Field Based Assessment of Running Metrics

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Recreational and competitive running has been linked to positive health outcomes and is a popular method of physical activity. Despite its popularity, 56% of recreational runners and up to 90% of competitive runners sustain a running-related injury (RRI) during the course of training. Examination of running kinematic metrics (i.e. pronation, pronation velocity, impact force, step rate/cadence, etc.) provides opportunities to explore and quantify risk factors related to the development of RRIs and/or performance improvement. The collection of running kinematic data has traditionally been completed in laboratory settings. With the advancement of wearable technology, real-time running kinematic data can be collected during field-based training sessions. **PURPOSE:** The purposes of this investigation were to collect running metric data using wearable technology in a field-based approach and to examine the relationship between running kinematic metrics. **METHODS:** Data were collected using wearable sensors mounted to the laces of running shoes of NCAA Division I distance runners (n=13) during team or individual training sessions during a one-week period. Data collected included impact force, stride length, breaking force, overall impact (Gs), and cadence. Pearson R correlations were used to analyze the relationships between kinematic variables. **RESULTS:** Analysis revealed a negative correlation (r=-.588, p=0.03) between average cadence and impact force. Stride length (r=-.541, p=.056), breaking force (r=.042, p=.891), and average G force (r=-.467, p=.107) were not significantly correlated. **CONCLUSION:** Excessive impact forces cause strain on the musculoskeletal system contributing to the development of injury. Increasing cadence may decrease impact force and therefore, reduce the likelihood of injury. From a training perspective, the use of wearable technology provides researchers, clinicians, and coaches a tool to provide real-time feedback to runners during field-based training.