The Sports Hernia: An orthopedic & regenerative medicine approach.

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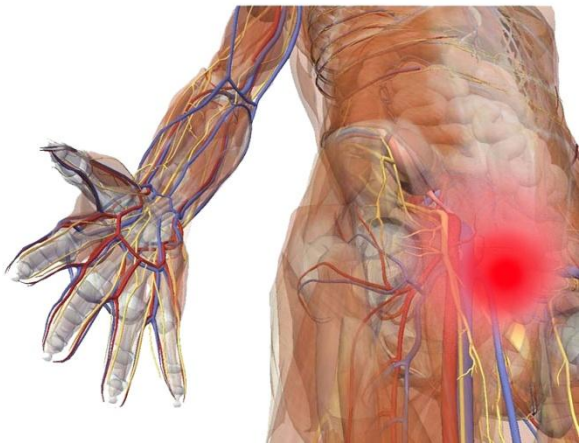
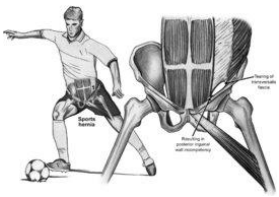
INTRODUCTION:



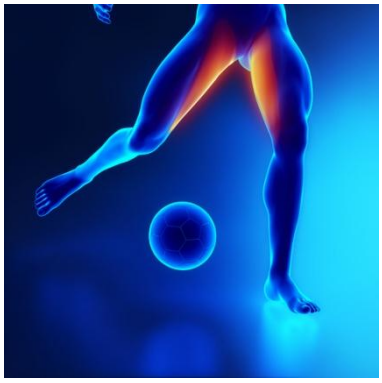
I can recall being sent to Germany many years ago to a World Championship in Track & Field. While I was there I was asked to care for an individual who is probably one of the greatest all around athletes in the world. Just before the World event he was doing poorly in competitions in Europe. He was expected to break the world championship record and he could hardly run and jump. What was the problem? Groin pain! What appeared to be a simple groin injury continued to plague this individual and despite multiple consultations and treatments he gained little to no benefit and this injury was threatening a career. Fortunately we were able to help this individual and he was able to break the world record and win the gold medal. Chronic groin pain (athletic pubalgia) is not uncommon in individuals doing cutting sports and participating in sports and athletic competition. We are going to address how complicated this condition is and review a number of options available to an athlete or individuals suffering with this malady that they may not be aware of.

The reason why this condition is so complicated is that there are multiple coexisting conditions that can present either alone or together causing the chronic pain and problem. For example many coexisting pathologies include a weakness in the posterior inguinal canal wall, tendinopathy of the conjoint tendon that attaches to the pubic bone, adductor muscle tendinopathy, osteititis pubis and even a peripheral nerve entrapment. The exact mechanism that causes this problem still remains unclear. What we do know is that sports that require sudden change in direction while sprinting is most often associated with "athletic



pubalgia". The term athletic pubalgia means sports related pubic region pain. The cutting and movements while sprinting can place large forces on the tendons and soft tissues that crossed the bony pelvis which can lead to injury. Garvey and Hazard reviewed cases involving 100 patients in the multiple causes and multiple treatment techniques and eventually defined a sports hernia or athletic pubalgia as a "GROIN DISRUPTION INJURY".[1] This condition is a result of functional instability of the pelvis. Periodic surgical intervention is aimed at the anterior pelvic soft tissues that support and stabilize the symphysis pubis. This is an important concept because we are going to address a regenerative orthopedic medicine approach to this condition that may be a more effective means of nonsurgical treatment for this condition.

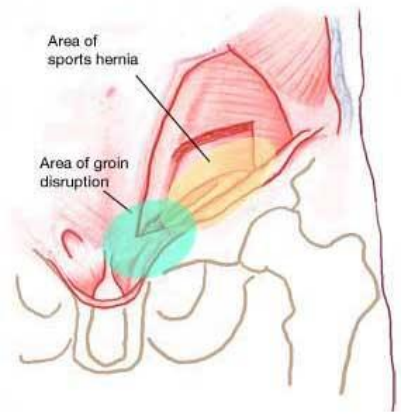
Chronic groin pain is often misunderstood and poorly explained in most medical circles. Athletes can find themselves frustrated with the lack of consensus that exists about this condition. There is no consensus on what to call this condition, its pathophysiology or management.[2] As we will discuss, there can be many causes of the pain that will need to be sorted out. The "sports hernia" is probably only one of many entities that can cause persistent groin pain. Sports hernia is a presentation of groin pain with a lower abdominal bulge that can be seen with ultrasound. Ultrasound offers the ability to perform a dynamic examination of the abdominal wall, and associated muscles with straining and therefore is a unique diagnostic tool in this condition.[3] CAT scan can also be used but we found ultrasound to be most practical. Typically this condition presents with localized pain overlying the pubic bone which can radiate into the lower abdominal muscles (rectus abdominis) and along the adductor muscles in the groin. Pain is typically provoked by kicking, sprinting and quick changes in direction. Individuals may feel better with rest and therapy but this typically re-occurs with once they return to play.



PRESENTING SYMPTOMES:

Presenting symptoms are commonly pain in the groin or lower abdomen. Patient may have a aching sensation or discomfort that can radiate into the testicular area or perineal area. One can experience intermittent groin swelling, bilateral groin pain, pain overlying the pubic bones or pain in a number of different muscles around the pubic bone as we will describe later. Pain, only occurs with rapid changes in direction, sprinting or kicking as previously described.

In general this type of condition presents more commonly in men. Typically they are involved in sports requiring cutting, pivoting, kicking, and sharp turns. Normally the pain comes on gradually and then progressively worsens. The pain is typically on one side. Pain can radiate into the upper thigh or in the perineal areas. Pain typically occurs with athletic activity or sport specific movements and can radiate into the scrotum and testicles and 30% of cases. Pain can be aggravated by sudden movements, coughing or sneezing or resisted trunk flexion or hip adduction.



PHYSICAL FINDINGS:

Typical physical findings is pain overlying the pubic region especially on resisted sit up (abdominal crunch). No findings are identified that was suggested a classical inguinal hernia. Decreased range of motion of the hip is often a common finding. It is critically important to conduct a very thorough examination to sort out other possible causes of groin pain especially the tendon attachments at the pubic bone and pubic symphysis.

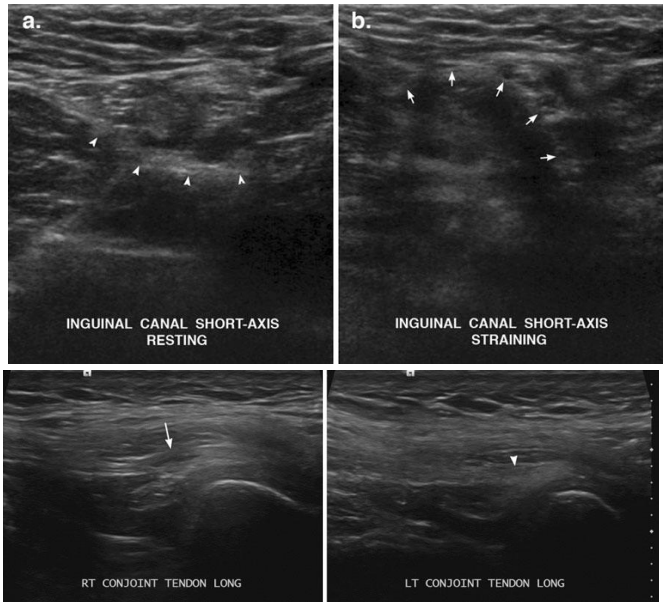
The tendons and ligaments that attached to this region are actually a common source of the pain and cannot be overlooked. One of the problems is that there are a number of hernias that cannot be felt on physical exam.[4]

Garvey who runs a groin pain clinic in Australia describes numerous causes of individuals presenting with persistent groin pain which includes a sports hernia, conjoint tendon pathology, adductor tendon injury, osteitis pubis, avulsion fractures, rectus abdominis pain, hip osteoarthritis, various peripheral nerve entrapments and irritation and many other conditions.[1] He describes many individuals having had negative MRI and ultrasound exams that were inconclusive. Because imaging findings can be inconclusive treatment is often based on physical exam and thus the athlete is going to receive treatment based on the expertise, training and experience of the individual providing care.

DIAGNOSTIC IMAGING:

CT scans, MRI scans and other diagnostic imaging is commonly used as part of the imaging examinations. However ultrasound is transforming the practice of sports medicine, orthopedics and some surgical practices. In a sports hernia a abdominal bulge in the posterior abdominal wall next to the rectus muscle can be seen with a dynamic stress test such as doing an abdominal crunch.

Shown in the ultrasound picture on the top right is a bulge under an abdominal muscle consistent with a sports hernia. Additionally, ultrasound allows us to evaluate the other soft tissue in the area such as in the picture on the bottom right showing a conjoint tendon tear attached to the pubic bone as a source of pain in this patient.

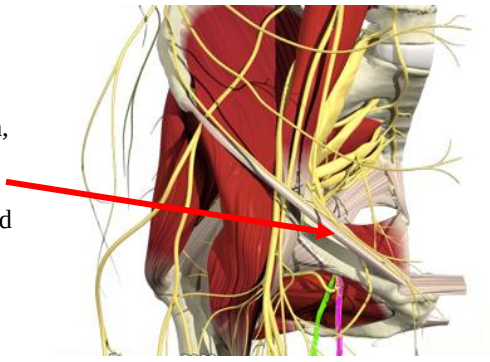


Ultrasound provides a number of advantages in the sports medicine and orthopedic practice because of real-time imaging and easy availability in the examination room. It is useful in evaluating and monitoring the stages of healing as well as guiding interventional procedures such as injections to a precision location targeting specific soft tissues. The probe of the ultrasound can be placed directly over the focal area of pain and also can be used as a means of dynamic assessment to determine whether there is any ballooning of the inguinal canal or bulging in the posterior wall with straining maneuvers.

UTILIATION OF X-RAY:

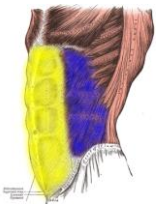
One of the important potential causes of athletic pubic pain (athletic pubalgia) can be instability of the pubic bone joints (symphysis pubis) or pelvic girdle such as the sacroiliac joint.
There are inflammatory changes that can be seen on the pubic bone and associated joints (osteitis pubis) and therefore x-rays can be helpful. There is also a special technique using a 1 leg stance called a “Flamingo stress view” that if the study demonstrates greater than 2 mm of vertical displacement it suggest instability of the pubic joints.

PERIPHERAL NERVE ENTRAPMENT:

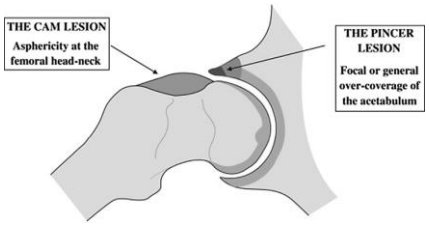


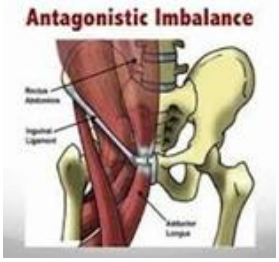
Groin pain can also be caused by isolated neuralgia or peripheral entrapment neuropathies. It is been noted that 2% of patients presenting with chronic groin pain, possible nerve is the source of the pain. There is significant variation amongst individuals in regards to the peripheral nerves. The ilioinguinal nerve noted at the red arrow may be a source of pain.[5] The genitofemoral nerve can be affected colored in Orange and the picture below. The obturator nerve and its 2 branches colored in pink and green in the picture to the right all her potential nerves that can cause entrapment neuropathy and groin pain.[6] Occasionally, surgical release may be required however we currently use special techniques under ultrasound guidance to hydrodistention connective tissues off the nerve and combine medications and cellular preparations and growth factors to encourage nerve regeneration and repair.

THE MULTIPLE CAUSES OF ATHLETIC PUBALGIA & GRON PAIN:



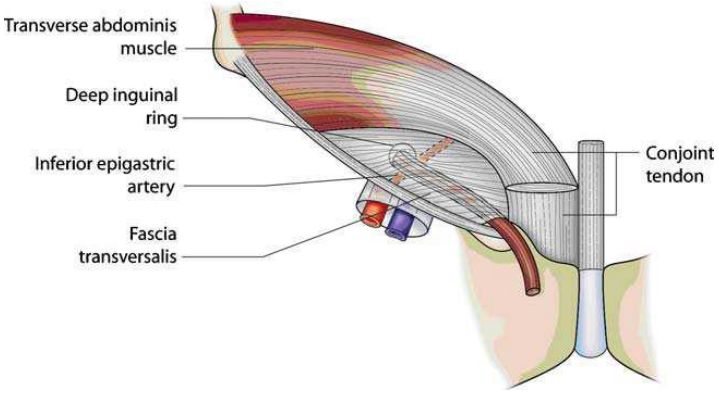
He was previously stated there are multiple causes of groin pain and athletic pubalgia and clearly the list noted below is non-inconclusive of many causes. However, review of published literature as demonstrated injury to the rectus abdominis muscle, the conjoint tendon noted in the groin at the bottom of the rectus abdominis, sports hernia, classical inguinal hernia, traumatic osteitis pubis, adductor tendinopathy, avulsion fracture of the pubic bone (flake fracture) rectus abdominis syndrome in the abdomen, cutaneous branches of the intercostal nerve at the level of the rectus abdominis muscle, pubic symphysis joint instability, osteoarthritis of the hip, pectineus tendinitis, adductor tendon

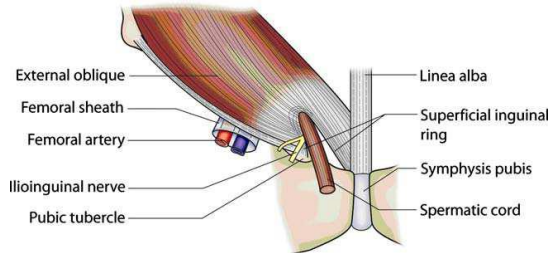


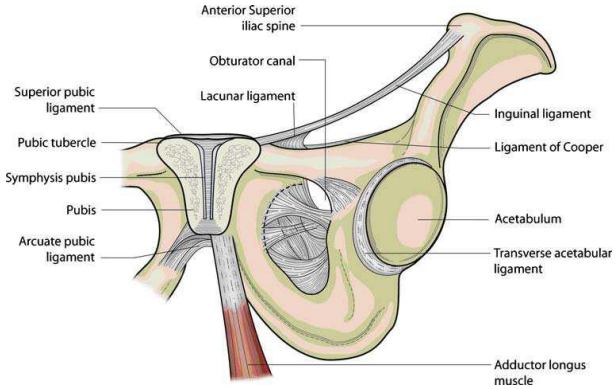


tendinitis/tendinosis, femoral acetabular impingement syndromes and acetabular labrum tears and a host of other causes. The process of sorting this out requires a detailed history, special diagnostic imaging depending on the source that is suspected and even diagnostic blocks of specific soft tissues done under ultrasound guidance. The key to treatment is to identify the specific diagnosis. Rarely does a single diagnosis to explain the clinical features encountered in patients with athletic pubalgia. It is much more common that multiple causes or multiple coexisting pathologies are the cause and therefore treatment needs to be directed to all of these causes.[7-9]

ADVANCED ORTHOPEDIC MEDICINE & REGENERATIVE MEDICINE TECHNIQUES:







TREATMENT OF ATHLETIC PUBALGIA:

Remember athletic pubalgia is a "basket term" for a number of conditions that can cause pain above the pubis or in the groin. We have addressed some of those causes in this discussion. If an individual has an actual hernia it is possible that surgery may be an option. Depending on the severity of the hernia and the findings on ultrasound there are injection procedures that can be utilized to help heal the abdominal wall. A biomechanical analysis needs to be done to determine whether there is any foot or ankle abnormalities or a congenitally shortened leg that may be placing extra stress on the pelvis. If that is the case a casting is performed and custom molded orthotics with leg length discrepancy correction is fabricated.

If the pubic symphysis is unstable as noted in the stress x-ray and physical examination the symphysis pubis can be strengthened and stabilized using various regenerative injection therapy techniques and prolotherapy. Groin pain in the case of athletic pubalgia can also be caused by various tendon attachments along the

pubic bones as previously described. These tendon injuries, and tears or tendinosis can be identified under ultrasonography and can be targeted for injection therapy to induce healing. This is accomplished by any number of regenerative injection therapy techniques. We have discussed a few of those in the section below. The key to treatment is the precision diagnosis of the specific soft tissue that is the source of the pain. Once the soft tissue is identified it is relatively easy for the orthopedic medicine practitioner to target that tissue for repair.

REGENERATIVE MEDICINE PROCEDURES FOR ATHLETIC PUBALGIA:

A "regenerative" approach to athletic pubalgia typically involves specific injection techniques to stimulate connective tissue repair, ligament and tendon repair using specific medications and/or cellular preparations that induce tissue healing. We have posted articles on this website that describe some of these regenerative injection therapies. Prolotherapy and platelet rich plasma therapies are described in the article entitled "**regenerative injection therapy and pain medicine**" and we refer you to that article written by Dr. Brown that describes this method of treatment in detail.

For brevity sake there are 5 basic regenerative injection therapies that we commonly use in the practice of orthopedic regenerative medicine. All of these methods target specific soft tissues which may include connective tissue, ligaments, tendon attachments and muscles. Some of these approaches include:

1. Classic prolotherapy utilizing dextrose based solutions.
2. Utilization of hormones to stimulate change in tissue and modulate pain
3. Platelet Rich Plasma utilizing the growth factors from platelets as a stimulus for growth factors from the platelets as a stimulus for repair.
4. Bone Marrow Aspirate Concentrate (BMAC) as a means of capturing and transplanting stem cells to stimulate tissue repair
5. Adult adipose derived stem cell therapy as another means for possible tissue regeneration.

It requires a detailed evaluation and to identify specific pathology to make a decision in regards to what type of injection therapies and procedures are employed for specific cause of groin pain and athletic pubalgia. It is also possible that surgical intervention and additional rehabilitative services such as physical therapy may also be required. No single physician or healthcare provider has all the answers and therefore treatment may often involve collaboration with other providers and a multidisciplinary approach to accomplish the therapeutic goal set and to return an athlete back to play.

STRETCHING EXERCISES FOR ATHLETIC PUBALGIA AND GROIN PAIN:

There has been specific stretching exercises recommended for groin pain and athletic pubalgia. We must emphasize that although these stretching exercises have been recommended for this condition it is important that your health care provider either physician or physical therapist clear issue for performing the specific exercises. There are times based on the degree of injury and many tendinopathy is that can be worsened by aggressive stretching so be cautious and discuss whether or not you should participate in stretching exercises with her provider.

Stretching exercises examples:

Foam roll your adductors and your hip flexors. Most of the time, athletes will have scar tissue built up in their adductors and some kind of soft tissue limitation in their hip flexors.

Stretch your hip flexors, glutes and hip external rotators. Because of the nature of a sport like hockey (repeated hip extension, abduction and external rotation), athletes will have a loss in adduction and internal rotation, as well as hip extension range of motion.

Prone 90/90 Glut. Stretch: Once in this position one can lean forward and roll to the side of stretch (in this case he would roll to the right side to stretch the contralateral left).

Lying Med Ball Crush: This technique involves simple isometric contraction of the adductor muscles by squeezing a medi ball between the knees as shown to the left.

Seated Psoas Lift: In this exercise he must position yourself in a seated position with your knee slightly higher than your hip. From this position and with your back straight or support to support the lordotic curve a single leg is lifted and then brought back to place the foot on the ground. This can be done 10 repetitions ×3.

Following the stretching exercises it is recommended that ice packs be applied to the groin for 20 minutes. In addition until appropriate diagnosis and additional management is instituted it is recommended to avoid provoking activity and place the tissues at rest until recovery.

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