4.1 Relationship between training load and injury

The injury process has been addressed by different models and/or paradigms in recent years. There seems to be a consensus on defining the sports injury process as complex, dynamic, multifactorial, and context-dependent (Windt J, Zumbo B, Sporer B, MacDonald K, and Gabbett TJ, 2017).

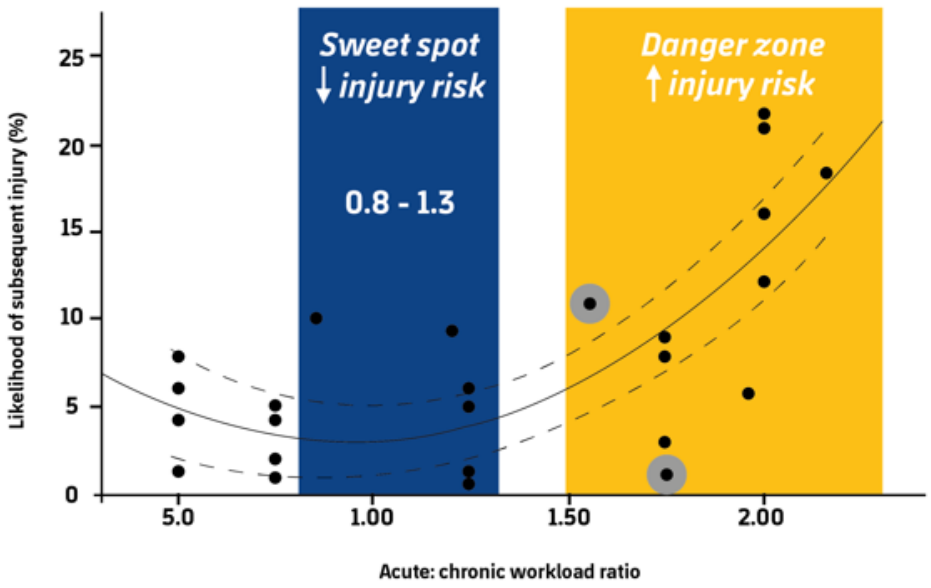
Today, we can identify a series of intrinsic risk factors that predispose athletes to injury. The most classic are age, somatotype, and previous injuries. In addition, there is a series of external and internal risk factors that increase the athlete's susceptibility to injury. Among them, we can mention the use of protective gear, the state of the playing field, and climate conditions. Thus, it is the presence of internal and external factors that determines the risk of injury, although they themselves are not sufficient to cause an injury. It is the sum of these factors and their interaction that predisposes the athlete to injury in a particular situation. Meeuwisse, Tyreman, Hagel and Emery (2007), describe the inciting event as the last link in the chain that causes an injury to occur. This triggering event is an action that surpasses the body's adaptation limits and causes an injury.

Multivariable injury prediction models increase the accuracy of prediction since they take the interactions between and moderating effects of different risk factors into account (Colby MJ., Dawson B, Peeling P, Heasman J, Rogalski B, Drew M, Stares J, Zouhal H, & Lester L, 2017). Therefore, a multidimensional approach is necessary in this sense, but what variables could interact to increase or decrease an athlete's likelihood of injury?

A very clear example can be seen in the now classic depiction by Gabbett regarding the likelihood of injury based on the acute:chronic load ratio. In Figure 1, we can look at the cases of two different athletes, in yellow. Both subjects were found to have A:C load ratios higher than 1.5, but different likelihoods of injury. We can observe that athlete A has a slightly lower ratio than athlete B (the first is situated more to the right than the second). With respect to the likelihood of injury (%), we can observe how athlete A, despite presenting a lower A:C load ratio, is around 10 times more likely to suffer an injury than athlete B. It appears, therefore, that athlete B presents a series of "characteristics" that make him less likely to suffer injuries (in this specific case with high A:C load ratios), but what are those characteristics? Should

we take them into account when proposing training loads for our athletes? Based on the results shown, it seems clear that we should consider these aspects when managing workloads (training and competition) for our athletes.

Figure 1 Acute:Chronic Load Ratio and Likelihood of Injury



Source: adapted from Blanch and Gabbett (2016).