Analysis of the Leg Press

By Peg Conradt and Karen Knortz

Introduction

The leg press has long been used by athletes to develop leg power and strength. Its popularity is partially a result of versatility in terms of equipment utilized. It is also widely accepted as a good general strengthening exercise for the lower body because of the many large muscle groups developed. Though this exercise is a good choice for most individuals, athletes who experience knee problems, specifically 'runner's knee' or 'jumper's knee', may have to modify the leg press somewhat. As always, the best insurance for safe and efficient strength and power gains is proper quantity and technique.

Apparatus

Common to almost every high school weight room is the leg press unit, consisting of a seat, pedals, and a weight stack. Some athletes use the bench press station for leg presses by lying on the floor and pushing into hip and knee extension with the soles of the feet against the bar. In recent years the hip sled has become popular, especially with athletes doing heavy training for such sports as football, wrestling and some field events. Performed in the supine (lying) position, the athlete places the feet against a bar loaded with free weights, and pushes into hip and knee extension. While the leg press unit and the hip sled are adjustable to accommodate differing leg lengths, improvising with a bench press unit does not permit this, and the result is often strengthening through an incomplete range of motion. Moreover, because the angle of hip flexion is approximately 90° in the improvised leg press, it is not specific to sport movements, in which hip flexion is generally 60° or less. Both the leg press and hip sled exercises are done in 45°-60° of hip flexion. Some potential problems encountered with the leg press unit are that the feet can slip off the pedals injuring the lower leg, and that low back stress may result from lack of back and upper body stabilization. These problems do not occur when using a hip sled because of its design, and because the stability of the back and upper body are assured in the supine position. When utilizing a circuit program, however, the ease with which weight can be changed on a leg press unit is an obvious advantage. The following analysis is of the leg press as performed on a leg press unit because it is probably the most commonly used apparatus.

Technique

The seat is adjusted so that with the feet on the pedals, the athlete’s knees are flexed at a 90° angle. The back rests firmly against the seat back, the hands grasp the bars at the sides of the seat, and the balls of the feet are in contact with the center of the pedals. The pedals are pushed away from the body (concentric phase) in a smooth and continuous motion to full knee extension, followed by plantar flexion at the end of the range. While speed is desirable, the exercise should not be performed so fast that it is ballistic, or so that there is danger of the feet slipping off the pedals. During the return (eccentric phase) the legs are brought back in the same smooth and controlled manner until the weight barely touches the remaining stack. There is a very slight pause between repetitions. It is extremely important that the exercise be performed through full range of motion.

Applied Anatomy

Joint movements occurring during the leg press are hip and knee extension, and plantar flexion. Thus, the following muscle groups are de...
veloped: gluteus maximus, hamstrings, quadriceps, and gastrocnemius. The leg press is generally considered to be a quadriceps strengthening exercise; however, because of the hip extension involved, the gluteus maximus and hamstrings are developed somewhat. The leg press is a total limb movement and does not isolate a specific muscle group.

Special Considerations

There is an inherent problem in all exercises in which the knee extends against resistance from a flexed position. The greater the amount of knee flexion, the greater is the compressive force driving the patella (kneecap) into the femur (thigh bone). In fact, the compressive force goes from 1x body weight to 6x body weight as an athlete goes from a knee position of 90° flexion to a full squat (without weights). This tremendous force can cause an irritation of the cartilage on the underside of the patella and the tendon from the patella to the tibia (top of the shin). Commonly referred to as “runner’s knee” and “jumper’s knee” respectively, these injuries are characterized by pain below, to the side of, or underneath the patella. This does not occur in but a few select individuals who, owing to structural factors, are predisposed. It can, however, occur as an overuse injury in an athlete who causes irritation due to too much weight, too many repetitions, or a combination of the two. Athletes who experience this type of knee pain should perform the leg press only through the last 20° of the motion, during which the knee moves from 20° of flexion to full extension.

It can be said that for the leg press, and all forms of weight training, that when performed properly and in a progressive manner, the risk of injury is minimized while the benefits of strength and power development are maximized.

The leg press has long been used by athletes to develop leg power and strength.

---

** YORK ALONE AT THE TOP **

The key to credibility in Olympic weight equipment is consistency, quality and a complete understanding and commitment to the athlete. This combination led the International Weightlifting Federation, after careful examination, to recognize the YORK barbell as the ONLY United States produced barbell for use in international and Olympic Games competitions.

This designation means that only YORK BARBELL has met all of the exacting specifications required by the IWF. In fact, YORK goes one step further. Every YORK Olympic barbell shipped anywhere meets these specifications.

Buy America’s one and only. Buy YORK!

YORK Barbell Co., Inc.  
P.O. Box 1707 York, Pa 17403  
Telephone (717) 767-0461