NAME: EDEMEKA UNWANA

MATRIC NO: 16/MHS01/072

DEPARTMENT: 400LEVEL PHYSIOLOGY

COURSE CODE: PHS402

DATE: 13/04/20

1. **How six principles of Sports physiology training can be applied to improve athletes performance during international competition**

Principles

1. **Progressive Loading (“Overload”) principle**

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. Loading must continue to increase incrementally as adaptation occurs, otherwise the training effect will plateau and further improvement will not occur. The basis behind the overload principle is that for training adaptations to occur, the muscles or physiological component being trained must be exercised at a level it isn’t normally accustomed to.

1. **Specificity Principle**

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 program 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. According to specificity principle, adaptations are specific to the muscles trained, the intensity of the exercise performed, the metabolic demands of the exercise, and the joint angle trained.

1. **Reversibility Principle**

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. When the training stimulus is removed or reduced the ability of the athlete to maintain performance at a particular level is also reduced, and eventually the gains that were made from the training program will revert back to their original level.

1. **Individuality Principle**

Each athlete will respond differently to the same training stimulus. There are many factors that alter the training response: genetics, maturity, nutrition, prior training, environment, sleep, rest, stress, illness or injury, and motivation, to name a few. The individuality principle refers to the concept that people respond differently to the same training stimulus.

1. **Progression Principle**

During the course of a training program, adaptations occur that can change the relative intensity or volume of training. In order to maintain the same absolute training stimulus (i.e., intensity or volume of training) the resistance used continually needs to be modified.

1. **Principle of diminishing returns**

The principle of diminishing returns states that performance gains are related to the level of training experience of the individual. At the onset of a training program, rapid strength gains are made. As training duration continues, the rate of strength improvement begins to slow down. As training continues further, changes in strength and performance are difficult to achieve and a plateau appears to be reached. This plateau may be considered as a genetic ceiling.

**HOW CAN THESE SIX TRAINING PRINCIPLES BE APPLIED TO IMPROVE ATHLETES PERFORMANCE IN INTERNATIONAL COMPETITION?**

**Applying the Overload and Progressive Principles in Practical Terms**

      The following are commonly accepted and practical ideas about overload implementation:

* **Increase loads gradually and progressively.** Training loads should gradually become more intense over a period of time and never increased abruptly or with excessive intensity.
* **Test maximums**. Competitive training loads progressive build to maximize efforts (peaking).
* **The intention is NOT to achieve muscular failure.**
* **Design ample recovery time.** Too little recovery time results in overtraining. Too much recovery time causes an effect known as "detraining".
* **Plan and monitor training loads**. Athletes need to participate in a long-range, periodized training plan.  An evaluation of progress must be incorporated into the seasonal training to determine training decisions are approaching a point of exceeding the overload and risking overtraining.
* **Each athlete should be responsible for tracking their individual progress.** It is essential to determine where there are deficits in the training. If athletes "run out of gas", for example, training can be overloaded to improve skilled performances when fatigued.
* **Alternate activities.** Organize workouts to allow recovery on some aspects of training while increasing intensity on others. Use periodized planning to link into weekly and daily activities.
* **Coordinate all training activities and schedules.** Fitness training loads should be adjusted for technical and tactical activities, travel, competitions, and other factors that could influence how overloading should occur.
* **Focus on skill work first.** Practice skills that require greater coordination prior to intense fitness training if both are performed in the same workout session. For example, complete Olympic lifting before weight training activities of lesser complexity.

**Applying the Reversibility Principle**

* **Conditioning.** After taking a long break from training, begin a conditioning program to rebuild sport fitness. After several weeks of not raining, athletes should gradually increase their general conditioning/fitness before resuming the training volume and intensity previously attained.
* **Resting Active.** During the off season, active participation in other sports or activities minimizes detraining effects and may even have some transfer or facilitation of skill acquisition.  
  Avoid long rest periods with complete inactivity.  
    
  **Returning to training.** Increase exercise gradually and progressively after long periods of inactivity. Athletes should avoid performing intense workouts without first participating in a conditioning program.
* **Resumption of training** Athletes who are restarting their weight training will remember *how* to properly execute the lifts, but can sustain an injury if they overestimate the maximum weight they can lift compared to their previous best lifting performance.
* **Flexibility.** Emphasize stretching exercises to regain previous levels of joint flexibility. This is particularly important for older adults who participate in senior sports.

**Applying the Principle of Individualization**

The goal of every coach and parent is to provide each child with the attention that makes them feel special, the following are offered as suggestions:

* **Set Clear Goals.** Goals set for team results can be personalized according to position and athletes' abilities.
* **Test.** Take baseline measurements and evaluation of results is the most precise way to apply this principle. In addition to fitness and skill testing, health related tests can provide implications for how to adjust training.
* **Optimize Shortcomings.** Devise ways to overcome weaknesses as much as possible. For example, for athletes with low motivation, set specific goals and reward progress. For those who are naturally seem to process information and acquire skills more slowly, reduce the pace to reduce frustrating the learner.
* **Gender Differences.** Be sensitive to physical as well as cultural differences. Women have wider hips, a lower center of gravity, and carry more fat in these areas than do men. Training tasks may need to be adjusted for these physical differences. Encourage and support both genders equally.
* **Positive-negative-positive**. When offering [feedback](http://iceskatingresources.org/AthleteFeedback.html), reinforce the good points while pointing out areas that still require improvement. Positive reinforcement is especially helpful when an athlete has difficulties on a given day or as part of a pattern.
* **Senior Athletes.** Older adults may need specific attention compared to younger athletes. Coaches should be sensitive to the fact that while the desire to perform is there the body may no longer perform up to the standards the adult may have established for themselves. They can be very frustrated due to decreased flexibility, posture problems, and other orthopedic related factors. Adults generally prefer to be in control and thus involving them as active participants in making decisions in developing a training program will increase the likelihood that they will be diligent in following the training program.
* **Youth Athletes.** Competitive youth sports offer children many opportunities, as well as exposing them to many physical and psychological vulnerabilities. Positive early experiences can lead the way to healthy lifetime habits. Coaches and parents need to be sensitive to such factors as the athlete's learning potential, general fitness, level of perception/motor development, and emotional physiological state. Children need positive approval, nonjudgmental acceptance, and emotional encouragement whether they win or lose.

*According to Simoneau and Bouchard (1998), athletes may have different biomotor abilities (strength, speed, endurance and co-ordination) due to genetic variance in physiological make-up. Research data from 4 studies provided enough evidence for Simoneau and Bouchard to conclude that the considerable variation between athletes in anaerobic performance can, to a large extent, is attributed to genetic factors.*

**Application of specificity principle.**

Specificity refers to the type of changes the body makes in response to sports training. Very simply, what you do is what you get.  
  
When an athlete trains, he or she repeatedly performs activities to prepare for the exact requirements of the sport. In time, the athlete's body becomes better able to meet the demands of the sport as it adapts to the training regimen.  
  
Adaptations to training are most evident in elite athletes. For example, the effects of years of rigorous training clearly distinguish the bodies of distance runners from throwers.  
  
For distance runners, major adaptations from the demands of sustained running include a larger, stronger heart and increased blood vessels to supply oxygen to the specific muscles involved in running. In contrast, adaptations to training for throwers include increased size and thickness of specific muscles of the body that are trained to improve power.  
  
This principle applied to sports fitness training means that the overall energy demands of the sport determine which fitness components (e.g., strength, power, endurance) should be developed so that the requirements of the sport are matched.  
  
For example, basketball fitness training should include some distance work with intermittent speed and agility training. In contrast, golfers would require little distance work, but train for power and flexibility.



**The Specificity Principle and Competitive Sport Skill Learning**

Sport skills are unique to each sport. Competitive sports require athletes to command an arsenal of options for executing skills so that they can make split-second adjustments in a variety of competitive situations.  
  
Specificity for learning sport skills involves performing a variety of closely related movements. Rather than practicing and perfecting any single skill or movement only, specificity of skill learning means that athletes must develop variations of skills so that they can quickly adapt to the different conditions they will encounter in game play.   
  
Early in learning, athletes tend to benefit from practicing skills with little variation because they are just beginning to understand what the skill requires. This is called the cognitive or mental stage. However, as learners progress, adding variation to practice better matches the specific demands of competition.

**Applying the principle of diminishing returns**

Breaking through that plateau will foster continued favorable adaptations but many athletes struggle with getting through it, but don’t worry there are many ways in which an athlete can break through the plateau and continue progressing. Just keep in mind that the further the athlete progresses the slower those adaptations will eventually become to achieve, as is the continual struggle with diminishing returns.

So the answer lies somewhere in the land of moderation, which is not a very controversial or attractive answer but when pursuing safe progress is the best answer. Taking that into consideration, there is a simple principle that you can use to incrementally increase athletes exercise so that they can continue to attain favorable training adaptations when your progress begins to plateau.