

**Yoga Therapy for
Anterior Cruciate Ligament Injury**

A Multi-Kosha Approach

Carrie N. Searles
carrie@yogarific.com
303.875.2438
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Under the supervision of
Mukunda Stiles

1A. Case study:

Alexis is a 24 year old female, 5'4" 120lbs. who has had a daily yoga practice (asana, pranayama, meditation) for 10 years. She works as a yoga instructor and a part-time secretary for a yoga therapist. Although she has taught and practiced yoga for a long time she is still insecure in her profession.

Tuesday morning, May 11 2004, Alexis received an insight while meditating: "while I enjoy playing recreational soccer, it does not support my dharma, or my purpose, I should quit." As a result Alexis decided to stop playing soccer at the end of the season. After meditation, she picked up her voice mail. One of the messages was from her indoor soccer league, "the team was dissolved, no soccer game tonight, or for the rest of the season." This left Alexis with just an outdoor soccer league team, one game a week for the next six weeks.

Saturday May 15 was a bright sunny day. Alexis was a little tired, she did not warm up before the game and was near the end of her menstrual flow. While running a straight line, no one around her, she started to stop, initiating a weight-bearing movement) and in the process she felt her knee joint move medially and then back into place, while making a distinct popping/shifting sound. This left Alexis *on her knees*. She knew she was hurt, and she should not walk on the injured limb, so she asked for help off the field. After some confusion her teammates understood there was something wrong. They carried her onto the sidelines.

Once on the sidelines Alexis applied the yoga technique of breath awareness, visualization and pranayama. She held her hands around her knee and imagined love and light around the area of pain. She wrapped the knee in an ace bandage (a way to apply compression to the joint to reduce swelling) and kept ice over it. After 30 minutes the pain subsided. She then slowly walked/limped back to her car and drove home.

Alexis did not walk for several hours, her knee began to swell and the joint became stiff. This is very common in an ACL injury, partial tear or rupture of the ligament. In Sports medicine they have the acronym R.I.C.E. in regards to the first steps in handling a sports (or any other traumatic) injury. Rest, Ice, Compression, and Elevation.

Rest: to calm vata, allow the joint to heal

Ice: to reduce pitta, inflammation

Compression (tightly wrapping the joint with an ace bandage): to reduce kapha, swelling and immobility.

Elevation: to improve circulation (V-P-K)

The RICE method works on calming all the doshas at the first kosha.

1B. Physical Assessment and Findings:

June 6th, 2004.

Alexis tracks well when walking a straight line. When walking up stairs her right knee moves medially, probably to avoid pressure on the medial meniscus of the knee due to a possible tear in the cartilage.

Client says that there is brief pain when she takes her right leg through full range of motion, mostly noticeable when carrying heavy objects. She has found that the regular use of BFS crème¹ takes the pain away. If she skips a day in applying the ointment she feels discomfort.

By December of 2004 (seven months post injury) Alexis started applying the BFS crème with less frequency and still felt comfortable.

Twelve months after the injury Alexis would apply the crème maybe once a week. She considered this treatment as a maintenance and precautionary measure rather than a necessity to abate pain.

C. Summary of Findings:

Right knee Left Knee
ROM

May 16		May 22		May 29	
R: 5°	L: 155°	R: 135°	155°	148°	155°

At the end of the second week after injury, Alexis was back to her normal yoga routine, except for positions that required full knee flexion such as kneeling, or complete full squats.

After five months, Alexis was at full flexion 155° on both knees. After six months Alexis was comfortable doing full squats, bearing full weight on right (previously injured knee) for 30 seconds with sustained comfort.

D. Recommendations:

The first step, as in any traumatic injury, was to reduce the trauma of the joint and surrounding muscles. Trauma is a vata imbalance. This can appear as extreme tension or rigidity of the muscles, guarding of the injured area, mental fear of using the joint or affected area, and pain. The body cannot move on and heal if it is still in a traumatic state.

The quality of vata is balanced by warmth, gentleness, oiliness, massage, breathwork, pranayama, love, tenderness, etc.

¹ For more information on BFS crème see page 17.

Alexis applied these techniques by practicing the Joint Freeing Series twice a day, eliminating the other asanas she was practicing previous to the injury. When going through the Joint Freeing Series she went slowly, with awareness, breathing into each joint as it was moving. Alexis did not bend or flex her right knee, as it was still in a traumatic phase of the injury, but left it straight and visualized doing the movement. Hence she was able to work with the knee therapeutically from the Prana Maya (breath) and Mano Maya (mental) kosha. She then continued to do the rest of the Joint Freeing Series, adapting so as to not hurt, or move her right knee.

She oiled her knee with a therapeutic salve, called BFS, or BFC, which stands for Bone, Flesh, and Sinew, or Bone Flesh and Cartilage respectively. When applying the salve she would rub the ointment onto the skin with the intention of rubbing the oil first into the muscles around the knee, then the ligaments, tendons and finally around the joint. She took arnica² internally for a week to help with damaged tissue.

Another technique Alexis used was therapeutic walking. While walking on her stiff and rigid leg she would go slowly and gently, so as not to feel any pain while moving. She directed prana and breath into the areas of the muscle that were still in trauma. She would talk to the muscles, recognizing that yes, they did indeed go through a traumatic event, and yes, it is okay and safe to start moving again. She promised the muscles that she would do her best to rehabilitate her knee and do whatever she could to prevent this event from happening again.

Alexis also received a massage around the area of the affected knee to help manually relax the muscles, her Tensor Fascia Latae and Rectus Femoris were especially tight.

Medical Treatment and Assessment

Wednesday May 19, 2004.

Doctor #1:

After examining Alexis's knee the doctor explained that the ACL was ruptured without a doubt. He is "95% sure," and as a result won't authorize an MRI. Alexis asked several questions about her options, including doing surgery, not doing surgery, possibility of living without an ACL, and the possibility that the ACL could heal on its own. The doctor recommended having surgery especially since she was very young and active. He explained that the procedure is very common with a high success rate. He said that without surgery Alexis would have to limit the movement of her knee, no planting or pivoting, no deep squats. To the possibility of the ACL healing on its own, the Doctor said yes, it is possible for the ACL to heal, but it would create so much scar tissue that it is not functional and gets in the way of the posterior ligament.

Upon leaving Alexis had a prescription to go to pre-surgery physical therapy. The prescription stated "Increase range of motion, reduce swelling, prepare for ACL surgery, counseling."

Thursday May 27, 2004.

Doctor #2.

² For more information on Arnica Montana see page 16.

At this point Alexis has normal range of motion in her injured knee, and it had not subflexed (moved out of position) or shown any other sign of being unstable.

Alexis was first examined by a nurse where she stated her concerns and curiosity of the initial Doctor's findings. She was doubtful of his diagnosis considering she was feeling well and was functional in her knee—ten days post injury. With this information the doctor came and examined her knee, and came to the same diagnosis as the first doctor—the ACL was ruptured, the ligament was severed completely. In the drawer and Lachman's test³ there is no catching whatsoever. He would not order an MRI, saying it was very obvious the ACL was ruptured and he did not want to spend the money on something that was already so certain. The doctor did admit that Alexis was walking normally and that this was abnormal for a person who had suffered from a ruptured ACL, especially ten days after the injury. The recommendation was still the same however: surgery. The reasons were the same also, youth and active lifestyle.

Physical Therapy:

Monday May 24, 2004.

Alexis came into physical therapy more out of curiosity than for the need to increase ROM and reduce swelling in her injured knee. She was still undecided on whether to have surgery and was interested to see what physical therapy would be like. During the initial evaluation the physical therapist was surprised that Alexis only experienced pain for the first 30 minutes after the injury. She was also surprised that she was basically back to practicing her normal yoga routine which included poses such as Virabhadrasana Variation II (Warrior II) which put the knee at an angle. After assessing ROM the findings showed that the right knee had 135° mobility, normal, but less than the left knee which was at 155° mobility. During this session Alexis received exercises to help increase strength of her hamstrings and the quadriceps Vastus Medialis, which are the muscles that help support the knee. The therapist examined Alexis's proprioception skills and ability to jump, pivot, stand on the injured leg and bend and straighten the knee on the floor and then with the foot on the edge of a step.⁴ After all these examinations in which Alexis excelled in doing without any pain or sign of instability the physical therapist was perplexed. She confided that there really was no need for more physical therapy but to go ahead and schedule two more sessions.

Wednesday May 26, 2004.

Alexis came in for a second physical therapy appointment where she went through more of the same strengthening and endurance tests as she did the visit prior. She observed other patients in the clinic who were going through different stages of ACL replacement rehabilitation and decided it did not look pleasant, and often times painful in the

³ For more information on the Drawer and Lachman's test see page 30.

⁴ See page 31 for specific physical therapy exercises.

beginning phases. Upon leaving the therapist said she was interested to hear the second opinion from the other orthopedic surgeon Alexis was scheduled to see the following day.

Friday May 28, 2004.

Alexis reported to her physical therapist that the second doctor gave the same recommendation as the first. By the end of the session the therapist confided in Alexis that if she was in her position, with her knee, she would not get surgery—rehabilitation is long and painful, and if the knee is already fully functional why go through something so long and arduous when it is not necessary. The only way to know for sure if a ligament is ruptured is through an MRI.

One year later:

Tuesday May 10, 2005.

It had been almost a year since Alexis injured her knee and she wanted to have her knee re-examined as a precautionary and maintenance measure. She saw a physician's assistant who specialized in orthopedics. After talking with Alexis and getting her history, the P.A. examined her knee. He said yes the right knee has more flex than the left, however it **does** catch. He could not say if it was just a partial tear or a rupture from the movement of the knee. He then did other knee evaluation tests. The P.A. stated that the knee tested very healthy, the joint was solid and stable. He continued saying that he would not see why any doctor would want to do surgery on her knee, with it being so strong stable and considering that she has had no problems with her knee since the injury one year ago.

“In order to heal, you must heal on *all* the koshas.”

Nischala Joy Devi⁵

Koshas

After sustaining this injury Alexis delved into a whirl wind of thoughts, confusion, and self-inquiry. Why did this happen? And what are all these new emotions that are being experienced? When Alexis *fell to her knees* and had to ask to be carried off the field, she was very humbled. It had been a long time since she had felt this way, and now she had a tangible experience to associate with this word.

A ligament carries the qualities of kapha: strong, stable, protective, static. This ligament was ruptured in Alexis’s body, and all the emotions that were stored in therein were now circulating throughout her system, at the surface of her consciousness too feel and experience once again. Kapha is the store house of deep seated emotions, and deep seated emotions that Alexis had tucked away were now being felt again. The qualities of devotion, surrender and feelings associated with religious practices and rituals—that she had forgotten and stored due to deep emotional scars—were now being remembered.

Through contemplation and discussions with her yoga instructor, Alexis gained an insight (fourth kosha, *vignana maya kosha*). She was not precisely sure what her dharma was, but was very much afraid of the power that she may channel when living out her dharma. As a result of this fear she was running away, and in her pride she was doing what *she* wanted to do *her* way. Alexis was afraid that this power may lead to non-virtuous behavior.

Her instructor suggested that she approach her power from a kapha perspective, with devotion. One could do this through surrendering one’s own power to a higher power, such as a religious figure, saint, or simply all of humanity. This suggestion once again brought back memories of a time when Alexis did do this, and was emotionally scarred by the people she was around concerning her devotion.

As a result this completed the circle. Alexis realized that she needed to cultivate surrender and devotion in her life again, and in order to do that she needed to heal the emotional wounds that caused her to lose her devotion nine years ago.

Alexis set up an appointment with a behavior kinesiologist. Behavioral kinesiology is where one accesses the subconscious thoughts through putting pressure against a muscle and observing its energy change, strength versus weakness. With this information one can make changes at the cellular level. Sue Meyer, a prominent Behavioral Kinesiologist explains that “with resolution integration we can access your personal computer, and discover what fears, attitudes or beliefs are holding back your progress or healing.” Alexis’s intentions in the session were twofold: to eliminate the obstacles and thought habits that blocked her from practicing devotion and moving towards her dharma; and to change the thought habit of functioning out of pride and ego.

The following week Alexis set time aside to spend a week isolated in the mountains to focus on healing on all koshas. She had discovered that the body can function on two different levels. The level of activity is where the body functions normally, doing daily activities. The level of rest/heal/rejuvenation happens when the

⁵ Email correspondence date May 30th, 2004.

body is stationary and very little energy is expended. When the body is still for an extended period of time it is given the opportunity to move into the rest and heal mode.

Personal Retreat

Activities applied to heal on the Anno Maya Kosha (physical level):

- Eating foods that were sattvic and filled with ojas, giving the body fuel to heal and build. These foods were: basmati rice, dates, almonds, squash, sesame seed chews, rooibos, and chamomile tea.
- Immobilized the injured knee by wrapping it with ace bandages. She also walked with a cane to prevent any weight bearing activities on the injured knee. Alexis practiced immobilizing the knee two weeks prior to the retreat, when she came home from work, and while sleeping.

Activities applied to heal on the Prana Maya Kosha (energetic level):

- Pranayama; both physical breathing practices and mentally directing subtle energy to knee joint.
- Visualization
- Reiki

Activities applied to heal on the Mano Maya Kosha (mental level):

- Read devotional books, yogic texts.
- Watched movie (4 times) on Mother Theresa, a woman who lived a life completely out of devotion and surrender.
- Journaling.

During the night and (later also in the day) Alexis would jolt out of sleep feeling intense concentration of heat running along the path of where the ACL is located in her right knee. Sometimes she would encourage this feeling and Reiki her knee, and incorporate visualizations. Sometimes this feeling was so intense she would remove her brace and flex her knee to dissipate the heat.

Alexis noticed that after the behavior kinesiology session and personal retreat that her outlook on life was very different. It included aspects of devotion and surrender. She realized that in order to maintain a healthy body she would need to adapt these outlooks for the rest of her life.

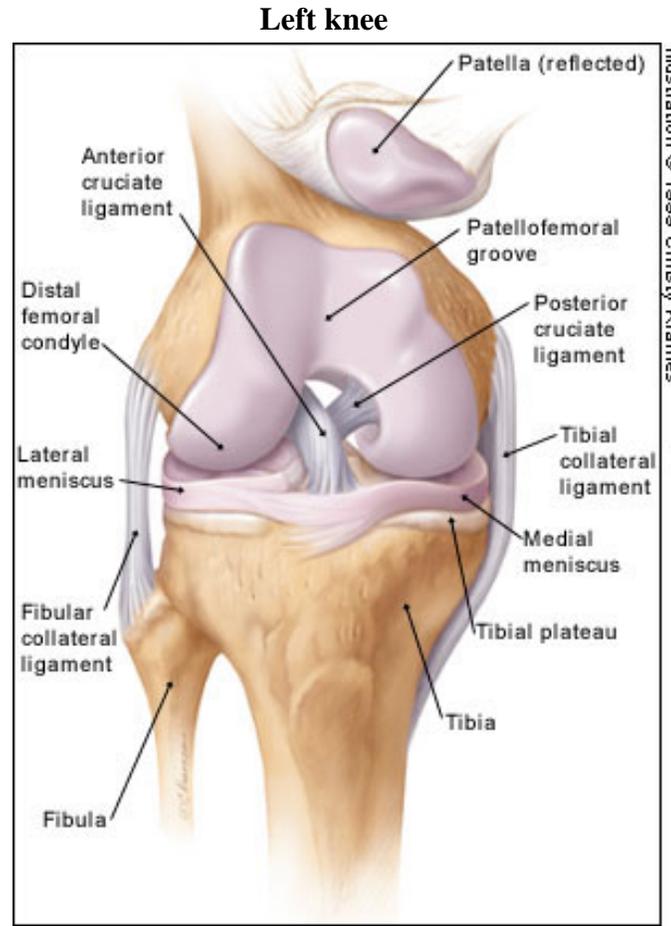
E. Summary of Results:

Alexis applied practices to reduce swelling and eliminate the trauma within the joint. She then strengthened the hamstrings and quadriceps to support the knee. Third, she completely rested her knee joint for over three days to allow the knee to heal. While resting the knee she made strives to incorporate a lifestyle that is more flowing, with humility and devotion. After one year Alexis has not experienced any knee problems and is able to accomplish her activities of daily living with ease. At a medical evaluation one year post injury the P.A. did not recommend surgery.

2A. Name and description:

Physical anatomy of the knee

Focus: Anterior Cruciate Ligament

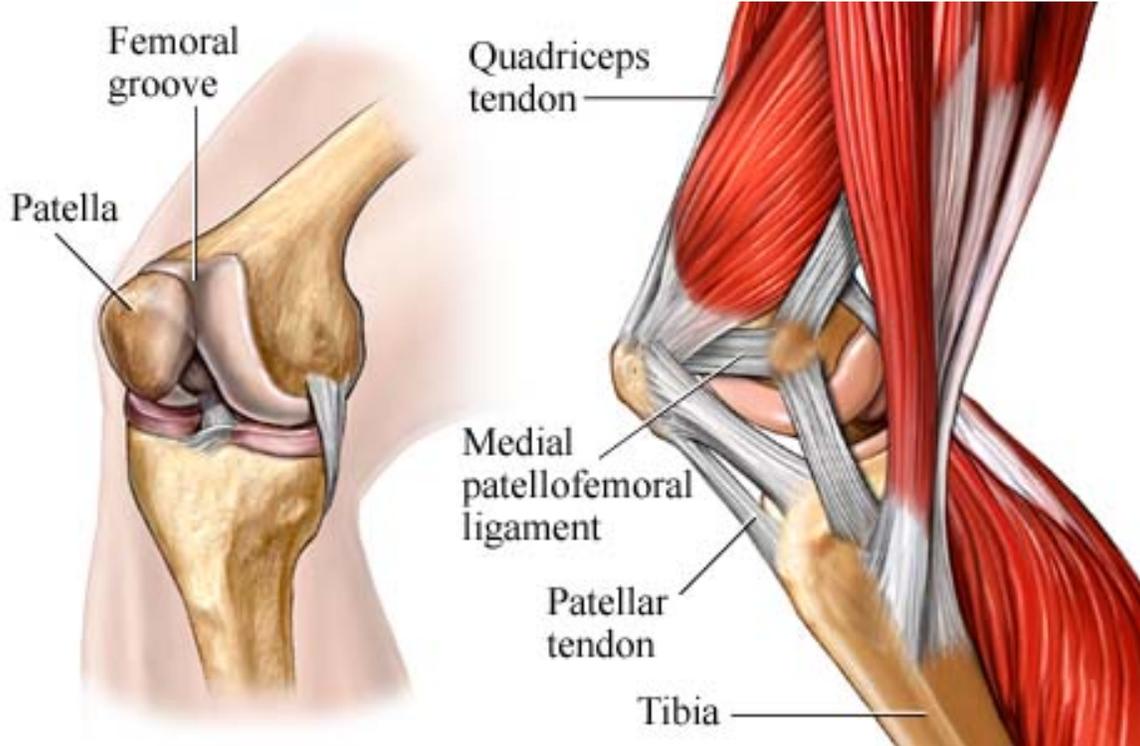


The ligaments that support the knee are: patellar ligament, anterior cruciate ligament, posterior cruciate ligament, tibial collateral ligament, and fibular collateral ligament.

The **patellar ligament** contains the patella. This ligament can be viewed as a continuation of the tendon of the quadriceps muscles, whose fibers cross over each other at the knee joint.

The **anterior cruciate ligament** resists anterior displacement of the tibia on the femur, while the **posterior cruciate ligament** resists posterior displacement.

The joint capsule is reinforced by two collateral ligaments on either side. The **medial (tibial) collateral ligament** functions to stabilize the joint and prevent it from opening on the medial side. The **lateral (fibular) collateral ligament** prevents the joint from opening on the lateral side (*Calais-Germain*, pg. 197-199).



The muscles that extend the knee: Quadriceps: rectus femoris, vastus medialis, vastus lateralis, vastus intermedius; gracilis, and tensor fasciae latae.

The muscles that cause the knee to flex: Hamstrings: biceps femoris, semitendinosus, semimembranosus. Gastrocnemius assists. Popliteus assists by initiating the rotation of the tibia to “unlock” the extended knee.

Energetic anatomy of knee

Vayu: Apana prana vayu

Mental anatomy of knee

from *Heal Your Body* by Louise Hay:

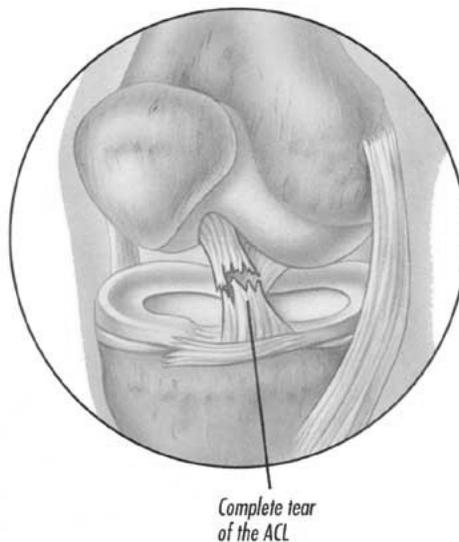
Problem	Probable Cause	New Thought Pattern
Knee	Represents Pride and Ego	<i>I am flexible and flowing.</i>
Knee Problems	Stubborn ego and pride. Inability to bend. Fear. Inflexibility. Won't give in.	<i>Forgiveness. Understanding. Compassion. I bend and flow with ease, and all is well.</i>

Function of the ACL

The anterior cruciate ligament prevents hyperextension (overstraightening) of the knee and is the primary restraint to anterior displacement of the tibia. The intact anterior cruciate ligament is a secondary stabiliser to varus and valgus (side to side) stress at the knee, and also plays a role in limiting internal rotation of the knee.

<http://www.sportsinjurybulletin.com/archive/acl.html>

ACL Image



This photo shows a rugby player with a combination of weight-bearing and twisting stress, plus quadriceps (frontal thigh) muscle contraction stress, being placed on his left knee (see arrow). While such forces can easily cause a knee with a loose or torn ACL to "go out" or sublux (shift out of place), they can also occasionally cause a healthy ACL to tear suddenly. That is exactly what happened to this athlete at the very instant this photo was taken! He went on to have his ACL reconstructed with a hamstring tendon graft and had an excellent result.

http://www.kneeandshoulder.md/print/print_acl.html

2B. Gross and Subtle Body common Symptoms:

- Pain at the time of impact which dies away afterwards.
- A distinct popping sound at the time of injury.
- Swelling—possibly due to bleeding inside the joint.
- Possible instability in the joint once the swelling has subsided.
- Pain when you bend the leg and have the tibia (lower leg bone) pulled forwards.

Later symptoms:

- arthritis

2C. Related Challenges:

A person with an injured ACL will need to discontinue playing sports or any other activities requiring planting, pivoting, and other sudden movements of the knee. They may be able to play again once the knee has healed through surgery or other means, or simply wear a brace when participating in any activities that put stress on the knee.

Subconscious movements, where the knee is just slightly flexed, yet the hamstrings are not engaged are often the instances where the knee will go out, and this can eventually cause arthritis.

3. Ayurvedic Assessment

Ayurvedic understanding of a ruptured ACL

When there is a tear or rupture of a ligament, pitta is going into kapha.

The kapha qualities of a ligament are firm and stable. They hold things together within certain boundaries, it is contained and strong. The ligament physically is dense, thick and inflexible.

The qualities of pitta create stretch and heat. When a ligament is over stretched there is an excess of pitta. When a ligament is torn, there is a moderate excess of pitta. When a ligament is ruptured there is an extreme excess of pitta.

Ayurvedic treatments applied:

Bath soak with Baking Soda and Ginger.

- Ginger to: extract ama
- Baking soda to: relax muscles

Abhyanga: Oiling with massage.

Pancha Karma:

Specifically virechana, in yoga it is called varisara dhouti, or shankhprakashalana.

Virechana is an excellent way to eliminate excessive pitta ama (toxins) in the body. With a ruptured ligament, pitta toxins from the injury circulate throughout the body and then settle in the joints of the body. Virechana when practiced with the proper preliminary procedures of internal and external oiling of the body brings the ama out of the joints, and out of the system. This gives a sense of lightness and comfort and mobility in the joints. Once the joint is cleansed it is then able to repair and heal itself with more efficiency.

One must have knee stability before performing full virechana.

A mild virechana may be performed by drinking 2 cups of salt water with 1 ½ teaspoons of rock salt.

Dr. Lad also recommends drinking 1 cup of ginger tea with 2 teaspoons of castor oil before bed. Castor oil contains natural precursors of steroids, which help heal inflammatory conditions (Lad, *The Complete Book of Ayurvedic Home Remedies*, p. 130).

Supplements used:

Arnica Montana is an anti-inflammatory homeopathic supplement. It encourages white blood cell activity therefore hastening the removal of the blood and fluids which cause bruising and swelling. It is best taken for acute or traumatic injuries.

Glucosamine Chondroitin: Glucosamine and chondroitin sulfate are substances found naturally in the body. Glucosamine is a form of amino sugar that is believed to play a role in cartilage formation and repair. Chondroitin sulfate is part of a large protein molecule (proteoglycan) that gives cartilage elasticity.

Both glucosamine and chondroitin sulfate are sold as dietary or nutritional supplements. They are extracted from animal tissue: glucosamine from crab, lobster or shrimp shells; and chondroitin sulfate from animal cartilage, such as tracheas or shark cartilage.

<http://www.arthritis.org/conditions/alttherapies/Glucosamine.asp>

Bone, Flesh & Cartilage (BFS) also known as Bone, Flesh, and Sinew is an herbal ointment made by Nature's Way. It is excellent in working with conditions listed in the product name. When applying it is best to hold the intention of first rubbing the ointment topically onto the skin, then deeper into the tissues, the bones, ligaments, and finally the joint.

It is made of Olive oil, Wheat Germ oil, Beeswax, Honey, Comfrey root, White Oak bark, Mullein leaf, Black Walnut leaf, Marshmallow root, Wormwood leaf, Gravel root, Scullcap leaf, Lobelia leaf.

The Doshas

Charaka, the great Ayurvedic physician of ancient times, found that all organic and inorganic substances, as well as all thoughts and actions, have definite attributes. According to Ayurveda, there are twenty basic attributes... Charaka categorized these attributes into 10 opposites pairs. ... Basically, the universe is the manifestation of the two opposites, male and female energy. (Lad, *Textbook of Ayurveda Fundamental Principles*, p. 30-31).

The 20 attributes (in their pairs) are:

1. Cold/Hot
2. Wet/Dry
3. Heavy/Light
4. Gross/Subtle
5. Dense/Flowing
6. Static/Mobile
7. Dull/Sharp
8. Soft/Hard
9. Smooth/Rough
10. Cloudy/Clear

The twenty attributes in relationship to the doshas:

Vata:

Dry, light, cold, rough, subtle, mobile, clear.

Qualities to balance vata post traumatic injury: warmth, nurturing, warm oil, gentle massage, loving kindness, rest, use of breath, and other subtle practices.

Pitta

Hot, sharp, light, liquid, mobile, oily.

Qualities to balance pitta post traumatic injury: cool, calm, eliminate intensity, increase range of motion with gentle movement and exercises, eliminate excess bile and acidity in the body.

Kapha

Heavy, slow/dull, cold, oily, liquid, slimy/smooth, dense, soft, static, sticky/cloudy, hard, gross.

Qualities to balance kapha post traumatic injury: reduce swelling, increase strength, endurance, and mobility.

Five Koshas

Anna Maya Kosha:

Anna means food. This is the physical aspect of the body. This kosha is strengthened and purified through shat karmas (cleansing practices), exercise in general, asanas, and a nutritious organic diet.

Prana Maya Kosha:

Prana means energy. This is the energetic aspect of the body. Pranayama and pratyahara strengthen and purify this kosha. This prana feeds the physical body and the mind.

Mano Maya Kosha:

This is the mental (mind) aspect of the body. Dharana, dhyana, and samadhi strengthen and purify this kosha.

Vijnana Maya Kosha:

This is the body of higher wisdom, or intuition. When the body is happy, and the mind is happy, prana can stay home, at the Prana Maya Kosha and increase. When the pranic bank is full, one can access the Vijnana Maya Kosha.

Ananda Maya Kosha:

This is the body of bliss, joy and peace.

Curing vs. Healing

Healing = to unify, to yoga—creating a healing shift at all koshas so that one will have a different, better perspective in life.

Curing = to fix the physical body.⁶

⁶ From Nischala Joy Devi's Cardiac Teacher Training course.

4. Common Body Reading:

A person with a torn, or ruptured ACL will have excessive anterior movement of the tibia when being pulled away from the femur. Activities such as going down stairs may cause the tibia to move forward excessively. The person may not track straight, their knee may move slightly medially or laterally when walking to avoid pain in the joint. They may also avoid activities that require planting and pivoting of the foot.

5. Contraindicated Yoga Practices:

Avoid positions that flex the knee more the 135° such as full knee squats or kneeling.

6. General recommendations:

a. Therapeutic/Free of Pain:

1. R.I.C.E.; rest, ice, compression and elevation of the joint.
2. Eliminate trauma in joint with vata pacifying techniques: gentle joint freeing series, oiling and massage, rest, yoga relaxation.
3. Reduce swelling and establish normal range of motion.

b. Stabilizing the Situation:

4. Discontinue any rigorous activity or sport until knee is stronger, use protective knee brace afterwards if necessary.
5. Strengthen muscles of knee joint, the hamstrings and quadriceps, so that the knee will be support and not 'subflux,' or shift out of place. The hamstring wrap around from the back of the knee and insert on the tibia and fibula, thus acting as knee stabilizers.
6. Shift into *rest and rejuvenation* mode. Evaluate on all koshas, what shift needs to take place, then rest the knee joint for 3-7 consecutive days—apply these life shifts.
7. Have a conscious awareness of movement from a closed hip position to an open hip position, also in weight bearing movements of the foot. These movements can cause the knee to shift.

c. -Maintenance:

8. Maintain muscle strength.
9. Sustain a daily practice to cultivate devotion and surrender.

7. Yoga Forums:

Subject: Alternative ligament building therapy?

Date: Thu Dec 23, 2004

Q—Hi Mukunda,

I have found out about this forum through a friend who practices structural yoga therapy. My question might be a little off topic here, but I hope you may have some advice.

I have a friend who has been practicing ashtanga yoga for about 15 years, and has been recently diagnosed with a mild version of a connective tissue disorder called ehler's-danlos syndrome. It seems that the root of the problem is a missing protein in collagen formation which leads to extremely elastic ligaments & cartilage tissue. One manifestation is extreme flexibility, even double jointedness, which has made the practice of advanced asana fairly easy. It has also led to multiple small horizontal tears in the knee and shoulder ligaments. At this point, arthroscopic surgery, to knit together the ligament tears has been suggested as an option which would lead to recovery & full mobility. However, sometimes the results of such surgery may lead to other complications, and it is an invasive procedure, so I am trying to do research on any dietary, herbal & physical therapy & lifestyle changes that might be effective to slow down, stop, or even reverse some of the damage.

A vegetarian version of glucosamine has now become available, and we will try that, but any additional suggestions or references would be greatly appreciated.

Namaste.

A— In the past few days, browsing on the internet, I came across something called prolotherapy. It supposedly helps heal arthritic joints and damaged ligaments by injecting dextrose solution into the affected area. It should be stimulating immune response strongly enough that the body actually is jump- started into rebuilding connective tissue.

I am not sure how succesful treatments are, and am doing more research - if anyone has any experience w/this pls. post

There are a few prolotherapy sites which can be easily found through google, I wouldn't post links or copy information here, as I'm not sure it is appropriate.

thanks!

Subject: Knee and pain question

Date: Thu Sep 30, 2004

Q—Dear Mukunda,

I am worried about a (sporadic) yoga student. She is awakened at night by pain in the lateral part of her right knee. She pointed to the TFL, and when I felt the knee, the gravelly movement is under the patella. She says that when she wakes up and straightens her leg, the knee pops and then pain shoots up all the way to the shoulder and down to the foot.

She originally asked me about a right shoulder injury she got. She wrenched it on a medicine cabinet about three weeks ago and it was very sore. Due to the soreness, I did not evaluate her muscle strength, but just asked her questions. She has a pronounced right thoracic scoliosis and tells me that she had to wear a cast for six months at the age of 15 (she is in her mid 30s). Her right scapula wings back and she has always had pain in the left hip and knee. However, this new pain is all on the right side. Also, lately she has had trouble breathing. She says her chest feels restricted and she can't take deep breaths. This is what alarms me. She says she has no neck pain. She is icing both sides of her body each night before bed, and still going to work and riding her bike! The pain that wakes her at night has been happening for the last three nights. She has tried physical therapy in the past with poor results and seems reluctant to do that again. She does not take pain relievers, and she is slim with generally low muscle tone in the upper body. Can I give her some breathing exercises? Should she lay in bed a certain way? Should I send her to a doctor? I did tell her to stop putting ice on her muscles for now.

Thanks for any help you can give me.

Namaste,

A—When you have a concern for student that has not seen a doctor, you must act on that impulse and encourage her to see one. Especially if you feel that what is needed is beyond your skill. I can see her in addition to her seeing a physician when I come there. With a scoliosis there are many regions that can respond to it. If she truly had only a right thoracic curve and not a lumbar then it is unlikely that symptoms to the knee would arise from that. The knee issues sound like need for stretching the IT band with reclining Gomukhasana pose. This may also lessen the tension on the patellar tendon. For pain relief I would recommend that she develop the wave breath of Ujjaye and begin to encourage exhales and sighs. Also she can work with intercostal breath motions to relieve the thoracic and shoulder symptoms. AS far as bed position it is always the most comfortable that she can find. In general I recommend students fall asleep by lying on the right side as this opens the parasympathetic dominated left nostril flow (Svara). Namaste

Subject: SI joint and knee problems combined

Date: Wed Aug 18, 2004

Q—I have a client c/o severe knee problems that (medial pain, shooting at times up inner thighs to pelvis. Some c/o of low back pain, at times shooting up one side of the back.

I immediately went to assessing her SI joints, and found a large difference between left and right (about 1 inch higher on the left). I worked with her on the SI Joint balancing format from Mukunda, and then did psoas release work. I left her with some information regarding the gracilis muscle, and the need to lengthening and release.

One week later, she has been doing the SI balancing work daily, and the psoas release work 4 times. The SI joints are now more evenly balanced (about 1/4 inch difference), the shooting pain up the back is gone, but the knee pain (although subsided for 2 days) is back. She has a hard time walking and doing any sort of forward bending.

She had some cranial sacral work done, and saw a chiropractor, no further results.

Any suggestions.

A—Sounds like you have done excellent work with this client. I would suggest you more carefully diagnose the tripod tendons. These are three muscles attaching into the same tendon at the medial knee. The muscles are the sartorius (to outer iliac crest), gracilis (to pubic bone) and semitendonosis (to ischial tuberosity, sitz bone). By gently doing bodywork on these three where they separate from each other just superior to the knee often the pelvis will release. Probably you are on the right track by working the gracilis, but need to more diligently assess its insertion point connective tissue. I have also found that just persisting and looking more carefully at what occurs during the SI mobilization exercise you will uncover the territory that needs attention. namaste mukunda

Subject: Knee Injury

Date: Fri Aug 06, 2004

Q—in October 2003, i injured my left knee during an Ashtanga training program. the injury is on the inside of my knee. i think i overstretched the medial ligament. i am a teacher with a full schedule of classes and have a very dedicated personal practice so I'm not able to fully rest the knee and quite honestly, it feels best we i remain active. i have not sought professional medical diagnosis, i.e. an m.d., but have worked with my massage therapist and chiropractor. it has improved a lot but i still am not able to come into a good full lotus or to bind in Ardha baddha paschimottanasana, or come in some other poses as well. prior to my injury, i could comfortably perform bound full lotus. i do "explore" where my knee is in the healing process by slowly and carefully approaching some of the positions that don't feel good, backing off as needed. i am also bow legged. i don't have any problems with my right knee. i have been practicing the poses you recommend to correct the bow legs. my question is, should i continue to give this injury time to heal and practice as i can or should i seek a medical opinion? how much time should i give the injury to heal completely or is that possible? i do feel as if the knee slips

sometimes. what does this mean? what kind of time frame is necessary to correct bow legs? i hope I've given you enough info and i look forward to learning from you in august.

A—I would recommend learning about your knee anatomy more and consider what practices will be stressing the medial knee. The medial collateral ligament if that is what it is on the inner surface of the knee does not like to do internal hip rotation poses such as hero sitting between the feet but in many cases will also not respond well to external hip rotation poses such as Padmasana. An injury of this sort should have healed within 6 - 8 weeks, thus you are well overdue for healing. To have been pushing yourself with a busy schedule is not advisable. The injury is now a more chronic inflammation of the connective tissues. When you go for a medical opinion you must be prepared for their possible recommendations which will be steroid shots or surgery. If you wish to consider that then see one. Doing yoga in a rajasic manner will always slow down healing time. Remember yoga is to promote sattvic mind and body. Unfortunately many teaching styles that are popular today are not taught in the Classical Yoga sattvic manner, but contemporary rajasic manner of do as much as you can and then some more. This manner of doing yoga is more the problem than the practices themselves. A sensible practice will be build upon classical guidelines that have been proven safe for millions of yoginis. Patanjali describes a specific series of contemplations for how to do yogasanas to achieve sattvic mind. They are described in my book on the Yoga Sutras II, 46-48.

To know for certain I would like to have an assessment of your external hip and internal hip rotation range of motion. This can be done in an individual session or quickly even during a workshop I can assess this using a goniometer tool from physical therapy. If you have 60 degrees of external rotation you are fine pursuing the poses you wish to regain. If not then I would suggest you not pursue them.

Changing the shape of legs requires diligent practice and perseverance. Depending upon the angle of your bowed legs I can say about 6-18 months of strong practice working to strengthen the adductors and stretching the abductors to achieve a change in the legs. You can reference in my book poses that do this for the muscles and also see chart on page 266 that will make suggestions for changing postural anomalies like bowed.

Q₂—Thank you for all the good advice. I don't feel I've been pushing myself but perhaps i have. I need the income my teaching provides and demonstrating poses is part of that teaching. I'm sure that inflammation of the connective tissue has happened and i am diligently trying to be patient in my practice. I was trained in integral yoga at Satchidananda ashram so i feel my training was not of the "do more" variety that you mention that it was sattvic in nature. One of my greatest challenges is that ever present

ego that wants to do every pose. I'm very familiar with the sutras and strive to follow them. It is quite possible I've fallen short and can only continue to enhance my awareness both inner and outer and follow the teachings of my guru. Once again, many thanks for the guidance and support. What is your opinion of cortisone shots and their effectiveness?

A₂—I certainly understand the need for income but I do not understand demonstrating poses when they cause you pain. I don't know what you were taught in your teacher training but I never want my teachers doing demonstrations when they can help it. Especially if they are in pain. Always use a model especially when the class is large. Without a model you cannot listen to your own body and are much more prone to injury or at the least not listen to your body's advice about when to stop. You are likely to show a healthy body poses done full out when it is inappropriate for your healing to do so. Hence it is normal for you to aggravate the condition.

One will always have an ego that is not the problem. The problem is to listen to the inner teacher in spite of the other voices that speak to you. Following the Yoga Sutras guidance is most beneficial. For this I recommend reading from it regularly. AS far as cortisone they are often quite affective, but they are also problematic. I cannot inform you as to the percentage of successful treatment with it. A physician could, so seek professional medical advice on that or look at Alternatives to Surgery by Sandra McLanahan, MD and her surgeon brother. This is an excellent reference book to keep handy for all considerations. She is the Yogaville ashram holistic physician.

Subject: Knock Knees

Date: Fri Jan 21, 2005

Q—I am working with a woman who had surgery for a torn meniscus in Oct. About 2 mos. after the surgery she started having a pain on the lateral side of the knee that goes to the calf. Now she has a baker's cyst behind the knee, and her doctor says that Synovial fluid leaks into the cyst. MT for sartorius, psoas, gluteus maximus were very weak. She has had "knock" knees her whole life but with lots of hatha yoga in the last year or so she seems to be changing the alignment of her legs for the better. I think her problems probably started with her hips. Her external rotation of the hips isn't very good, and this goes along with the weak muscles mentioned above. What would you recommend? JFS for the hips? I don't know about the Baker's cyst. I do think there is always some pain when muscles are changing/realigning, but not to the degree she has had. Would you suggest some poses that would not stress the knee too much but strengthen the weak muscles such as bridge, stick, locust, bound ankle (maybe), Warrior I (maybe, depending on the knee).Also, I guess strengthening the quadriceps is almost always a good idea with a knee problem. Any help you can give with this will be appreciated.

A—Note that the weak muscles have in common that they are external hip rotators. Also this weakness is correlated with her range of motion being small. So you want to give plenty of variations of motions and asanas that work those muscles from mild to moderate difficulty. Definitely JFS but also modify sunbird motions to give external hip rotation motions. Modify all motions to not stress the knee or be weight bearing long. Give extra padding to knees and if necessary change to another position. Your ideas and directions are all good. Definitely tone the quads but also think that the entire 4 compartments (adduction, abduction, flexion and extension) of the hip need toning when there has been knee surgery. Give all actions in dynamic manner not static asanas, as this builds tone the safest and quickest. Namaste

Q₂—I am looking for some help, if possible with yoga, to correct a knock-knee problem. The left knee is quite severe, and I am hoping there could be some help with yoga to correct this.

I would appreciate your guidance in this regard.

A₂—In my book I describe how I did asanas to correct my knock knees. All the details are there in Structural Yoga Therapy along with charts to understand which muscles to stretch and which to strengthen. Once this is known then you can see Asana Kinesiology charts showing which asanas to use for these specific muscle by muscle transformations. When this is done the pressure on bones changes and they will shift their shape. If you are near where I teach then come for workshop or individual session for more custom tailoring of practices. See workshops page on my website. Some more details and Q on Yoga therapy can be found at my archive site www.yogaforums.com namaste

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9. Appendix

A. ACL injury: Female vs. Male; why it is more common in females:

Females are four to eight times more likely to injure their anterior cruciate ligament.

Excerpt from article: *ACL – female anterior cruciate injuries review*.

By Alex Watson and Fares Haddad

<http://www.sportsinjurybulletin.com/archive/acl.html>

Why has the injury rate increased?

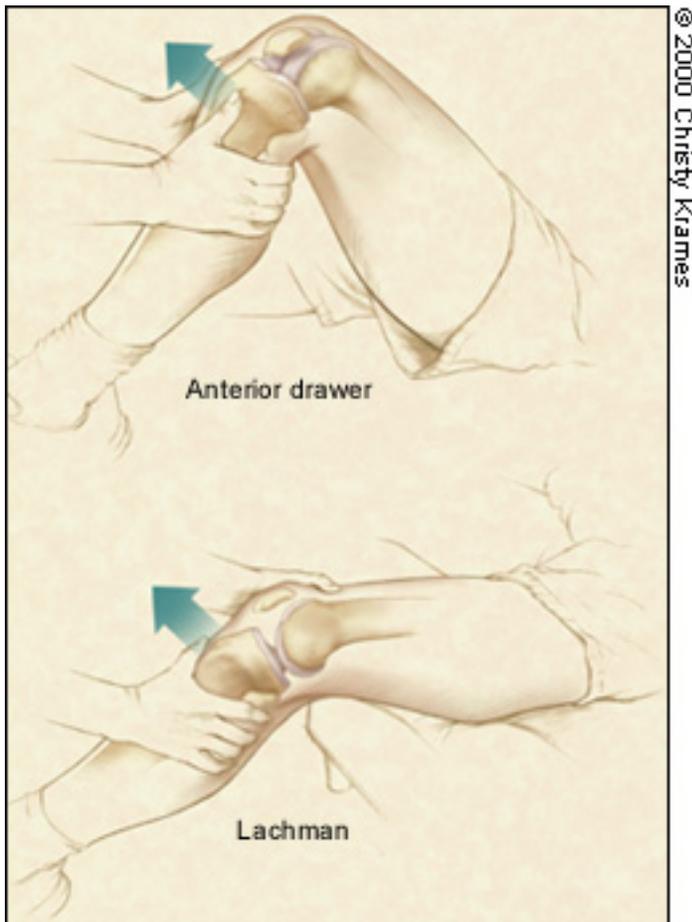
The cause of the increased anterior cruciate ligament injury rate in females is unclear and is most likely to be a complex interplay between multiple variables. Speculation on the possible etiology of anterior cruciate ligament injuries in women has centred on anatomical differences, joint laxity, physiological differences between men and women, and the effects of hormones and training techniques. Investigators have not agreed on the causal factors for anterior cruciate ligament injury but have started to profile the type of athlete who is at risk.

The primary factors involved in the high incidence of female anterior cruciate ligament injury include:

- **Wide female pelvis.** The wider female pelvis exaggerates the angle between the femur and the tibia at the knee. The resulting increased inward pressure on the knee with external rotation of the tibia may place excessive stress on the anterior cruciate ligament.
- **Narrow intercondylar notch.** The intercondylar notch of the femur through which the anterior cruciate ligament has to pass is generally smaller in women than it is in men. This difference may not be statistically significant since there is a wide overlap of notch sizes between the sexes. It is postulated that cutting and jumping movements in patients with narrow femoral notches may weaken and fray the anterior cruciate ligament. Shelbourne et al have shown that patients with narrow notches (<15mm) have a higher incidence of tears in their contralateral ACL. After reconstruction with a 10mm autograft, the incidence of graft rupture appears the same for men and women. It is unlikely that the increased incidence of anterior cruciate ligament tears in females compared to males in the same sports can be attributed to notch width alone, but this factor undoubtedly plays a part. Graft impingement from regrowth of the notch is also recognised as a relevant factor that can result in late graft failure in the anterior cruciate ligament reconstructed knee. No attempt has been made to prophylactically enlarge the femoral notch, but the measurement of notch size helps to predict the risk of anterior cruciate ligament injury.

- **Lax anterior cruciate ligament and hormonal interplay.** Receptors for both estrogen and progesterone have been identified on the anterior cruciate ligament. These hormones are believed to make the female anterior cruciate ligament more lax and susceptible to overstretching. Furthermore, recent research suggests that women are more susceptible to anterior cruciate ligament injuries during the ovulatory phase of the menstrual cycle rather than the follicular phase. Anterior cruciate ligament fibroblast proliferation and type I procollagen synthesis vary in a dose dependent manner with oestradiol concentrations. Clinically, alterations in anterior cruciate ligament cellular metabolism caused by estrogen fluctuations in a menstruating athlete may render the anterior cruciate ligament more susceptible to injury at this time.
- **Muscle reaction time disparity.** Female athletes typically have less strength in their leg muscles and slower muscle reaction times than males. Strong fast-reacting hamstrings are needed to optimise the chance of keeping the anterior cruciate ligament intact - for example, by keeping the tibia in place during landing from sudden jumps and stops. Even if the hamstrings are strong, if they react slowly they may be unable to protect the anterior cruciate ligament in time to avoid injury. A low level of hamstring activity and low angle of knee flexion at foot strike and during eccentric contraction, coupled with forces generated by the quadriceps muscles at the knee, could produce significant anterior displacement of the tibia, which may play a role in anterior cruciate ligament injury

B. ACL Physical exam procedures



Anterior Drawer test:

Flex the knee to approximately 80° verification of complete relaxation of the hamstrings is achieved by hamstring palpation. Place the foot in a stabilized (such as by sitting on the foot) and in neutral rotation. Use a firm, but gentle, grip on the proximal tibia and apply force anteriorly with a gentle to-and-fro motion. If there is excessive anterior motion (1/2 inch or more) this is a sign of an over-stretched or injured anterior cruciate ligament. If there is excessive posterior movement, it is a sign of an over-stretched posterior cruciate ligament.

Lachman's test:

One hand secures and stabilizes the distal femur while the other firmly grasps the proximal tibia. A gentle anterior translation force (pulling away) is applied to the proximal tibia. A good endpoint, where there is as solid catch, means that the ACL is healthy. If there is no end point, or a weak end point it is symptomatic of an injured ACL.

C. Physical Therapy recommendations:



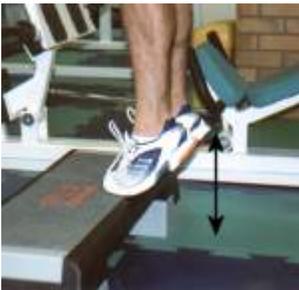
Static quads seated

- Contract the quadriceps muscles and hold for 5 to 10 seconds.
- Relax for about 3 seconds and repeat 10 to 20 times.
- Place the fingers on the muscle towards the inside of the leg above the knee (vastus medialis muscle). It is important that this muscle is developed and this one should be felt contracting whilst performing the exercises.



Static hamstring holds

- Lie on front.
- Bend the knee to about halfway up.
- Hold in that position for 10 to 20 seconds.
- Repeat 1 to 3 times daily.
- Progress by increasing duration of hold and number of repetitions or using an ankle weight.



Heel raises

- Simply raising up and down on the toes, keeping the legs straight.
- Aim for 3 sets of 10 to 20 repetitions daily.
- This exercise can be progressed later in the rehabilitation process by doing single leg calf raises and then single leg calf raises without leaning against a wall or holding onto anything.



Heel drops

- Standing on a step or similar of up to 6 inches in height, bend one leg so the heel of the other almost touches the floor and return to starting position.
- Repeat until the muscles feel tired.



Quarter squats

- Squat down to about a quarter of the way down and return to the starting position.
- Aim for 3 sets of 10 to 20 repetitions.
- Progress this by going down to half way (Phase 3 of rehabilitation) and then full squats (to horizontal) in the sports specific stages.
- Increase the intensity by adding weight. Ensure stomach muscles are kept firm when performing squats.

Intense Hamstring Strengthening:

- Starting in a supine position, place back of feet on an exercise ball, keeping the body in a straight line.
- Flex the knees and roll ball towards body.
- Extend knees and roll ball to back original position.

Yoga Asanas:

When practicing yoga asanas make sure breath fully (filling the belly and lungs followed by a full exhale), and continually. Also have the mental awareness of what muscles are being strengthened (in this case most often the hamstrings and quadriceps). Most importantly, one should **feel sweet and steady while doing the postures**. If one does not feel comfortable, ease up on the effort or try a gentler variation until there is a sense of comfort and ease.

- **Utkatasana**, Chair pose (all variations) to strengthen quadriceps and improve tracking (equal toning of the four muscles of the quadriceps which supports proper knee alignment and knee stability)
- **Setu bandhasana**, Bridge pose; to strengthen the hamstrings and gluteus maximus.
- Standing poses such as **Virabhadrasana I, II**, Warrior I, II; **Utthita Trikonasana**, Extended Triangle pose, and **Utthita Parsvokonasana**, Extended Side Flank pose; to increase overall strength in the legs. NOTE: be cautious when transitioning from a closed hip to open hip standing position as this will put stress on the knee, and it may potentially sub-flux. Move slowly, and if necessary lift up foot and reposition instead of pivoting.

Mild Exercise:

- **Brisk Walking** to stimulate the knee and promote circulation to the joint. Where there is increased blood flow, there is increased healing. NOTE: only walk/jog at a pace that is comfortable, and for a duration of time that leaves the person feeling refreshed and energized, instead of depleted.