GILMORE'S GROIN REVISITED

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INTRODUCTION

With so many potential diagnoses, pathologies and treatment options, groin pain in athletes seems to get more and more complicated with every passing year! But, perhaps in our desire to understand groin pain in its entirety, we have lost site of the original, specific, clinical syndrome which has spawned so much discussion and generated so much confusion!

The condition of footballer's groin was popularised by the London Surgeon Jerry Gilmore in the 1980s, following successful surgery on several, what were then, first division (and international), footballers. He described the syndrome as occurring in young, physically active men, with the groin pain being made worse by specific movements, both during and after exercise. The patient would indicate the superficial inguinal ring as the site of the pain and this was found to be dilated when compared with the normal side. He also noted posterior weakness and inguinal canal tenderness. At surgery the characteristic findings were of a torn external oblique aponeurosis, causing the dilated superficial inguinal ring, a torn conjoint tendon which had pulled off the inguinal ligament, which was also torn. Surgery involved using sutures to repair the torn muscles, restoring the normal anatomy (1).

As the condition became more widely recognised different terms were used to describe it. Gilmore's Groin became widely used in the UK and sportsman's hernia, although anatomically incorrect (there is no hernia) became popular with the public. Other terms included athletic pubalgia, and hockey groin. Each time a new term was concocted it seemed to apply to a wider, or different, range of symptoms and signs, although all had the common feature of pain in, or around, the groin. The upshot was that sportsman's groin began to be an umbrella term that covered all causes of groin pain in athletes, and the original, well defined, clinical syndrome got lost in the morass of new, and different, diagnoses.

Having got into a bit of a mess, there have been several attempts to untangle the confusing collection of conditions. The Doha Consensus looked at the problem from an anatomical point of view and, depending on the site of the pain, described four entities: adductor related pain, iliopsoas related pain, inguinal related pain, and pubic related pain (2). However, this did little to relate causes to clinical, or imaging, findings or to recommending specific treatment strategies. It also missed out a fifth common site of "groin" pain, hip related pain due to femoro-acetabular impingement. The Groin Pain Syndrome Italian Consensus Conference took things a little further by adding in the importance of imaging using modern modalities, particularly MRI (3). The Manchester Consensus, in the UK, focused on the specific syndrome of Gilmore's Groin and considered different surgical approaches. It also put forward the term "inguinal (or groin) disruption" as a label for the condition in an attempt to abandon the eponymous "Gilmore's Groin"(4).

Progress has been made on agreeing of the underlying cause and nearly everyone accepts that Gilmore's Groin is a musculotendinous injury of the muscles of the anterior abdominal wall at the junction of the trunk and the thigh (as originally described), although different individuals may have different patterns, and severity, of tears of the various muscular components. Unfortunately, there still remains much confusion about how to make the correct diagnosis. Part of the problem is the perception of where "the groin" is! Anatomically it is inguinal region, above the thigh crease, but those who are non-medical (and even some who are!) often think of the groin as the adductor region on the inside of the thigh and this can cause confusion which has, unfortunately, become incorporated into some of the descriptions of Gilmore's Groin. To try and make the diagnosis easier some have attempted to produce a tick box list of symptoms or signs with a certain number of ticks giving a positive diagnosis. However, even in these cases some authors continue to confuse groin, hip and adductor pathology and often ignore the fundamental importance of combining symptoms, signs and the results of imaging before making a diagnosis (5). Most disappointingly we still see Gilmore's Groin referred to as a "diagnosis of exclusion", which it most definitely is not.

So, to try and put the spotlight back on the original syndrome of Gilmore's Groin, and in an attempt to re-introduce some certainty into the conundrum of groin pain in athletes, we felt it might be useful to summarise the important aspects of diagnosing, and treating, Gilmore's Groin

GILMORE'S GROIN AS A DISCRETE CLINICAL ENTITY

Separating out the distinct clinical entity of inguinal disruption from other causes of groin pain requires accurate evaluation of the symptoms and signs, along with appropriately reported specialised investigations. The art lies with the skill, and experience, of the surgeon, or sports, physician, in evaluating, and weighting, the relevant aspects in making a diagnosis. Fundamentally it is a sports injury and the typical patient, as originally described, is a young, active male who participates regularly in sporting activities. Rarely it may occur in those with very physical jobs, for example the armed forces. A list of associated sports/ occupations that we have seen is shown in Table 1.

Sport	%
Association Football	56
Rugby Union and League	9
Athletics	5
Racquet sports	4
Cricket	2
Hockey	2
Other Sports: Gaelic football Handball Skiing Martial Arts Cage Fighting Basketball Fencing Lacrosse Ice Hockey Gymnastics Water polo "Strongman" Boxing Weight Lifting	12
No sport (including one porn star!)	10

Table 1. *To show the relative frequency of Gilmore's Groin in different sports.*

The primary symptom is of pain. Only in the very rare case of a co-existing hernia will there be a lump. It will rarely be the cause of groin pain in an overweight, middle aged or older man who complains of groin pain (but has no hernia), although, sadly, these people are often inappropriately labelled as having Gilmore's Groin (the inexperienced often resorting to the erroneous "diagnosis of exclusion" label), giving them false hope of a cure (6).

SYMPTOMS

Patients describe pain in two distinct patterns, during and after exercise (Table 2). In most cases there is no discrete causative factor and complete disruption occurs after multiple previous minor episodes of trauma. In around a third a definite event brings on the typical symptoms, often following overstretching, excessive kicking, or miskicking, abduction or eversion.

SIGNS

In most cases there are no visible signs. In the rare instance of a severe, acute groin tear characteristic bruising may be seen, delineating both the inguinal and adductor anatomy (Figure 1). The patient will localise the pain over the superficial inguinal ring on the affected side. Straight leg raising against resistance or performing a partial sit-up will often reproduce the pain. When the superficial inguinal ring is examined, by inserting a finger upwards and backwards into the neck of the scrotum, it is dilated, and tender compared with the other (normal) side. There will also be inguinal canal tenderness and a distinct cough impulse (but no true hernia) indicating a deficiency in the posterior wall of the inguinal canal. Characteristically, the examination reproduces the pain the patient feels on, or after, exercise.

Figure 1. *In a case of severe, acute, Gilmore's Groin the pattern of bruising outlines the inguinal region, especially the superficial inguinal ring, and, in this case, the associated adductor tear with bruising in the inner thigh.*

INVESTIGATIONS

The investigation of choice is an MRI scan with the fundamental requirement that it is carried out in a specialist centre, using the appropriate sequences, and is reported by an experienced musculoskeletal radiologist who works closely with the groin team. In around 80% of cases of groin disruption the MRI will show a tear in the adductor longus-rectus abdominis aponeurosis with secondary clefts around the pubic tubercle (7). CT scans can show similar findings, but it is difficult to justify the relatively high radiation exposure in, what are usually, young adults. Historically ultrasound scans have been used and in experienced hands, may show thinning of the inguinal ligament, but the often reported finding of a posterior wall bulge seems to be a ubiquitous occurrence and not a helpful diagnostic finding on its own.
The important features for diagnosing Gilmore's Groin are summarised in table 3.

Symptoms During Exercise	Symptoms After Exercise
Pain in the groin increases with:	**Pain in the groin increases with:**
Running	Turning in bed
Striding	Getting out of bed
Sprinting	Getting out of a car
Sudden movement	Sit ups
Twisting and turning	Coughing
Side stepping	Sneezing
Jumping	Sudden movement
Dead ball kicking	The groin is stiff and sore
Long ball kicking	

Table 2. *To show the symptoms of Gilmore's Groin, during and after exercise.*

- A sporting injury
- Young, fit, male
- Definite causative episode in one third of suffers
- Typical pattern of pain, during and after exercise
- The site of the pain is over the superficial inguinal ring
- Pain is often brought on by resisted straight leg raising
- The superficial inguinal ring is dilated compared with the normal side
- Examination reproduces the pain
- There is inguinal canal tenderness and posterior wall weakness, compared with the normal side
- There is no hernia
- Confirmatory MRI changes are seen in 80%

Table 3. *Summary of the key points in making a diagnosis of Gilmore's Groin.*

TREATMENT

In many cases surgery is not required, and the symptoms will settle with focused, individualised physiotherapy. Since 1980 we have seen nearly 9000 referrals for groin pain and performed nearly 5000 operations including over 400 internationals. For those whose pain does not resolve with conservative treatment, and have the typical pattern of symptoms, signs and (usually) changes on an MRI scan, surgery is an option.

The aim of the operation is to fully explore the anterior inguinal musculature, identify all the disrupted elements and perform an anatomical repair, restoring function. The surgery is best carried out under a general anaesthetic, with appropriate muscle relaxation (which is impossible with local anaesthetic), to allow accurate repair. An ultrasound guided ilioinguinal nerve block, performed by the anaesthetist before surgery begins, aids post-operative pain relief and means that most procedures can be performed as day cases. The repair technique now used is based on the original, successful, Gilmore Technique with modifications (The Marsh Modification of the Gilmore Technique). All the sutures used are dissolvable so that ultimately only the patient's natural tissues remain. Using this technique our recurrence rate is 3%, with 10% of patients injuring the other side over a ten-year period. 91% of professionals return to their sport.

REHABILITATION

Following surgery, a tailored rehabilitation programme is very important in achieving a full return to sport and physiotherapists plays an absolutely essential role. Recovery can be considered in four stages: mobility, flexibility and strength, followed by sport specific training (before returning to play), with individuals only moving on to the next phase as their progress allows. In the first stage, straight line activities are encouraged, and abdominal straining avoided. Depending on the patient, appropriate activities might include walking, front crawl swimming, static cycling and cross training. In the second stage body weight movements such as lunges, side lunges and partial squats can be added along with hip flexion and extension exercises. In stage three the intensity of the core stability work can be increased and change of direction at speed can commence, including box drills, cutting drills and figure of eight routines. Sport specific training makes up the final stage before returning to play. For professionals, with access to a full-time physiotherapist familiar with the condition, a full recovery in three to four weeks is possible. Amateurs, and in cases where access to physiotherapy is more restricted, should expect rehabilitation to last six to eight weeks (8).

THE IMPORTANCE OF THE MULTIDISCIPLINARY TEAM

The development of multidisciplinary teams has improved the quality of care in many aspects of medicine and surgery and the diagnosis and treatment of Gilmore's Groin is no exception (9). There is no place for a surgeon acting alone without the benefit of a range of associated health care professionals. As well as general surgeons experienced in groin reconstruction surgery the team should involve sports and exercise physicians specialising in non-operative techniques, orthopaedic surgeons with an interest in hip problems, physiotherapists, and anaesthetists familiar with muscle relaxation, as well as pain specialists. An experienced musculoskeletal radiologist is fundamental. Patients also need access to information and advice at all stages and specialist nurses are an important part of the team.

DISCUSSION

Whilst the specific symptoms, signs and imaging findings define the condition as discrete form other causes of groin pain, there remains discussion about the correct form of surgery. If one accepts that groin disruption is a complex musculotendinous injury to the structures of the anterior abdominal wall, as almost everyone now does, then the only logical way to repair it is by an anterior approach, with each element of the disruption repaired with sutures, resulting in an anatomical, functional, and physiological repair (a groin reconstruction). Simply placing a mesh over the disrupted muscles makes no sense and may result in chronic pain along with the inability to return to sport. A laparoscopic approach is similarly illogical. An intra-abdominal, or posteriorly placed, mesh does nothing to address the musculotendinous tears in the anterior abdominal wall and there is also the recently highlighted issue of chronic pain caused by the mesh itself.

CONCLUSION

Groin pain in athletes can reflect a variety of causes that will need different treatments depending on the diagnosis. The appreciation of Gilmore's Groin as a specific syndrome in which appropriate surgery may be curative allows a subset of those presenting with groin pain to be correctly treated. Gilmore's Groin can be considered a specific clinical entity which may have an insidious onset or be the result of a definite injury. There are characteristic symptoms and signs including a dilated superficial inguinal ring (compared with the asymptomatic side), inguinal canal tenderness with a cough impulse and, usually, pain over the superficial inguinal ring brought on by straight leg raising against resistance. It is a diagnosis made by positive findings, not a diagnosis of exclusion. In most of the cases the clinical findings will supported by an appropriately performed, and reported, MRI scan. It is not (despite popular misconception) a hernia. Whilst many groin injuries can be successfully treated conservatively a significant proportion will not respond and will need surgical intervention. If it is accepted that groin disruption is a complex musculo-tendinous injury then an anatomical, functional, and physiological repair is the logical approach to treatment, followed by a structured rehabilitation programme aiming for a rapid, but realistic, return to sport.

Whilst the current trend is away from eponymous syndromes (hence the suggestion to use the term "inguinal disruption") on the grounds that, amongst other things, they may vary internationally and perhaps confer credit on a particular individual who may not have first described the syndrome, and exclude others (although this is almost the norm in medicine, our favourite is the condition known as Henoch-Schonlein Purpura, named after two German physicians, which was, apparently, first described by an Englishman called Smith!), we would recommend it's continued use, in this case, as the syndrome of Gilmore's Groin is more memorable than other labels and reminds us of the specific set of symptoms, signs and imaging findings that reflect a distinct clinical entity where surgery may be curative. Learning to recognise it and treat it properly will allow many athletes to return to their sport, whilst not offering false hope to others.

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