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CHAPTER 01: THE KNEES

The knee is the joint between the thigh bone (femur) and the shin bone (tibia), of the lower leg. The function of the knee is to stabilize and balance the body, while at the same time provide the ability to bend, stretch, and move at a variety of speeds, while supporting varying weights—often more than a person should be handling. Knees also work in support of upper and lower leg movement, and stabilize weight and balance of the lower back and spine.

The knees are one of the most used parts of our body. They are widely overused and abused, with injury-statistics to support the statement. A 2010 National Hospital Discharge Survey reported over 719,000 knee replacement surgeries that year. The millions of unreported and lesser-damage knee injuries that did not require surgery should also be taken into account. Due to their importance and use, injuries can occur in several ways: accidents, overuse, misuse, degeneration, and osteoarthritis. In 2014, the Bureau of Labor and Statistics reported over 104,000 workplace knee injuries with a median of 17 days off work due to those injuries. In addition, 55% of sport related injuries occur to the knees, with the primary culprit being ACL damage.

Most people have experienced knee pain at some time in their life whether it's mild discomfort, or had a knee injury. However, the vast number of knee injuries are due to high activity, and in many ways are preventable. Knees, like the rest of our body, are also resilient, and with proper diagnosis, treatment, and care can be back to full strength in a short time.
Anatomy

The knee joint appears to be a simple hinge, allowing the leg to move from one position to a set degree of another. In addition - and perhaps the knees most interesting feature - is the movement and stability provided by allowing the knee and legs to twist side to side, as well as up and down. This gives the knee similar movement to a ball joint, while providing the strength and stability of a hinge.

Visually, the knee’s anatomy may seem like a simple joint, however, its demands, stability and weight-support require the knee to be one of the most complex joints in the human body. It is made up of several bones, cartilage, muscles, tendons and ligaments, which act together in one of the body’s most used and susceptible functions.

• **Bones:**
  Three bones make up the knee joint. The femur is the bone of the upper leg, the tibia is the bone of the lower leg, and the patella is the bone at the front of the knee which protects the joint. The purpose of these bones is to provide pivot-support to the body, as well as protect the joint.

• **Cartilage:**
  o Articular cartilage covers the areas of the bone that come together to form the knee joint: The ends of the Femur and tibia, as well as the back of the patella. This slippery cartilage assists in allowing the bones to slide across each other while you bend and move your knee.

  o Meniscus, a tough and rubbery “cushion” located between your femur and tibia which stabilizes the joint.

• **Ligaments:**
  The purpose of ligaments are to connect bone to bone. Like support ropes on a bridge, there are four ligaments which hold the bones together and provide stability and extra strength to the joint.

  o Collateral ligaments, the MCL on the inside of your knee, and the LCL on the outside of your knee control the side to side movement, and help to stabilize your knee from unusual movement and overextension to either side.

  o Cruciate ligaments form an “x” shape with the ACL and PCL, and control the back and forth movement of your knee.
• **Muscles:**

There are 23 different muscles within 3 primary muscle groups that make up the knee. The 3 primary groups are the muscles of the Quadriceps (front upper leg), the hamstrings (back upper leg), and the calf muscles (lower leg). These muscles work congruently to help the knee bend, flex, and control side-to-side movement.

  - Quadriceps Femoris Muscles: The Quadriceps femoris muscle group is made up of 4 muscles: vastus lateralis, vastus medialis, vastus intermedius, and rectus femoris. Their function is to extend the leg at the knee and flex the thigh at the hip.

  - Hamstring Muscles: The Hamstring muscle group is made up of 3 muscles: biceps femoris, semitendinosus, and semimembranosus, whose function is to flex the leg at the knee.

  - Calf Muscle: The gastrocnemius muscle forms the posterior muscle wall of the knee and works as the knee flexor and foot’s plantar flexor.

• **Joint Capsule:**

This is a fibrous capsule that wraps around the joint and encompasses the synovial membrane. The synovial membrane is lined with a soft tissue that secretes synovia fluid (lubrication), called the synovium.

• **Bursae:**

Fluid-filled sacs that cushion and reduce friction between the muscles, bones, tendons, and ligaments. There can be up to 13 bursae in and around the knee.

• **Plicae:**

Folds in the synovium, which can sometimes become caught between the femur and kneecap, causing pain.
Types of Knee Injuries

People put a lot of demand on their knees. In daily life, without pushing limits, the knees are required to lift 100+ pounds multiple times a day in body weight, balance awkward movements, twist, and provide walking support for up to several daily miles of movement. However, depending on your lifestyle, the knees may also be susceptible to constant pounding, jarring motions, a variety of paces from walking to sprinting, sudden stops, jumping, and hard landings. The frequent demands we place on our knees contribute to varying degrees of injuries commonly seen due to:

- Overuse
- Accidents
- Degeneration
- Osteoarthritis

With the complexity of the knee there is a variety of potential injuries that can occur, from mild patellar tendonitis and dislocations, to extreme tendon and ligament tears. While some injuries are due to age and degeneration, the vast number of injuries, especially those occurring to individuals 40-years-old and younger, are both preventable, and quickly recoverable if the symptoms are diagnosed early.

Injuries due to Accident or Excessive Strain

The knees support the entirety of the body’s weight, as well as provide essential movement for most athletes in their respective sports and the daily movement of most people. Due to the constant use, knees are often taken for granted and as a result are easily susceptible to injury, from blunt trauma such as a car accident and falling, irregular and fast movements, sudden stops, jumping and sprinting. Accidental knee injuries can range from a small and easily treatable, to painful injuries that require surgery and months, or even years, of rehabilitation. The following injuries generally occur upon an immediate accident, however, they may also be the result of gradual damage under physical duress.

Fractures: Patellar, femur, and tibia fractures are generally caused by a traumatic collision of your knee bones and a hard surface. These injuries are typical of falls, vehicle crashes, or similar direct-impact collisions. While not a common injury, these fractures will often require surgery and substantial rehabilitation.
Symptoms of fractures are immediate and result in:
- Pain
- Swelling
-Bruising
- Sensitivity to the touch

**Dislocations:** Patellar slippage, or dislocation of the tibia, or femur are usually caused by impact-related collisions as a result of falls, crashes, and athletic-trauma injuries. They can also be related to abnormalities in the knee, often related to an unstable kneecap. 50% of dislocations occur as a result of having a prior knee dislocation.

Symptoms of a knee dislocation tend to be immediate and are both painful and visible:
- Severe pain and tenderness
- The kneecap may be visibly displaced to the outside of the knee
- Kneecap may move excessively from side to side.
- Difficulty moving leg and supporting weight while attempting to stand.

**Anterior Cruciate Ligament (ACL) Injuries:** ACL injuries are one of the more common injuries found in athletes, especially in sports requiring quick movement, split-steps, and jumping. Rapid direction change and awkward landing often results in a torn ACL. In addition, nearly half of all ACL injuries result in further damage to other parts of the knee’s anatomy. ACL injuries often take months to heal, and often require surgery.

ACL Symptoms are immediate:
- A loud hear pop or snap is often heard
- Immediate severe pain occurs
- Swelling will continue for an additional 5-6 hours
- Difficulty straightening out the leg.

**Posterior Cruciate Ligament (PCL) Injuries:** PCL injuries most often occur as a result of an impact to the knee while the knee is bent. This injury is common among athletes, and vehicle crashes. As opposed to ACL injuries, PCL injuries are often partial tears and can heal on their own.

Symptoms of PCL are occur shortly after injury, although the feeling of uncertainty is immediate:
- Mild to moderate pain in the knee,
- Swelling continues for several hours.
- Knee will feel unbalanced like it cannot support your body, or may give out.
**Collateral Ligament Injuries**: Collateral ligament injuries are most often related to sports injuries and are a force-related injury pushing the knee sideways. Damage to the medial collateral ligament (MCL) is a result of impact to the outer part of the knee. Damage to the lateral collateral ligament (LCL) is a result of impact to the inside of the knee. LCL injuries are the least common of all knee-related injuries.

Collateral Ligament Injury symptoms
- Feeling of instability in the knee
- Joint may lock when moved
- Pain, stiffness, and swelling will occur along the outside of the patella
- There may be numbness, or weakness in the foot of the injured knee

**Meniscal Tears**: Meniscal tears are common, often related to aging, but can be torn due to sports-related movement. Meniscal tears are often a result of awkward twisting, pivoting, sudden side-movement, or being tackled.

Symptoms of meniscus tears:
- Pain and tenderness when touched
- Swelling
- Difficulty moving the knee

**Tendon Tears**: Unlike many of the knee injuries commonly caused by traumatic, or blunt force injury, tears to the quadriceps and patellar tendons can happen to anyone, and age is a common contributor. Middle-aged men who participate in endurance and jumping activities are most likely to experience tendon tears, which are often followed by weeks, or months, of rehabilitation.

Symptoms of tendon tears:
- Immediate pain and tenderness, which may worsen overnight, and in the morning
- Redness, warmth, and swelling near the injured tendon
- Stiffness in the joint
- Grinding sound or feeling when the tendon moves
**Overuse Injuries**

Much like accidental injuries, many overuse injuries are sports related. The constant use applied to knees give a false sense of relief that knees can handle much more stress than they are actually able to. Over time, damage to the knees occurs often as a result of frequent and strenuous stretching and pulling, or overuse.

Where accidental injuries tend to be identified with immediate and severe pain, overuse injuries have subtler symptoms such as warming of the inflamed area, mild swelling, and eventual pain. Overuse injuries are also the easiest to prevent through diligent management of symptoms, stretching, muscle-development, and rest.

The following injuries are overuse injuries developed over time, which can be weeks, months, or even years, depending on factors such as health, body weight, sport, and how you move your body.

**Bursitis**: A painful condition that occurs when the Bursae (small fluid filled sacs) become inflamed. Bursitis is common among often-used joints.

Symptoms may vary depending on which bursa are affected, however common symptoms occur in affected area of knee:

- Knee may feel warm
- Tender when pressure is applied
- Swelling
- Possible pain while moving, or resting

**Tendinopathy (tendinitis, tendinosis)**: Often referred to as “Jumper’s Knee” due to the greatest stress on the patella tendon is from jumping and landing. While initial affects may be small, continued overuse will likely strain the lesions beyond rate of repair. This can lead to severe pain and dysfunction, and possibly require surgery. Tendinopathy is common among athletes, and has varying stages that determine treatment. Athletes who jump, sprint, and need to make quick direction changes commonly experience this injury.
Symptoms of tendinopathy are very similar to tendon tears caused by an accident:

- Immediate pain and tenderness, which may worsen overnight, and in the morning
- Redness, warmth, and swelling near the injured tendon
- Stiffness in the joint
- Grinding sound or feeling when the tendon moves

**Iliotibial band syndrome**: The iliotibial band (ITBS) is a ligament that runs from the hip to the shin, and attaches to the knee for stabilization and movement of the knee. When the IT band becomes inflamed it causes problems with the movement of the knee and can be very painful. This injury is found often among runners, and can take weeks, or even months of rest and rehabilitation until recovered.

Symptoms of ITBS are:

- Stinging pricking feeling on the lateral side of the knee
- Pain on the lateral side of the knee

**Patellofemoral pain syndrome (PFPS)**: PFPS, is commonly referred to as “Runner’s Knee”, and is the most common knee injury for runners. Not to be confused with tendinopathy, PFPS has symptoms of a dull ache or pain along the behind or around the kneecap, where tendinopathy is typically found at the base of your kneecap connecting the tendon to the shin. Due to the exercises and aggravating movements of PFPS, such as squatting, leg extensions, sitting, running, and descending stairs, treatment and rehabilitation can often take months. The pain is caused from your patella sliding against the groove in your femur where the two meet. While there have been many myths as to what causes PFPS the most current suggestion is that the pain is a result of weak quadriceps and other muscles surrounding the knee.

Symptoms of PFPS are:

- Knee pain when sitting, or bending knee. Often occurs when walking down stairs and squatting.
- Occasional and sudden knee buckling
- Stuck, or popping sensation while moving joint
Degenerative Disease

A degenerative disease is a disease which occurs over time, with effects that cannot be reversed. However, if you maintain a healthy weight and diet, stay active, and follow other treatments, arthritis, can be slowed and the pain of joint damage can be lessened.

Osteoarthritis (OA): is a chronic degenerative disease that affects the joints. There are more than 27-million people with OA in the United States, and most people over the age of 60 have some degree of OA. While it can affect any joint, knees, hips, neck, fingers, thumb, and lower back are the most common joints affected.

OA is due to the smooth gliding cartilage surface wearing down. This causes pain and swelling, as well difficulty moving the joint. As bone friction worsens, the bones too begin to break down, eventually causing bone spurs, which are tiny bone fragments that have chipped off and float within the joint. Inflammation eventually causes proteins and enzymes to further complicate the problem. Finally, the cartilage wears completely away, causing bone to rub against bone resulting in joint damage.

Osteoarthritis wears away the cartilage slowly, therefore symptoms may not be immediate, or known until the damage has begun. However, you can help identify the effects with early recognition of the following symptoms:

- Increasing pain due to activity
- Swelling
- Warmth in the joint
- Stiffness in knee after not moving for a period of time, such as in the morning
- Difficulty in general movement and mobility
- Grinding sound when the knees move.

Diagnosing Knee Problems and the Exam

Diagnosing knee injuries can be complicated. As you’ve seen thus far, the knee is a complex and fine-tuned joint made up of several bones, muscles, tendons, ligaments, and other components. Unfortunately, the anatomy is all located in a small area, and many injury symptoms are the same, which often means a doctor must depend on full-disclosure of
symptoms, and often at least an x-ray is needed. In some cases, additional imaging testing may be required.

During the initial exam a doctor will want to know as much about the problem as you can provide. More than any imaging equipment, the doctor will rely on your accurate report of symptoms.

While equipment can help a doctor determine the injury, the equipment is not a fail-safe method. X-rays can provide a doctor with sufficient information which, when combined with your accurate list of symptoms, can help diagnose most knee related injuries.

Other imaging equipment, such as Magnetic Resonance Imaging (MRI) may be used for injuries that are more difficult to diagnose. However, there is no guarantee an MRI will identify the problem, or diagnose the correct issue.

This is especially so if you have an undiagnosed problem that is not causing you pain, or discomfort.
The Interview

The doctor will ask you a series of question to help you identify and remember your symptoms. It’s important to be as thorough as you can in order to help diagnose the correct problem. You may be asked:

1. Where do you feel pain?
   Show the doctor where the most painful part of your knee is, as well as areas where you ache. Often, pain will radiate out to the legs and feet. Depending on the type of pain, and how far out the pain radiates, a doctor determine exactly where the core of the problem is.

2. What type of pain do you feel?
   The doctor will want to know the type of pain you’re feeling. Is your knee, or surrounding area tingly? Is the pain sharp and stabbing, like a knife? Dull, achy, and burning are common types of pain for the knees. The doctor may also ask, if you have felt the same type of pain in other joints.

3. When did you first feel the pain?
   This question is the best way to identify if the pain is the result of a traumatic event, or if the pain has been gradual. If there was no single event that led to your pain, the doctor can now focus on stress type injuries, or maybe arthritis. However, if you can pin-point the exact moment, the doctor will need to look for ruptures, tears, broken bones, and dislocations. Did it pop out of joint? Have you had the same injury before? Have you had other injuries in the same area, that may be causing this pain?

4. When, and how often, does the pain occur?
   Is the pain at its worst in the morning when you wake up? Does the pain get worse after a certain activity? The doctor will want to identify when you are feeling pain, and when that pain is aggravated.

5. Is there anything that helps relieve the pain?
   Have you applied heat or ice? Do you lie in a position that helps support your knee and make it feel better? Are there positions that make your knee feel worse? Can you stand on your knee, and if you do, does that make the pain better or worse?

6. Are there other symptoms besides pain?
   Other symptoms are typically due to movement of your joint. Can you bend, or straighten out your leg? Do you feel grinding when you bend the joint? Does your knee lock when you move it, or do you hear a popping sound when you bend your knee?

7. Are you on any medication?
   If you are taking medication, especially prescription medication, for other unrelated knee problems the doctor will want to know. Sometimes medication may resolve one issue, but cause or contribute to another.
The Physical Exam

Once the doctor has a good idea of your symptoms, he or she will have a better understanding of how to physically examine you to find the problem. The doctor will first evaluate any obvious physical symptoms, such as swelling and bruising. If the doctor feels the swelling is too extensive, you may be asked to schedule a follow-up appointment after swelling begins to recede, however this is rare.

The doctor will evaluate your movement by placing you in a variety of positions, such as lying on your back, or on your stomach, with your feet dangling.

While in each position, the doctor will carefully move your leg forward, backward, side to side and possibly gently twist it. When doing this, the doctor is trying to gauge your range of motion, muscle strength, severity of your pain, abnormal joint and bone movement, and assess where you are feeling pain, and in what position.

Your body position and movement are important in diagnosing where the pain is coming from. In addition to the doctor moving your legs and knee to evaluate range of motion, the doctor will watch you walk, evaluate nerve function, and circulation in your legs.

Your Q-angle may also be measured. The Q-angle is the angle at which your thighbone slants between your hips and knee. A higher Q-angle puts you at risk for ACL injuries and PFPS.

This evaluation will be able to diagnose most knee-related injuries. However, if a diagnosis is can’t be reached, or fully realized, a doctor may request follow-up lab and imaging tests.
**Additional Diagnosis Considerations**

• **Body Weight:**

Body weight plays a significant role in susceptibility to knee problems. The burden of the knee is already a difficult one. When you add obesity to the equation, a simple movement like walking may add hundreds of extra pounds of pressure on your knees.

Consider that every step you take adds one to one and a half times the force of your body weight to your knees. Movement up and down stairs may be 2-3 times as much force, and tasks such as squatting can be as high as 5 times your body weight.

Being 50 lbs. overweight can result in hundreds of pounds of extra force on your knees. So, it’s easy to understand how obese people are 20 times more likely to have knee-replacement surgery than those who are not obese.

If a patient is overweight, it is likely the doctor will discuss with the importance of maintaining a healthy weight as a way to manage additional stress on your knees, and minimize the damage already done. Often, a weight-loss plan which includes discussions with a professional dietician, as well as a sports medicine therapist, will be included with your treatment.

• **Knee Problems in Women:**

In 2000, just over 53,000 women between the ages of 20 and 39 saw a doctor for a knee-related injury. By 2010, that number had more than quadrupled to 230,000. These and other statistics have given way to a new understanding of women’s knees compared to men’s knees. The end result is that women are more susceptible to knee injury, and for a variety of reasons.

  o **Biology:**

    ▪ Hormone changes during a woman’s monthly cycle contribute to the susceptibility of a woman’s joints to injury. Studies show that muscles behave differently during certain periods of a menstrual cycle, which can destabilize the knee joint.

    ▪ Nerve reactions show that a woman’s nerve responds slower than a man’s. This may mean women’s muscles might not act as efficiently as men’s muscles in critical times of impact.
- Simple movements are also much different. Women tend to land differently from jumps than men do, as they land with locked knees often pointed inward. This results in potential injury to the ACL.

- Worse news: More than half of women who have an ACL injury are likely to end up with OA, and often within ten years of their injury.

While women tend to be more susceptible to knee injuries, that does not mean women can’t take steps to manage or prevent the injuries from happening.

There are certain preventive measures that can be taken, which will be talked about in the next section are important.

In addition, women can work with a trainer to adjust their body movements correctly to avoid injury, especially if playing a specific sport. Eating healthy, building muscle in your legs, and adequate rest are all components to reducing the risk of injury.

Smoking causes damage to cells that protect cartilage, and high-heels apply unneeded stress to the knee joint.

Lastly, if women feel persistent pain that lasts a week, or longer, even if mild, the doctor should be seen. Women are more prone to small tears, such as in the meniscus, and early identification is the key to keep the affects short-lived.
Protection and Prevention

Whether you are recovering from an injury, or you have never had an injury, there are a few key steps you can take to ensure you keep your body strong, and injury free.

- **Stay healthy:**
  Staying healthy includes maintaining a good weight, avoiding smoking and excessive drinking, and maintaining a healthy, well-balanced diet.

- **Stretch:**
  Stretching will protect your muscles, tendons, and ligaments by making them more flexible and strong. The stronger your joints are, the less likely you will be injured. Flexibility gives you a wider range of motion, enabling your body to adjust to sudden and unexpected movements you might experience in sports, or in an accident.

- **Low-impact exercise:**
  If you are recovering from an injury then low-impact exercises, such as swimming, walking, and elliptical machines are great ways to safely improve the strength in your joints. Joints are worked out, without the hard impact and awkward movements that come from high-impact exercising such as jogging, and sprints. In addition, for people who play high-impact sports, training with a few low-impact exercises per week will allow your joints to rest while still providing a good work out.

- **Don’t go too hard:**
  Especially true for injury recovery, working out too hard and pushing your personal limits can, and likely will lead to injury. Personal trainers are notorious for over-pushing personal limits. So, be careful with your personal trainer, and learn when to say no. If you are pushing yourself to pain, or recovery from a workout takes more than a couple days you may be working out too hard.
• **Use machines over free-weights:**
The best thing about weight machines is they provide a smooth, and controlled, range of motion. When using free weights, you are fully dependent on your body to manage your range of motion. Awkward and improper body motion with free weights can lead to injury.

• **Stay active:**
While it may seem counterproductive to move around and exercise after you have been injured, staying active is important. Inactivity can decrease flexibility, and weaken your muscles. You don’t need to go “all-out”, but walking, weight-lifting movements without weights, and flexibility exercises, such as yoga and Pilates, are great ways to stay active while recovering from an injury or ease arthritis symptoms.

**Over-the-counter Pain Medication**

Unfortunately for most people, the injury and recovery from it also comes with pain. If your injury is severe enough your doctor may prescribe muscle relaxers or other prescription medication. However, for most people over-the-counter medications will work just fine. There are two different kinds of over-the-counter medications that can be taken. Each has their benefits, and each has side-effects. Knowing which medication to take, and how to take them will help you both relieve pain and at the same time, avoid further complications as a result of the medication.

**Acetaminophen:** Commonly referred to as the brand name Tylenol, acetaminophen comes in several generic brands as well. The drug is a mild pain reliever, generally safe, and easy on the stomach. It is often used for people who have reactions to anti-inflammatory drugs such as ibuprofen.

The problems around taking acetaminophen are side-effects. When taken in extremely high doses, it may damage the liver. The recommended dosage is not to exceed 4,000 mg per day, which is 8 extra-strength Tylenol. However, to be safe only 3,000 mg, or 6 extra-strength Tylenol is recommended.

Other considerations are not taking acetaminophen if you drink moderate amounts of alcohol every day, or have liver disease. It is also recommended, that you take regular-strength doses of acetaminophen (325 mg) instead of extra-strength to help to prevent dosages above 4,000 mg.

**Nonsteroidal Ant-inflammatory drugs (NSAIDs):** NSAIDs can be more effective than acetaminophen because they relieve pain and reduce inflammation. Drugs such as: aspirin, ibuprofen, and naproxen. They are more commonly known by their brand names: Advil, Motrin, Aleve, and Anaprox. While they may provide better pain relief than acetaminophen,
NSAIDs also have several possible side-effects such, as gastric bleeding and ulcers that can occur with regular, repeated usage, and they can increase the risk of heart-attacks, strokes, and kidney failure when taken in excessive doses, or for a long period of time. Some of these side-effects can be reduced with a proton pump inhibitor such as esomeprazole (Nexium) and prazole (Prevacid).

**Combining medication:** One way to reduce the risk of side-effects from these over-the-counter medications with equivalent pain relief, is by taking lower doses of both acetaminophen and NSAIDs simultaneously. You can also alternate taking acetaminophen and an NSAID to further decrease chances of side-effects.

One important note is that you cannot take more than one kind of NSAID at the same time. This can result in increased chance of side-effects and an over-dose.
CHAPTER 02: YOUR HIPS

The hip joint is one of the largest, and most important joints in the body. When most people think of the hips, they think of the bone slightly below the waist. However, the Hip is actually a very large ball and socket joint that connects your upper body to your lower body, providing a socket where the femur and hip bone connect.

The hip joints bear the weight of your upper body, and supports the strength of your legs. It is a strong flexible joint with a high range of motion which enables humans to excel in sports such as football, wrestling, and ballet.

As the hip is so large and depended upon for movement, any injury to the joint can cause significant problems for the injured person. The hip joint is strong yet can be susceptible to impact injuries and overuse injuries in athletes, and osteoarthritis conditions from degeneration.

Understanding how your hips work and how to protect them is important in maintaining a healthy hip joint and ensuring you will have decades of easy, pain-free, mobility.
Anatomy

Much like the knee joint, the hip joint is comprised of bone, cartilage, tendons, ligaments, and muscle tissue. Despite being the biggest ball and socket joint in the body, and one of the strongest, the hip joint cannot be overlooked for injury. While hip injuries are not as common as knee injuries, they can often result in more significant injuries, sometimes resulting in hip replacements. Hip replacement procedures of those 45-years and older represent 95% of the procedures. Hip surgery replacements have dramatically increased from 138,700 in 2000, to 310,800 in 2010. This is in part due to advancements in replacement surgery, which improve the speed and recovery of surgery.

Damage in younger people is often related to musculoskeletal abnormality, or impact accidents that may tear, strain, or fracture the anatomy. As adult progress to middle age, injuries are related to overuse and athletic injuries. The elderly are often treated for osteoarthritis, which deteriorates the joints cartilage, can lead to brittle bones, and often plays a role in falls that result in hip fractures.

The anatomy of the hip joint is similar to the knees, although provides for more body stability and a much higher range of motion.

**Bones**: The bones of the hip joint are large and strong. There are four key bones structures in the hip joint: ilium, acetabulum, thighbone (femur), and the greater trochanter. To allow for the great range of the bones, the hip joint is shaped like a smooth ball at the top of the thighbone, that fits into the acetabulum. While women and men have the same joint structure, women’s hips are wider and lighter to accommodate for pregnancy.

The ilium is the superior part of the hip, and what most people think of when it comes to a hip bone, resting just below the waist, and at the top of the pelvis.

The acetabulum is a depressed socket within the pelvis that forms a ball and socket joint. It is formed by three bones, the: ilium, ischium and pubis.

The femur is the largest bone in the body, the upper leg bone, and connects at the hip joint linking the upper and lower body.

The greater trochanter is the neck near the top of the femur.
**Cartilage:** The acetabulum has a cushion of smooth, and super-slick cushioning cartilage called the labrum, which allows for the easy movement of the bones in the joint. This cartilage does not have a blood supply, which often delays the healing process.

**Ligaments:** Four ligaments make up the joint capsule surrounding the hip joint. The function of the ligaments is to allow flexibility, yet prevent the overextension of the femur from the joint which could lead to dislocation. The iliofemoral ligament is the strongest ligament in the body, and arguably the most important. It helps to prevent extension of the femur when the body is standing erect.

**Muscles:** Muscles of the hip joint extend from the major muscle groups of the thigh, lower back, gluteus maximus, hamstrings, and hip flexors. These muscles provide support, strength, and a wide range of movement. The muscles help support, provide balance, and ease the pounding motion from running, jumping, and heavy use.

**Bursae:** Similar to the knee joint, bursa are small, liquid-filled sacs, located near tendons, muscles, and bones that provide a smooth and frictionless surface while moving.

**Types of Injuries**

The hip joint is very strong and supported by large and powerful bones and muscles. It is designed to maintain the support of the entire body, take a pounding, and allow for a wide range of movement.

While injuries are not as common as other parts of the body, injuries occurring to the hip are often more concerning, and painful, sometimes leading up to a hip replacement surgery. Injuries can happen to any age group, however, the type of injuries are exceedingly disproportionate according to age. Younger people under the age of 20-20-years-old typically have injuries due to impacts found in sports and accidents. Middle age are often related to overuse, and the elderly are subject to osteoarthritis, although a common injury, due to osteoarthritis, are fractures from falling as cartilage wears away and creates instability in the joint.

For most hip-related injuries, a medical examination is nearly identical to a knee-injury exam. By referencing the knee-exam questions in chapter one, a patient can help their doctor to quickly diagnose their injury, or determine a good evaluation and treatment program for you. A review of potential injuries is a good way to create preventive measures to avoid these injuries, or manage lifestyle to limit difficulties with osteoarthritis.
**Overuse Injuries**

Larger joints that are prone to excessive use are also prone to overuse. The hip in particular is used in all situations where a person is standing, walking, running, jumping, or in general moving their body. Whether the joint is being used as support in sitting, or full extension and flexibility as a ballerinas or gymnasts may move, the joint may eventually have damage from overuse.

Overuse injuries may be caused by several conditions, such as:

- Lack of appropriate muscle strength or endurance
- Poor core stability
- Muscle imbalance (strong tight muscles versus weak stretched muscles)
- Inflexibility
- Malalignment or Biomechanical issues (e.g. flat foot, squinting patellae)
- Training errors
- Poor body mechanics
- Incorrect equipment.

However, of all of these, the most common type of overuse injury is poor body mechanics, which refers to not moving your body in the most efficient way over long periods of time.

Identifying an overuse injury can be relatively easy if you are paying attention. Swelling, warm to the touch, redness and impaired function of the area all warning signs of an overuse injury. Depending on your symptoms and how long you go without seeing a doctor, your condition may worsen. There are four stages to identifying an overuse injury. The further down the list, the longer, and more difficult recovery is.

1. Discomfort that occurs during normal movement, but still allows you to move relatively easily throughout the day, especially with more activity.
2. Discomfort that occurs before and after activity. Typically, the discomfort occurs after long bouts of rest such as when you wake up in the morning, or after sitting at work for a few hours.
3. Discomfort becomes worse as you become more active. For example, if you go for a jog, or workout at the gym the discomfort worsens instead of becoming better.
4. Constant pain or discomfort
When looking strictly at the hip joint, common overuse injuries are:

**Hip and Muscle Strain:** As the body becomes older, muscles become tighter, and people tend to stretch less. Changes in health, nutrition and exercise, greatly affect your muscles ability to recover from day to day activities. While our mind may be telling us that we have the same capabilities as when we were 20-years-old our body does not always agree. Something as simple as bending over to grab a pen on the ground can lead to a muscle strain. Severe strains are often the result of heavy lifting, pulling, pushing, or extreme movement in recreational and athletic activities.

Treating hip muscle strains can usually be done with over-the-counter pain medication, ice, and rest. Swelling usually only takes a few days to subside, and once you are capable you can start light stretches to regain some flexibility and loosen the muscles. If your pain is severe enough, a doctor might recommend physical therapy which will involve a series of stretches, and strength training before returning to physical activities.

**Tendinopathy:** Hip tendinopathy injuries are very similar to knee tendinopathy injuries. In the hip they occur often in old age when a person’s gait is thrown off due to other injuries found in the spine, knees, ankles, and hips. In younger people the injuries are more common with athletes, especially athletes who need to overextend their legs to perform.

Examples would be dancers and gymnasts. Other athletes who perform hills, and sprints are prone to tendinopathy, as they excessively use the muscles to gain strength. In the mean time they are damaging tissues from the additional stress applied to the joint and muscles.

The treatment and examination of hip tendinopathy is similar to knee tendinopathy. The doctor will rely on your answers to a series of questions on when the pain first occurred, how often it occurs, what type of pain you feel, and where the pain is located.

The doctor will then have the patient move in several different positions to evaluate the range of motion, and degree of pain in certain positions. If a diagnosis cannot be fully realized, the patient may be prescribed imaging or lab tests.

**Bursitis:** Hip bursitis is when the small bursae sacs become inflamed. Symptoms are sharp aching and burning pain that tends to get worse as you move, or when applying pressure to the injured area. For example, laying down on the side of your body with inflamed bursae. The pain is often radiating, and limits your leg’s range of motion.
Bursitis is more common in women and middle-aged, or older people. There are several types of bursitis, but the most common are:

- **Trochanteric bursitis** which is the result of an impact injury, accumulation of stress over time, or excess pressure on the hip as you move, such as carrying a toddler for extended periods of time in one area, or balanced on a hip.

- **Ischial bursitis** is common among long-distance bikers and office personnel who sit for long periods of time without standing and moving around. This type of bursitis is often referred to as “tailor’s seat” due to the inflammation of bones you sit on.

- **Iliopsoas bursitis** affects the bursae that lies between the front of the hip joint and the iliopsoas muscle. The inflammation is often associated with arthritis, or sports that require repeated hip flexing.

Diagnosing bursitis can be difficult and will often require a closer examination than muscle strains and tendinopathy. Imaging and lab tests may be needed after an initial physical exam to rule out injuries with similar symptoms such as fractures and arthritic joint damage.

Treatment of bursitis is similar to both strains and tendinopathy with over-the-counter pain relievers, rest, and ice until swelling and pain is relieved. Then a stretching and muscle strengthening program. If the pain persists surgery can be done to remove the inflamed bursae, although this is always the last course of action, as removing the bursae can lead to complications.

**Labral tear**: The labrum cushions and seals the hip joint. Tears are often the result of a blunt trauma injury such as a dislocation from a fall, or severe accident, or occur in people who frequently squat and bend such as plumbers. Once this seal has been damaged the joint loses its frictionless internal surface and causes the bones to chafe against each other.

Labral tears are extremely common, affecting most people by the age of forty, and common among people born with abnormally shallow hip sockets.

Labral tears can be difficult to diagnose. Symptoms are a sharp pain near the groin or front of the hip, and pain that worsens in high leg lifts. People may feel a catching, or locking when twisting at the hip. The difficulty in diagnosis is that often labral tears feel as if they are a lower back strain, or a pulled groin, which is why during self-diagnosis, many people fail to realize the severity of their injury.

The initial exam, an x-ray or CT-scan are unlikely to give a definitive diagnosis, however, dye imaging and invasive arthroscopy can provide a conclusive diagnosis.
While initial treatment of Labral tears is the same as strains and tendinopathy, this will not heal the tear, but rather reduce the pain. Additional pain relief, such as cortisone shots can relieve inflammation and provide more lubrication.

If the condition does not improve further surgery may be required, which in some cases can fully repair the damaged area. Recovery can last several weeks or even months depending on the damage and the types of activities you are involved in.

**Damage to young hips**

While most hip injuries, especially overuse injuries, affect people 45 and up, there are conditions that affect younger people in their teens through to their early 30s. Femoroacetabular impingement (FAI) is a condition where the bones of the hip are abnormally shaped. This irregularity causes bone spurs, which rub against the hip bones, causing damage to the joint.

While the cause of the condition is not fully understood, it is thought to be a degenerative condition that people are born with. FAI can lead to early arthritis, and causes severe pain that limits the physical and basic activities.

However, surgery can help repair the labrum and remove the bone spurs and other irregularities that might prevent the joint from functioning properly.

**Hip fracture**

Hip fractures can be life-altering for most people. In the United States alone, there are over a quarter-million hip fractures annually, with people over 65-years-old. 9 out of 10 of those fractures occur due to falls. As people age, the cartilage in our joints eventually wears out. In the hip this results in poor posture, awkward movements, and friction between the bones in the hip that often cause instability in simple activities such as walking, standing up, and turning. As people age, bones become more brittle, and tendons, ligaments, and muscles that once could help support and protect the joints and bones are less flexible and have lost their strength. The end result is often a fall, which leads to a hip fracture.
The seriousness of a hip fracture cannot be understated. 20% of people over the age of 50 who break a hip die within a year of the fracture due to health complications. For most, they will need walking support the rest of their life.

In addition to age, gender, race, health, and activity level also greatly affect the possibility you may get a hip fracture.

If a person falls, and experiences severe pain in the hip or groin, a deformed or abnormal appearance of the hip, can’t stand, or has symptoms of a strain in the hip they should go to the doctor immediately, as it is likely that they have a hip fracture. Depending on the type of fracture, nondisplaced or displaced, a person will likely need immediate surgery, to repin the bone back together. Recovery is typically months long, and physical therapy to strengthen the area can last a year or longer. Additionally, calcium and bone strengthening medications may be prescribed, depending on age and recovery progress.

**Osteoarthritis**

Often considered a “wear and tear” type arthritis osteoarthritis is commonly first developed in middle-age and is the leading cause of falls and hip fractures in the elderly, and as just explained, hip fractures can be a serious problem. Osteoarthritis can occur in any joint in the body.

However, it is most common in the hip. While there is no way to prevent osteoarthritis in the hip, there does appear to be a link between maintaining a healthy weight (not being obese), eating well-balanced and healthy meals, and staying active.

In addition, the sooner you begin treatment and take steps to manage the arthritis, the better you can manage the pain and stay active.

There are several potential causes of osteoarthritis, such as:

- Age degeneration
- Family history of osteoarthritis
- Previous injury to the hip
- Obesity
- Birth defect
Even without any of these causes, you may still get osteoarthritis, such as people who frequently participate in highly active joint-impact activities, such as running and tennis, have a higher risk for osteoarthritis due to overuse and wearing down of joint-protecting cartilage.

The most common symptoms are pain that generates around the hip and radiates down the legs, or flares up during physical activity, loss of full range of mobility, or a grinding sound or feeling at the base of your hips when you walk.

Diagnosis involves an initial doctor examination which will cover your symptoms and take you through a series of physical movements to determine where pain exists, and the degree of range of motion.

Most physical exams cannot clearly diagnose osteoarthritis, however imaging tests and laboratory tests can help rule out other likely conditions. Osteoarthritis is degenerative, and therefore you will not gain back the lost cartilage.

However, it can be managed with over-the-counter medication and prescription in some cases.

Pain can also be reduced with low-impact exercise, especially water exercises which help relieve the pressure gravity puts on the body. Rest and walking aids will also help limit the pain.
CHAPTER 3: HOW TO TEST FOR KNEE AND HIP PROBLEMS

Injuries to your knees and hips can occur due to several reasons. Often, self-diagnosis or an office visit to the doctor can identify your problem, and help put you on a treatment plan that will put you on a path towards recovery.

However, initial office visits cannot detect every condition or injury. With the complexity of the knee within such a small area, and the contributing factors of hips, it can be difficult to pin-point exactly what your injury is, and more so underlying issues contributing to, or caused by your injury.

Because of this, your doctor may prescribe further treatment such as imaging techniques and laboratory tests.
**Imaging Tests**

Imaging tests can identify problems not detected with range-of-motion tests, interview questions, and a standard office visit. The equipment can help show what's going on in the more difficult to view areas of the knees and hip, allowing the doctor to get a detailed look at bones, muscles, cartilage, and ligaments. There are three main imaging tests that can help a patient: X-Ray, CT-Scan, and MRI.

**X-Ray:** Most people are familiar with an x-ray, since it is often the first imaging scan you will have done for nearly any injury. An x-ray is a radiation scan that can provide a two-dimensional image of bones within your knee and hip joints.

X-rays are an excellent way to show bone related damage within the joint such as fractures, bone spurs, loose debris, spatial issues, and bone damage caused by osteoarthritis. While x-rays can give you a good glimpse into bone related issues, an x-ray cannot provide quality imaging of cartilage, tendons, or ligaments.

The x-ray technician will take several x-rays of your knee in different positions. You may be asked to lie back with your leg bent and knee pointed upward, standing, or on your side. For a hip injury, you will most likely be laying down. Whether you receive x-rays for knees or the hip, your doctor may take images from many different angles, and possibly the comparable joint for comparison of the joints and joint space.

**CT-Scan:** More commonly referred to as a “Cat-scan”, the CT-Scan (Computed Tomography), is also a radiation scan that provides a more comprehensive three-dimensional image of the bones and joint. This provides the doctor better imaging of the bones to help identify hidden problems, such as hidden fractures, lesions, and bone-related anomalies.

A CT-Scan is completed inside a large tube, with rotating x-ray equipment that takes small x-ray slices of your injured area. When the slices are assembled, they will render a three-dimensional image. When performing the exam, a technician will have the patient lay down on a moveable table that will slide into the tube and be raised, lowered, and moved while the test progresses. This is a pain-free and noninvasive test which generally lasts less than an hour.

However, while the CT-Scan can help a doctor evaluate your bone structure and hidden bone problems, it still cannot help evaluate soft tissue damage, such as tendons and ligaments.
**MRI:** Magnetic resonance imaging (MRI) uses a powerful magnetic field, radio waves and a computer to produce detailed pictures of joints, soft tissues and bone. It is usually the best choice for evaluating the body for injuries, tumors, and degenerative disorders such as osteoarthritis. However, if an x-ray or CT-Scan has already identified physical signs of osteoarthritis, the MRI may not be able to tell the doctor any more information.

Dye treatment is common in MRI’s, and allows doctors to view higher quality images that may provide a more accurate diagnosis of the problem.

While most smaller hospitals and clinics will have a small MRI machine that can be easily manipulated to focus on smaller joints such as the knee, larger hospitals will have a scanning table that can move you through the machine. The exam generally lasts less than an hour, with immediate results displayed on the computer.

The non-invasive and non-radiation exam is safe, however due to the strong magnet you cannot have an MRI if you have a pace maker, aneurism clips, or other metal implants.

**OCT:** Currently used to test for eye problems, Optical Coherence Tomography (OCT) is being reviewed for knee joint imaging. OCT is a high-resolution imaging test that provides three-dimensional images of bones and tissue. OCT has an opportunity to provide more detailed and better diagnosis for several conditions that would have otherwise been tested through a series of expensive processes. With image capabilities 10 to 100 times more detailed than current imaging equipment, doctors can identify and monitor the knee joint more closely.

The test is more invasive than other imaging tests, using a needle arthroscope or a surgical arthroscope, thus the test may only be used if tests from prior imaging methods prove inconclusive.

**Laboratory Tests**

Imaging equipment tests provide a view of your joints, including bones, cartilage, tendons, ligaments, and muscle tissue. However, while imaging may provide clarification on the damaged area of the joints, it may not be conclusive as to what is causing the damage. In this case, a doctor may prescribe one or more laboratory tests to help determine what is causing the damage, and how it should be treated.

There are five common tests: Arthrocentesis, Rheumatoid Factor, Erythrocyte Sedimentation and C-Reactive Protein, and Serum Uric Acid.
**Arthrocentesis:** The process of removing synovial fluid for examination. In this process the doctor will provide a numbing agent, then insert a needle with a syringe into the joint space to withdraw a fluid sample.

This test is often performed upon sudden onset of swelling, and can be used diagnostically to identify etiology of acute arthritis, or therapeutically to relieve pressure. Lab tests of the synovial fluid will help determine infection, injury, inflammation, or crystal deposits in the joint that could indicate gout or pseudo-gout. Pain is often relieved immediately due to pressure relief from withdrawing the excess fluid. However, simple pain medication and ice can also be used if pain does not readily subside.

**Rheumatoid Factor:** A blood test that detects an antibody found in up to 80% of people with rheumatoid arthritis. High levels of rheumatoid factor can indicate an aggressive disease. However, the results can be controversial as the same antibody is found in other medical conditions, resulting in nearly 10% of people testing positive for rheumatoid arthritis, who do not have it.

**Erythrocyte Sedimentation and C-Reactive Protein:** These blood tests measure inflammation. Generally, the tests are used to measure the level of inflammation after knee and hip surgery, although, they can also be used to detect other inflammatory conditions, such as rheumatoid arthritis. While the tests can detect inflammation levels, they cannot always determine the location of the inflammation.

**Serum Uric Acid:** This test measures uric acid in the blood, which can indicate uric acid crystals in a joint, and the onset of gout. Uric acid is a chemical produced when your body breaks down foods that contain organic compounds called purines often found in meats, most alcohol, and a variety of other foods. When too much uric acid is produced it accumulates in joints such as toes, knees, and ankle. This causes an extremely painful condition that can be managed with diet and exercise, or prescription medication. Extreme cases result in large amounts of swelling, and can be permanent.
CHAPTER 4: LESS INVASIVE TREATMENTS TO KNEE AND HIP PROBLEMS

As you now know, knee and hip problems are complex with several potential injuries, many of which have similar symptoms. Factors that lead to or exacerbate injuries are just as numerous, and can represent how you manage your life, as well as undiagnosed medical issues. Age, gender, lifestyle, health, previous injuries, and birth defects all play a role in your injury, as well as prescribed treatment and success rate in surgery.

Now that you understand how your knees and hips work, as well as potential causes of injury, it is important to understand different treatments to get you back on the road to recovery. As surgery can often lead to further complications doctors often advise trying simple and non-invasive treatments prior to surgery. Most injuries can be managed with these treatments in a matter of weeks. However, some may take several months to realize the full recovery progress.

With any of these treatments it is important to stay focused and on target, and not relax from the treatment once pain recedes. In addition, some of the treatments, such as weight loss and healthy lifestyle, are life-benefitting experiences which should be treated as a permanent change, rather than a short-term treatment to a current problem.
Rice

Rest, Ice, Compression, and Elevation (RICE) is the most common first aid treatment for muscular-skeletal soft tissue conditions. The treatment should be started as soon as an injury occurs, and continue for the next 24-48 hours after the injury. Depending on the severity of your injury, your doctor may suggest continuing with RICE treatment throughout your recovery process to reduce pain, and while you are using other treatments.

Often, if an injury is not severe, such as a mild knee strain, you may be able to self-administer your RICE treatment without going to see a doctor. However, if your symptoms continue beyond a week, it is highly recommended you schedule a doctor’s appointment to make sure your injury isn’t more severe than you think.

Rest: The amount of time you rest will vary depending on how long your swelling exists. A general recommendation is to wait until your injury is a nuisance, rather than painful when you move. Of the four steps in RICE, rest is the most important and can last the entire duration of your RICE treatment.

After an injury it is important to prevent aggravating the injured area further. For example, if you strain your knee, you will want to lay down, or sit in a position where that part of your knee does not feel pain from undue pressure. This may mean laying on your back, or side. You may also have to use crutches, a cane, or other walking-assist if you do need to walk, in order to take some of the pressure from the injured area.

Most muscle strains and sprains are a result of micro-tears, and while resting for up to a week may relieve a great deal of your pain and swelling, it can take 3-4 weeks for those tears to fully recover. Stay away from the activity that caused the injury for several weeks. When you do go back to any activity, if you feel pain, stop so as to not reinjure yourself.

Ice: It is important to ice an injury immediately after the injury and continue to do so for 20 minutes at a time, up to 8 times a day. Ice provides several benefits from reducing swelling to relaxing your nerve sensors, which helps relieve, or mask the pain. Ice will reduce blood flow to the injury, therefore help to reduce the pain and swelling.

It is important to limit icing to only 20 minutes to avoid freezing your skin. In addition, you will want to wrap the ice in a towel to provide a buffer between it and your skin. While ice is a good treatment for immediate injuries and swelling, it is not recommended to ice an injury for as long as you would rest an injury.
**Compression**: Compression is often a personal choice. Using a compression aid such as bandage, cast, boot, or splint can provide a comfortable support to keep your joint from jostling around. Preparing the compression to a personal comfort level is often fine, however, a doctor or nurse can advise on the best compression aid for your injury, and how tight the fit should be.

**Elevation**: Elevation should only be done the first 24-48 hours of treatment. Elevation acts like ice to reduce blood flow to the injury, thereby reducing further inflammation. The key is to elevate your knee or hip at or above your heart level to allow gravity to limit blood flow.

**Weight**

If you are experiencing frequent pain in your knees and hips sometimes losing a few pounds of weight will help relieve your pain. Any extra weight, especially if a person is obese will contribute to the likelihood for osteoarthritis by adding additional pressure to the joints that contributes to the deterioration of cartilage.

If a person attempts to lose weight due to obesity it is best to consult a doctor or nutritionist who can advise on a safe way to lose weight, while still maintaining good health and nutrition to improve muscle strength.

Utilizing low impact exercises combined with a healthy portion controlled, meal plan is a great way to lose weight.

**Heat Therapy**

As important as ice is to reducing swelling, heat is also important when you want to get back into your activity. It is recommended that before starting your activity, you apply heat to warm the previously injured area.

Heat is a great way to alleviate pain, and reduce painful muscle spasms.

There are several ways to apply heat, each with its own benefit.

- Heat packs are a common way to isolate the heat to a certain area, such as the upper or lower patellar region of your knee. However, you need to be cautious of how hot the pad is, and be aware that direct contact with your skin that may cause burns.
• A warm bath or hot shower are recommended to warm your body and muscles prior to any activity. The affects can be just as good as a light jog prior to your activity.

• Hot and cold treatments often work well together, with heat prior to an activity and cold to reduce swelling after the activity.

• Diathermy is a deep-heat technique that helps relieve muscle spasms by using electromagnetic waves to deliver heat beneath the skin. However, people with pacemakers cannot use this technique.

**Ultrasound, phonophoresis, iontophoresis**

A therapeutic ultrasound technique can be used to generate sound waves that reach deep tissues and increase blood flow, relax muscle spasms and help the healing process. The technician will apply gel to the skin of the injured area, and slide the ultrasound wand over the area.

Phonophoresis is the use of ultrasound to enhance the delivery of topically applied drugs such as hydrocortisone. The technique has been used to enhance the absorption of topically applied analgesics and anti-inflammatory agents through the therapeutic application of ultrasound.

Iontophoresis is a non-intrusive technique that sends mild electrical currents through water and into the skin. While initially used to treat excessive sweating, there has been a increase in treating joint injuries to deliver anti-inflammatory medications directly into the skin.

**Therapeutic exercise**

Therapeutic exercise and physical therapy are two of the most important ways to improve your muscle and joint strength after injury.

Muscles work in pairs, and are also supported by nearby muscles to perform their function. For example, your quadriceps and hamstring muscles work together to move your lower leg. When you contract your quadriceps your hamstring is relaxed. The same works the other way. In addition, your calf and shin muscles help stabilize the knee and support the weight of the movement.

As in an injury, strengthening all supporting muscles in those groups through low-impact exercises and stretching, such as water exercises, and safe machines which can help you control your range of motion, is a good idea. It allows you to provide the injured area with additional support, while taking the stress away from the injured part of the joint.
Working with a physical therapist is important because the therapist can show you the exercises that will be of the most benefit to your joint and surrounding muscles. However, their greatest benefit may be in teaching a patient how to move correctly. This is important, as most overuse injuries occur as a result of poor body mechanics.

Some exercises a physical therapist may teach you:

*The three stretches below can be repeated 2-3 times 4-5 times a week.

*The exercises can be repeated with reps of 10, and 2-3 sets.

- **Heel to Cord Stretch**
  Stand facing a wall with your unaffected foot straight and against the wall, while the foot of the affected leg is flat on the ground behind you with the toes slightly raised. Hold the stretch for 30 seconds, rest 30 seconds, and then hold again.

- **Standing Quadriceps Stretch**
  Stand straight up and grab the ankle of your injured leg. Pull the heel of your foot behind you, trying to touch your buttock. Hold for 30 seconds, rest for 30 seconds, and then hold again.

- **Supine Hamstring Stretch**
  Lie on your back with both of your legs bent at the knee. Bring one leg toward your chest, position your hands behind the knee and extend the leg straight up. Hold for 30 seconds before relaxing 30 seconds, and then repeat.

- **Half Squats**
  Stand with your legs shoulder level apart. Hold your back straight and your head up as you lower your body about 10 inches, as if sitting in a chair. Hold for 5 seconds before rising, and then lower again.

- **Hamstring Curls**
  Stand straight with your hands in front of you holding a table or chair for balance. Raise one leg as high as you can, hold for 5 seconds, and then lower again. Repeat.

- **Calf Raise**
  Position yourself behind a table or chair. While standing, lift your body weight onto your toes, hold for 5 seconds and lower. Repeat.
**Leg Extension**

Sit in a chair with your back straight. Raise your lower leg to as full an extension as you can, hold 5 seconds and then lower. Repeat.

**Gate Retraining**

Knee and hip problems can affect your gait, by causing pain, restricting movement, or weakening muscles. After several weeks or months of pain, you may “forget” how to walk the way you used to. Or, the way you used to walk may have been part of the problem all along. A physical therapist can watch and analyze how you walk to help you tweak your steps, thereby reducing the pain casing, twists of an over-pronated foot, limp, or awkward bend in your step.

Without proper coaching on how to walk, you may be applying more force to your joints, or requiring some muscles to work harder than they should, while other muscles are not working hard enough. This creates a lack of balance and can lead to further complications.

**Water Exercise**

Water exercise is an excellent way to relieve stress on your joints after an injury, and can be built into a long term program to mix with your regular workout once you have recovered. The benefits of water exercise come from your body’s buoyancy in the water and the pressure relief the water provides.

Most exercises you would do outside the water are good to help your joints while inside the water. Exercises such as walking or jogging in place, side-stepping, lunges, and standing knee lifts are ways you can safely exercise, build range of motion, and strengthen the joint.

**Medication**

Acetaminophen: Commonly referred to as the brand name Tylenol, acetaminophen comes in several generic brands as well. The drug is a mild pain reliever, generally safe, and easy on the stomach. It is often used for people who have reactions to anti-inflammatory drugs such as ibuprofen.

The problems around taking acetaminophen are side-effects that may damage the liver, when taken in extremely high doses. It is recommended not to exceed 4,000 mg per day, which is 8 extra-strength Tylenol. However, to be safe, 3,000 mg, or 6 extra-strength Tylenol is recommended.

Other considerations are not taking acetaminophen if you drink moderate amounts of alcohol every day, or have liver disease. It is also recommended that you take regular-
strength doses of acetaminophen (325 mg) instead of extra-strength. This can help to prevent dosages above 4,000 mg.

**NSAIDs**: NSAIDs can be more effective than acetaminophen because they relieve pain and reduce inflammation. Drugs such as: aspirin, ibuprofen, and naproxen are more commonly known by their brand names: Advil, Motrin, Aleve, and Anaprox.

While they may provide better pain relief than acetaminophen, NSAIDs also have several possible side-effects such as gastric bleeding and ulcers when taken for a long time, and increased risk of heart-attacks, stroke, and kidney failure when taken in excessive doses, or for a long period of time. Some of these side-effects can be reduced with a proton pump inhibitor such as esomeprazole (Nexium) and prazole (Prevacid).

**COX-2 Inhibitor**: Celecoxib (Celebrex) is a prescription NSAIDs known as COX-2 inhibitors. They were developed to relieve pain with less stomach irritation than traditional NSAIDs. However, due to side-effects, patients should not be using COX-2 Inhibitors if they have a heart condition.

**Opioids**: Opioids, such as codeine and oxycodone, are pain relieving medications which have morphine-like properties. Due to their high pain-reduction they are commonly given out after surgeries, or when other over-the-counter medications are not working well.

**Corticosteroids**: Corticosteroids, such as prednisone, do an excellent job of relieving pain by blocking the body's ability to create an inflammatory reaction. However, taken regularly, over long periods of time, side-effects can be severe. Some side-effects are compression fractures of the back, bone weakening diabetes, hypertension, and other problems.

**Platelet-rich plasma therapy**: In this therapy blood is drawn from an individual, run through a centrifuge to separate platelets, which are then injected into cartilage of an injured knee as platelet-rich plasma. While many people attest to the treatment, there is little scientific proof showing the treatment has a positive effect on OA.

**Alternative Therapy**

Alternative therapies are treatments that have developed over centuries in an attempt to manage pain. Some of the alternative treatments are hundreds or even thousands of years old. However, the concern modern medicine has is that many alternative therapies have no scientific evidence backing them up.
Regardless of culture or background, most people have the same afflictions, pain, and similar injuries. This has led to countless unsubstantiated cultural therapies to manage the same injury.

However, due to popular culture and global harmonization these therapies are becoming more popular. While science may not have found any supportive evidence, as long as the treatment is not causing problems, you may find a treatment that does work for you.

**Acupuncture**: This ancient Chinese treatment involves pricking the skin with very thin needles to alleviate pain, and treat several other physical and emotional problems. The theory behind acupuncture is that the needles will stimulate “energy meridians” which correct disease-causing imbalances in the body. While there is not clear scientific support of this treatment there have been studies that show results.

There are several westernized theories on why this treatment may work. One suggestion is that acupuncture works as a placebo effect. The person who is being treated believes in the therapy, and mentally manages the pain, while believing it is the acupuncture. Another theory is that the needles release endorphins in the body which act as a pain reliever, similar to the benefits of morphine.

**Supplements**: Through the decades there have been several supplements developed to try and reduce pain and swelling of joints, while at the same time repairing, and even “re-growing” cartilage to improve degenerative joint problems such as osteoarthritis. However, much like acupuncture the tests have been inconclusive, and often times fully without merit.

Two popular supplements currently being tested are glucosamine and chondroitin sulfate. Glucosamine is found in both cartilage and synovial fluid, while chondroitin sulfate is part of a compound that makes cartilage elastic.

Despite several studies on both supplements tests done by the American Academy of Orthopedic Surgeons do not support either of these supplements, as they do not show significant treatment properties, beyond pain relief.
Another popular supplement used for joint pain through injections is Hyaluronic acid, a compound found in body tissue and cartilage. Despite its use for pain relief, it too has not performed well enough in trials to garner support as a positive supplement.

S-adenosylmethionine, an analgesic pain reliever may stimulate cartilage growth. However, it works better as a pain reliever than NSAIDs, and with fewer side effects.

Boswellia Serrate may help prevent cartilage loss and inhibit the autoimmune process. An Indian study recently showed that cartilage damage began to slow after 3-month treatment. While supplements do exist, the studies showing positive effects of reducing pain, and slowing or regenerating cartilage are still in their infancy.

**Arthroscopy**

Unlike many of the other noninvasive treatments for knee and hip problems, arthroscopy is a slightly more invasive treatment. Arthroscopy is a surgical process where a doctor cuts a quarter inch slice in your knee and then inserts a small video camera and tiny instruments to identify and repair damage.

The procedure is predominantly used to repair knee injuries, with less success with hip injuries. The benefits of arthroscopic surgery is a relatively easy surgery with quick recovery time. The procedure is also less invasive and painful than regular surgery.

Afterwards, the patient is able to move around as he or she would normally in the first week, return to light-duty at work in the second week, and by the third and fourth week you might be able to start light exercising.

While not as effective in treating arthritis, or hip damage, arthroscopy has been able to repair dozens of other knee problems.
CHAPTER 5: KNEE AND HIP REPLACEMENT SURGERY

Over 11-million people in the United States are living with either an artificial hip or artificial knee, according to a 2014 study by the Mayo Clinic. Those are staggering numbers, and each year the number of completed surgeries goes up for both.

There are several reasons why we are seeing more surgeries. For starters, people are living much longer than they ever have before, but physically, their bodies cannot take the toll of 80+ years of life, without complications, such as osteoarthritis causing problems. Secondly, technology and efficiency in performing surgeries is always improving. This means that the surgery is not only more affordable to people who need it, but also faster, meaning more that can be done during the operation.

Both of these points are positives. People are living longer, and surgeons and researchers are constantly improving procedures. However, statistics will not change the fact that most people going into surgery are nervous. They do not know what to expect, and that leads to a fear of the unknown.

You needn’t worry. In this chapter we talk about everything you need to know prior to surgery, going into surgery, and after surgery.
Decisions to make before Surgery

The first step before surgery is sitting down to have a discussion with your doctor on whether replacing your hip or knee is right for you. If you have already reached this point there is a very good chance that you are a candidate for surgery.

Other decisions you will need to ask are:

- Who will perform the surgery?
  *Often your doctor or hospital can provide good recommendations for a surgeon. Your doctor has likely been through the same conversation with other patients and understands your needs, and the strengths of surgeons.*

- When should you schedule the surgery?
  *One thing to keep in mind is that knee and hip replacement surgery is elective. When you complete the surgery and if you choose to go through the surgery is up to you. Your doctor and the surgeon can give you a good estimate on the “mileage” left on your joint.*

- What implant is best for you?
  *We will cover a variety of options in this chapter. However, your surgeon will be the expert on what implant is best for you and why.*

- Do you replace one, or both joints?
  *If you are considering replacing both joints, the question will always be, “Do I do both right now? Or, one now and one later?” The benefits of doing both surgeries at the same time is that you can get them over with. In addition, the surgeon can compare one joint with the other, which is sometimes beneficial during surgery. However, if you replace both joints at the same time, your mobility afterward is going to be more limited than if you replace one, and then the other at a later date.*

Surgery is entirely your decision. However, there are several factors to consider that may sway you in one direction or another. Age, your current activity level, and the degree of pain you are in are all things you should consider. Also if any of the following occur, you may want to consider replacement surgery:

- You frequently need help to complete regular tasks such as standing up, or taking a shower.
- You experience constant, and daily pain.
- You can’t sleep due to the pain.
- You have not found a non-surgical way to relieve the pain.
• Your range of motion is limited so much that simple movement such as straightening your leg is difficult or impossible.
• You’ve been diagnosed with osteoarthritis, and are physically, emotionally, and mentally drained.
• Medications cause severe side-effects, but are your only nonsurgical recourse to combat the pain.
• You are in the advances stages of arthritis

Waiting too long to have surgery, or having surgery too soon, are important factors to consider. If you wait too long to have the surgery you may put yourself at risk for complications from the surgery, or your joint problems may lessen the benefit you receive from a replacement knee or hip. However, if you have surgery too soon, you may risk your replacement knee or hip will wear out within your lifetime and you will have to consider a second surgery.

Other factors your doctor will talk to you about are your current health, and weight. In fact, in March of 2015 the American Academy of Orthopaedic Surgeons published a position paper recommending people with a body mass index of 40 or higher, should speak with their physician about starting a weight-loss program prior to surgery.

In addition to obesity, your doctor may recommend you do not have the surgery if any of the following apply:

• Systemic infection, or infection in the replacement area
• Poor leg circulation
• Severely damaged nerves or muscles in the replacement area
• You have a neuromuscular disease
• Allergy to metal or plastic
• Illness that makes surgery risky

Knee and hip replacement surgery is common, and done hundreds of times a day in the United States. However, it is still considered a major surgery, and most surgeons will ask you to think carefully about whether or not you would like to pursue the surgical route. Life-altering and life-threatening complications such as aneurisms and blood clots can occur in any surgery. While the risks are low, they should also be a part of your thought process.
Choosing Your Team

If you are already at the stage of making a decision on whether or not to have knee or hip replacement surgery, then you have probably been seeing your doctor for a while. Discussing potential surgeons with your doctor is always a good idea. Your doctor will likely know, either in person or by reputation, the surgeons and can provide a good reference. However, you should still do your due diligence and research the team that will be performing the surgery.

Complications can arise and doctors are not infallible. However, choosing an experienced surgeon who frequently performs knee and hip replacement surgeries, will lessen your chances of a problem.

Prior to determining if you want, or are eligible for surgery, your surgeon will want to have a personal examination and consultation. At the consultation they will review your concerns, past labs, and imaging tests, as well as perform their own exam. If the surgeon determines that they feel you are a good candidate for surgery you should ask more questions to ensure he or she is a right fit for you. Questions such as:

- Are you board certified?
- How often do you perform the surgery, or how many surgeries have you performed?
- What results would you expect from my surgery?
- Do you have patient references?
- What are complications have you experienced and how did you handle them? What are common complications with this procedure?

In addition to an experienced surgeon you will also want to evaluate the hospital. Remember that the surgery, and visits with the surgeon will occupy a small amount of time you spend preparing, and recovering from the surgery. A hospital should have an established in-patient and out-patient care center, as well as a physical therapy center you are comfortable with. Don’t be afraid to ask questions, or request a tour of these areas. It is likely you will be using these resources for several months and it is important that you are comfortable using them.

Once you are comfortable with the hospital and surgeon who will be performing the surgery, you have gone through the initial steps. However, there are still many decisions to make.
Types of Implants

What many people don’t realize is that there are dozens of knee and hip replacement designs available. Some are designs that have been used for decades, while others are new. The type of implant used will depend on several things. What activities do you enjoy? What kind of job do you have? Do you drive a lot? How much do you weigh? And how old are you? It is important that an implant is a near-identical match to a fully functional joint in your body. It needs to be able to support your lifestyle, weight, and potential changes in your life.

The type of implant chosen may also be affected by the number of implants you are going to have. Depending on how bad your joints are, and your current health, you may be eligible to have simultaneous implants. However, this is not an easy decision. Simultaneous implants are more prone to infection, blood clots, and other complications. However, a simultaneous replacement is more cost-effective as both surgeries are being done at the same time. Current health concerns, such as cardiac problems, will limit your options due to the risks of a simultaneous replacement.

While staged implants (occurring months apart) offer benefits such as a single replacement often provides enough stability to stave off a second replacement for several months. Yet, is more cost prohibitive.

Knee Replacement Options

As mentioned earlier, there are dozens of knee replacement options. Your surgeon will have a better idea of what option(s) fit best for you and your condition. However, some of the common knee replacement options your surgeon might discuss are:

• Fixed bearing vs. rotating knee platform:

A fixed bearing knee replacement is the most common knee replacement. In a fixed bearing replacement, the tibial component which attaches to the shin is topped with a piece of metal that holds the polyethylene insert in place. As the knee moves the component attached to the thighbone glides across the polyethylene. In a rotating knee platform, the polyethylene insert has the ability to rotate slightly. This is to lessen the stress and wear on the implant, while giving the recipient better movement.
• **Gender-specific knees:**

Knee implants weren’t always gender specific. However, now there are prosthesis for both men and women. There is still some debate on whether gender-specific prosthetics perform any better than neutral prosthetics.

• **“Custom” knees:**

Somewhat new to the market, and not yet fully realized for capabilities, custom prosthetics are molded to fit your joint using the three-dimensional imaging of your CT-scan.

• **Partial knee replacement (“mini-knee”):**

Developed to lessen the risk of surgery, by reducing the invasiveness of the surgery. The partial knee replacement can be performed using a 3” incision, rather than the usual 8” incision, with minimal impact to muscles and tendons.

• **Minimally invasive knee replacement:**

The minimally invasive knee replacement has the same result of a standard knee replacement, however the incision is about half the size, and there is less impact on the surgical area, ideally resulting in fewer complications.

• **Patellar resurfacing:**

In this procedure the surgeon attaches a separate component to the back of the kneecap so it glides with the implant. The downside is that there appears to be a higher degree of failure, with patellar resurfacing, while others feel it reduces long-term pain.

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**Hip Replacement Options**

There are fewer options when it comes to hip replacement surgery, but when you sit down for a consultation with your surgeon, you will likely discuss the following, and how they may or may not benefit your needs.

**Hip Resurfacing:** This option is more viable to younger people who may need surgery again in 20 or more years. Instead of replacing the head of the femur with an artificial ball, the surgeon reshapes the head and caps it with a cobalt chromium prosthetic that fits into the metal-lined socket.
Anterior vs. Posterior hip replacement surgery: Posterior hip replacement surgery has been the norm for many decades. However, the process of anterior hip replacement is becoming popular because the surgeon can avoid cutting through major muscle groups, which also enables a faster recovery time. However, both options have their own risks, and it appears that whichever you choose is based more on personal preference rather than a risk analysis.

Hemiarthroplasty: This is a partial hip replacement of the neck and head of the thighbone, that leaves the acetabulum intact. The surgery is most often used for hip fractures where the neck of the thighbone has been fractured. It is also common for people with osteonecrosis, or people born with an abnormal hip dislocation.

Planning the Surgery

In the weeks, or months, heading into your surgery your surgical team will be in regular contact with you and will offer advice on how you should be preparing yourself. During this time you will discuss:

- Prior and current medical conditions
- Previous, and upcoming surgeries
- Medications you take
- Allergies to drugs and anesthesia
- Insurance information

Your surgical team will review with you any steps you need to take to ensure a positive outcome. Steps such as weight loss, quitting smoking if you do, and not drinking alcohol 48 hours prior to surgery. You will need to avoid NSAIDs for two weeks prior to surgery, and you may need to stop taking blood thinners a few days before surgery.

On the day of surgery, you will meet with your anesthesiologist, who will insert a tube in either a vein, or your back depending on the anesthesia, and a catheter will be inserted into your bladder to remove urine during surgery.

The Knee Replacement Surgery

On the day of surgery, you should have been in contact with your surgical team for the last few weeks or months, and have a pretty good idea what is going to happen. You will know what prosthetic you will be receiving, how the surgery is conducted and have a good idea of what happens after surgery. The entire procedure takes less than two hours.
For the surgery, you will be laying on your back while the Orthopaedic surgeon makes an incision over your knee. The size of the incision will depend on the type of surgery. Once an incision is made:

1. The surgeon will move the endcap out of the way
2. Flat cuts are made to remove damaged sections from the top of the tibia and end of the femur, contouring the bone to the implant. Precision guides ensure the bone is shaped correctly for the implant.
3. Surgeon puts trial implants in place, and tests the knees ability to move without wobbling
4. The surgeon attaches implant components to the thighbone and shin with cement or screws
5. If your kneecap is to be resurfaced, the surgeon will attach an oval-shaped plastic piece to the back.
6. Incisions will be stitched closed

### The Hip Replacement Surgery

Hip replacement surgery requires you to lie on your side, with braces or pillows to help keep you in the correct position throughout the surgery. Total surgery time is generally no more than two and a half hours.

1. The surgeon makes an incision along your hip to separate your thighbone from the hip socket.
2. With a surgical saw, the damaged ball at the top of your thighbone is removed.
3. The thighbone is measured to create a perfectly implant from the components available in the operating room.
4. The surgeon tunnels down into the thighbone to create a stem of the implant.
5. The quality of the bone tissue will help the surgeon determine whether to cement the implant in place.
6. Surgeon shaves away damaged bone and cartilage on the socket side of the joint to hold the implant’s socket portion in place.
7. Implant components are prepared. Screws or cement are used to secure them in place if needed
8. New ball and socket are fit into place.
9. Incision is stitched closed.
In-Patient Recovery Process

Once the surgery has been completed there are several steps that need to be taken to ensure that the patient is comfortable, and that the replacement is not compromised.

**Pain control** is more proactive than it used to be, as many surgeons opt to inject a local pain reliever directly to the joint upon completion of the surgery. In addition, if you had anesthesia, it may remain in place for up to a day to ensure your lower body remains pain-free in recovery. Patient dosed anesthesia may also be provided through an IV. After a couple days, you will likely be transitioned into oral medication.

**Breathing** techniques are essential, as during and after surgery it is possible for airways in the lungs to collapse, creating an ideal setting for pneumonia. The nurse may ask you to cough several times, or practice deep breathing exercises.

**Blood-clots** can be minimized with a compression device around your legs and feet. The device is hooked to a machine which compresses and releases pressure on your legs and feet mimicking blood flow as if you were up and walking around.

**Infection control** is important after any surgery. Signs of an infection are redness, swelling, pain, tenderness, fever, and increasing or odorous drainage. You will have received antibiotics prior to, and for up to 24 hours after your surgery to try and minimize infections. However, if you see any symptoms of infection you should contact your nurse immediately. An infection is much easier to stop in the onset, rather than after it has begun to take over.
**Steps to restore mobility**

Mobility restoration begins immediately. You will be given a set of simple exercises to begin doing while resting, and by the next day you will likely be moving around on crutches or a walker.

If you had a hip surgery, you will be given support in the form of pillows and a sling to ensure you do not dislocate the joint. You will be given instructions on movements and body positions to avoid while waiting for your hip to set in place.

Prior to leaving the hospital, you will be required to perform certain movements and tasks to ensure that you can function outside of the hospital.

You may be asked to get out of bed, walk on crutches or a walker, walk up and down a street curb, and a number of steps to mimic what you may have at home, perform required rehab exercises, as well as manage common home tasks.

Most people are in and out of the hospital with no complications. Knee and hip replacement surgeries happen all the time. However, taking precautions and following the advice of your surgeon and nurses is important.

New innovations are currently being developed to minimize complications, extend the life of implants, and limit the number of future surgeries a patient may need.

Research is being conducted to minimize infection by putting antibodies directly into the prosthesis. Due to the cost of these prosthesis however, they may be reserved for at-risk patients.

In addition, there are also bone-enhancing drugs, being identified which may help extend the lifespan of knee and hip replacements.

Lastly, robotic surgeons that would complete the knee and hip replacement surgeries are being tested to remove human error from the operation room.
CHAPTER 6: BACK ON TRACK AFTER SURGERY AND LIVING WITH A REPLACEMENT JOINT

Once your surgery is finished and you are back home you should understand some of the conditions you will be facing. Ideally, you will have family or friends who can help you along for at least the first week of recovery. Prior to surgery your surgical team would have prepared you for life after surgery by offering suggestions on how to prepare your home for your recovery period.

One of the most important things to do is try to get yourself back into a normal home routine, although you will want to keep it slow, and stay within the recommended parameters set for you.
If you followed your pre-surgery instructions your home should be prepared for you already.

- An area where you spend most of your time should already be set up. Items you need during the day will be within close proximity and arm’s reach. Things like a TV remote, water, phone, medication, and reading materials should all be nearby.

- Daily items you may have to get up to retrieve, such as clothes, toiletries, food, and cooking supplies should be at waist to shoulder level so you don’t need to bend or stretch to grab them.

- Prepared foods should be available so you don’t need to spend a significant amount of time cooking, or moving around the kitchen.

- A fanny-pack or apron with large pockets are great to have so you can carry items with you, while still using crutches or a walker.

- Prepare an area to perform simple stretches and exercises. This is a commonly forgotten task, where either the patient or a family member ends up having to prepare a place once the patient returns home. The area does not have to be large, but should be against a wall, and have a chair available for balance.

The better you prepare for post-surgery at home, the more successful your experience will be. Preparing your living space for the next couple weeks, and notifying family, friends, or neighbors that you will need their help is important.

Prepping the person(s) who will be helping you during recovery will pay off when you need them most. They must understand that you will need help cooking, cleaning, possibly bathing, and in case of an emergency they need to be available to help.

**Postsurgical pain**

Everyone is different and your pain threshold may be higher or lower than normal. Some people go home after surgery and feel little to no pain at all, while others are in so much pain they can’t sleep and can hardly function. You are your own gauge for pain tolerance, and it is up to you to escalate your concern about pain if you have any.

It is important to notify your “helper” that your pain may fluctuate quite a bit in the weeks following your surgery. One day you may feel fine, and the next all you want to do is scream. This is all okay and normal. However, if you find yourself in constant, and unbearable pain or you see symptoms of infection, such as swelling, redness, warmth to the touch, or drainage from your incision, you should contact the surgeon, or your primary care doctor.
If your pain level is intolerable, contact the surgeon. There are several pain relievers that can be prescribed to manage pain.

**Recovery Guidelines**

Recovery for a knee or hip replacement can last several weeks, and you may not be able to return to a regular life for up to six-months. You will have several questions on what you can do, and when you can start getting life back to normal.

Tasks such as driving a car can take several weeks. It is best to wait until when you are no longer taking opioids for pain relief at the very least. If you replaced a knee joint, this could be a couple weeks. If you replaced a hip, you may not be able to drive for 12 weeks or longer.

Work is a matter of what you do for a living. If you have a desk job, you may be able to return after 6-8 weeks. However if you are a laborer, or you job requires a lot of walking you may have to wait twice as long.

Sex is a common question. The general guideline is to wait until your incisions are fully healed, which will take about 6 weeks. However, you will want to start slow, such as laying on your back instead of on your knees and letting your partner take more control of movement.

If you are an athlete, low impact sports such as swimming and golf can probably be returned to after 8 weeks. However, if you play jarring joint-impact sports such as football, soccer, tennis, running or baseball you may not be able to play for six months or longer depending on your rate of recovery and if there are further complications after the surgery.

There is a standard of recovery guidelines you will be given which will ensure your road to recovery, and positive mobility goes well.

- Eat a healthy diet of fruits, vegetables, whole grains, and lean protein to aid in tissue recovery and help restore muscle strength
- Learning the signs of a blood clot are imperative after any surgery. It can be a matter of life and death. Symptoms of a blood clot in your leg are tenderness, redness and swelling in your knee and leg. If you are feeling shortness of breath or chest pain with sudden coughing contact 911 immediately, as it is likely the clot has gotten into your lungs.
• Follow your exercise regimen as prescribed.

• Be knowledgeable about signs of infection; fever, shaking, chills, swelling, drainage from the surgical sight are all indicators of an infection.

• Don’t take risks that could cause you to fall. Falling after knee and hip replacement surgery will not only be incredibly painful, but may require an emergency surgery to repair the damage.

• Keep your wound dry until it has thoroughly healed.

Living with a replacement joint

At some point after your surgery life will return to normal, even if it is months or a year down the road. It’s a great feeling, especially after all of the difficulties and pain of recovery. However, you must also recognize that just because you are feeling good now does not mean complications will not show up. These are a few complications to be aware of:

• Infection in your implant is possible, even after your recovery. This is almost always due to infections from other parts of your body that make their way to the implant. If this occurs, you should notify your doctor immediately. Antibiotics may be given for all medical procedures following your surgery as a precaution against infection.

• Leg-length discrepancy may occur for several reasons. While not common with knee replacement surgeries, hip replacement surgeries often see one leg that is longer than the other. This is due for several reasons, such as a weak hip, swelling, and limited mobility. For most people, if they continue with their assigned recovery and mobility exercises, leg length will eventually go back to normal as both your legs and hip gains strength.
• Dislocation occurs in 5% of hip replacements. When a hip is dislocated, your doctor or surgeon will give you a strong sedative to relieve the pain, while he or she resets the dislocation. Generally, multiple dislocations result in surgery.

• Loosening may occur for several reasons. Cement became loose or never fully attached or the surrounding bone didn’t grow into the implant. Loosening often requires an additional surgery to repair the problem.

• Bone loss can occur after wear of the joint releases fragments of bone. As the immune system attacks the fragments, it may also attack the surrounding bone, which may lead to detachment of the bone from an implant.

**Revision surgery**

Revision surgery is a follow-up surgery that can be scheduled due to complications with your initial implant. Causes may be bone loss, loosening, excessive wear, being overweight, or simply the replacement joint reached its expiry date, as it only has a lifespan of about 15 to 20 years. Should you need revision surgery for whatever reason, it is important to know that it may not be as easy as your initial surgery.

Revision surgeries have additional complications and risks. Damaged bones, muscle, tendons, and ligaments need to be repaired, and the entire prosthetic needs to be removed. Then, a new implant has to be fitted and secured. The surgery is generally longer than your first surgery.

If the implant is damaged, the revision implant will likely be bulkier, and will take additional time for you to become used to a new and different implant.
CONCLUSION

By now you should know everything there is to know about pain in your knees and hips. The anatomy of your knees is complex due to the small area, and dozens of muscles, tendons, ligaments, bones, and supporting cartilage and bursae. Identifying the pain source in your knee can be difficult and may take several steps from a general exam to imaging tests, and eventually labs.

Hips have their own complexity, and while not as difficult to determine where the pain is coming from there are complications that lead to misdiagnosis, such as back pain.

Management of both knee and hip pain varies depending on the degree of injury. Most injuries are minor to moderate and can be managed with simple home treatment such as rest, light stretching, and over-the-counter pain medications such as acetaminophen and NSAID’s. However, there are nearly 11 million people in the United States who have replacement hips and knees, and the number increases every year. Your best way to manage knee and hip pain as well as minimize invasive surgery and injury is to be aware of how to manage pain and injuries before they grow into something more serious.
Chapter Review

Chapter one we reviewed the anatomy of the knee joint, noting all of the primary anatomy and touching on some of the minor anatomy. We discussed pain in the knees and the different types of injuries such as accident and impact injuries, to overuse, and finally degenerative injuries.

Chapter two was a review of the hip joint. While the knees and hips have a similar anatomy, they are distinctly different joints with different motion, and requirements. As such, damage to a hip joint can be a life-altering event. It is also one of the most common sites for osteoarthritis.

Chapter three focused on testing for knee and hip injuries, with a focus on imaging and lab tests, as well as the difficulties in determining exactly where pain is originating, and what damage exists. Imaging tests such as x-ray, CT-Scan, and MRI all have their strengths, but they also have their limits. Along with laboratory tests, often the best way to diagnose a condition is by eliminating potential causes.

Chapter four touched on non-invasive ways to treat knee and hip pain. Immediate home treatment such as RICE is able to manage most injuries, however several treatments exist, such as heat therapy, ultrasound, therapeutic exercise, and more controversial techniques such as acupuncture.

Chapter five recognizes that after all non-invasive treatments have been exhausted without resolving the condition, that surgery may be required. Chapter five provides all the information you should expect when preparing for and going into surgery; questions to be aware of, diligence in choosing a surgeon, and the variety of replacement options available.

Chapter six discusses the after effects of surgery, how to prepare, precautions that should be made, and potential concerns you should be aware of. If you take anything from chapter six, it should be that the recovery process is a slow one, but with early preparation you can set yourself up for an easy road.

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