

Examination of Injury in Female Gaelic Football

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ABSTRACT

International Journal of Exercise Science 6(2): 98-105, 2013. To examine the relationship between body mass index and injury as well as examine injury according to playing position. In addition we sought to describe injury as it pertains to female Gaelic football. Data was collected using an online questionnaire. Archived data was also collected from a ladies Gaelic football team located in Washington, USA. Respondents included 74 recreationally trained female Gaelic footballers aged 15 – 45 years and a playing experience of 1 – 24 years. Respondents were asked to recall injuries that resulted from participation in Gaelic football. A Pearson Correlation Coefficient was used to describe the relationship between BMI and injury. Analysis of variance was performed to examine injury according to playing position. There was no significant correlation between BMI and injury and no significant difference was seen for injury among the different playing positions. There was no significant difference in BMI between injured and non-injured players. A total of 98 injuries were recorded among the 52 injured players with an incidence rate of 1.88 injuries per injured player. Lower limb injuries accounted for 46.9% of injuries, while the upper limb accounted for 38.8%. The most frequent injury location were the fingers (22.5%) followed by the ankle and foot (19.4%). Despite the limitations associated with retrospective studies, this study provides valuable information regarding injury in female Gaelic footballers. As Gaelic football is new to North America, these results may help coaches and trainers identify problematic injuries and develop appropriate training programs to reduce both incidence and severity.

KEY WORDS: Gaelic football, injury, females

INTRODUCTION

Gaelic football is a popular sport in Ireland and is increasing in popularity in the United States, Canada and Europe (13, 26). The game is played by both men and women and is similar to rugby, soccer and Australian Rules football. Differences between men's and women's football do exist. In women's football, the ball may be picked directly off the ground using the

hands. In the men's game, the ball must be lifted from the ground using the foot. Women's rules also forbid deliberate body contact, such as shoulder charging; however, fielding and shadowing are permitted.

It is inevitable that injuries will occur in contact sports. Gaelic football is a contact sport which requires vigorous efforts with peak heart rates reaching 205 bpm (22) and

an average heart rate reaching 81% of heart rate max (4, 21). Furthermore, work-rate analyses suggest players cover a distance of 8,500 m per match with midfielders performing significantly higher amounts of high intensity activity (8, 11, 15). Such vigorous efforts may place athletes at risk for injury as they begin to fatigue. An examination of injuries in male Gaelic footballers by Cromwell showed 1.78 injuries per year for individual athletes (2). In comparison, Wilson reported 2.20, Newell reported 1.46, and Watson reported 1.33 injuries per athlete per year (14, 27, 29). Gaelic football is a sport demanding movements such as sprinting, running, jumping, twisting, pivoting, and turning. As a result the lower body accounts for more than 70% of all injuries (2, 14, 29). Injuries related to Gaelic football which are less common occur at the shoulder, hand and finger, back and ribs, head, neck, and the face (1, 2, 14, 29). Injuries regarding Gaelic football have focused primarily on male footballers. To date few studies have examined injury in the female Gaelic footballer. Crowley et al. examined insurance claims of female footballers during a full season and found 58% of injuries occurred to the lower limb, 24% to the upper limb, and 18% to the head, neck, and trunk. In addition, 40% of the injuries were muscular, 19% were fractures, and the remaining 41% were classified as miscellaneous injuries (3).

Various codes of football have examined possible risk factors for injury such as age, history of injury, playing position, and body mass index. Gomez et al. (5) found that BMI was associated with increased rates of injury to the lower extremity. In a group of New Zealand rugby players,

Quarrie et al. (20) demonstrated higher incidence of injuries in players with a BMI greater than 26.5 kg/m². Tyler et al. (24) found High School football players with a BMI greater than normal were at an increased risk for ankle sprains. In contrast to those findings, Ostenburg and Roos (17) did not find BMI to be a risk factor among injured and non-injured female soccer players. Watson et al. (25) speculated that Gaelic footballers with higher levels of muscle mass and physical working capacities may fatigue later than the average player. During competition, fatigued players may have difficulty maintaining tempo predisposing them to injury. Despite the growing popularity of Gaelic football it has received little attention from sports scientists, particularly among the female footballers. The main purpose of this study is to examine relationship between body mass index and the rate of injury in the female Gaelic footballer. A secondary purpose was to examine the relationship between playing position and the rate of injury. It was hypothesized that there would be a significant relationship between BMI and injury and that injured players would have a higher BMI than non-injured players. We also hypothesize that midfielders will sustain more injuries due to fatigue resulting from the higher amount of time spent in high intensity activity compared to other positions.

METHODS

Participants

This study was a retrospective study which included past and present Gaelic football volunteers. Archived data was obtained from a ladies Gaelic football team (Seattle Gaels) located in Washington, USA. Data

included player age, height, weight, position played, injury type and location, and years experience playing Gaelic football. In addition, an anonymous online survey was posted for a period of 3 months. Permission for this study was granted by the Central Washington University Human Subjects Review Committee.

Protocol

An anonymous survey was constructed to provide information on the prevalence and type of injury related to Gaelic football. Descriptive questions such as age, height, and weight were open-ended questions. Respondents selected from a list the best choice related to their injury (location, type, and cause). The survey was developed on the Web development program Macromedia Dreamweaver 8. The Web site included a home page, two survey pages (adult and minor), and a page of general information including a description of the research. Respondents between the age 12 and 18 were asked to have their legal guardian complete the survey indicated for minors. Reasonable and appropriate safeguards were used in the creation of the Web-based surveys to maximize the confidentiality and security of the responses. No contact information was requested and none of the participants was identified directly, demographically or statistically. The Web site was displayed on the server provided by Central Washington University, and completed surveys were emailed to the lead researcher via the Central Washington University secure email connection.

Descriptive information included age, height, and weight. Sport specific questions consisted of years participating in Gaelic

football and position played. Athletes were asked if any injuries were sustained by participation in Gaelic football (type, cause, number of injuries per season, and any restrictions because of the injury). Respondents were asked to only include injuries resulting from match play and practice; all other injuries as a result of cross training or other sports were to be excluded. Injuries were categorized by joint (wrist, elbow, shoulder, hip, knee, and ankle/foot), including all muscle and bone tissue associated with each joint(s). Surveys were entered into an Excel database for statistical review. Surveys were checked via filters for duplicates, which were deleted.

Statistical Analysis

Data was screened for normality and homoscedasticity. Results are expressed as means \pm standard deviation and were completed using Microsoft Excel 2003 and SPSS (ver. 19.0, Chicago, IL). A Pearson's Correlation Coefficient was used to describe the relationship between BMI and injury. One - way ANOVA with post hoc comparisons using the Bonferroni test were used to examine differences in height, weight, BMI, and injury among playing positions. A t-test was used to examine differences in BMI between injured and non-injured players. For all statistical analysis the significance level was set at $P < 0.05$.

RESULTS

A total of 74 questionnaires were returned, four of which were removed from analysis due to missing data. Responders were between the ages of 15 and 45 years with a mean age of 26.76 ± 5.79 years. Playing experience ranged between 1 and 24 years

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Table 1. Mean (SD) anthropometric measures among playing positions.

Measure	Back (N = 30)	Midfielder (N = 9)	Forward (N = 18)	Goalie (N = 4)	Multiple (N = 9)
Height (m)	1.67 (0.06)	1.70* (0.07)	1.64 (0.06)	1.61 (0.06)	1.61 (0.05)
Weight (kg)	64.55 (6.85)	66.63 (7.66)	62.71 (11.80)	68.12 (12.61)	57.63 (4.77)
BMI (kg/m ²)	23.17 (2.05)	23.10 (1.63)	22.30 (3.44)	26.19 (4.58)	22.31 (2.20)

BMI, body mass index.*Statistically different from footballers playing multiple positions ($P < 0.05$).

with a mean 5.97 ± 5.31 years. The players' mean height was 1.65 ± 0.06 m, while the mean weight was 63.65 ± 8.83 kg. The mean BMI was 23.25 ± 2.65 kg/m². Midfielders were significantly taller than those who played multiple positions (Table 1). No statistical difference was seen in body weight and BMI among playing position (Table 1). No significant correlation was observed between BMI and injury ($r = 0.12$, $P = 0.30$). Injured players had a mean BMI of 23.06 ± 2.21 kg/m² whereas non-injured players had a BMI of 23.82 ± 3.68 kg/m². No statistical significant difference was seen in BMI between the injured and non-injured groups.

Of the 70 players surveyed, 52 (74.3%) of them indicated they experienced injury as a result of participation in Gaelic football. A total of 98 injuries were recorded among the 52 injured players with an incidence rate of 1.88 injuries per injured player. limb injuries accounted for 46.9% of injuries, while the upper limb accounted for 34.7%. Injuries not occurring to the limbs accounted for 18.4% of injuries. The three most frequent injury locations were the fingers (22.5%), ankle and foot (19.4%), and knee (10.2%). Other notable injury sites can

be seen in figure 1 and include the hamstrings (8.2%) and the hip and pelvis (7.1%). Muscular injuries were most frequent (35.5%), followed by ligament (16.1%), and fractures (12.9%) (Figure 2). No significant difference was observed for injury among playing position.

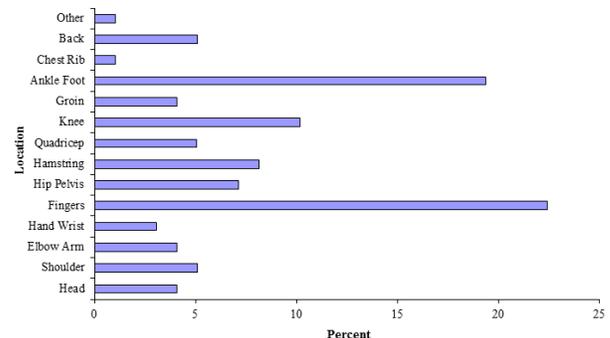


Figure 1. Location of reported injuries sustained as a result of participation in Gaelic football.

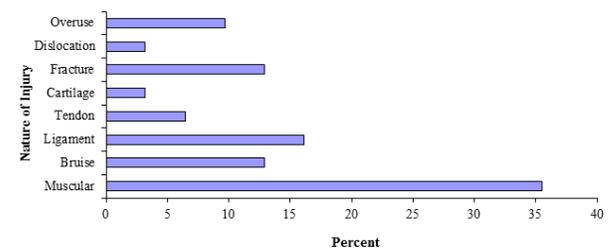


Figure 2. Reported nature of injury in female Gaelic football.

DISCUSSION

The main purpose of this study was to examine the relationship between body mass index and injury in the female Gaelic footballer. Watson (25, 26) suggested players with higher a higher BMI tend to be more successful in Gaelic football due to its physical nature. Wilson et al. (29) speculated that players with greater size are at a greater risk of injury due to increased momentum involved in physical play. We therefore hypothesized a significant relationship between injury and BMI. The hypothesis that there would be a significant relationship between BMI and injury was not correct. In this study we found no significant relationship between BMI and injury. Other codes of football have examined BMI as a risk factor for injury and have reported mixed results. Watson (28) demonstrated a higher incidence of ankle sprains in male Gaelic footballers that were taller with a lower BMI. Mackey et al. (10) found injured football players had a higher BMI than non-injured players; however those results were not statistically significant. Osteburg and Roos (17) found no significant difference in BMI between injured and non-injured female soccer players (22.6 ± 2.6 vs. 21.6 ± 1.8 kg/m²). The mean BMI for injured players in the current study is similar to that reported by Osteburg and Roos, however there was no difference in BMI between injured and non-injured players (23.06 ± 2.21 vs. 23.82 ± 3.68 kg/m²). Differences between this study and Watson may be reflected by rules differences between male and female game. In addition, it may also reflect the nature Gaelic football as it is a sport which requires more extensive use of the upper body than soccer.

A secondary purpose was to examine the relationship between playing position and injury. These data also showed no significant difference in injury among playing positions and agree with the results of Watson et al. (28) who also found no difference in injury according to playing position. In contrast, Murphy et al. (13) found midfielders a higher relative proportion of injury followed by defenders, forwards, and then goalkeepers. Numerous investigations examining soccer players have found no significant difference in injury among playing positions (6, 7, 9, 12). However, Tegnander et al. (23) reported a higher injury incidence among the midfield position while Hawkins and Fuller (6) found 43% of injuries occurred in defenders. Quarrie et al. (20) also found no significant difference in injury for rugby players; however, the authors did report midfielders missing a significantly greater amount of playing time due to injury. Although playing position was not significant it is possible that injury severity may differ among positions. Caution should be taken when interpreting these results as there was an unequal distribution of responses according to playing position (goal keepers = 4, midfielders = 9, forwards = 18, backs = 30, multiple positions = 9). This distribution could have influenced the results observed. Further investigation with an equal distribution of players among the various playing positions may reveal a more accurate analysis of injury rates according to playing position.

Finally we sought to describe injuries associated with female Gaelic football. In this study a greater percentage of female Gaelic footballers reported injuries to the

upper body, in particular to the fingers. This percentage of injuries reported by location is different than that reported for male Gaelic footballers (2, 14, 29). While it was expected that finger injuries would be the most frequently injured site of the upper limb because of the extent of hand ball contact (18); it was not expected to be the most frequently injured anatomical site. O'Rourke (16) reported the majority of injuries in pediatric football occurred to the upper body, however, most reports suggest the lower body sustains 58 to 70% (2, 14, 17) of all injuries. Because of the extent of running, jumping, and twisting associated with Gaelic football, it was expected that the ankle would be the most frequently injured anatomical site followed by hamstring injuries. In this study females experienced 46.8% of injuries to the lower limb which is lower than reported by Crowley (3) and is lower than what has been reported for males (70 to 77%) (2, 14, 28). In addition, 8% of injuries occurred to the hamstrings compared to 34% reported by O'Sullivan et al. (19). In this study, 22.5% of injuries occurred to the fingers and 19.4% occurred to the ankle and foot. Cromwell et al. (2) reported 4% of injuries to the hand and wrist and a similar 21% of injuries to the ankle for male Gaelic footballers. Watson (27) reported the most frequent injury was the ankle sprain (11.6%) and also reported fewer finger injuries (5% sprains and 4.5% dislocations). Murphy et al. (13) conducted a 4 year longitudinal study in male Gaelic footballers and found 33.3% of injuries occurred to the thigh followed by 11.3% to the knee, 10.0% to the ankle, and 9.4% to the pelvis and groin. In addition, the hand and fingers accounted for only 1.5% of injuries. Possible reasons for the differences between studies could be rule

differences between the male and female game and that females typically have smaller hands and fingers, and less strength than males.

Several limitations should be considered when interpreting these results. First, we used an online survey which had not been validated. Retrospective surveys do offer well known disadvantages regarding respondent recall. Surveys require participants to recall injury and severity which may not be accurate. In addition, players may have only reported acute injuries and disregarded overuse injuries. Players may have also neglected to report minor injuries that do not require the player to leave the field. This study also had a low number of participants in comparison to studies examining other codes of football. Finally, of the 70 respondents, 9 indicated they played multiple positions rather than a primary position which may have influenced the results of this study.

The main finding of this study indicates no relationship between BMI and injury and no difference in injury according to playing position. Furthermore, the highest injury occurrence among this group of female Gaelic footballers was to the fingers. Despite the limitations associated with retrospective studies, this study provides additional information regarding female footballers. Because of the growth of the sport it is critical that sports scientists, coaches, and trainers understand potential causes of injury for these athletes. Further research is needed regarding causation, severity, and rehabilitative strategies used to treat injured footballers.

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