(1) an athlete may injure himself while performing an exercise, an injury that is a DIRECT result of exercise...or (2) an athlete may hurt himself on the field as an INDIRECT result of exercise.

Injury that is directly caused by exercise will usually be obvious, you will normally be aware of such an accident when it happens and will thus know where to place the blame. But INDIRECT injury may not be so easy to recognize...since it will not result from a single cause and effect type of situation that makes itself known immediately.

For example, if an athlete pulls a thigh muscle while performing squats in the gym, you will know exactly where to place the blame. But if, instead, he pulls a hamstring on the field...you might not realize that the injury was an INDIRECT result of exercise. And it might not be...BUT IT COULD BE.

If an exercise program results in a disproportionate muscular development in antagonistic muscles, then it is almost literally asking for trouble. For example, if you develop great strength into the muscles of the frontal thigh, while doing little or nothing to increase the strength of the rear of the thigh...then you might actually cause an injury. An injury that would probably occur on the field, and that probably would not be blamed on exercise.

Unfortunately, since the blame for such indirectly caused injury is seldom placed where it belongs, it is utterly impossible to even estimate the number of such injuries with any reasonable degree of accuracy...but I am personally convinced that the number would be quite high.

Thus, the KNOWN injuries from exercise, when added to the UNKNOWN injuries equals a high but unsuspected total.

Balanced against this unknown total, we have only another UNKNOWN factor in the way of compensation...since, obviously, it is also impossible to estimate the number of injuries that were PREVENTED by exercise. After all, who can even guess just how injuries "might have happened?"

So on the surface it may well appear that exercise merely causes injuries...while offering nothing in the way of value in return.

But in fact, simple common sense also makes it obvious that a stronger man is less likely to be injured in any given situation...and that a more flexible man is also less prone to injury.

Many years ago, when I first started flying, a student pilot was required to practice spins, and proper recovery from spins. Then somebody decided that more people were being killed as a result of such training than as a result of accidental spins. Whereupon, they stopped teaching students spins and spin recovery.

Now, somebody else has suddenly noticed that quite a large number of supposedly well-trained pilots are killing themselves as a result of accidental spins...probably because they don't know what to do if an accidental spin occurs, never having been taught the proper procedure. In such situations, it is almost impossible to come up with anything even approaching a reliable set of statistics...and I will personally be very surprised if any meaningful statistics are ever produced to indicate the actual value of exercise for the purpose of preventing injuries. So, in such cases, we must simply rely on common sense, self-evident truth, obvious fact...call it what you may.

And injury is caused when a FORCE is imposed upon a muscular structure (or a joint) to the degree that the FORCE exceeds the BREAKING STRENGTH of the body part, the muscle or joint. That much is undeniable...and thus it follows that the injury would NOT have occurred if the breaking strength had been greater than the force.

If a rope has a breaking strength of 100 pounds, then it will not break as a result of 50 pounds of force. But if its breaking strength is only 40 pounds...then 50 pounds of force must break it.

You, as a coach, can do little or nothing to reduce the forces that will be imposed upon your athletes on the field. But you certainly can increase the breaking strength of their muscles and joints.

In some cases, the forces will be so great that no possible level of human strength would be high enough to prevent injury...but even in these cases, the extent of the injury may well be reduced as a result of exercise-developed strength. Thus exercise will reduce the level of damage in many cases...as well as preventing injury in many other cases.

So much for "preventing injury"...even in the lack of statistics to prove the value of exercise for the purpose of preventing injury, it is obvious that exercise does help prevent injury and that it also reduces the extent of damage in many other cases.

But we still need to look at the subject of "avoiding injury." We need to be aware of the factors that cause most training injuries, the type of injuries that are directly caused by exercise. Almost all of which injuries could be easily avoided.

AGAIN...such injuries result when the force exceeds the breaking strength of a muscle or joint. So the force that is involved in exercise should be as low as possible without reducing the productivity of the exercise.

Which may, at first glance, appear to present a paradox...since exercise consists of exposing muscles and joints to force. But in fact, no paradox exists...it is easily possible to produce maximum-possible strength from exercise while avoiding at least a large part of the force that is usually involved in exercise. Un-required force that does absolutely nothing in the way of increasing strength, while causing almost all injuries that are a direct result of exercise.

Bad form, or style of performance, is the culprit in almost all such cases...and this usually involves sudden, jerky movement. Which jerking greatly increases the forces imposed on the muscles and joints.

But in practice, thousands of athletes train in a way that may well be the most dangerous manner...meanwhile believing that their style of training is quite safe. AND...meanwhile avoiding the most productive part of their exercises under the totally mistaken impression that they are thereby helping to avoid injury.

So they train in a dangerous manner, while considering it safe...and avoid an actually productive style of training, because they wrongly consider it dangerous.

Most people are absolutely convinced that a “hard” exercise is a “dangerous” exercise...and sometimes, in a few special situations, this may be true. But in most situations encountered, in exercise, it is exactly the opposite of the truth...it is utterly false.

REMEMBER...force causes injuries.

It matters not at all how hard it “feels”...all that matters is the force in relation to the breaking strength. Since we are never aware of the exact, momentary breaking-strength, all that we can do is reduce the force as much as possible, while still working the muscles as hard as possible.

And again there is no paradox involved, as the following example will clearly prove.

If you walk into the gym with the momentary ability to curl 150 pounds...and if you actually curl 150 pounds...then you will be working as hard as you can at that point of time...and you will also be producing maximum-possible force.

And if it happens that the momentary breaking strength of your tendons is only 140 pounds...then you will injure yourself. Under those circumstances, injury is unavoidable.

But, if instead, you used a barbell weighing only 120 pounds...and if you performed several repetitions with this lighter weight...and if the form was good and the movement fairly slow...then you would probably never produce more than 125 pounds of force, which would be less than the breaking strength of your tendons...and the injury that was unavoidable with 150 pounds is thus avoided.

During the first repetition with this lighter weight, the resistance would “feel” lighter...because, at that point in the exercise, the resistance would be well below the momentary strength level of your muscles.

During later repetitions, the same resistance would feel much heavier, much “harder”...but in fact, the weight has not changed. All that has changed is your momentary strength, which has been reduced as a result of the first few, seemingly light, repetitions.

And when you reach the final repetition, it will feel very heavy indeed...but again, the weight remains the same.

In fact, if the exercise is performed from the first to last in good form, then the actual force will be lowest in the final repetition...because the speed of movement will be less at that point.

So the final, seemingly hardest repetition will feel very “hard”...and it is probably only natural for people to feel that it is the most dangerous repetition, because it feels that way. But in fact, it is the safest repetition in the exercise...because, at that point in the exercise, you are no longer strong enough to produce a force high enough to hurt yourself. Not, at least, if you avoid jerking.

As a result of the widespread misunderstanding that exists in regard to these actually very simple points...misunderstanding that has probably resulted from the fact that nobody ever bothered to consider the actually-involved factors in the light of physical law...most athletes avoid the final, seemingly hardest, repetitions. Mistakenly believing that they are thus avoiding injury...when, in fact, all they are avoiding is the most important and most productive part of their exercises. And the safest part as well.

Exercise builds strength by exposing muscles to an “overload”...to a level of work that is beyond the limits of momentary ability. Or, at least, well inside the existing level of reserve ability...far beyond the limits of normal ability.

But it is neither necessary nor desirable to expose a muscle to a maximum workload when it is fresh and strong...and doing so is dangerous.

If, instead, the muscle is “pre-exhausted” by the performance of several repetitions against a resistance that is well below the starting level of strength...then, later in the exercise, when a point of muscular failure is reached, the forces involved will be greatly reduced.

Upon reaching a point of momentary muscular failure, the resistance will certainly feel much heavier than it did at the start of the exercise...but that is merely an illusion produced by the fact that your **MOMENTARY** ability has declined to the point that you are unable to produce enough force to move the weight.

In the example given above involving a curl with 120 pounds, 125 pounds of force might have been produced during each of the first few repetitions...but at the end of the set, when movement is momentarily impossible, you may be producing only 110 pounds of force, or less.

And if 125 pounds of force didn't hurt you...then 110 pounds of force certainly won't hurt you either. Regardless of how it “feels” at the moment.

The breaking strength of a muscle (or tendon, or joint) doesn't decline during an exercise...it remains unchanged during exercise. All that happens is that your muscles become progressively weaker until they reach a point where it is impossible for them to continue with the available resistance.

If an injury is going to be produced by an exercise, then it will usually occur during the first few repetitions...simply because the forces are highest at that point in the exercise.

With the exception of Olympic weightlifters, athletes should NEVER be required to lift as much weight as possible for a single, maximum-attempt repetition...such lifts are not required for building maximum strength, and they greatly increase the danger of injury.