LARBI BEN M'HIDI
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Introduction to the field of science and techniques of physical and sports activities

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Principles of Training

Progressive Loading ("Overload")

Biological systems can adapt to loads that are higher than the demands of normal daily activity. Training loads must be increased gradually, however, to allow the body to adapt and to avoid injury (system failure due to overloading). Varying the type, volume, and intensity of the training load allows the body an opportunity to recover, and to over-compensate (Figure 3-2). Loading must continue to increase incrementally as adaptation occurs, otherwise the training effect will plateau and further improvement will not occur (Figure 3-3)

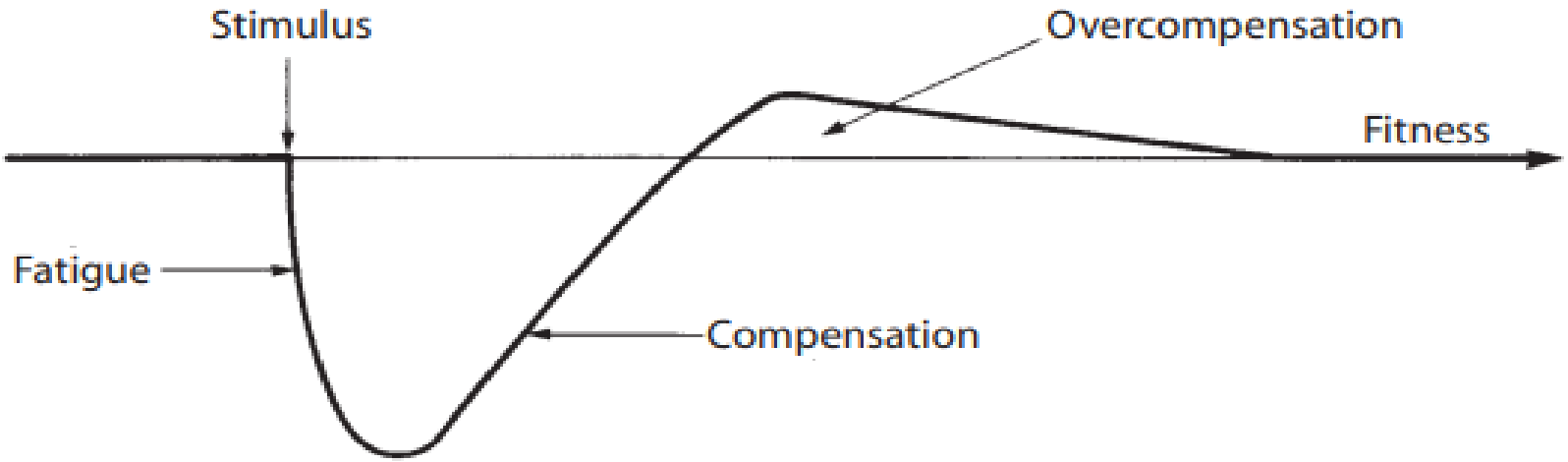


Figure 3-2. The law of overload.

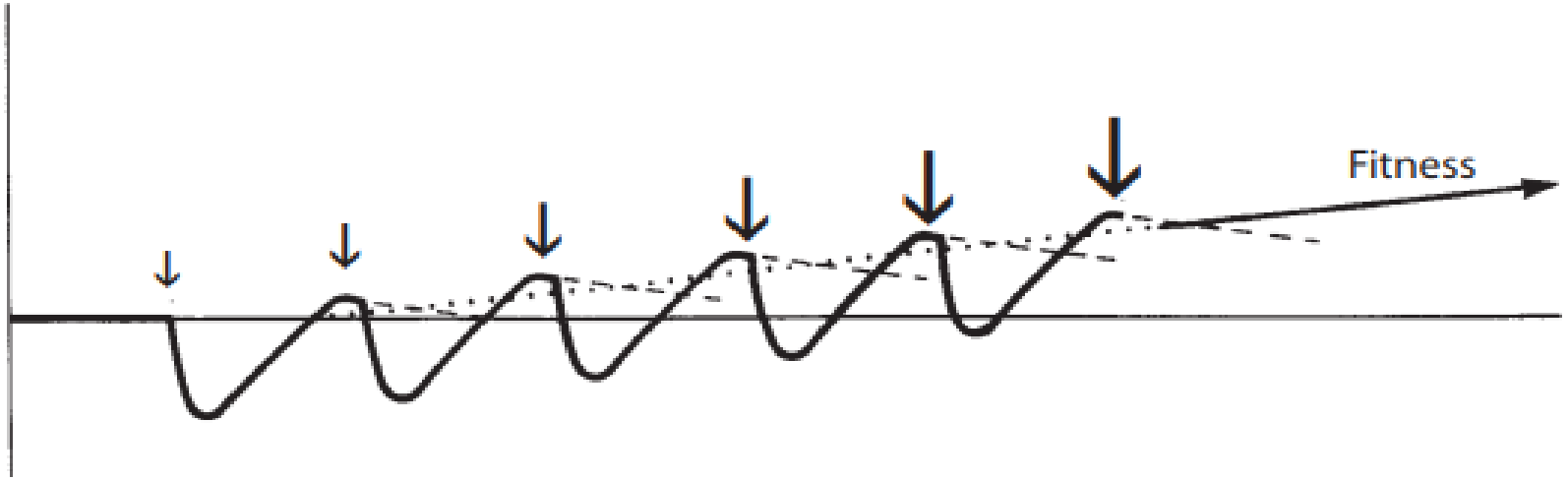


Figure 3-3. Principle of progressive overload—optimal improvement.

Adaptation

Adaptations to the demands of training occur gradually, over long periods of time. Efforts to accelerate the process may lead to injury, illness, or “overtraining” (see Part 2, of this chapter Restoration, Recovery, and Overtraining). Many adaptive changes reverse when training ceases. Conversely, an indadequate training load will not provide an adequate stimulus, and a compensatory response will not occur. Figure 3-4 illustrates the effects of various training loads.

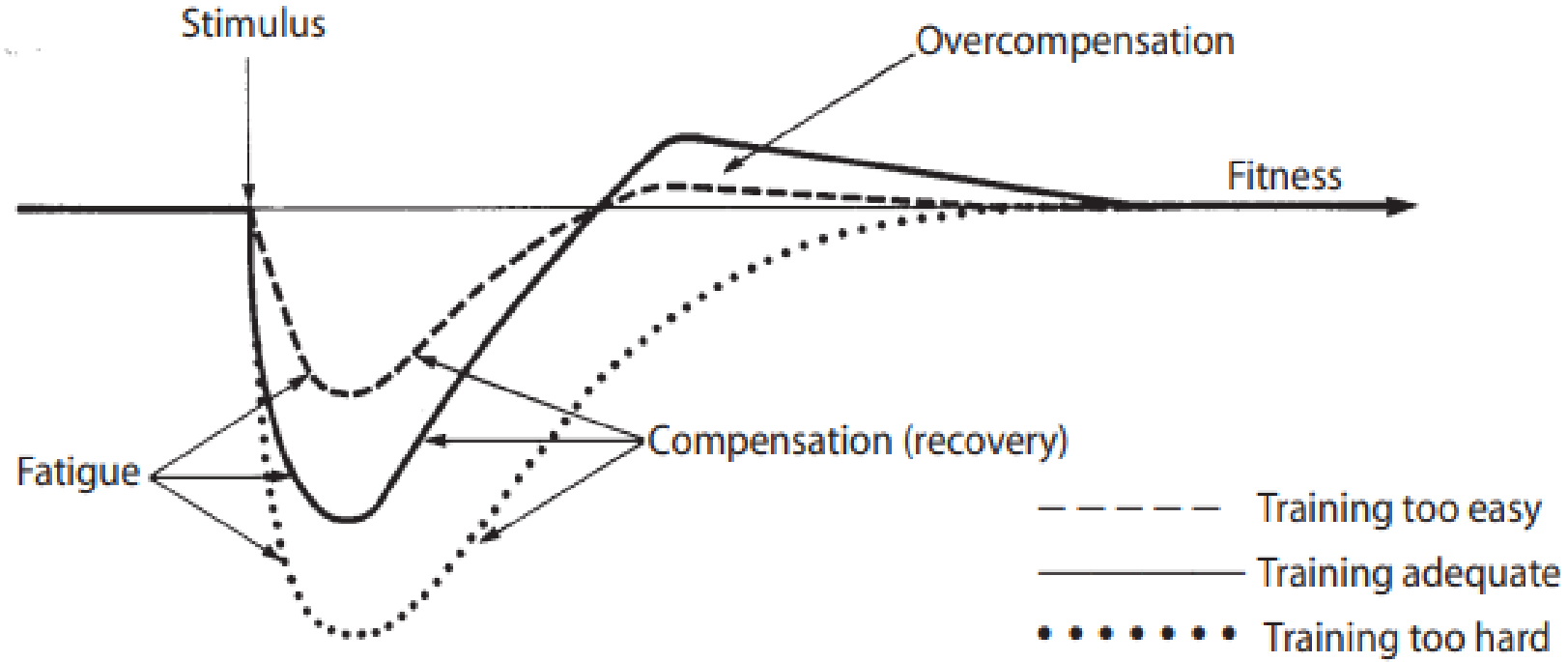


Figure 3-4. Different training loads have different effects on the athlete's recovery.

Specificity

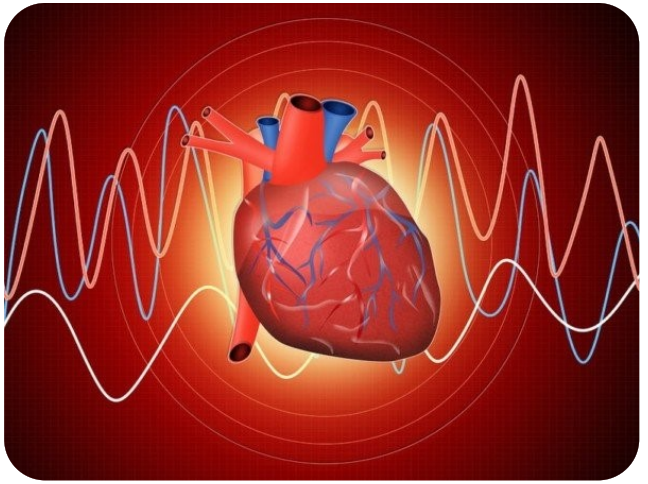
Energy pathways, enzyme systems, muscle fiber types, and neuro-muscular responses adapt specifically to the type of training to which they are subjected. For example, strength training has little effect on endurance. Conversely, endurance training activates aerobic pathways, with little effect on speed or strength. Even so, a well-rounded training programme should contain a variety of elements (aerobic, anaerobic, speed, strength, flexibility), and involve all of the major muscle groups in order to prevent imbalances and avoid injuries.

Reversibility

A regular training stimulus is required in order for adaptation to occur and to be maintained. Without suitable, repeated bouts of training, fitness levels remain low or regress to their pre-training levels.

Variation and Recovery

Muscle groups adapt to a specific training stimulus in about three weeks and then plateau. Variations in training and periods of recovery are needed to continue progressive loading, without the risks of injury and/or overtraining. Training sessions should alternate between heavy, light, and moderate in order to permit recovery. The content of training programmes must also vary in order to prevent boredom and “staleness”.



Individual Response

Each athlete will respond differently to the same training stimulus. There are many factors that alter the training response: genetics, maturity, nutrition, prior training, environ men

Periodisation of the Training

Cycle The training programme must consist of a variety of elements, including cardiorespiratory (aerobic) fitness, general strength, anaerobic fitness (power), speed, neuro-muscular skills development, flexibility, and mental preparation. The emphasis placed upon each of these elements must vary during the training year, but will also depend on the athlete's event and level of experience and maturity. Generally, basic preparation for all events should focus on general strength and aerobic fitness. Training cycles usually last about 3 weeks, with a week of lower-intensity recovery before starting the next cycle. Skills acquisition should not be emphasised during a high-intensity training cycle, but should be reserved for periods of lower volume and intensity.

Maintenance

Gains achieved during high-intensity training periods can be maintained with a moderate level of work. Thus, by means of periodisation, some elements can be maintained with less work, while other elements are stressed

Characteristics of Sports Training Components