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PREVENTION & REHABILITATION: Editorial

General Physical Preparation: The big rock of fitness



1. Introduction

Training is preparation. Whether it is preparation for age-related effects like sarcopenia (muscle loss) and osteoarthritis, or preparation for the development of new skills – every individual's training plan should be pro-active and strategic. The goal is to expose the body to just enough stress in order to facilitate recovery and lead to eventual super-compensation, or in simple terms - to get better!

General Physical Preparation, or “GPP”, is the groundwork of any successful training program. The abilities trained during this period must be developed before advancing to more intensive, specialized trainings. We do not begin building a house until there is a strong foundation. Therefore, the over-arching theme of GPP is to increase general strength and develop “work capacity” (the ability to perform work repeatedly).

2. Block Periodization

This concept is often seen in Sports and Training textbooks when discussing block periodization or macro-cycles. In his book “Block Periodization: Breakthrough in Sport Training,” Vladimir Issurin describes block periodization as “the purposeful sequencing of different training units so that the athlete can attain the desired state and planned for results” (Issurin and Yessis, 2008).

In order for the training plan to have proper direction, there must be a goal - both short- and long-term. From there, the annual training plan is developed in blocks based on the schedule (off-season vs. in-season), the residual effects of training (how long qualities last), and the preparedness of the athlete. This all begins with GPP.

3. Who needs GPP?

The GPP phase is often seen at the beginning of a program or run as the first “block” of training. While GPP is mainly seen in athletic programs, this is where *everyone* should begin. This training period is used to build confidence, coordination, and the ability to withstand fatigue. The main goal is to enhance the body's functional capacity.

GPP is not only for elite athletes. In fact, GPP will be a cornerstone for enhancing performance in an elite athlete, preventing injury in all people, and be a keystone to effective rehabilitation. Rather than focus on passive, unproven modalities, those applying it will find that successful rehabilitation is simply quality movement and exercise for someone who is injured or in pain.

In this block of training the athlete is exposed to high(er) levels of volume, submaximal (low-medium) intensities, and a variety of exercises. Examples of this would include – Bodybuilding workouts (higher repetition ranges), Circuit Training, Calisthenics, Aerobic Training, Mobility Drills. The following scenarios demonstrate this in more detail:

- A **recreational athlete** might be aiming to run a half-marathon. First, they or their coach should identify the major energy systems (aerobic), bio-motor abilities, movement dynamics, and the current performance limiting factors between the athlete and the goal. It is recommended that this athlete begin with a thorough GPP phase to build general strength, stamina, and suppleness of tissue to prepare for increasing speeds and workloads. Jogging at moderate speeds can impart 3–4x bodyweight in ground reaction forces upon each landing. The athlete must have the capacity to withstand these forces over the course of a long run. That base begins in GPP.
- A **youth athlete** should follow a training plan based on the Long-Term Athletic Development model. This model places emphasis on the developmental stages and optimal windows of trainability of the youth athlete. It is recommended that youth athletes undergo a long period of GPP for up to a few years, before becoming more specialized. If they develop a well-rounded base first, the overall motor potential will rise. This is one reason why it is important for the youth athlete to play multiple sports, as it exposes them to the development of different abilities, thus enhancing overall athleticism.
- An **aging athlete** may simply want to feel better, improve their balance, or increase their strength for daily activities. General Physical Preparation is likely the safest, most time-effective solution for this athlete. Because intensities are lower in nature and movement quality is emphasized, this provides a pleasant and safe environment to develop meaningful, long-lasting improvements. As their level of GPP rises, the work can evolve and become more intensive.

4. General strength training

The GPP phase should include basic resistance training exercises with intensities ranging from 50 to 75% or even body weight – depending on the individual. With low to moderate intensity and higher repetitions, muscular endurance and muscle cross-sectional area (hypertrophy) are the goals. Some may have the impression that hypertrophy is just for bodybuilders; however, that is absolutely not the case.

Muscle dimension is arguably the most important factor in

potential force production (Zatsiorsky and Kraemer, 2006). Furthermore, submaximal loading during this phase prepares the tendons and ligaments for greater intensities while also providing an opportunity to practice quality repetitions. This is important in order to develop the underlying support structures, improve motor patterns, and reinforce the overall working platform.

5. Aerobic Training

Due to its efficient energy supply and large potential for improvement, the aerobic system is arguably the most important energy system. Contrary to popular belief, the energy systems are not independent of each other. The human body is a complex, inter-dependent system that requires the interaction of numerous sub-systems. These do not function like an on-off switch, rather, all three systems are always contributing to energy production, just in differing quantities.

Aerobic capacity is the duration for which one can produce energy at a certain intensity. Put another way, it is the ability to sustain an effort for a prolonged period of time – often called endurance. Properly developing this will enhance the recovery of the other energy systems and improve one's ability to maintain quality effort through fatigue.

Recent research has shown that the aerobic system is hard at work helping the body to recover in between bouts of anaerobic exercise (such as when lifting weights) (Bishop and Jones, 2008; Scott, 2011). Studies on short, 30s bike sprints, which one would expect to be primarily anaerobic, have shown increased usage of the aerobic system with each successive sprint (Paroline et al., 1999). So, if an individual has greater aerobic capacity, they can perform for longer, and recover faster.

For these reasons, in any training program it is best to include some low-intensity, aerobic training where the heart rate stays between 120 and 150 bpm. This should start with at least 15–20 minutes initially, and work up to 30 + minutes.

6. Work capacity

The adaptations from higher repetition strength training and

aerobic training will form the basis of an individual's "work capacity." Without developing these abilities, recovery in between exercises and training sessions will be hampered, negatively affecting the potential for improvement. An athlete is only as good as their ability to recover and positively adapt from their training sessions.

Two significant benefits of building work capacity are:

- To increase ability for repeat efforts (eg. hitting a baseball or striking a golf ball).
- To increase the ability to recover from a workout or activity.

7. GPP training template

As the name states, this training is general in nature. It does not need to be elaborate. The example that follows is one that could be used during a GPP phase. There are many ways to set up a workout for this block, while the exercises themselves are up to the discretion of the coach. These can include: Push/Pull; Upper/Lower; Bodyweight Circuits; Medball Circuits, and so forth.

7.1. Warm-up

It is important to include a variety of movements. The goal is to increase heart rate/core body temperature, promote blood flow to the tissues about to be trained, and prepare for the session.

Include some exercises from each:

- Jogging, Skipping, Jumping Jacks, Backwards Skipping, Lateral Shuffle, etc.
- Hip Circles, Shoulder Circles, Good morning, Bodyweight Prisoner Squat, Forward/Backward Lunges, etc.
- Walking Knee tuck, Quad Stretch, Cradle Stretch, Lateral Lunge, Hip Airplane etc.
- Bird-dogs, Elbow Touches, Lateral Band Walks, Pull-Aparts, TKEs.

Exercises are paired in two with 90–120 seconds rest between. Those in training should use submaximal weights and maintain proper form throughout.

Day 1	Day 2
A1.) Dumbbell Row (Controlled Eccentric) – 2 × 15 A2.) Unilateral Incline Dumbbell Press – 2 × 12	A1.) Goblet or Weight Vest Squats – 3 × 12 A2.) Physioball Deadbugs – 3 × 6/e
B1.) Off-Set Loaded Split Squat – 2 × 12 B2.) Banded Facepull – 2 × 15	B1.) Inverted Row – 3 × 12 B2.) Deficit Reverse Lunge OH Medball Press – 3 × 10
C1.) Good Morning – 2 × 15 C2.) Banded Tricep Extensions – 2 × 12	C1.) Push-Up (Controlled Eccentric) – 3 × 10 C2.) Lat-Pulldown – 3 × 10
D1.) Side Plank with Medball – 2 × 25 seconds D2.) Hip Rotations over a Box – Fwd/Bkwd 2 × 10/e	D1.) Banded Hip Thrust – 2 × 20 D2.) Unilateral Farmer Walk – 2 × 25 yards
E1.) Hamstring Curl (Controlled Eccentric) – 2 × 15 E2.) Scaption Thumb Up Raise – 2 × 12	E1.) Elevated Calf Raise (Controlled Eccentric) – 2 × 15 E2.) Dumbbell Hammer Curl – 2 × 12
*Add aerobic training pre- or post- training	*Add aerobic training pre- or post- training

Those undergoing training should perform a minimum of two resistance training workouts per week. If time permits, one of the workouts should be repeated for a third day. On the other days of the week, they should include low-intensity, restorative activities that they enjoy - such as walking, yoga, hiking, or stretching. From week to week, different exercises can be added for novelty or to increase the intensity of the previous week's exercises as the level of GPP rises.

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