

Prescription for Rehabilitative Strength Training

There are several exercise options open to your members who want to continue strength training while rehabilitating an injury.

By Matt Brzycki

AS MUCH AS ACTIVE individuals try to avoid getting hurt, injuries are an unforeseen and inevitable occurrence. In many instances, an individual who suffers an injury eliminates all strength-training exercises — even those that involve uninjured body parts. Yet, it is important to continue some type of strength training whenever possible, even in the event of an injury.

Many authorities have suggested that a muscle begins to lose size and strength if it is not stimulated within 48 to 96 hours of a previous workout. There is some anecdotal evidence suggesting that it may be a longer time for some individuals. Nevertheless, a loss of muscular size and strength will occur after some period of extended inactivity. Moreover, the rate of strength loss is most rapid during the first few weeks. Because of this, a prescription for rehabilitative strength training can prevent a significant loss in muscular size and strength — provided that it can be done without pain.

In general, injuries can be classified as either traumatic or non-traumatic. Traumatic injuries are severe and include fractures and muscle tears. Non-traumatic injuries are less serious and are often due to overuse, such as tendinitis and bursitis. In the event of an injury, the injured area should be evaluated and treated by qualified sports medicine personnel (athletic trainers, physical therapists, etc.). Regardless of the nature of the injury, it will have some impact on strength-training activities. In fact, some injuries — especially those that are traumatic — might not permit any training of the injured area whatsoever. But exercise can often be performed for other parts of the body. And in some cases, people may be able to address their injured body part directly by modifying their existing programs.

Program adjustments

There are several exercise options and program adjustments for someone who wants to continue strength training an injured area or body part. These methods are not intended for injuries that are viewed as very serious or extremely painful. A person should receive approval from a certified sportsmedical authority before initiating any pre-

scription for rehabilitative strength training. Ken Mannie, strength and conditioning coach at Michigan State University, suggests that the approval should also include a report of the specific nature and severity of the injury. This information should be relayed to the strength and fitness professional to determine an appropriate exercise prescription.

Rehabilitative strength training can be performed by applying the following guidelines:

1. Lighten the resistance. One of the first steps in rehabilitative strength training is to reduce the amount of weight being used. Reducing the resistance will lessen the stress on the tendons and muscles, and may allow the person to perform the exercise in a pain-free manner. The amount that the weight is reduced depends upon the extent and the nature of the injury.

2. Reduce the speed of movement. Slowing down the speed of movement is often done in conjunction with decreasing the amount of resistance. Reducing the repetition speed will decrease the orthopedic stress placed on a joint. John Thomas, strength and conditioning coach for the Penn State Football Team, sometimes has his players perform 20-second repetitions when training their injured areas (raising the weight in 10 seconds and lowering it in 10 seconds). As the injury heals, an individual can gradually return to a normal speed of movement.

3. Change the exercise angle. If pain persists during certain exercises, it may be possible to change the angle of the exercise, which essentially changes — and restricts — the angle that the limb is moved through. This option can be used with many exercises for the upper body, and particularly with those that involve the shoulder joint. If an individual has slight shoulder pain when doing a supine (flat) bench press, in some cases, if the angle is changed to a decline press, there will be significantly less orthopedic stress on the shoulder joint. Likewise, some people experience pain due to shoulder impingement when performing a seated (or shoulder) press with the bar positioned behind the head. Generally, the discomfort can be lessened considerably by changing the angle of the push. This can be done by performing the movement with the bar in front of the head rather than behind the neck.

Similarly, some people experience pain from shoulder impingement when doing a behind-the-neck lat pulldown with an overhand grip. In this instance, the discomfort can be alleviated by grasping the bar with the palms facing the

Matt Brzycki is coordinator of health, fitness, strength and conditioning at Princeton University. He has authored three books, co-authored another and written more than 150 articles on strength and fitness for 30 different publications.

torso and pulling the bar to the upper chest instead of behind the neck.

4. Use a different grip/hand position. In regard to the shoulder joint, many times there is less orthopedic stress when a different grip/hand position is used. If an individual has slight pain when doing an exercise such as the supine bench press, it is possible that there will be a significant reduction in pain by simply using dumbbells to change the grip to a parallel one with the palms facing each other. In movements for the upper torso, changing the grip in this manner causes the head of the humerus to rotate laterally, which may relieve the stress in the shoulder joint.

Any exercise that can be performed with a barbell can be performed with dumbbells. These exercises include the bench press, incline press, decline press, seated press, upright row, shoulder shrug, bicep curl and tricep extension. As such, there is an option for varying the grip for just about every exercise involving the upper torso. Additionally, many machines allow individuals to vary their grip/hand positioning without any loss of technique or function.

5. Perform different exercises. Yet another option for rehabilitative strength training is to perform different exercises that require the same muscle groups. For instance, if a person simply cannot perform a lat pulldown without experiencing shoulder pain, then a seated row or a bent-over row can be substituted for the lat pulldown. All three of these exercises involve the same major muscles, namely the upper back (or "lats"), biceps and lower arms.

6. Bypass the injured area. One of the biggest advantages of machines is that they allow exercisers to apply the resistance above a joint so that it does not involve an injured area. With a wrist injury, a person could still use machines to perform a variety of movements that target the major muscles of the upper torso without involving the wrist joint. Among the exercises that bypass the wrist area are the chest fly (the "pec dec"), pullover and lateral raise. These movements could be performed on machines even if a wrist were in a cast.

In addition, if a person's leg were immobilized with a cast from the mid-thigh to the ankle, it would not be possible to perform traditional hip exercises such as the squat, lunge and deadlift. It would be possible, however, to circumvent the knee joint and exercise the hips — despite the cast — by doing single-joint, isolation movements with machines such as hip abduction, hip adduction and hip extension.

7. Limit the range of motion. There is a good possibility that pain only occurs at certain points in the range of motion (ROM), such as the starting or the mid-range position. In either case, an injured person can restrict the ROM for the exercise. For example, an injury such as a hyperextended elbow or knee is especially painful at the beginning (or stretched position) of the movement. In this instance, a person should not lower the weight all the way down. If pain occurs at the mid-range position of an exercise, a person should stop short of full muscular contraction (i.e., flexion or extension). Many machines also offer range-limiting devices. This enables a person to restrict the ROM in a precise, repeatable manner. And, the ROM can sometimes be adjusted in fractional increments without exiting the machine. As the injured area heals, an individual can gradually and carefully increase the ROM until it is possible to perform repetitions that are pain-free throughout a full ROM.

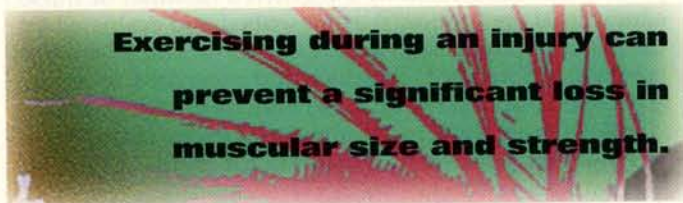
Mike Bradley, assistant strength and conditioning coach at Stanford University, sometimes prescribes static (or iso-

metric) contractions of varying durations to exercise the muscles at pain-free positions. This can be accomplished by securing the lever arm of a machine so that it cannot move, and then exerting force against this immovable resistance. It can also be done by exerting force isometrically against another person who is applying manual resistance. As a measure of added safety, Bradley recommends a gradual build-up of force for 60 seconds to fatigue and weaken the muscle before maximum effort is produced. Then, the lifter can exert maximum (pain-free) effort for an additional 30 to 60 seconds.

8. Exercise the good limb. If all else fails, exercise can still be done for the unaffected limb. For example, a person in a left-ankle cast would not be able to perform any exercises that involved any ROM for this joint. Even so, strength training could still be done for the right ankle. This has important ramifications in rehabilitative strength training, since some research has shown that training one side of the body will actually affect the muscles on the other side of the body. Researchers are not exactly sure why this occurs, only that it has. This phenomenon has been dubbed as "indirect transfer" or "cross transfer."

Many exercises can be performed on machines in a safe and comfortable fashion with one limb at a time. Furthermore, numerous machines are equipped with independent movement arms that allow an individual to train the limbs separately if needed. If machines are not available, dumbbells and manual resistance are other options for one-limb training.

9. Exercise unaffected body parts. If a person cannot exercise an injured area due to pain or discomfort, movements can still be performed for uninjured body parts. For example, if an individual has a knee injury that prohibits activity for the lower body, exercises can still be performed for the entire upper torso — as long as the exercises are done sitting or lying down. Likewise, if a person has a dislocated shoulder



that does not allow activity for the major muscles of the upper body, exercises can still be performed for the lower body, the arms and mid-section — provided that it does not indirectly produce shoulder pain.

Pain-free choices

Safely exercising during an injury can prevent a significant loss in muscular size and strength. Remember, though, that the critical factor for rehabilitative strength training is pain-free exercise. That said, it is important to understand that there is a distinct difference between muscular pain and joint pain. Muscular pain is not necessarily cause for alarm. It is an indication that high-intensity work is being done and that the muscle is being fatigued. However, joint pain is something else. Localized pain in a joint usually means that there is some type of structural problem. Individuals who experience pain in their joints while exercising are merely aggravating their condition and perhaps even causing further damage by brutalizing their joint infrastructure. An exercise that produces joint pain must be avoided or altered. **FM**