

# GROIN PAIN IN WOMEN'S FOOTBALL

## RADIOLOGY AND CLINICAL FEATURES FEDERATION

– Written by Milena Tomovic, Greece

### ATHLETIC GROIN PAIN

Groin pain is common in team sports and it accounts for up to 23% of all sports injuries. Professional football, when compared to other popular team sports, shows the highest prevalence and the longest time loss from playing when it comes to hip and groin injuries<sup>1,2</sup>. The predominant sports related activities that lead to acute and chronic groin pain are changing directions and kicking. A multidisciplinary approach is crucial for early diagnosis, adequate treatment and return to play (RTP) decision making<sup>3</sup>. Timely and correct diagnosis may be a challenging process as the anatomical region of the groin is characterised by close proximity of several complex muscular, skeletal and visceral structures. Intimate relationships and interactions of the same structures complicate the precise pain evaluation<sup>4</sup>.

In 2014, the DOHA agreement meeting on terminology and classification of groin pain in athletes resolved the reporting confusion and defined related clinical entities. This

classification system, that categorise groin pain as adductor-related, iliopsoas-related, inguinal-related, pubic-related, hip-related and other causes of groin pain, enables medical professionals to communicate more easily and efficiently<sup>5</sup>.

### *Groin pain imaging pearls*

MRI today, in specialized sport clinics, remains a gold standard when evaluating adductor longus, rectus abdominis and pubic bone pathology. In one examination modality, MRI can assess femoroacetabular, sacroiliac joint and lumbar spine. Plain radiographs protocols are necessary when excluding other pathologies, often not connected with playing football, while ultrasound, beyond its dynamic diagnostic advantages, offers therapy related benefits (e.g. US guided injections of the groin region)<sup>6,7</sup>. Dynamic echography of the groin region is still the imaging modality of choice in excluding true inguinal hernias. "Sonopalpation", another advantage of ultrasound examination, can locate the

pain in real time settings and confirm the exact spot of injury. *Different imaging modalities offer the necessary comprehensive visualisation of this complex region and should be available in everyday football medicine practice.*

Radiology nomenclature of groin pain in athletes reflects the anatomical and pathological complexity of the region and remains without relevant experts' consensus. In some cases, different clinical findings can be associated with the same radiological findings<sup>8</sup>. As recognized before, more than 44% footballers with groin pain have more than one underlying pathology and different clinical findings can be present at the same time<sup>9</sup>. The sport/football radiologist should be aware of the groin imaging clinical pearls. When reporting, anatomical description of presented abnormalities is preferred over the confusing terms that imply certain pathology, e.g. osetitis pubis. Scientific evidence supports the inseparable pathology of adductor, gracilis and rectus aponeurosis. Their

attachment around the pubic symphysis is an anatomically continuous entity with several structures blending together (the pubic symphysis joint capsule, fascia and tendons of adductors and rectus abdominis), and imaging evaluation of the region can be challenging<sup>6-8</sup>.

In groin pathologies, certain radiological features can have significant predictive value; a study on groin pain MRI findings concluded that the presence of a secondary cleft sign is an independent factor associated with delayed return to play and prolonged recovery<sup>10</sup>. Nevertheless, experts agree that imaging findings in long standing adductor related groin pain cannot be used in return to play decision making<sup>11</sup>.

Future research should recognize diagnostic criteria and define imaging modalities of choice for specific groin pathological entities<sup>12</sup>. Existing and technologies in development, such as digital body mapping of pain quality and distribution<sup>13</sup>, will improve patient/athlete management while providing more precise and timely diagnosis.

#### *Women's football and groin pain*

Hip and groin injuries are the most prevalent in women's amateur football, with 93% of players sustaining an injury of this region during one season. Non-time-loss injuries are 3 times more prevalent than the time-loss injuries, but the burden of groin pathology remains - even in the following season, especially if the groin pain is persistent in character<sup>14</sup>.

Data on female football medicine are scarce and the literature has just recently begun to recognize the rise and importance of this beautiful and also female game<sup>15-17</sup>. As medical professionals, football doctors require scientific data to support their daily practice and to offer best available medical care. Most existing studies on football groin injuries, some of which are ground-breaking, base their conclusions on predominantly male samples. When scrolling through methodology sections, phrases such as "382 consecutive athletic groin pain patients, all male, enrolled", "the majority of athletes were male (98%) soccer players (60%)", "study followed three male elite-level soccer clubs"<sup>9,18,19</sup> are common. This makes it difficult for a doctor in women's football to be informed and remain up to date. What do we know about this complex and



**Image:** Illustration.

common football related pathology? How do female footballers differ from their male counterparts when it comes to groin injury?

Male athletes are at almost 3 times higher risk of groin injury, compared to female athletes when playing the same sport<sup>20</sup>. Footballers and similar athletes have the highest incidence of groin injury and the longest recovery<sup>14</sup>. Recent research revealed that groin injuries in female football can substantially affect player's game availability<sup>22</sup>. Adductor and hip related groin pain is more common in male athletes, but female athletes are more likely to develop pubic degenerative changes<sup>21</sup>. Female athletes are not only underrepresented in scientific literature but they are also less likely to get imaging, surgery or physical therapy referral<sup>4,23</sup>. Nevertheless, it is important to acknowledge that the football medicine community has taken the first big steps to address gender bias<sup>15,22,24</sup>.

Based on limited data, hip and groin injuries are also common in youth female footballers. Future research should overcome the existing gaps in the literature and offer growth and maturity assessment that is gender specific<sup>17</sup>.

The differences in incidence of groin injury between male and female football players can be explained by gender related groin anatomy, pelvic morphology, training loads, competition demands and hormonal status<sup>25</sup>.

- Assessment of female cadavers revealed that the medial part of the rectus abdominis tendon was attached as a separate entity on the anterosuperior pubic region. In male cadavers, the medial rectus abdominis tendon goes over the anterior symphyseal surface and attaches to the pubic symphysis together with gracilis and the fascia lata. This anatomical feature may result in higher tensile forces in men which, combined with training load, may predispose them to increase risk of groin injury.
- Inguinal canal anatomy is highly gender specific. In men, the inguinal canal is a passage for several vascular, neural and spermatic structures, while in females it carries only the round ligament and ilioinguinal nerve. Additional characteristics that mirror the anatomical and physiological

demands on the female and male inguinal canal, such as the size of superficial and deep inguinal ring and posterior wall of inguinal canal, play an important role in groin pathology and risk of athletic injury. Women have smaller superficial and deep inguinal rings, and a more robust nature of the transversus abdominis and fascia transversalis (posterior inguinal wall structures). This less complex and better developed inguinal canal segments can protect female footballers when it comes to groin injury.

- Pelvic morphology is in continuum with previously mentioned groin related gender differences. The female pelvis has a wider mediolateral diameter and bigger inferior rami angle (female ~90°, male ~65°). This alignment between the midline of the body and the line of action of adductors might result in a smaller load through the proximal attachment of the adductors, thereby protecting female athletes from adductor related groin injury. Groin pain associated with pubic degenerative changes is more likely to be observed in female athletes. Hormonal status, wider joint space and higher ligament elasticity destabilise this secondary cartilaginous joint and can lead to its degeneration. The female pubic symphysis is more mobile, which is thought to be the main risk factor for degenerative processes.
- Hip joint morphology reflects the above mentioned pelvic gender differences and can be related with groin pain, as is recognized in DOHA groin pain agreement. It is clear from the literature that hip joint anatomical and biomechanics differences contribute to certain sports related pathologies being more common in one sex than another. Cam morphology can be related with groin pain and there is some evidence that it is more common in male athletes<sup>26</sup>.

**“OTHER CAUSES” OF FEMALE GROIN PAIN**

Female football players require special attentional when evaluated for groin pain. Differential diagnosis should always include gynaecological considerations in this complex groin region. Imaging modalities, especially in emergency sports medicine care, should evaluate all the pelvis minor anatomical structures. Low

**KEY POINTS**

- *Groin pain is common in female football. Prolonged in character and with substantial re-injury risk, groin pain can compromise a player's ability to practice and compete.*
- *Female footballers are at a lower risk of developing most of the groin pain related pathologies compared to male players.*
- *When evaluating groin pain in female football players, comprehensive differential diagnostics is essential.*
- *MRI and ultrasonography are modalities of choice when imaging the football player's groin injury.*
- *Radiology reporting should be standardised and with more descriptive nomenclature that doesn't include imprecise terms.*
- *Additional research is necessary for better epidemiological, clinical and radiological evaluation of groin pain in female footballers.*
- *“The wind of change” in female football research is present and the future practices should embrace gender specific and bias free scientific evidence.*

energy availability is common in female footballers<sup>27,28</sup> who are at increased risk of developing Relative energy deficiency syndrome (RED-S). RED-S as a multifactorial pathology affects several organ systems, such as reproductive, cardiovascular, gastrointestinal and musculoskeletal<sup>29,30</sup>. Amenorrhea and bone stress fractures are common complications of RED-S.

- Amenorrhea can increase the risk of several gynaecological disorders including tumours, which must be excluded when evaluating groin pain in the football female player<sup>30</sup>. There is evidence that female football players belong to the group of athletes with the highest prevalence of primary amenorrhea<sup>31</sup>.
- Bone stress injuries as potential groin pain pathologies include neck of femur, pubic ramus and acetabulum<sup>5</sup>. Scientific evidence, although confusing regarding certain body regions, suggests a strong female predisposition to bone stress injury<sup>32</sup>. Timely diagnosis is crucial for uncomplicated recovery, but often challenged with very discreet examination findings. Existing imaging modalities are highly sensitive if used in correct indications. Good communication between the radiologist and referring clinician is essential for this.

**References**

Available at [www.aspetar.com/journal](http://www.aspetar.com/journal)

Milena Tomovic M.D.  
Sports and Exercises Medicine Specialist  
Radiology Resident  
Ippokrateio General Hospital of  
Thessaloniki  
Thessaloniki, Greece

Contact: [milenatomovic83@gmail.com](mailto:milenatomovic83@gmail.com)