

**Optimum Performance Through Movement**  
*providing education and physical rehabilitation services*

# THE KNEE BOOK

*Self care for knee problems*

Knee pain is a common problem affecting 25-34% of the population. It affects both athletes and sedentary individuals. When experiencing knee pain it is important to address the problem so that it does not evolve into a chronic condition. Pain and swelling will result in inhibition of the quadriceps musculature which is important in controlling the motion of the knee cap (patella). Lower extremity muscle weakness and tightness can lead to improper mechanics at the knee joint, perpetuating pain by irritating the soft tissue, and causing damage to the cartilage. Therefore, it is important to recognize the signs and symptoms of inflammation (pain, swelling, the skin appears red, the skin is warm to touch, and loss of function) so the problem can be addressed.

### **Controlling Your Pain**

**Ice:** Ice is very effective in controlling pain and minimizing swelling. It should be used for about 15 minutes as often as necessary. Be sure to place a thin towel between you and the ice. A faster and more effective method is with use of an ice cup. Freeze water in a dixie cup and rub ice in a circular motion along the surface of the knee for five to ten minutes or until the skin is red.

**Medication:** Use prescribed medication as instructed by your physician. If you are relying on "over the counter" anti-inflammatory medication such as motrin, ibuprofen, or aleve, use as directed. If you have high blood pressure, gastrointestinal problems, or are taking anticoagulants, consult with your physician.

**Rest:** It is important to allow time for the tissue to heal with rest. Therefore, it is important to avoid activities that may cause added stress to the tissue. The following activities should be avoided when experiencing symptoms: running, walking up and down hills, wearing high heels (this type of shoe restricts ankle motion which results in added stress at the knee), standing on hard surfaces for prolonged periods, and prolonged sitting positions. Refer to the graph illustrating patellofemoral joint compression with functional activities for additional information.

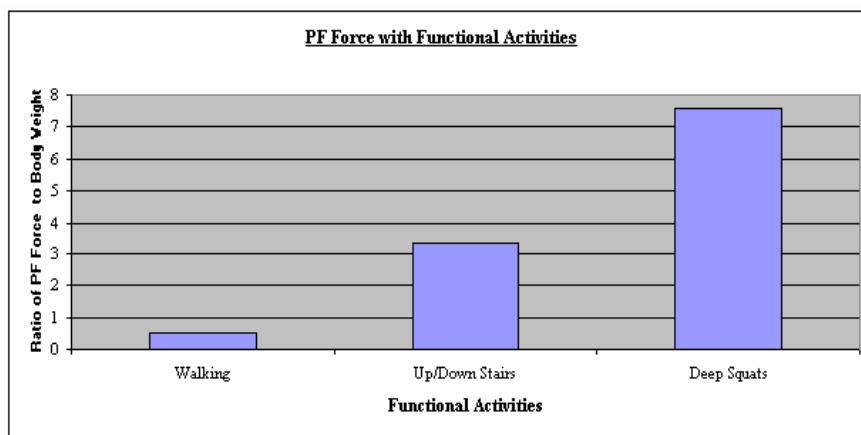
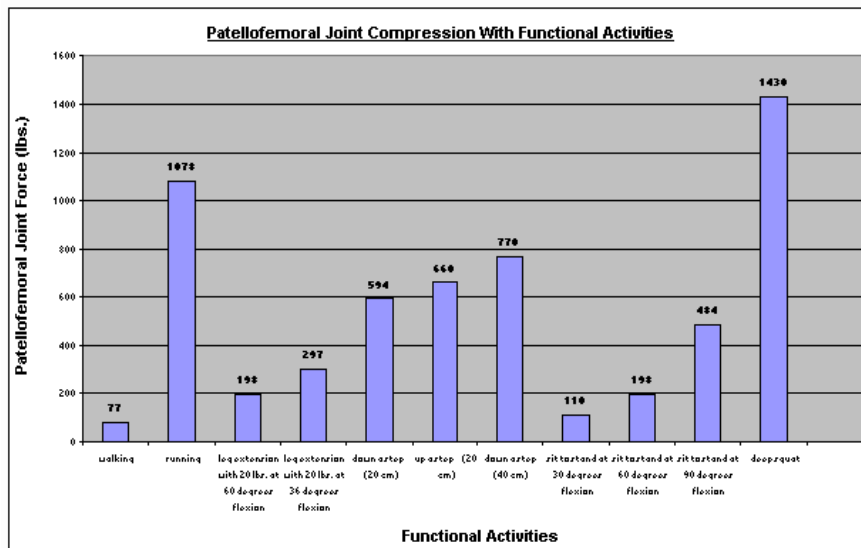
**Use of a brace or tape:** There are specific taping techniques which help control motion of the patella as well as modulate the pain. Compressive sleeve/braces can help control swelling and the motion of the patella.

### **Causes of Knee Pain and the Importance of Strengthening and Flexibility Exercises**

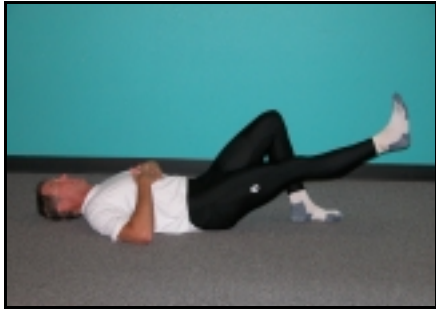
There are various causes of anterior knee pain: 1) muscle and movement imbalances of the lower extremity; 2) maltracking of the joint as a result of malalignment of the patella (knee cap) in the femoral groove (the patella glides on the femur as the knee bends/straightening); 3) overuse from activities 4) degenerative changes which result from various causes such as a high-impact blunt trauma to the region or a genetic predisposition. Identifying the underlying cause is essential for the appropriate rehabilitation program which usually will involve some combination of muscle flexibility and strength training, taping, orthoses (such as a knee brace), and modalities (i.e. electrical stimulation).

**The importance of strengthening and stretching the appropriate lower extremity muscles:** Weak gluteals and quadriceps as well as tight calves, hamstrings, quadriceps, and TFL musculature can result in stressful forces at the knee. Therefore, it is important to strengthen the weak and stretch the tight muscles when indicated.

**The importance of a strong quadriceps muscle:** Sometimes a maltracking problem results from a weak quadriceps muscle. Pain and swelling resulting from any of the causes listed above will inhibit the quadriceps muscle from working when it is supposed to. This muscle is a vital part in controlling the motion of the patella. Faulty mechanics at the joint can lead to the irritation of the tissue. If it becomes weak from disuse, long term problems can result. Therefore, it is important to strengthen the quadriceps muscle once the pain is controlled. The pictures below illustrate some important quadriceps strengthening exercises. Keep in mind that the exercises should be performed in a pain-free manner since pain will inhibit the activity of the muscle.



**Strengthening**



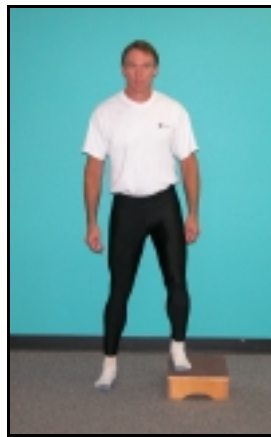
**Straight Leg Raise**



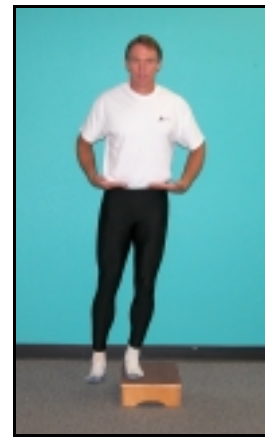
**Side Leg Raise**



**Hip Extension**



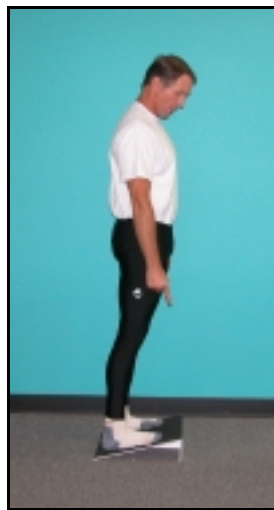
**Lateral Step Up**



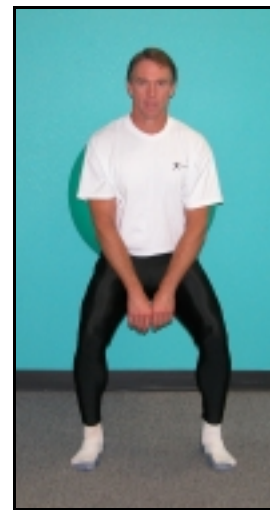
**Step Up**



**March in Bridge**



**Heel Raises**



**Wall Slides**

**Flexibility**



**Hip Flexor**



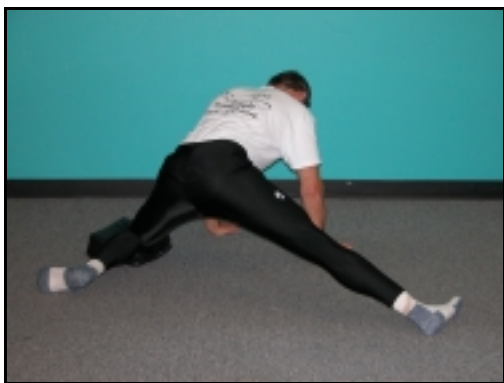
**Hamstring**



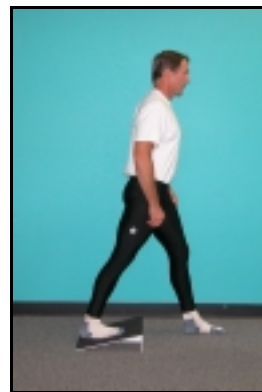
**Quadriceps**



**Quadriceps**



**Adductor**



**Calf Stretch**