Analysis of GPS-Acquired Distance Data in NCAA Division I Women’s Soccer

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PURPOSE

- Analyze and evaluate four years of retrospective data from an NCAA Division I Women’s Soccer team’s Global Positioning System/Heart Rate Monitoring (GPS/HRM) units.
- These position-specific performance metrics add to sparsely existing data, in this demographic of female athletes, to increase awareness of optimal conditioning levels, for each position, when evaluating sport demands.

METHODS & DESIGN

- Four years of retrospective GPS/HRM data for a collegiate women’s soccer team was analyzed for total distance traveled by player position during conference and non-conference matches.
- Sensors are worn via chest harness during training and matches.
- Data was analyzed for all players as a simple mean per position.
- Data for starters was also analyzed separately
- Goalkeepers were excluded
- Playing position is defined as Defender (D), Midfielder (M), or Forward (F).

LIMITATIONS

- Data was pre-existing, not allowing for optimization of sample collection
- Data was collected for all players regardless of minutes played
- In several previous studies data was collected on selected individual players allowing for optimization of important variable such as playing time
- Data for the 2020 season was significantly limited due COVID-19 schedule alterations, resulting in conference only matches
- Data is collected from a single Division I women’s soccer team

RESULTS

- Team data was analyzed from 89 matches over four seasons.
- Data for 27 starters was also analyzed separately and is the focus of this report
- Consistently, the Midfielders covered the most distance for both non-conference and conference matches, followed by Defenders, and then Forwards.
- Distance covered by all positions was found to be greater in Conference vs. Non-conference matches
- Four-year averages for Non-conference vs. Conference Matches were:
  - Midfielders 6.29 miles vs. 7.25 miles
  - Defenders 5.81 miles vs. 6.43 miles
  - Forwards 5.69 miles vs. 6.31 miles
- For Non-conference matches, the absolute difference between positions was 0.60 miles and for Conference matches it was 0.93 miles.
- In Conference play, the maximum total distance by a single player (Midfielder) was 10.7 miles.
- In Non-conference play, the maximum total distance covered was 8.9 miles by both a Midfielder and a Forward.
- This difference may be accounted for by the level of competition in conference versus non-conference play.

CONCLUSION & SIGNIFICANCE

- The sports axiom “defense creates offense” applies to the soccer midfielder whose role is to connect the defense to the offense.
- In that process, data supports the active midfielder will cover more distance than the other positions on the pitch.
- This single metric in monitoring player dynamics and performance heightens awareness of the demands of each position.
- While forwards score more often, the fit midfielder covers more ground to help create those scoring opportunities, and her conditioning should reflect those demands.
- This data may be used to implement conditioning programs for female soccer athletes, focusing on:
  - each position’s demands
  - optimizing performance and recovery
  - fine-tuning training
  - monitoring training loads to assess risk for injury
  - developing robust injury resilient athletes.

REFERENCES/ADDITIONAL INFORMATION