

GUIDELINES FOR THE MANAGEMENT OF KNEE PAIN

KNEE JOINT

Knee joint is the largest synovial joint in the body, combined considerable mobility and strength with the stability necessary to lock the knee in the upright position. A bicondylar hinge joint, the knee is made up of three functional units; the medial and lateral tibiofibular compartments and the patellofemoral joint.

The superior tibiofibular joint is included in the knee complex, which is often forgotten as a source of lateral leg and knee pain. It needs to be examined routinely in movement disorders of both the foot and the knee¹.

HISTORY

In the musculoskeletal disorders, knee (OA) is one of the most common disorders which affect the patients and it exceeds prevailing articular disorder. It is also the major cause of disability and socioeconomic burden².

EXAMINATION

The diagnosis of the knee can be done with considerable certainty and many conditions are easily curable. History is of critical diagnostic importance. The knee pain is usually well localized and many of the tissues are accessible to palpation. Pain originating from the knee is limited to the four dermatomes which may also be affected by pain arising from the lumbar spine L2 (left) L3 (right)³.

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DIFFERENTIAL DIAGNOSIS (DD)

The following DD has been suggested for knee pain based on anatomical site⁴.

Conditions	Test
Anterior Knee Pain:	
1. Patellar subluxation or dislocation	Apprehension Sign
2. Osgood – Schlatter lesion	
3. Jumper's knee	Patellar grind test
4. Patellofemoral pain syndrome	Patellar tracking
5. Anterior ligament injury	Lachman test
Medical Knee Pain:	
1. Medical collateral ligament	Valgus Test
2. Medical Meniscal tear	Mc Murray's Test
Lateral Knee Pain:	
1. Lateral ligament sprain	Varus Test
2. Lateral meniscal tear	Mc Murray's test
3. Iliotibial band syndrome	Ober's test
Posterior Knee Pain	
1. Baker's cyst	Ultrasound
2. Posterior ligament injury	Posterior draw test

1. Osgood-Schlatterdisease

Osgood-Schlatter disease is an overdoing injury which takes place in the teenager's knee area that is caused by inflammation in the tendon below the kneecap (patellar tendon), through which it attaches with shinbone (tibia). The teenagers participating in various sports activities including gymnastics, soccer, basketball and distance running are exposed to this disease⁵.

Physiotherapy Treatment

1. Ice or cool compress The person can get relief from the pain and reduce the swelling of the affected part of the body by applying the cool compress or ice for fifteen minutes⁶.

2. Limitation of physical activity for six to eight weeks with a gradual return to full participation over another six to eight week period has been monitored as an effective plan in reducing pain for these patients.

3. Knee brace or support The stress at the tibial tuberosity may be reduced by using the strap on the front of the kneecap in the course of heavy physical activities.

4. Low intensity quadriceps stretching has shown to decrease pain along with strengthening of the vastus medialis oblique, which have been observed to decrease pain for these patients⁷.

5. Crutches The crutches may be used for few weeks by the person suffering from severe pain, it is applied for reducing the stress level on the knee and it also allows healing.

Prognosis In most of the cases Prognosis gets better after few weeks or months, it eventually leaves once the child has finished growing⁸.

2. Jumper's Knee

It commonly contains the attachment of kneecap tendon to the lower kneecap pole, It causes the injury or inflammation in the knee, where the thigh muscles tendon are attached to the upper kneecap pole and to lower leg bone⁹. The Jumper's knee is usually observed in around 20% of jumping athletes¹⁰.

Treatment¹¹

1. The Cold therapy can be applied on the regular basis following any type of exercise.
2. For reducing the pain use the knee strap for knee support.
3. Transverse friction massage to the tendon.
4. Quadriceps stretching and eccentric strengthening.

If conservative treatments do not respond then other treatment option is surgery. After the surgery of patellar tendinopathy, it requires a number of months for rehabilitation.

3. Meniscus Tear

It is rupturing of one or more of the fibro cartilage strips in the knee called menisci, which is a C-shaped piece of cartilage found in the knee joint. Meniscus protects the joint and serves as a shock-absorption system. It helps in lubricating the joint, at the same time restricts its ability to flex and extend¹². Meniscal injuries are the most common knee injury, further its prevalence is 61 cases per 100,000 persons. After the age of 65 years degenerative meniscal tear is 60%¹³.

Post-Operative Rehabilitation¹⁴

The goals of the physical therapy program are given

here under;

- I. To minimize the effusion
- II. Normalize gait
- III. Normalize pain-free range of motion.
- IV. Prevent atrophy of muscles, preserve its proprioception, and keep up the cardiovascular endurance.
- V. Exercises
 - Static Quad exercises
 - Straight-leg raise to the front
 - Straight-leg raise to the outside
 - Straight-leg raise to the back
 - Hamstring curls
 - Heel raise
 - Heels dig bridging
 - Half squat

4. Patellofemoral Pain Syndrome

Patellofemoral joint pains are more common in musculoskeletal disorders in the all age groups, symptoms of which are anterior knee pain to peripatellar knee pain. In United States, Patellofemoral joint syndrome rate is around 25% of all athletes¹⁵.

Treatment:

Iceing

The Ice is used as an anti-inflammatory "medication," however its effective use is for 10-to-20 minutes.

Taping The Knee¹⁶

Friction may be reduced by taping the patella in different positions.

Exercises¹⁷

1. Static Quadriceps Contraction
2. Adductor Squeeze (Supine)
3. Knee Bend to Straighten
4. Hip Extension in Standing

5. Baker's Cyst

it is a fluid which forms a lump at the back of knee. Baker's cystitis also known as a popliteal cyst. The bursa can connect with the sac which supports knee bones (the synovial sac) to develop a cyst¹⁸.

Exercises for a Baker's Cyst¹⁹

The following exercises are commonly prescribed to patients with a Baker's cyst.

1. Knee Bend to Straighten
2. Static Quadriceps Contraction

6. Patellar Subluxation

Patellar subluxation occurs when the kneecap (the patella) is partly dislocated from its usual alignment inside the knee joint. Patellar tracking disorder is similar to patellar subluxation, but in this disorder the knee cap tends to be in its normal position unless the knee bends or straightens. Normally the occurrences of patellar subluxation is age group between 16 to 20 year²⁰. This incidence was mostly seen due to sports such as soccer, gymnastics and ice hockey which accompanied with the injury involve sudden twisted of the knee²⁰.

Physical Therapy²¹

1. The PRICE (Protection Rest Ice Compression Evaluation)
2. Quadriceps-static exercises
3. Straight-leg raise
4. Further, strengthening exercises should be accomplished for hip abductors, flexors & adductors.
5. Patellar bracing
6. Patellar taping (McConnell method)

Post Operative Rehabilitation²²

Above mentioned treatments may be included in the Rehabilitation plan after surgery, but it will necessarily take longer time to return on full mobility.

Exercises

The exercises should be started to improve the range of motion of the knee and to strengthen the supporting muscles.

1. Quad Sets
2. Hamstring Stretch
3. Quad Stretch
4. Side Leg Lift
5. Straight Leg Raise

7. Anterior Colleteral Ligament Injury

A force applied against the anterior thigh which drive the femur backward on tibia so that knee closes to full extension and tends to stress the ACL. It is the most frequently injured ligament which is associated with the limited range of motion²³. Most of the authors have recommended that estimation of ACL repair performance is between 80,000 to 100,000 each year in United States²⁴.

Physical Therapy²⁵

The rehabilitation and physical therapy management must include:

1. Flexibility exercises.
2. Strengthening exercises.
3. Endurance activities.
4. Coordination and agility training (for competitive athletes).

Post Operative Rehabilitation²⁶

- Closed-chain exercises are used to focus on the maintenance of compete extension.

- Therapy protocols can be divided into IV phases as recommended by Shelbourne and Nitz:

Phase-I: The aim of this phase is to maintain the range of motion.

Phase-II (0 to 2 week): The aim is to reduce swelling, gain full extension & flexion up-to 90° to maintain quadriceps control.

Phase-III (3 to 5 week): Improve flexion up to full range of motion and maintain full extension. For which Bicycles & Stair-climbers may be used.

Phase-IV (6 week): Progressively coming back to sports and increase strength and agility.

8. Medial Collateral Ligament Injury

The force on knee includes valgus stress and external rotation of tibia on the femur and anterior movement of the tibia on femur with torn medial capsule followed by torn MCL²⁷.

Physiotherapy of MCL²⁸

Grade-I & II of MCL injuries may be treated conservatively with a suitable functional rehabilitation program.

1. RICE (Resting, Icing, Compression and Elevating)
2. MCL Sprain Rehab:
Exercises:

Flex and extend:

Sitting, standing or lying on stomach, gently flex & extend the knee within the pain free range. Each set should have 10-20 repetitions; progress is up- to 3 sets thrice every day.

Heel slide:

Lying on back, bend the injured knee and keep the foot on the floor. Slide the heel towards the hips within the pain free range. Repeat each exercise 10-20 times.

Quad stretch:

Hold the right foot with right hand and gently pull the foot up and back towards the hips, stop when you feel the stretch. Maintain the stretched position for 10 seconds and then relax.

Hamstring stretch:

Standing, place one leg slightly in front of the other. Straighten the front knee & bend the back knee. Shift the weight on the bend knee, lean forwards until you feel a stretch in the back of the thigh. Hold for 5 to 10 seconds & then relax.

3. Bracing:

A light weight hinged knee brace can be applied that will allow increase in range of motion gradually as the MCL heals.

9. Posterior Cruciate Ligament (PCL) Injuries

A force during the tibia backward is applied on the femur which stresses the PCL.

For example dashboard injury: It is concluded by Schulz and his colleagues that 33% of PCL injuries were caused by sports²⁹.

Treatment

The treatment of PCL injury can be determined by the grade of injury.

1. A grade I & II injury is mostly treated with knee splinting in extension position.
2. Early ROM of joint, quads & hamstring program (which is particularly eccentric)³⁰.
3. The exercises of closed chain are performed in 6 weeks.
4. Hamstring exercises are postponed for 4 months to minimize the posterior load on the tibia.
5. Cycling and aerobic exercise can also be beneficial for the patient and it is also useful for restoration function³¹.

Post-Operative Rehabilitation³²

1. Reestablishing knee motion.
2. Reduce pain and inflammation
3. Quads strengthen
4. Knee brace in extension

10. Iliotibial Band Friction Syndrome (ITBFS)

ITBFS is an inflammatory, repetitive strain injury to the knee which is common in long distance runners³³.

Physiotherapy³⁴

Early goals of therapy are:

- I. To minimize the inflammation & swelling
- II. To increase strength & flexibility of the thigh, calf musculature, and hip.
1. Mobilization of patella is used to free up joint motion.
2. Electric muscle stimulation & Ultrasound combination therapy to return usual muscle tone, it also helps in healing process & decrease the pain. Iontophoresis with dexamethasone is also a useful modality to decrease inflammation³⁵.

Foam Roller (FR)

Roll affected leg over the FR and hold it for a few seconds and gradually increase time each day to mobilize tissues & break up adhesion tissue.

Single leg balance and strengthening

Start balancing on one foot during brushing the teeth. Then progressively increases the challenges with soccer ball and moving the ball in various directions.

Side leg lifts

Put back of the leg & hips beside the wall, slide the leg up towards the wall and hold for 5 seconds then slide back down.

Strengthening with Theraband

This exercise is performed for 3 to 5 times for every day for both legs.

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