Journal of Human Kinetics volume 19 2008, 141-148 **DOI 10.2478/v10078-008-0011-0**

Groin Pain in Athletes – Clinical Experience

by
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Dysfunction of lumbo-pelvic area is a common problem in many sports. Due to insufficient data supporting variables predisposing to lumbo-pelvic dysfunction, and a lack of standards in thorough assessment, understanding the overall problem continues to provide clinical complications; and unfortunately, the prognosis is less than promising. Most often this type of non-contact injury in the groin area is seen in dynamic sports involving running, sprinting, and sports performed over longer time periods, where fatigue plays an important role (soccer, rugby, hockey). There have been proposals in identifying most probable factors influencing the occurrence of pelvic overload injury. Among those we can list: muscle strength and balance, training regimen (including warm-up), fatigue, flexibility, body mechanics, sports specific activities, movement technique, previous injury, and psychological state. During clinical assessment by the physician and physiotherapist, many of these risks of injury factors are found. Currently more attention is given to neuromuscular factors that can affect risk of this pathology.

Our clinical experience suggests that poor neuromuscular control and lack of strength may significantly contribute to injury in the lumbo-pelvic and groin area. Certain objective indexes (e.g., hamstrings to quadriceps strength H/Q, stability deficits) can be important indicators of injury risk, as well as guidelines for motor dysfunction recovery.

Key words: *sports injuries**,** motor control, neuromuscular training, exercise-related transient abdominal pain (ETAP)*

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Introduction

Dysfunction of lumbo-pelvic area is a common problem in many sports. Due to insufficient data supporting variables predisposing to lumbo-pelvic dysfunction, and a lack of standards in thorough assessment, understanding the overall problem continues to provide clinical complications; and unfortunately, the prognosis is less than promising.

The most frequent causes of groin pain are:

- inflammation of the pubic bone
- early inguinal hernia
- pathological attachment of the adductor muscle
- changes within the lumbosacral spine segment
- changes within the interpubic joint

Less common complications of groin pain, but of importance:

- neuralgia of nervus ilioinguinalis
- damage to the acetabulum of the hip joint
- necrosis of the head of the hip bone
- avulsion injury

Pain is usually reported as chronic, localized, and that occurs during and after exercise. The different characteristics of acute pain, known as ETAP, are related to diaphragmatic ischemia, stress on peritoneal ligaments, and irritation of the parietal peritoneum (Morton et al. 2005, Eichner 2006)

The occurrence is regardless of discipline, gender, body mass index, or the capacity and intensity taken to complete the event (Tsikouris 2003). ETAP appears to be most prevalent in activities that involve repetitive torso movement, either vertical translation or longitudinal rotation (Brown 2000, Cameron et al. 2003, Peterson and Renstrom 2001). Most often this type of non-contact injury in the groin area is seen in dynamic sports involving running, sprinting, and sports performed over longer time periods, where fatigue plays an important role (soccer, rugby, hockey) (Davies 1992, Ficek et al. 2004, Hoskins and Pollard 2005). There have been proposals in identifying most probable factors influencing the occurrence of pelvic overload injury (Earle and Mark 2008, Ficek et al. 2005, Hiemstra et al. 2004). Among those we can list: muscle strength and balance, training regimen (including warm-up), fatigue, flexibility, body mechanics, sports specific activities, movement technique, previous injury, and psychological state (Eichner 2006, Pull and Ranson 2007). During clinical assessment by the physician and physiotherapist, many of these risks of injury

factors are found. Currently more attention is given to neuromuscular factors that can affect risk of this pathology.

Aberrant body mechanics due to lack of strength and muscular control as well as changed patterns of fundamental movements, are pointed out during dynamic activities. Specific and probable factors analyzed include (Dvir 2004, Eichner 2006, Ficek et al. 2005, Kamen 2004, Kasman et al.1998)

- unilateral strength training that does not address both agonist and antagonist muscles (e.g., training only knee extensors for kicking sports),
- repeating the same movement pattern over longer period of time without addressing variety of movements for improving overall coordination,
- increasing strength of particular muscle groups without improving others links in the kinetic chain (e.g., increasing quadriceps strength for improving jumping without training the hip extensors),

Insufficient coordination and balance of the entire kinetic chain during functional movements (e.g., lack of balance during simple single-leg stance test) (Brown 2000, Cameron et al. 2003, Coombs and Garbutt 2002, Davies 1992, Dvir 2004) Hiemstra et al. 2004)

Modern sports, requires extensively dynamic capabilities, involving various parts of an athlete's body. Sport specific training must meet these requirements. If players do not exhibit sufficient strength and coordination through the entire lower kinetic chain (and most particularly, in its crucial links such as the ankle and hip), they are more likely to suffer from micro tears to soft tissues and overuse injuries. Dynamic activity requires the balance of strength and stability from each muscle group. If sportsmen lack such preparation, muscle strength will not be stabilized and thus excessive loads will be placed on soft tissues. Muscle strength should be adequately balanced according to sport specific demands. If an athlete is able to exert a maximal load in a concentric motion, he should be able to absorb an even greater load during an eccentric movement. If this cannot be accomplished, one becomes predisposed to risk of soft tissue overload injuries. When we observe a lack of stability during a dynamic activity, the kinetic link that should normally work in certain conditions (e.g., optimal axial load, coordinated muscle activity), is forced to bear an external load that cannot be coped with. Shifting the axis of load from an anatomical perspective creates tremendous strain on tendons, ligaments, and joint cartilage encompassing the entire kinetic chain involved in the movement.

As sports becomes more commercialized, very often grass soccer fields are replaced by artificial surfaces aimed at prolonging the season, which in turn places additional loads on soft tissues. Needles to say, such factors have to be taken into account, as they contribute to a variety of injuries.

Evaluation, performed by physiotherapist commonly assess: active and passive ranges of motion (ROM), muscle strength, central stabilization strategy, local stabilization, muscle coordination, fundamental movement patterns, soft tissue status, functional capability, history of injury, training regime and training standards.

While it is important to identify objective indicators of existing dysfunction, empirically established motor evaluation, include the following objective assessment:

- strength of the entire kinetic chain, including isokinetic and isotonic strength evaluations in closed and open kinetic conditions,
- balance and stability on an unstable surface to identify balance deficits among extremities,
- functional asymmetries on a stable surface to identify stability and mobility differences during functional activities (Brown 2000, Cameron et al. 2003, Dvir 2004),

If rehabilitation is not sufficient, surgical procedures have to be applied. Diagnosis is based upon orthopedic and surgical examinations, in addition to ultrasound scan, X-Ray, CT or MRI scans, and electromyography. Surgical operations cannot be treated as separate from the rehabilitation schedule, but as an option closely related to it, especially in post- operation treatment (Ficek et al. 2005, Hoskins and Pollard 2005, Kasman et al. 1998Pull and Ranson 2007)

Medical treatment comprises of adductor muscle attachment release or laparoscopic prosthetic material implantation using the following techniques (Earle and Mark 2008, Ficek et al. 2004 Ficek et al. 2005, Hoskins and Pollard 2005, Miguel 2002, Tsikouris 2003)

- TAPP (transabdominal preperitoneal),
- TEP (totally extraperitoneal),
- IPOM (intraperitoneal onlay mesh).

The surgical operations are not separated from the rehabilitation schedule, but closely associated with it, especially in post operation management.

Comprehensive treatment

Proposed treatment is based on clinical findings and procedures performed by surgeons. Exercise programs (Aagaard et al. Pull and Ranson 2007) are based on the concept of soft tissue healing, which divides the progression of healing into acute, remodeling, and strengthening phases. As a crucial element in motor reeducation for proper central stabilization, the activity of local stabilizing muscles must be ensured. Gradual implementation of activity, including external load movements, initiated soft tissue healing. Exercises involving isolated as

well as functional movements, performed under gravity and gravity-free conditions. Other important modalities such as manual therapy and physical modalities, are provided on an individual basis. Objective assessment performed before clinical intervention provides information for optimal neuromuscular training. Comprehensive training addresses stability and strength of the isolated kinetic chain, as well as proper conditioning of specific muscle groups. Optimal intervention is focused on reeducation of functional activity to which an athlete is to return. Objective assessment is used as a guideline for establishing proper recovery via specific training regimens (Aagaard et al. 1998, Davies 1992, Eichner 2006, Ficek et al. 2004)

Discussion

Dynamic activity requires complete preparation of the entire body. Implementing proper conditioning and training regimens should include elements of strength, power, stability and balance, for optimal athletic performance. Many reliable sources state that muscle imbalance, and a lack of strength and stability, can create greater risk of injury, which limits the athlete's participation in training and competition (Cameron et al. 2003, Hiemstra et al. 2004, Kamen 2004, Kasman et al. 1998, Pull and Ranson 2007).Therefore it is mandatory to include in training programs, various exercises that involve functional activities (e.g., squats and lunges), as well as stability and balance exercises (e.g., one-leg exercises, with eyes open and eyes closed) in a balanced manner. Strength exercises should involve not only main muscle groups responsible for sport specific activity (agonists), but also muscles that stabilize joints and counterbalance prime movers (antagonists). Neglecting a balanced conditioning program may lead to injuries and hamper sports development.

Conclusions

Our clinical experience suggests that poor neuromuscular control and lack of strength may significantly contribute to injury in the lumbo-pelvic and groin area. Certain objective indexes (e.g., hamstrings to quadriceps strength H/Q, stability deficits) can be important indicators of injury risk, as well as guidelines for motor dysfunction recovery.

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Authors submited their contribution of the article to the editorial board.

Accepted for pinting in Journal of Human Kinetics vol. 19/2008 on February 2008.