Connections

Treating the Knee and Lower Extremities, Part I

BY ART RIGGS

As a veteran of seven knee surgeries resulting from my genetic roots of extremely bowlegged peasant ancestry, combined with excessive and, some might say, obsessive athletic overindulgence, I have a virtual PhD of personal research in acute and chronic injuries to the legs and recovery from surgeries. Through my own experience and the treatment of fellow sufferers, I've learned that the best treatment should include a wide range of approaches from soft-tissue muscular and fascial work, joint mobilization, stretching, strengthening, and neuromuscular reeducation.

Injury to any joint of the leg will necessarily impact the joints above and below. In addition to offering specific treatment strategies for the knee, this article will also discuss the complex interplay and feedback loops between muscles and all major joints in the legs and how to work with compensatory limping patterns that occur after injury. Today, with current health insurance restrictions, many patients rarely see their doctors for follow up or for more than perfunctory physical therapy after acute knee injuries or after the scars from surgery have healed. After my third knee arthroscopy and in spite of extensive conventional physical therapy treatment of strengthening, stretching, ultrasound, electrical stimulation, and various anti-inflammatory modalities, I still experienced considerable pain and limping patterns. I had essentially started to believe that my surgeries just didn't work well and that I must accept my fate, when a friend twisted my arm to see a physical therapist who eschewed many of the conventional physical therapy modalities and concentrated upon soft tissue manual therapy. I had never before experienced bodywork, but after one treatment of manual work to free restrictions in the muscles and fascia around the knee and some attention to compensatory holding in my hip and ankle, I felt that I had a new knee. So I suppose that I was actually lucky to have experienced my knee problems because my astonishment at the effectiveness is what led me into the bodywork field.

The benefits I continue to receive from hands-on treatment are not the proprietary domain of sophisticated physical therapy. With good manual skills and an understanding of the complex interplay of the joints from the foot to the hip, any massage therapist can really help clients recovering from injury. Unfortunately, many massage therapists are hesitant to work with injuries because they are given little instruction on dealing with post-injury or surgery cases except for caveats that instill trepidation. We will focus on the knees, but since injuries to the foot, ankle, and hip often present the same compensatory movement patterns as knees, the strategies in this article will be just as helpful for treating these injuries to return normal gait in a holistic manner.

These techniques are not magic bullets to be arbitrarily followed. Clients must be treated as unique individuals based upon their particular injury or surgery, their experience of pain or dysfunction, and their adaptive compensations in gait. As tempting as it is to move into specific techniques, it is essential to develop an understanding of the complex relationship between all the joints of the leg and how they influence recovery from injury so that therapists can have a logical plan for treatment, rather than just trying to work where it hurts or using some technique that looked good in a class or book.

NEUROLOGICAL FACTORS

When manual therapy and conventional western medical methods prove to be less than satisfactory, the success of Pilates and somatic therapies such as Feldenkrais Method demonstrates the importance of treating more than the specific injury site. The benefits of movement therapies are due to their understanding of the kinesiology and neurological patterns of how limping becomes established and hampers healing. It is short-changing your client to focus your attention on just the muscular issues at the injury site without considering joint compensations above and below the site of dysfunction and working to mobilize them.

The movement of the knee through extension and flexion is a sophisticated combination of spinal cord reflexes and conscious higher order brain function. To greatly simplify: When the quadriceps (the agonists in this case) contract, they extend the knee (The rectus femoris, along with the psoas, can also flex the hip, and will need to be addressed to return normal hip

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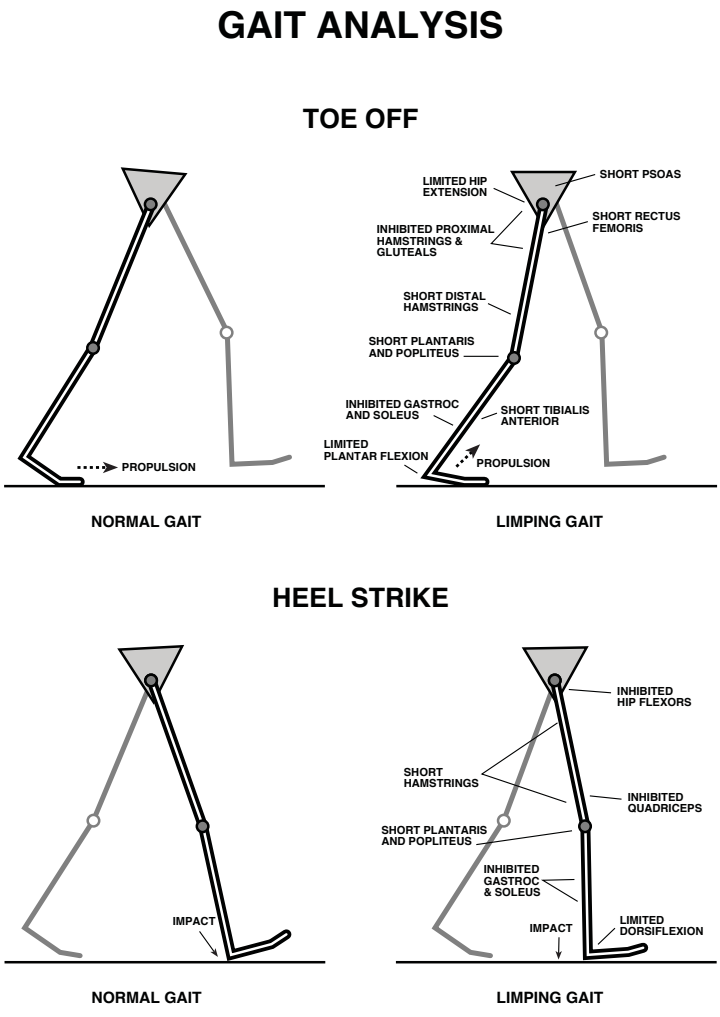
function in the later stages of recovery). In order to facilitate this action, the hamstrings (antagonists) must relax so the two muscle groups aren't competing with each other. Conversely, in knee flexion the hamstrings contract to flex the knee (or extend the hip if the knee is fixated) while at the same time, the quadriceps must relax. This process of contraction/relaxation of opposing muscles is called reciprocal inhibition and occurs at an unconscious reflex level in all parts of the body.

If there is pain or soft tissue restriction in the knee joint, a complex series of protective reflexes occurs that overrides the smooth function of reciprocal inhibition to compensate for the restriction or prevent the joint from moving into painful positions. This reaction may be useful in the early stage of recovery to prevent pain or protect the joint, but if the joint does not quickly return to normal pain-free movement, there is a likelihood of limping patterns being established that disrupt function above and below the knee. These global feedback loops tend to exacerbate and fixate the original injury. Understanding how the foot, ankle, and hip at first respond to and later continue to affect the knee is often the key to rehabilitation, not only of acute problems but long-standing chronic ones.

Although there are many different patterns for compensation in walking, limited knee extension demonstrates the most common limping patterns for knee pain. In part two of this article we will go into a deeper analysis of gait, techniques for joint mobilization, and some strategies for returning normal function to the feet and hips. For now, this illustration will give you a map of short muscles that you can begin working with to directly improve knee function.

Limited Knee Extension

In varying degrees, limited knee extension will have the following results in gait, including a short stride. If you can return normal extension to the knee (the primary restriction), then most of the secondary compensations in the foot and hip will improve with minimal intervention. Muscles that are inhibited will need to be strengthened, and any good sports medicine book will have suggestions. These images confine themselves to the pelvis and below, but notice how pelvic tilt is also affected and will have effects up the spine and beyond. If you consider how a tight psoas on the affected side will present side-bending and rotational strain on the lower back, it becomes clear how the effects of injury radiate globally.



TREATMENT STRATEGIES FOR THE KNEE

Even ideal techniques or soft tissue strategies may prove less than effective or possibly counterproductive if performed without considering clients' progress in their healing process. We all walk a fine line between providing effective work or occasionally working too hard or too early, thereby increasing inflammation. Never attempt to force inflamed tissue to release. The real skill in rehabilitation is gained through experience of determining what is constructive pain versus too aggressive intent.

It is understandable that both therapists and clients are anxious to progress as quickly as possible with recovery, but I feel that too early or aggressive intervention may disrupt the amazing ability of the human body to direct its own healing. Often, clients are hoping be quickly fixed by outside intervention or magic bullets. I prefer to look at my work as returning balance, thereby opening the door for their bodies to heal themselves. Giving clients confidence and trust in their body's recuperative powers is another gift that you can provide, in addition to your work.

After surgery, most orthopedists and physical therapists feel that if the incision is healing properly, it is safe to perform superficial work to reduce swelling, prevent adhesions from forming, and improve mobility after approximately seven days. To play it safe, I recommend waiting for at least 10 days, and always proceeding with authorization from the surgeon. The tissue will most likely be very warm from natural inflammation processes; it is strongly recommended that whenever working on injuries, you apply ice packs for 10 minutes after the session and have your client apply ice later in the day. Hot or very red, irritated tissue, especially if the client has a fever, is a serious problem after surgery, and the client should immediately contact his or her surgeon to rule out an infection in the joint. That said, what do you do when you first see a client after surgery or an acute knee problem?

Although clients may be concerned with the lack of knee flexion, the primary culprit in limping is a lack of knee extension, even if it is just a matter of a few degrees. Certainly you should work to improve flexion,

but in most normal, relatively level walking and running conditions, it is possible to navigate without limping, even with restricted flexion. Once you understand how the ankle, knee, and hip are related, you can begin to work with a rational strategy to return normal movement to the whole leg.

TREATMENT 1: FREEING THE SUPERFICIAL SLEEVE

This is really quite easy and gratifying work once you have a feeling for it, but it is quite different from typical kneading, effleurage, or deep muscular work of conventional massage. This work will facilitate improvement in both flexion and extension and the feeling of tightness surrounding the knee. The superficial tissue around an injured or surgically repaired knee will usually lack the resilience and mobility of normal tissue and feel leathery. This is a different quality from softer puffiness of deeper joint swelling which may also be present, but will give more easily because of the additional fluid in the joint capsule. It is almost as if a tight sleeve has been wrapped around the joint. This is the body's attempt to stabilize after trauma—either surgical or accidental—and should be the first issue addressed. The client will probably have some residual pain and fear, so it is crucial to move slowly and within the pain threshold.

With your fingers softly curved, take hold of as broad an area of tissue as you can with the soft pads of your fingers and the palms of your hands. Your intention should be very superficial, no more than a half inch deep, as you visualize very slowly beginning to first soften tissue and then unwind and separate this outer sleeve from deeper tissue and the joint. If performed properly, the client usually comments that it feels quite enjoyable (in an intense way) and freeing. The softening of tissue might feel like you are slowly letting your fingers test the ripeness of an apple while being careful to not bruise it. Gently grabbing the incision, lifting it and slowly moving back and forth (in a motion similar to skin rolling) is very helpful; again, the doctor's permission is needed for treatment soon after surgery. After softening the tissue, visualize that you are sliding this superficial layer around

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the joint in whatever direction it wants to stretch, unwind, and release—almost like very slowly wringing out a wet towel—being careful that you are grabbing and stretching tissue rather than sliding over it. There is little or no need for lubrication, which makes the skin slippery and requires more pressure to grab the sensitive tissue.

Sleeve Work

The release happens at the end range of restricted motion and at a very oblique angle (not from jostling tissue back and forth or working on deeper tissue). It is almost as if you are trying to free the lid from a jar, slowly applying steady pressure and waiting (hoping) that it will eventually release and move.

Photos and illustration courtesy of Art Riggs with thanks to model Joanne King.

You want that leathery superficial tissue to slide over the joint in all directions so it does not disrupt joint function. An effective technique is to rotate the outer sleeve of tissue as far as it will go and then ask your client to very slowly flex and extend the knee so that the joint moves under the sleeve that you are stabilizing.

TREATMENT 2: IMPROVING FLEXION

As mentioned earlier, flexion is rarely a lasting problem, and returning full extension should be a higher priority. However, most clients seem quite concerned with flexion and it is relatively easy to improve. Your goal is to increase joint range of motion and mobility at the end range restriction of tissue. Working in the neutral position is of minimal benefit. If superficial tissue has sufficiently healed and is not inflamed, take the joint to the end range of comfortable flexion and work to extend that end range either passively or by having your client actively flex the knee while you work on any soft tissue areas that are resisting. Your client can tell you where the tissue is tight and resisting movement.

Prone Knee Flexion Technique

To ensure that you are not stressing the knee capsule, be sure to have your client inform you if the restriction feels like it is deep in the joint rather than in the soft tissue you are addressing. Also make sure that the patella is not compressed against the table. Slowly flex the knee with your other hand and

address any areas distal to the knee that are restricting movement. The fist, fingers, or even the forearm are effective tools. In addition to freeing localized tissue where you are working, this will also stretch the quadriceps. This is the perfect time to offer your client suggestions about a home stretching program for rehabilitation.

Supine Knee Flexion

Address any soft tissue restrictions around the joint. This approach affords more contact with the anterior knee and patella as well as the quadriceps. Stretch the knee into flexion and ask where any restrictions are felt. You can use anchor and stretch strokes applying pressure proximally as you flex the knee against adhesions, or you can work in the direction of

lengthening by grabbing tissue and pulling it in that direction. To allow both hands to work, you may instruct the client to flex her knee by using her hands to pull the knee toward her chest, or use your own body to apply flexion pressure to the lower leg.

Seated Quadriceps Work

Good old-fashioned softening of the quadriceps with the forearm is always helpful. Of course working with your client in a supine position is also acceptable, but does not stretch the tissue or joint. Having the client sitting and actively flexing the knee as you apply force in a distal direction to

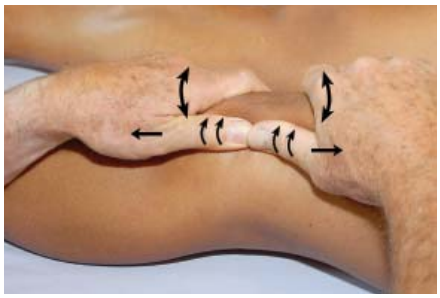
expedite lengthening is more efficient for biomechanical use of your weight and also assists with joint tracking and other neurological movement patterns. Anchor and stretch strokes applying force proximally while stretching the tissue by increasing flexion are also very effective for freeing more superficial adhesions around the knee joint.

TREATMENT 3: FREEING THE PATELLA

Even with deep joint injury or surgery, the patella often becomes restricted and can cause tendinitis and secondary pain. It is unfortunate that many early massage trainings instill fear of working in this important area. Be careful to not compress the patella against the femur when working, but do work for more ease in proximal/distal and lateral/medial movement. Tight tissue and tension in the iliotibial (IT) band and vastus lateralis most often will cause the patella to deviate laterally, so although not shown in this example, any work to lengthen and soften the IT band is very helpful. Don't try to accomplish too much in one session. A little work each time will be helpful.

Patellar Mobilization

The patella will only glide freely when the knee is fully extended (another reason to return full extension to the knee joint as soon as possible). Palpate the difference on yourself by attempting to slide your patella back and forth with the knee just slightly



bent, as it would be if supported by a bolster in supine position. Now let your knee rest in full extension (without contracting the quadriceps) and notice how much more easily the patella moves. To mobilize the patella, the knee should be extended as straight as is comfortable without a bolster.

With the soft, flat border of your thumb, gently lift the patella and slowly mobilize in all directions, waiting at end range of restriction for a softening of resistance. In this case, I am actually lifting and tilting the patella with my thumbs slightly below the anterior surface so it is not compressed against the femur. You can even rotate the patella clockwise and counterclockwise.

Soft-Tissue Patellar Work

In addition to mobilizing the patella by working directly with the bone as a lever, it is very important to soften tissue around the perimeter of the patella that can interfere

with tracking. Work slowly in all directions with fingers or knuckles and wait for the melt of tissue.

TREATMENT 4: FREEING THE ILIOTIBIAL BAND

With virtually every knee injury, the IT band will become tight and hard. Not only is this uncomfortable or painful for the client, but the tightness causes strain on the knee, pulls the patella laterally, and prevents smooth flexion and extension. The biggest complaint that some clients express for work in this area is that the therapist moves too fast and exerts pressure directly into the femur rather than obliquely. Although not shown here, work to release the tensor fascia latae and all of the gluteals is always helpful

With immobility after injury or surgery, adhesions may form along the anterior or posterior border of the IT band.

(remember that the gluteus maximus attaches directly to the IT band).

Working with the Iliotibial Band in Side-Lying Position

Just softening the tissue will be of substantial benefit, but putting the IT band on as much as a stretch as possible by having the leg extended in the side-lying position will add to the benefit of this work. In addition to stretching in a distal direction with

the soft underside of your forearm, grabbing the IT band and rotating it around the leg to free it from deeper adhesions is also very helpful.

Compartment Separation

With immobility after injury or surgery, adhesions may form along the anterior or posterior border of the IT band. Precise work along

either border with fingers is very effective to allow the band to stretch in a straight line and also to allow the patella to track correctly instead of being pulled too far laterally.

CONNECTEDNESS

I hope that this first of two articles provides some helpful strategies for working with knee injuries, and more important, stimulates some thought about the interconnectedness and global issues involved in treating not only injuries to the legs, but in treating any other injuries. The forthcoming article in the January/February issue will offer specific tools for returning full range of motion to the knee in extension and in working with joints. **m&b**

Art Riggs is a certified advanced Rolfer who has been practicing and teaching in the San Francisco Bay area and internationally for over more than 20 years. His graduate studies were in exercise physiology at the University of California in Berkeley. He is the author of Deep Tissue Massage: A Visual Guide to Techniques, *now in a second edition and translated into five languages, and the seven-volume companion DVD set. Visit his website at www.deeptissuemassagemanual.com.*

NOTE

1. *This article uses the more common use of the word* leg *to refer to the entire lower extremity, as opposed to strict medical terminology where* leg *specifically refers to the portion of the lower extremity between the knee and ankle.*

Editor's Note: *Massage & Bodywork* magazine is dedicated to educating readers within the scope of practice for massage therapy. This feature was written based on author Art Riggs' years of experience and education. It is meant to add to readers' knowledge, not to dictate their treatment protocols.