

RATING OF PERCEIVED EXERTION (RPE)

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Perception of effort during physical activity can be defined as the conscious sensation of how hard, heavy and strenuous the activity is (3). Perceived exertion is often defined using more extensive terms like: subjective intensity of effort, strain, discomfort or fatigue. However, individuals are able to discriminate perception of effort from other exercise-related sensations, such as pain and discomfort, as the neurophysiological pathways for perception of effort and pain are different. Perception of effort is generally quantified using psychophysical scales: the Borg Rating of Perceived Exertion (RPE) scale 6-20, the category-ratio scale CR10 and CR100 (1). The 15-point Borg RPE scale is an equidistant interval scale in which ratings grow linearly, while in the category-ratio scales the responses grow in a nonlinear and positively accelerating manner. The category-ratio scales are considered more adapted for the quantification of perception of effort in sports activities; they cannot be used interchangeably but they return similar results. All these scales can be considered valid and reliable, if the standardized procedures are followed during instruction and administration. RPE is primarily influenced by the relative intensity at which someone is exercising instead of by the absolute workload sustained. The subjective nature of RPE means that it can be affected by psychological and social factors (e.g. personality, mood, self-efficacy and locus of control). In football, the quantification of Training Load (TL, the product of volume and intensity) is a crucial aspect for an effective training process. It was demonstrated that it is possible to quantify individual internal TL by multiplying the whole training session RPE by its duration. In male football players, significant relationships (from moderate to large) were found between TL quantified using session RPE and TL quantified using HR-based methods (Banister's TRIMP, Edwards' TL and Lucia's TRIMP) (2). Session RPE can be considered a reliable indicator because it is not affected by training intensity distribution within the session. Similar results were also obtained in elite female football players. Furthermore, it was demonstrated that the combination of lactate accumulation and Heart Rate (HR) measures collected during small-sided games is better related to RPE (57% of the variance explained) than either HR or lactate measure alone. Significant relationships were also reported in professional football players between the TL RPE method and external load indicators (total distance, high-speed and very high-speed running distance and player load). On the contrary, poor relationships were found between the TL RPE method and TL HR methods in youth football players. It can be speculated that, in this particular population, the increased session RPE may be mainly influenced by the increased coordination and cognitive difficulty of the situational training. For these reasons, RPE can be considered a good indicator for the quantification of TL in youth football players. A number of recent studies have investigated the possibility of differentiating perceptual reports according to their specific mediators (local or muscle effort, leg exertion and central effort, breathlessness). Data collected during football matches suggested that these different scores may facilitate the interpretation of the internal match load of the players. While it is important to remember that injuries in football have a multi-factorial origin, quantification of TL using RPE appears to represent a useful strategy in order to recognize critical levels of TL. It was reported that a too fast increase in TL or excessively high TL levels (maintained over several weeks) can increase the odds of injuries. In conclusion, although it is important to consider some limitations, perception of effort quantified using RPE scales can be considered a useful tool for the quantification of TL in football.

References

1. Borg E, Kaijser L. A comparison between three rating scales for perceived exertion and two different work tests. *Scand J Med Sci Sports* 2006; 16: 57-69
2. Impellizzeri FM, Rampinini E, Coutts AJ, Sassi A, Marcora SM. Use of RPE-based training load in soccer. *Med Sci Sports Exerc* 2004; 36(6): 1042-1047
3. Marcora SM. Perception of effort. In: Goldstein EB (ED), *Encyclopedia of Perception*, Thousand Oaks, CA: SAGE Publications, 2010: 381-384