

Developing Hip Power for High Performance Athletics

By Mike Young

Many people understand that lower body power is the key to performance in the large majority of sports. One thing that is misunderstood though is which muscles and motions are responsible for this performance and how to most appropriately train to maximize performance. This article will attempt to address these issues.

The muscles of the leg can be divided into anterior (frontal) and posterior (rear) categories. The major anterior muscles are those of the quadriceps muscle group. They primarily act to extend the knee and flex the hip. The major posterior chain muscles are the gluteus and hamstring muscle groups. These muscles are primarily responsible for extending the hip and, in the case of the hamstring muscles, flexing the knee. A common misunderstanding is that the knee extensors (aka the 'quads') are the most important muscle of the legs for athletic performance. This is because they seem to make the most readily apparent contribution to activities like jumping and running.

In truth, the posterior chain muscles are just as, if not more important for lower body power than the muscles of the anterior chain. So even though explosive knee extension is more commonly associated with activities like running and jumping, the reality is that hip extension is almost always occurring simultaneously and may be a greater contributor to performance than knee extension.

Several anatomical and physiological mechanisms explain this phenomenon. Athletic activities primarily involve a combination of hip extension and knee extension. Previous research has indicated that a proximal-to-distal firing pattern is the most efficient movement strategy for performance. This means that the muscles closer to the trunk (in this case those acting on the hip joint) should be employed prior to those responsible for movement at joints further from the trunk (in this case the knee and ankle joints). This proximal-to-distal movement strategy is more effective because it takes advantage of the higher strength and power capacities of the more heavily muscled proximal joints (such as the glutes) to overcome an athlete's inertia before using the less heavily muscled distal muscles for enhancing the speed of movement.

This indicates that even though both hip and knee extension are important, the effectiveness and contribution of the more distal knee (and ankle) extension is likely dependent on the actions of the hip that precede them. Add to this the fact that the muscles of the gluteus muscle group are among the most dense of the entire body and capable of producing tremendous force and power at the hip joint; and that the bi-articular hamstring muscle group is a powerful hip extensor that can also help to transfer power generated at the hip joint to the knee joint; and you can quickly see how important the muscles that produce hip extension can be to athletic performance. It is for these reasons that I call the glutes and hamstrings the 'engine for athletic performance.'



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With these points in mind, the important question remains about what are the most effective means and methods of developing explosive hip strength and power to best improve performance. The first point that should be obvious is that movements that focus on the muscles that produce hip extension should be emphasized. Furthermore, because of the complex interaction of joints and muscle actions detailed above, it's important for athletes to use activities that train movements rather than just muscles.

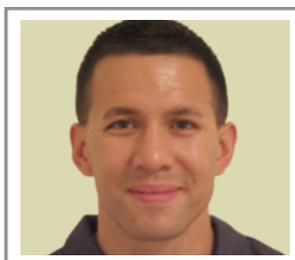
More specifically, multi-joint movements that activate the muscles in the appropriate proximal-to-distal movement sequence should be selected at the exclusion of single joint isolation movements which do not mimic the complex mechanical and neuromuscular coordination that occur in 'real life' athletic movements. In light of these points, activities like squats, dead lifts, lunges, and step-ups would be appropriate weight room exercises to develop the muscles surrounding the hip in a manner specific to what will be needed in athletic movements. There are endless varieties of these exercises that can be used to develop the muscles surrounding the hip joint while continually introducing the variety that is so beneficial for both adaptation and fighting off training monotony.

With regards to squats, I would suggest two specific techniques to maximize development of the hip muscles responsible for hip extension. The first is characterized by a low bar position (on the trapezius) and a wider stance technique with an emphasis on pushing the glutes backward on descent. This technique is most frequently seen in power lifters. The second technique that I recommend for maximum development of the hip extensors is characterized by a high bar position, a shoulder-width stance, and an emphasis on achieving a depth well below parallel. Because of the insertion points and length-tension relationships of the posterior chain muscles, these exercises provide the best opportunity to focus training on the desired area. Olympic lifts in particular are also great for developing explosive strength and power in the hip extensors and also training the triple extension of the hip, knee, and ankle in a coordinated proximal-to-distal movement pattern that mimics what is observed in most athletic movements.

In addition to weight training, plyometric exercises such as hopping, jumping, and bounding will dynamically build explosive power in the hip region. Selecting plyometric exercises that involve explosive hip extension followed by knee extension will help to 'bridge the gap' between the strength developed in the weight room and the speed and power needed for athletic performance. They will also enhance the neuromuscular coordination necessary to move most efficiently.

Now that appropriate exercises have been detailed, remember that if power development is the goal, intensity rather than volume is the key training parameter. As such, employ lower rep schemes with either heavier loads or light to moderate loads with the intent to move as fast as possible. Longer rest periods will likewise be necessary to ensure that athletes can maintain intensity without excessive fatigue.

I hope this article has provided information regarding the importance of the muscles surrounding the hip joint, especially those responsible for hip extension. To maximize sport performance, training the hip extensors in a manner similar to what is observed in the sport of choice is vitally important.



Meet Mike our Human Performance Expert!

Mike Young is founder and owner of Human Performance Consulting. Mike coaches the HPC Elite Track Team whose members compete at the international level in track and field. Mike has a PhD in Biomechanics and has worked with many Olympians, National Champions, and Collegiate National Champions in the sport of Track & Field as well as training athletes from a variety of other sports.

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