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# THE ROLE OF BIOMECHANICS IN GROIN PAIN IN FOOTBALLERS

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**Introduction**

Athletic Groin Pain (AGP) is common in multi directional sports including Soccer, Australian rules football, Gaelic football, Ice hockey and Rugby Union.
The underlying mechanism of AGP is poorly understood with the features of bony overload, aponeurotic disruption hernia, femeroacetabular impingement, labral injury and adductor endthesopathy all implicated as potentially causative.
The range of eponymous names highlights the confusion over the underpinning mechanism behind the resultant dysfunction and including osteitis pubis, athletic pubalgia, pubic bone stress injury, aponeurosis dehiscence, avulsion injury, sportsmen's hernia, incipient hernia, Slapshot groin, nerve entrapment and Gilmores Groin.
The authors whilst defining the pathologies involved in their differential diagnosis (1-2), identified the importance of the stability of pelvis as a plane and the relevant anatomical importance of the torso to the pelvis stability provided by the oblique and transverse muscles and segmental stiffness. Where muscle contraction is compromised by dysfunction or pain this balance is altered, this altered balance may cause pain in its own right or lead to abnormal loading or overload patterns. The repetitive overload is the underlying mechanism which should be preventable or manageable with effective rehabilitation.
Attempts have been made to study standardized clinical examination, but these have been confined to Handheld dynamometry power measurements, pressure manometry or joint range of motion. No attempt has been made in the literature to quantify in a 3 dimensional capacity the kinematic and kinetic variables of the pelvis and the movement of the leg-hip-pelvis torso complex. Previous work on stability has focused on a weakness of the Adductor to abductor ratio as a propagative mechanism, but whilst this has an effect on knee stability this has significant limitations being unable to address torso, pelvis obliquity, hip joint restriction or anterior or posterior chain function, but is to date the best reproduction of athletic movement that has been possible.
The authors believe that by accurately identifying 3 dimensional deficiencies in thoraco-pelvic and pelvic-limb control in patients with athletic groin pain, rehabilitation can be targeted at deficiencies in speed of muscle recruitment, stability and strength with the intention to deliver prevention programmes and expediated rehabilitation protocols.
The results of 40 patients undergoing standardized examination, MRI imaging and 3D Biomechanical assessment lead to the development of the diagnosis – Pelvic Biomechanical Overload with clear rehabilitation targets for recovery.

**Methods**

Forty field sports players diagnosed with AGP were recruited (mean±SD: age 24.6±5.1 years; height 181.1±5.4 cm; mass 81.9±9.1 kg; time with groin pain 63.5±10.6 weeks). Clinical examination findings; completion of patient reported outcome measure (HAGOS: Copenhagen Hip and Groin Outcome Score); Magnetic Resonance Imaging (MRI) and 3D-motion analysis of the biomechanics in an acute 75° run and cut were used to direct the rehabilitation process.

**Results**

All players presented with AGP, with confirmed MRI findings of pubic bone stress injury (n=33) and anterior aponeurosis disruption (n=22) and all Returned To Play (RTP) following the rehabilitation intervention.
Initial HAGOS symptom score was 64.3 (IQR 46.4-75) and on RTP 89.3 (IQR 78.6-94.7).
Overall time to RTP was 67±21 days.

**Conclusion**

Existing non-surgical interventions in AGP have focussed on adductor strength with reported RTP times of 4 months.
No studies have addressed pelvic forces over sport-specific multi-joint, multi-planar movement stressors. The improvement of control of turning mechanics correlated with alleviation of symptoms, with an improvement in HAGOS, and return to play.
This prospective study reports the most expeditious published RTP times of 9.7 weeks for a non-surgical approach.

**References**

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