

Utilizing data mining to predict elevated knee loading in athletes and assessing their risk for anterior crucial ligament injury

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Anterior cruciate ligament (ACL) injury prevention research is still limited by the inability to identify the biomechanical characteristics that are consistent for individuals at elevated risk of ACL injuries. Current studies employ discrete variables within experimental kinematic, kinetic and surface electromyography (sEMG) datasets to detect differences in an athlete's movement patterns with the goal of identifying biomechanical factors associated with non-contact ACL injuries. However, additional information could be obtained from analyzing these variables over the entire waveform. By using the data mining approach, it is possible to extract patterns within the data to help describe the underlying relationships between variables that are common for at-risk individuals and utilize this information to develop predictive models of ACL injury risk. Both wavelet and principal component analyses will be employed for data reduction and data transformation and analysis purposes to make identifying patterns easier. The ultimate objective of this research is to develop a model to accurately predict individuals at elevated risk for ACL injury.