Heart Rate Normalization for Training Load Analysis

1. Why % of Maximum HR is commonly used:

* Normalizing by % of HRmax provides a simple way to compare intensity across athletes.
* It puts individual heart rates on a common scale from 0–100% of maximum.

1. Limitations:

* Ignores resting HR: two athletes with the same %HRmax can have different physiological stresses if their resting HR differs.
* Does not account for heart rate reserve (HRR), which reflects the actual capacity to increase heart rate from rest to max.

1. Better alternatives:

* Heart Rate Reserve (HRR) normalization: HRR = HRcurrent - HRrest %HRR = HRR / (HRmax - HRrest)
* This approach captures both fitness level and relative effort, making it more individualized.

1. Key idea:

* Like duration, heart rate alone doesn’t capture training load accurately.
* Scaling HR by HRR gives a more meaningful physiological intensity measure that can be compared across athletes.