Physical Therapy in Sport 10 (2009) 91–96

Contents lists available at ScienceDirect

Physical Therapy in Sport

journal homepage: www.elsevier.com/ptsp

Original research

Hypermobility, injury rate and rehabilitation in a professional football squad – A preliminary study

Richard Collinge [a,*], Jane V. Simmonds [b]

[a] UCL Training Ground, London Colney, Hertfordshire AL2 1BZ, UK
[b] School of Health & Emergency Professions, University of Hertfordshire, Hatfield AL10 9AB, UK

ARTICLE INFO

Article history:
Received 4 December 2008
Received in revised form
6 February 2009
Accepted 3 March 2009

Keywords:
Joint hypermobility
Laxity
Beighton scale
Professional football
Injury audit
Return to play timeframes

ABSTRACT

Objectives: To determine if joint hypermobility is a risk factor for injury in a professional football squad. Primary objectives were to estimate the prevalence of hypermobility amongst a professional football squad and to undertake an audit of injuries sustained over a season. Secondary objectives were to relate the injury audit findings and hypermobility levels to time missed through injury, assessed by training days and competitive first team games missed after musculo-skeletal injury.

Hypothesis: Increasing levels of joint hypermobility may result in an increased risk of injury in a contact sport such as professional football.

Design: A prospective observational study consisting of the Beighton joint hypermobility screen and an injury audit (season 2007/8).

Setting: A second tier, English professional football club.

Participants: Thirty-three male professional footballers aged 18–35 years.

Main outcome measures: The Beighton joint hypermobility screen and a seasonal injury audit.

Results: The prevalence of joint hypermobility was found to be between 21 and 42% depending on the cut-off score used for the Beighton scale. Similar injury rates were found in both the hypermobile and non-hypermobile participants (6.2 as compared to 6.3 injuries/1000 h exposure respectively). Once injured, the hypermobile group showed a tendency towards missing more competitive first team games (12 as compared to 5/season in non-hypermobiles) and training days (71 as compared to 31 days/season in non-hypermobiles). These findings were not statistically significant.

Conclusions: The prevalence of joint hypermobility in a cohort of professional footballers is comparable to previous studies in athletic populations and is dependent upon which Beighton cut-off score is selected. It may be inferred from this preliminary study that the return to play timescales in hypermobile individuals may be extended so as to minimise the potential risk of re-injury and limit the socioeconomic costs associated with time out of competition.

1. Introduction

Hypermobile joints are described as those displaying a range of movement that is considered excessive, taking into consideration the age, gender and ethnic background of the individual (Grahame, 2003). Joint Hypermobility Syndrome (JHS) is present when an individual presents with hypermobile joints in the absence of demonstrable rheumatological disease (Grahame, 2003). Where once hypermobility was thought to be uncommon, it is now classified as a hereditary connective tissue disorder (HCTD), sharing common features with more serious counterparts (Fig. 1).

The epidemiology of joint hypermobility (JH) and JHS varies in the literature reviewed (Simmonds & Keer, 2007), with females and individuals from Asian and African backgrounds being more prone to the presentation (Russek, 1999). The prevalence of JH and the syndrome in the adult population has been reported at between 10 and 30% (Hakim & Grahame, 2003). Joint laxity is usually greatest at birth, decreases during childhood and continues to reduce during adolescence and adult life (Middleditch, 2003), suggesting that there are age related changes in flexibility levels.

The underlying pathophysiology in JH is attributed to imbalances in the proportions of different forms of collagen, extracellular proteins or hormonal factors that affect the soft tissue matrix. A strong familial aggregation has been linked to the HCTDs and an autosomal dominant mode (Malfait, Hakim, De Paepe, &

* Corresponding author. Tel.: +44 07974772014; fax: +44 01727821211.
E-mail address: docsamanthony@yahoo.co.uk (R. Collinge).

1466-853X/$ – see front matter © 2009 Elsevier Ltd. All rights reserved.
doi:10.1016/j.ptsp.2009.03.001

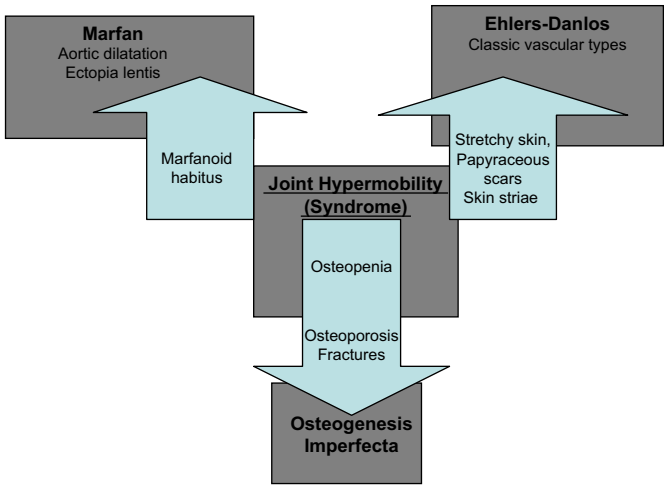

Fig. 1. A flow diagram showing the relationship between joint hypermobility (syndrome) and the heritable disorders of connective tissue (adapted from Grahame, 2003).

Grahame, 2006). The manifestation of this genetic encoding is the subsequent effect upon the connective tissue matrix; namely the collagens, fibrillins, elastins and proteoglycans. It is the make up of the connective tissue matrix that determines an individual's flexibility, as well as joint capsule, ligament and tendon mechanical properties.

It has been suggested that it is the abnormal ratio of type III:type I collagen that results in the decreased tissue stiffness common to JH patients, with the thin and elastic type III collagen becoming more prevalent within the soft tissue matrix (Russek, 1999). Tissue biopsies have supported the hypothesis that it is the interference with the processing of the N-propeptide of either α-chain (α1 or α2) of type I collagen or mutations in the production of type V collagen that result in hypermobile presentations (Malfait et al., 2006). Another mutation in a non-collagenous molecule, called tenascin-X, has also been suggested as a predisposing factor towards JH (Schalkwijk et al., 2001; Zweers, Dean, van Kuppevelt, Bristow, & Schalkwijk, 2005), whilst elevated levels of IGF-1, insulin and growth hormone have also been discovered in JHS patients (Denko & Boja, 2001).

It has been suggested that proprioceptive acuity is reduced in hypermobile subjects. This has been reported at the knee (Hall, Ferrell, Sturrock, Hamblen, & Baxendale, 1995) and proximal interphalangeal joints of the finger (Mallik, Ferrell, McDonald, & Sturrock, 1994). It has also been suggested that joint hypermobility may affect other afferent apparatus of the nervous system and subsequently lead to chronic, sensitised pain states (Grahame, 2003) and in the longer term, osteoarthritis (Al Rawi & Nessan, 1997; Jonsson, Valtysdottir, Kjartansson, & Brekkan, 1996).

At present, the optimum level of flexibility required to prevent injury when participating in sporting activity is not clear and may vary between muscle groups and probably sports (Dadebo, White, & George, 2004). A knowledge of where athletes fall in the spectrum of joint mobility may influence intervention and understanding of their complaints (Boyle, Witt, & Riegger-Krugh, 2003) and it has been postulated that athletes at either end of the flexibility spectrum are likely to be more at risk of injury (Stewart & Burden, 2004). Indeed, individuals presenting with generalised joint laxity have been reported to have an increased risk of Anterior Cruciate Ligament (ACL) injury to the knee (Ramesh, Von Arx, Azzopardi, & Schranz, 2005), with the risk increasing five fold in female football players who demonstrate hyperextension postures of the knee (Myer, Ford, Paterno, Nick, & Hewett, 2008).

The implications for hypermobile subjects competing in sport have produced conflicting results in the literature, mainly due to the diversity of both contact and non-contact sports studied but also due to inconsistencies in study design. Hypermobile athletes have been shown to have an increased risk of injury in American football (Nicholas, 1970), amateur rugby (Stewart & Burden, 2004) and netball (Smith, Damodaran, Swaminathan, Campbell, & Barnsley, 2005), whilst contradictory evidence has been published for lacrosse participants (Decoster, Bernier, Lindsay, & Vailas, 1999) and American Collegiate athletes (Krivickas & Feinberg, 1996). To date, no studies have examined whether hypermobility is a risk factor for injury in a professional football squad.

On a more general level, Hardin, Voight, Blackburn, Canner, and Soffer (1997) report a slower rehabilitation course for individuals presenting with joint hypermobility, highlighting the need for effective screening and preventative programmes to manage hypermobile athletes and limit the socioeconomic costs associated with sports injuries.

The primary objective and hypothesis of this research was to estimate the prevalence of JH in a professional football squad and to determine if increasing levels of joint hypermobility, measured using the Beighton scale (Beighton, Soskolne, & Solomon, 1973), results in an increased risk of injury in a professional football squad.

The issue of the cut-off score that denotes hypermobility diagnosis has caused much confusion in the hypermobility literature. There is no universal agreement on a threshold for JH; some researchers use a Beighton score of 4 or 5/9, other researchers use a Beighton scale score of 6/9 and still other researchers use a modified score of 3/5 (Russek, 1999). The latter is scored out of 5 by combining the scores obtained by the left and right peripheral joint tests. For the purposes of this study, the cut-off scores utilised by Stewart and Burden (2004) in a study of rugby players, where a score of 4 or greater represents hypermobility and 7 or greater represents excessive hypermobility, will be considered. The cut-off score of 4 points also correlates with the criteria used in the Revised 1998 Brighton Criteria (Grahame, Bird, & Child, 2000). Boyle et al. (2003) found the Beighton scale to have good to excellent reliability in screening individuals aged 15–45 years, with intra-rater reliability reported at 81% when a cut-off score of 5 or greater was selected. This scoring classification will also be referred to in this study.

Secondary objectives of this study were to relate the seasonal injury audit findings and hypermobility levels to time missed through injury, assessed by training days and competitive first team games missed after musculo-skeletal injury.

2. Methods

2.1. Participants

Thirty-three professional footballers signed to a second tier English team for the 2007/8 season volunteered for the study. The participants were aged 18–35 years and had all signed professional contracts. All players were available to train on a full time basis and were eligible for selection for first team fixtures. Demographic information for the participant group can be seen in Table 1.

When analysed by player position, the breakdown of the participant group consisted of three goalkeepers, eleven defenders, nine midfielders and ten attackers (Fig. 2). Three of the players were carrying injuries over from the 2006/7 season (two players had undergone ACL reconstructions and the other internal fixation of a tibial fracture) and were classified as having been injured at the start of the study on 1st July 2007.