



The Complexity of Designing an Exercise Program: Some Challenges

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Editorial

Designing exercise programs for sports injury prevention and rehabilitation is a multifaceted process that demands knowledge, expertise, and careful consideration of individualized needs. From elite athletes to individuals undergoing rehabilitation, the goal is not merely to enhance physical fitness but also to prevent injuries and aid in recovery. However, achieving this balance requires understanding the complexities involved in programming. Tailored exercise regimens can address muscular imbalances, enhance biomechanical efficiency, and improve functional capacity, minimizing the likelihood of sports-related injuries. Moreover, structured exercise interventions play a vital role in rehabilitation, promoting tissue healing, restoring mobility, and facilitating a safe return to play. Despite its importance, designing effective exercise programs sets significant challenges for sports professionals.

Among some other needs, creating an exercise program requires careful attention to the intensity, as part of the exercise load needed for the correct stimulus. This brings us to some important considerations. One of the primary considerations in determining exercise intensity is individual variability. What may be an appropriate intensity for one athlete could be too high or too low for another, based on factors such as age, fitness level, injury history, training experience, competitive level, and others. Therefore, exercise professionals must properly assess capacities, skills, and limitations to prescribe appropriate intensities. These should be challenging for the athlete but do not overwhelm. Designing a training program requires, therefore, recognition of individual differences. Each person has distinct physical characteristics, movement patterns, and training experience, which means that an individualized approach to exercise prescription is necessary. This personalized strategy is critical for training adaptation, injury prevention, and rehabilitation.

Furthermore, progressive overload is a fundamental principle in exercise programming that involves gradually increasing the intensity of workouts over time to stimulate adaptation and progress. However, reaching the right balance between progression and safety is crucial. Progressing too quickly or aggressively can lead to overtraining, burnout, or injury, while progressing too slowly may result in stagnation or suboptimal outcomes. This progression should be carefully programmed and monitored throughout the program. The continuous observation/evaluation would allow an adjustment of exercise intensity during workouts and this way optimize results and minimize injury risk. For this purpose, it is possible to use different evaluation techniques such as rating of perceived exertion, heart rate monitoring, and objective performance metrics. In recent years, several instruments and evaluation measures have been developed to evaluate intensity levels and make real-time adjustments as needed. Here, we would highlight the velocity monitoring during resistance training, in populations with different needs [1-3]. This movement velocity monitoring during resistance training makes it possible to analyze the individual's response in "real-time" (intensity and volume), determine if they are training according to the programmed dose response, and make the needed adjustments.

In addition to individual variability and progressive overload, exercise program intensity must also consider proper technique and form. Performing exercises with incorrect form, especially at high intensities, increases the risk of musculoskeletal injuries. Therefore, sports professionals must prioritize teaching and reinforcing proper techniques to ensure safe and effective exercise execution.

The challenge surrounding exercise program intensity resides in achieving a delicate balance between providing an adequate stimulus for physiological adaptations and minimizing the risk of injury. Intensity, influenced by factors such as load, velocity, time, and force (among others), plays a fundamental role in driving improvements in physical fitness and performance. However, if not managed effectively, it can also increase the risk of injury. In addition, we should not forget that exercise prescriptions should be updated with the latest evidence-based practices and guidelines, and translating research findings into practice can be challenging.

We should highlight that inadequately designed programs may fail to address underlying risk factors or target specific areas of weakness, increasing the likelihood of injury recurrence. Moreover, suboptimal exercise prescription can delay the rehabilitation process, prolong recovery times, and compromise athletic performance. Overall, by embracing an individualized approach, incorporating progressive overload carefully, emphasizing proper technique, implementing robust monitoring protocols, and integrating evidence-based practices, exercise professionals can cross the complexities surrounding intensity management and design programs that maximize benefits while preservation against potential harm. As a final noteworthy of reflection, this is all better accomplished when performed by multidisciplinary teams.

References

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