

311 **HEADING A SOCCER BALL AND THE CHARACTERIZATION OF PARAMETERS THAT INFLUENCE ITS PEAK IMPACT FORCE**

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Background As participation in soccer increases in the United States, with an estimated 16 million registered players, the possibility of athletes being exposed to injuries, more specifically traumatic brain injuries, increases as well. All levels of soccer play have been associated with a high risk of TBI, predominantly through the mechanism of injury known as heading.

Objective This study aims to model impacts between a soccer ball and head to determine what factors are most influential during a heading action.

Design Dimensional analysis was utilized as a means to construct a model that would define the peak impact force as a function of four variables of interest: pressure inflation, incoming ball velocity, mass and diameter of a soccer ball. To characterize the model, a soccer ball was kicked at a force platform, while varying the ball size (size 4, 4.5 and 5) and pressure at which it was inflated (4, 8, 12 and 16 PSI).

Main Outcome Measurements A Cotter's method sensitivity analysis was used to determine which factors were most influential under the constructed model.

Results Velocity and inflation pressure were found to be the most influential factors affecting peak impact force. In addition, a direct relationship was found between the force and velocity; the force and ball size and; the force and inflation pressure. Moreover, by controlling these parameters it is possible to reduce the amount of cumulative impacts a player receives in-game to a range at which the risk of TBI is much lower. These include lowering the pressure from 16–8 PSI, utilizing a smaller sized ball and reducing the number of impacts per season.

Conclusions The model proposed determined that a reduction of injury risk due to TBI in soccer is possible through the control of specific in-game factors such as ball inflation pressure and controlling the number of impact events.

312 **STUDYING OF SELECTED PERFORMANCE AND SKILL TEST BATTERIES FOR PREDICTION OF SEVERITY OF INJURY IN IRAN PREMIER LEAGUE FOOTBALL PLAYERS AGED 16–21 YEARS OLD**

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Background Football is the most popular sport in the world, including in Iran. Muscular injuries has 31 percent of all

injuries and due to this injury, 27 percent of athletes couldn't contribute at sport sessions.

Objective To predict selected performance and skill test batteries of severity of injury in Iran premier league football players.

Design Prospective cohort study, purposeful sampling method for selecting football players.

Setting Youth male football players of Iran premier league.

Patients (or Participants) A total of 79 premier league football players aged 16–21 years old who were member of two professional football clubs were selected for the study.

Interventions (or Assessment of Risk Factors) At the pre-season time of league, five performance tests including Standing Long Jump Test, Change of Direction and Acceleration Test (CODAT), Illinois Agility Test, Yoyo Intermittent Recovery Test and Y-Balance Test (YBT), and one skill test including Loughborough Soccer Shooting Test were performed. The pre-season medical assessment forms including the number of players injuries were collected by the club medical staff. This information were gathered weekly and were sent to the researcher.

Results Logistic regression analysis results showed that, of performance and skill tests, just Yoyo Intermittent Recovery Test could predicted the severity of injury ($P < 0.05$). Investigation of predictive variable index was showed that the Wald test of performance and skill test was significant just for Yoyo Intermittent Recovery Test and was able to predict injury severity.

Conclusions None of the performance and skill tests could predict the severity of injury, except the Yoyo intermittent recovery test. This test were designed for measurement of aerobic capacity of athletes. We suggest that coaches use this test to identify at-risk athletes.

313 **AN INVESTIGATION INTO ADHERENCE TO REHABILITATION AND PERFORMANCE PROGRAMS IN PROFESSIONAL FOOTBALL PLAYERS**

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Background Adherence is a multi-faceted concept and poorly understood in professional football in relation to rehabilitation and performance programs. To offer best practice to players, an understanding of why players are undertaking such programs (adherence) is important. No research to date has examined adherence in professional football.

Objective This study aimed to examine adherence in both men's and women's professional football players in order to better inform practice and program design.

Design Qualitative research design - focus groups and questionnaires.

Setting One English professional Football Club - men's U23 team and women's first team.

Patients (or Participants) 10 men's U23 players and 11 women's first team players from one English professional football club.

Interventions (or Assessment of Risk Factors) 10 men's players and 11 women's players answered a questionnaire adapted from the Sports Injury Rehabilitation Adherence Scale (SIRAS) to provide an overview of adherence rates. 9 men's players and 4 women's players took part in follow-up focus groups to gain a deeper understanding of the players perspectives of