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## **Using the Classification and Regression Tree Analysis in Determining the Relationship Between Functional Movement Assessment, Clinical Measures, and Injury in NBA Players**

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# Using the Classification and Regression Tree Analysis in Determining the Relationship Between Functional Movement Assessment, Clinical Measures, and Injury in NBA Players

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## Background

Musculoskeletal pathology has been linked to games missed in the NBA due to player injury. Sports medicine professionals utilize functional assessments and clinical measures in order to minimize injury risk and maximize performance. The investigation of interactions among non-linear factors may help further the understanding of the interdependence of various measures and missed games due to injury.

## Purpose

To investigate predictors of games missed in the NBA due to player injury.

## Subjects

60 individual NBA players from 3 NBA teams.

## Methods

Data were acquired from pre-season assessments collected prior to the 2008-2017 seasons, including: the Functional Movement Screen, Y-Balance Test, and select clinical measures. Injury data were tracked by each team's sports medicine team. Classification and regression tree analyses (CART) were used to investigate nonlinear interactions among predictors and their influence on the occurrence of injury dichotomized to players who missed > 7 games or did not.

## Results

Of the 60 total number of players included in this study, 30 players were injured and missed more than 7 games and 30 players were injured missing fewer than 7 games or were not injured. Pruning resulted in 6 splits ( $r^2=0.542$ ) demonstrating that injury was predicted by Non Dominant Hip External ROM ( $<33^\circ$ ), Ant Stance of the YBT ( $\geq 2$  cm), ND Arch Stiffness (z-score  $\geq 0.66$ ), and to a lesser extent FMS total score ( $\geq 13$ ). The predictive model, after pruning, classified 17 of the 30 injured players and 14 of the 30 non-injured players. The area under the ROC curve was .934 which suggests that classification of players into injured or not injured using this model was not random.

## Conclusion

Injury to NBA players is difficult to predict. That said, injury may be associated with an interaction between measures associated with stiffness and compliance along the kinetic chain. CART analysis captured non-linear and complex interactions between clinical and functional measures suggesting that lower extremity biomechanical factors may be associated with injury.

## Clinical Relevance

A predictive model may be helpful in determining which NBA players may be at risk for injury. In addition, CART analysis can aid in classifying individuals who are injured during the NBA season into various sub groups.

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