Project 2: Running Speeds and Running Imbalance in Football

Running Speeds Questions:

1. How often are athletes reaching ≥90% maximum velocity throughout the training season?
    a. We hypothesize that athletes are reaching ≥90% maximum velocity 7 times per week during the training season.
2. Should we consider the number of sprinting efforts that athletes are completing?
    a. We hypothesize that we should consider the number of sprinting efforts that athletes are completing.
        i. Shah et al. Found that “eccentric hamstring strength significantly decreased when 7–8 weekly sprint efforts at max >90% were completed but not at <6 weekly efforts”
3. Are relative efforts and bands more advantageous than the absolute bands provided?
    a. We hypothesize that relative bands are more advantageous than absolute bands
        i. Football is a sport that has varying athletic abilities across the field
            1. A wide receiver may be able to regularly reach band 7, even at minimal effort. While a lineman may not be able to reach this band, even at maximum velocity. Only comparing the bands you would not be able to tell if the lineman is working harder.
4. How does sprinting exposure (# of efforts, % max reached) relate to incidence of hamstring injuries?
    a. We hypothesize that the underexposure as well as the overexposure of sprinting will relate to hamstring injuries.
    b. Furthermore we hypothesize that a rapid increase in sprint exposure could lead to a potential hamstring injury.

Running Imbalance Questions:

1. What is the variation at the team level and at each individual athlete level?
    a. We hypothesize that variation in running imbalance will depend on whether or not a player has been injured recently or has a high likelihood of lower body injury where a recently injured athlete will have higher running imbalance variation.
2. What is a meaningful change? What red flags should go off when we see a week-to-week change in running imbalance?
    a. Since previous research suggests that high variation in running imbalance is associated with an increased risk of lower body injury, then we expect that when we see a week-to-week change in running imbalance, that player is at a higher risk for lower body injury.
3. Is running imbalance sensitive enough of a metric to use as a prognosis tool versus a rehab tool?
    a. Previous research has shown that with a mild to moderate lower body injury within the previous two years, there are still asymmetries in gait for athletes. With this, we hypothesize that running imbalance will not be a sensitive enough metric to use as a prognosis tool versus a rehab tool.

Project Outline

Week 1:

- Research for literature review
- Start writing literature review

Week 2:

- Finish literature review
- Clean data for all questions
- Start part 1 – running speed questions

Week 3:

- Continue and finish running speed questions
- Start running imbalance questions
    - Exploratory analysis

Week 4:

- Continue and finish running imbalance questions
- Start on project write up and presentation

Week 5:

- Finish up project write up and presentation
- Extra time for anything that runs over allotted time