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Hit Or Miss: Kinematic Predictors Of In-game Performance In Collegiate Pitching

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Baseball coaches, scouts, and statisticians argue over the variables that lead to a successful season. Among pitchers, earned run average (ERA), strikeouts per inning (SPI), and fielding-independent pitching (FIP) are useful metrics to evaluate the quality of a pitcher. Kinematic predictors of these measurements can provide strength coaches and athletic trainers with valuable information for exercise prescription. **PURPOSE**: To assess kinematic predictors of success in collegiate pitchers via SpartaTrac measurements. **METHODS:** We collected data on 30 Division 1 baseball pitchers. Independent variables were height, weight, year in school, Sparta force plate data (Load, Explode, and Drive), vertical jump, and pitch speed. SpartaTrac data were recorded as the best of six trials and were collected at multiple times throughout a season. Dependent variables were winning percentage, ERA, SPI, and FIP; each of these was calculated as a season statistic. Multiple linear regressions tested the SpartaTrac outputs on dependent performance variables, holding significant confounders constant. **RESULTS:** In our cohort of pitchers, winning percentage was 41.9% ± 26.2%, ERA was 6.5 ± 5.1, FIP was 6.0 ± 3.5, and SPI was 0.8 ± 0.5. Holding confounding variables constant, predictors of winning percentage were Load (β=0.004; p=0.047), Explode (β=-0.011; p<0.001), and Drive (β=-0.016; p<0.001); the overall model was significant (R2=0.516; p<0.001). Predictors of ERA were Load (β=-0.138; p=0.008) and Explode (β=0.213; p<0.001); the overall model was significant (R2=0.442; p<0.001). Predictors of SPI were Load (β=-0.095; p=0.013), Explode (β=0.267; p<0.001), and Drive (β=0.161; p=0.001); the overall model was significant (R2=0.501; p<0.001). Predictors of SPI were Load (β=0.012; p=0.039) and Explode (β=-0.034; p<0.001); the overall model was significant (R^2=0.313; p<0.001). **CONCLUSIONS:** SpartaTrac data correlate with on-field performance of collegiate pitchers, although the effects are not always encouraging. Out of the four evaluated performance metrics, Load and Explode each improved two and worsened two. Drive improved one, worsened one, and was irrelevant in two. Before coaches, scouts, and trainers can predict how Sparta data affect pitching performance, more analyses must be done on larger pools of pitchers.