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RUNWISE AI VERSUS TRADITIONAL SOLUTIONS

By some estimates, 50% or more of runners experience an injury annually. This is despite numerous existing solutions. RunWise AI aims to address the limitations of existing solutions by providing runners with a tool that directly assess their risk of injury.

- **Heuristics**

- Heuristics are mental shortcuts used to make decisions quickly. They prioritize efficiency over accuracy. Examples include the 10-percent rule and taking a “down week” every fourth week.

- **Acute-to-Chronic Ratio (ACR)**

- ACR is the ratio of the current week’s mileage to the average weekly mileage during the last four weeks. $ACR > 1.5$ has been associated with higher injury risk.

- **Strava’s Fitness and Freshness**

- Fitness and Freshness is used to quantify training stress. Fitness is your chronic training load (CTL), which represents positive training adaptations. Fatigue is your acute training load (ATL), which represents negative training effects.
- CTL and ATL are calculated using an impulse response model as exponentially-weighted moving averages of daily stress scores over 42-day and 7-day periods, respectively. Daily stress scores are based on training volume and heart rate data.
- Interpretation:



- $ATL < CTL \rightarrow$ losing fitness
- $ATL \approx CTL \rightarrow$ maintaining fitness
- $ATL > CTL \rightarrow$ improving fitness
- $ATL \gg CTL \rightarrow$ possibility of overtraining, which may result in sickness, injury, and/or decreased performance

- **Garmin's Training Effect**

- Training Effect is used to characterize the physiological impact of training on an athlete's fitness. It is a score on a scale of 0 to 5, with higher scores indicating greater physiological impact.
- Following exercise, one uses oxygen at a higher rate than in steady state. In a lab setting, post-exercise oxygen consumption (EPOC) quantifies such exercise-induced disturbance. Training Effect employs a heart rate-based algorithm to estimate EPOC, which is then mapped to a Training Effect score.
- Interpretation:
 - Training Effect $\sim 0-2 \rightarrow$ losing fitness
 - Training Effect $\sim 3 \rightarrow$ maintaining fitness
 - Training Effect $\sim 4-5 \rightarrow$ improving fitness
 - Training Effect $\sim 5 \rightarrow$ possibility of over overtraining when score is ~ 5 too often and without sufficient recovery

- **How is RunWise AI Different?**

- **RunWise AI uses a machine learning model to analyze multiple aspects of your running data**, including volume, average pace, and consistency metrics over different time periods. The analysis aims to **identify patterns in your running data that are similar to patterns linked to previous injuries** in the model's training data. Traditional solutions rely on simpler



metrics like weekly mileage (e.g. heuristics, ACR) or estimated physiological impacts of training (e.g. Strava, Garmin).

- **RunWise AI specifically provides a risk score for injury.** This directly addresses the likelihood of injury based on your training patterns. In contrast, traditional solutions require runners to interpret metrics like ACR, Strava's Fitness and Freshness, and Garmin's Training Effect in relation to *potential* injury risk. This involves understanding the complexities of the metric calculations and your response to training stress.
- **RunWise AI believes that injury risk can be elevated by specific training patterns,** regardless of overall fitness levels. For example, the founders of RunWise AI understand, based on experience, that injuries occur when acute load exceeds chronic load, as well as when chronic load exceeds acute load. In other words, while estimating training stress can help clarify your training progress, its relationship to injury risk appears to be more nuanced. RunWise AI therefore more directly assesses injury risk based on potentially problematic training patterns.

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