



# Rehabilitation and Return to Play Following Surgery for Inguinal-Related Groin Pain

Roald Otten, BPhy,\* Zarko Vuckovic, MD,<sup>†</sup> Adam Weir, MBBS, PhD,<sup>†</sup> and Andreas Serner, PT, MSc<sup>†</sup>

This article discusses rehabilitation and return to play following surgery for inguinal-related groin pain (IRGP) in athletes. IRGP is defined as pain in the inguinal canal region, in the absence of an actual inguinal hernia. Recognizable pain is present on palpation of the inguinal canal. The article discusses the current thinking on possible underlying pathology, which is a subject of debate. The different surgical options in use at the present time are described briefly and an overview of the current literature regarding rehabilitation following surgery for IRGP is provided. The main body of the article describes a 4-stage clinical milestone-based rehabilitation program, based upon the authors' expert opinion. The program moves the athlete through the phases from immediate postoperative, early, intermediate, to advanced sports-specific rehabilitation. Each stage comprises a number of basic exercises with a focus on strengthening along with a set of functional exercises with progressive running and agility. Clinical milestones to be completed before progression to the next phase are provided. Both the basic and functional programs are performed simultaneously from the beginning of rehabilitation. This 4-stage clinical milestone-based rehabilitation and return-to-sport program is provided as an expert opinion-based suggestion as to how one can approach rehabilitation following surgery for IRGP.

Oper Tech Sports Med ■■■■-■■■ © 2017 Elsevier Inc. All rights reserved.

**KEYWORDS** groin pain, sports hernia, sportsman's groin, athletic groin pain, groin injury, inguinal repair

## Introduction

Inguinal-related groin pain (IRGP) in athletes is infamous and shrouded with confusion and controversy. This clinical entity has had many different terms used to describe the diagnosis along with multiple definitions. Similar clinical presentation in different global regions lead to the emergence of multiple terms such as "incipient hernia," "Gilmore's groin," "hockey groin," "posterior inguinal wall weakness," "groin disruption," "sportsman groin," "sports hernia," and "sportsman hernia." More recently after the British hernia society consensus meeting, the term "inguinal disruption" was also suggested.<sup>1</sup> In this article,

we use the term Inguinal related groin pain, which was agreed upon during the 2014 Doha Agreement meeting on Terminology and Definitions of Groin Pain in Athletes.<sup>2</sup> This classification system also defined other common clinical entities in athletes with groin pain; adductor, iliopsoas, or pubic-related groin pain. An emphasis should be placed on the importance of the hip as a possible cause of groin pain in athletes, as well as the need for careful examination of other possible causes, such as entrapment neuropathy or an actual inguinal hernia.

Please note that in all cases, a complete examination of the entire groin region should be conducted, as multiple clinical entities can be present in a single athlete presenting with groin pain.<sup>3,4</sup> In the same regard, treatment expectations should be aligned as concomitant entities such as adductor-related groin pain that is frequently present.

## Defining IRGP

According to the Doha agreement, IRGP is defined as<sup>2</sup>:

\*Roald Otten Sportsrehab (Part of J&C Sportsrehab), Amstelveen, The Netherlands.

<sup>†</sup>Sports Groin Pain Centre, Aspetar Orthopaedic and Sports Medicine Hospital, Doha, Qatar.

Address reprint requests to A. Weir, MBBS, PhD, Sports Groin Pain Centre, Aspetar Orthopaedic and Sports Medicine Hospital, Doha, Qatar. E-mail: adam.weir@aspetar.com

- Pain in the inguinal canal region and tenderness of the inguinal canal; no palpable inguinal hernia is present.
- IRGP is more likely if the pain is aggravated with abdominal resistance testing or Valsalva or cough or sneeze.

This definition describes the clinical presentations and examination findings, without attempting to describe what the underlying pathology may be. There are almost as many theories to explain the underlying pathology of IRGP as historical terms to describe the diagnosis. The exact pathophysiology of IRGP remains unclear. A number of possible theories have been proposed, ranging from inguinal canal posterior wall weakness with a bulge compressing the genital branch of genitofemoral nerve,<sup>5-8</sup> ilioinguinal nerve entrapment,<sup>9</sup> inguinal ligament degenerative changes leading to pain at the pubic tubercle,<sup>10</sup> to inguinal canal disruption with tears of the external oblique aponeurosis and conjoint tendon.<sup>11,12</sup>

## Treatment of IRGP

A systematic review on the treatment of groin pain in athletes in 2015 included 72 different studies.<sup>13</sup> Most studies were case series (90%) and most studies were retrospective (80%). There was a significant association found where studies with lower quality reported better treatment success. These factors should also be considered when interpreting the conclusions of the current studies on the outcomes of IRGP. No studies on the conservative treatment of IRGP with a well-described treatment protocol were identified.

In total, there were 38 studies describing various methods of surgical inguinal repair. There was 1 high-quality study identified and 37 low-quality studies. The high-quality randomized study was found, in which surgery (laparoscopic totally extraperitoneal repair) was compared to conservative treatment consisting of various types of strengthening and coordination exercises for muscles around the pelvis and hip, and corticosteroid injections and oral anti-inflammatory analgesics.<sup>14</sup> The conservative arm of the study was described only very briefly. This study provides moderate evidence that laparoscopic inguinal repair for IRGP results in lower pain

and a higher percentage of athletes returning to sports than conservative management. In this study, 67% (20/30) of athletes returned to play after 1 month, with this increasing to 90% at 3 months and 97% at 12 months.

The 37 low-quality studies had an average Downs and Black quality score of 8.4 of a possible 27 points. In total, possible complications were adequately reported in only 32% of studies. The reported treatment success varied from 57%-100%, bearing in mind an inverse correlation mentioned above with poorer studies reporting higher success. The percentage of athletes returning to sport was reported in 90% of the studies and varied from 72%-100%. The time needed to return to play following surgery was reported in 50% of the studies and varied greatly from 1 week to 6.9 months.

Another systematic review on the treatment of groin pain in athletes from 2015 compared surgery to physical therapy rehabilitation for “abdominal-related groin pain.”<sup>15</sup> Although return-to-play times appeared similar between the 2 treatment groups, it should be noted that there were only 2 studies with a total number of 4 subjects that received physical therapy only. Further studies with more detailed standardized conservative management protocols are therefore needed to ascertain the optimal choice of treatment.

In this article, we describe a simple clinical approach to managing athletes after surgical treatment for IRGP, which can be used in most clinical settings. It should be noted that because of the lack of high-quality studies on which to base our approach, this protocol should be considered to be “expert opinion” in terms of level of evidence. It is based upon clinical experience that conservative treatment can be successful, and this is, in most cases, the preferred first line of treatment. There are many factors that can influence the decision to perform surgery, such as the level of sports, time of season, duration of and type of previous conservative management, player preferences, etc. In cases where conservative treatment has failed or a surgical approach is chosen as first-line treatment, there are a number of different surgical approaches. If there is a symptomatic inguinal hernia present, then this excludes the diagnosis of IRGP, and the treatment will be surgical, but this is beyond the scope of this article.

Different types of surgeries addressing IRGP can, in general, be grouped into open and laparoscopic repair. The open repair

**Table 1 Common Surgical Procedures for the Treatment of Inguinal-Related Groin Pain**

<b>Surgical Procedure</b>	<b>Characteristics</b>
<i>Open nonmesh</i>	
Modified Bassini repair <sup>16</sup>	Interrupted sutures
Muschaweck minimal repair <sup>7</sup>	4 layer continuous sutures
Meyer anterior pelvic floor repair <sup>11</sup>	Multilayer suture repair with repair of conjoint tendon and external oblique tears
Gilmore repair <sup>17</sup>	
<i>Open mesh</i>	
Lichtenstein repair <sup>5,18</sup>	Tension-free repair with mesh
<i>Laparoscopic</i>	
TAPP—transabdominal preperitoneal repair <sup>10</sup>	Mesh with or without inguinal ligament release
TEP—total extraperitoneal repair <sup>14</sup>	Mesh used without entering peritoneal cavity

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