

# WHAT CONSTITUTES ELITE PERFORMANCE?



## PLANNING AND PROGRAMMING

# ELITE PERFORMERS

## LANCE ARMSTRONG



- 6 consecutive Tour De France Wins.
- Resting heart rate of 32 b.p.m.
- $VO_{2max}$  of 83.8ml/kg/min.
- Revolutionary training techniques and the application of sports science.
- Trained at much higher cadence levels than other cyclists.
- 8% increase in mechanical efficiency over 7 years.
- Unprecedented planning strategy for Tour De France. Attention to detail on all major facets of preparation.

# PLANNING AND PROGRAMMING

- A daunting task.
- Impossible to provide all answers.
- Demands of game and individual limitations.
- Every exercise/session must be performed with a reason reflecting the planned training aim.
- Planning helps you organise your ideas, create a clear direction and refine your coaching philosophy.
- All aspects of training must be quantified for execution of planning (i.e. H.R., TRIMP, G.P.S., Neural)



# PLANNING

- The plan must be flexible - the more parameters are put into the plan - the harder to manage training process.
- Even if a coach is working to a plan and making all the correct player assessments the plan will be likely to be executed at the best 70-80% of the time because to many factors affect adaptation (recovery ability), health (injury) and learning (years of experience).

**BRFC**

# PERIODIZATION

- **Phase (wave-like) character of adaptation, periods of building, maintenance and loss of physical and psychological fitness.**
- **Different rate of the development for distinctive components of fitness.**
- **Compatibility of different types of training - [aerobic, anaerobic, sprint, maximal strength, speed and speed endurance etc.]**

# SCIENCE

**“Those who are enamoured of practice without science, are like a pilot who goes into a ship without rudder or compass and never has any certainty of where he is going”.**

**Leonardo de Vinci**

**C.B.**

# ELITE PERFORMERS

## EMIL ZATOPEK

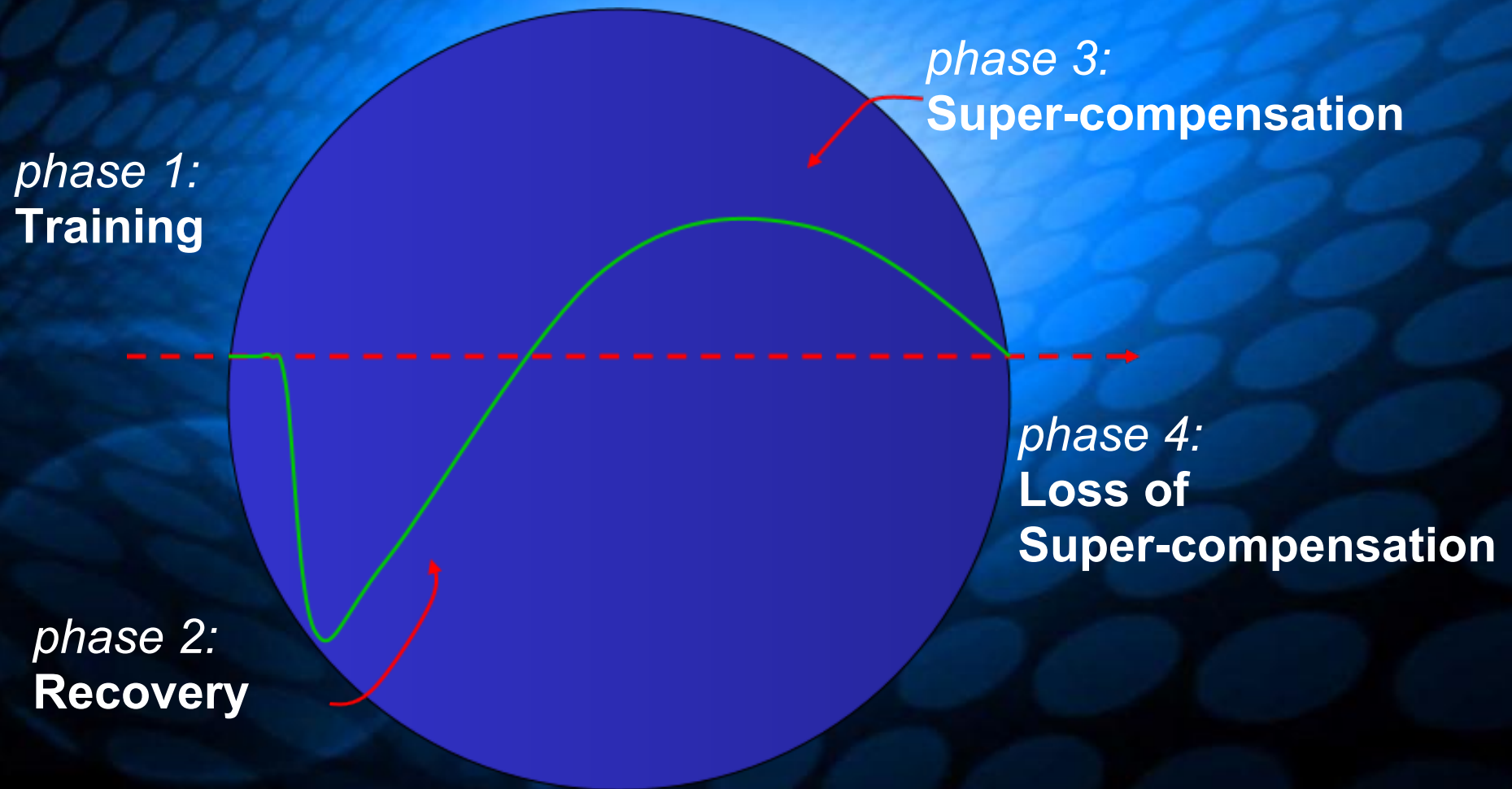


- Czechoslovakia, triple gold medallist at 1952 Olympics in 5000m, 10,000m and marathon.
- Most famous athlete to utilise advanced interval training techniques.
- Modernised training with low volume high velocity training.
- Repeated up to 100 x 400m repetitions per day, interspersed by 200m of recovery run at a pace close to that of hard work.

# THE PURPOSE OF PERIODIZATION

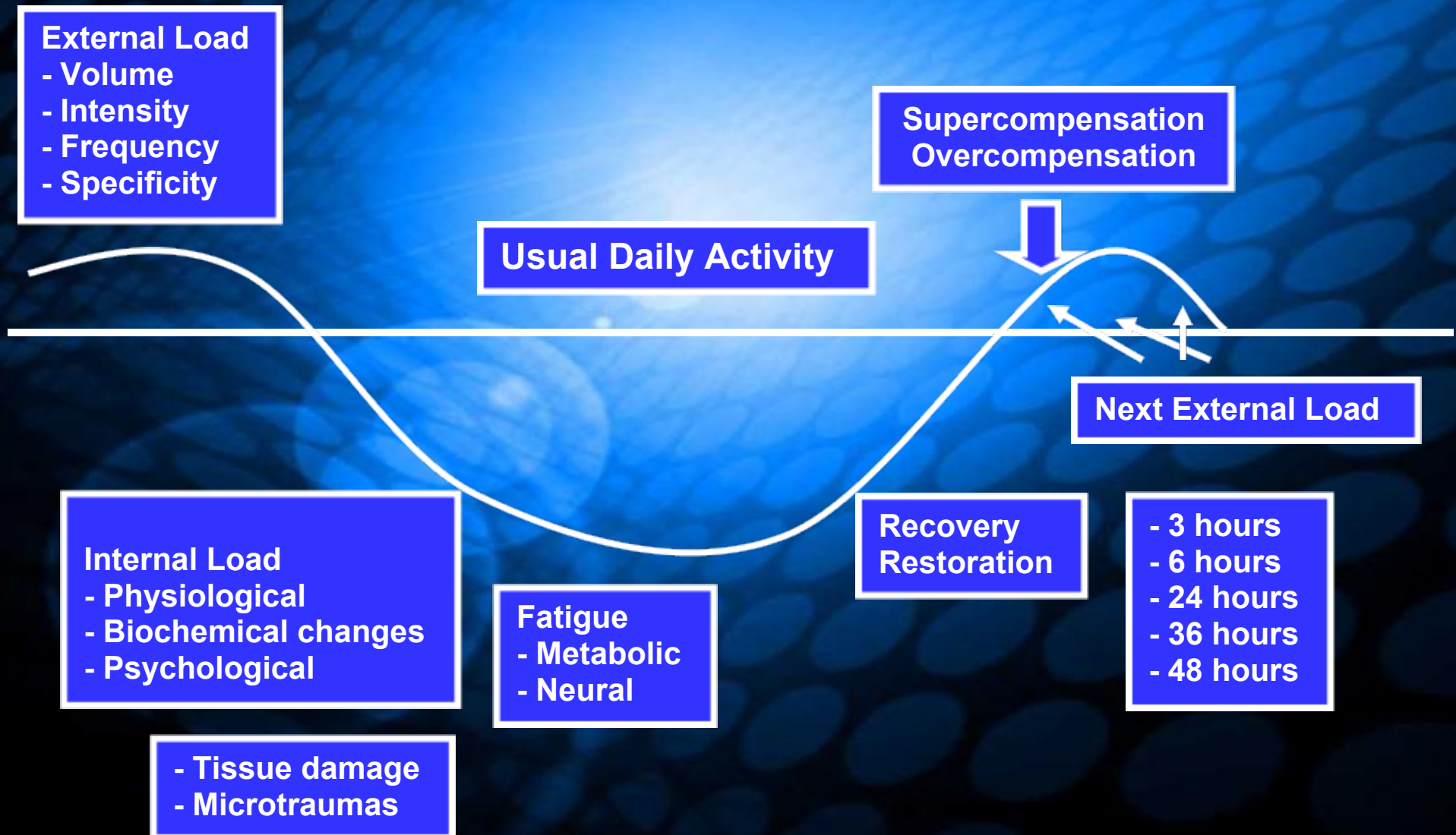
- Continuous stage-like adaptation of the physiological and metabolic systems through progressive overload and to allow these systems and entire organism to recover from the stress of training.
- The construction of a yearly season or macrocycle program requires the alteration of training phases for the purpose of peaking for the competitive season.

# PRINCIPLE OF SUPER - COMPENSATION



*Schematic representation of "the principle of super-compensation"*

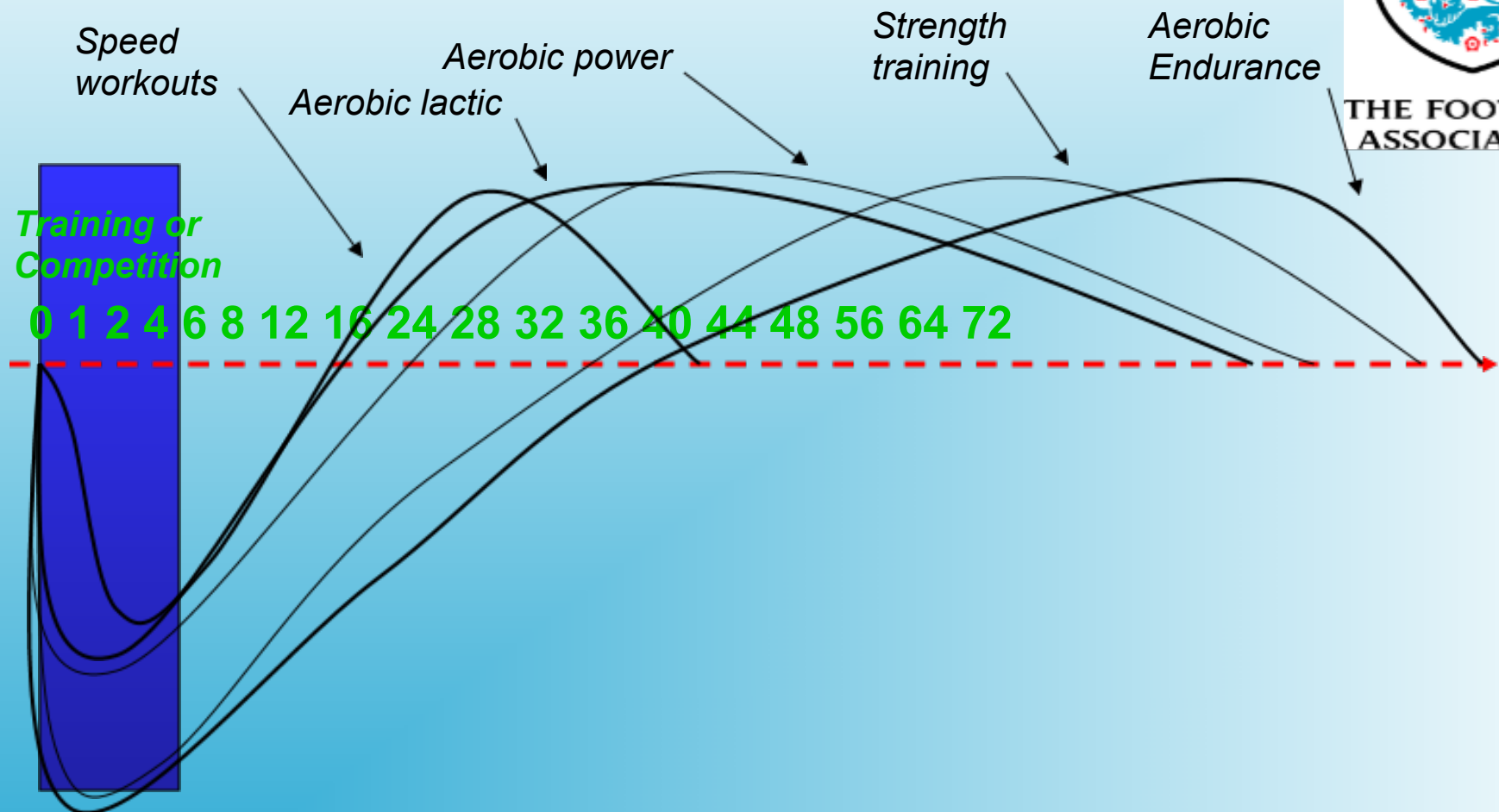
# ADAPTATION TO TRAINING



# Time Required for Complete Recovery (Platanov, 1988)



THE FOOTBALL ASSOCIATION



| Training Types | Speed | Aerobic lactic | Aerobic Power | Strength training | Aerobic endurance |
|----------------|-------|----------------|---------------|-------------------|-------------------|
| From           | 24    | 48             | 48            | 48                | 56                |
| To             |       |                | 56            | 72                | 72                |

Time, expressed in hours, for complete recovery following various types of training inducing high level of fatigue .

# DEFINITION OF KEY TRAINING FACTORS

- **The volume of training** - is the quantitative component of training containing the duration, length or the extent of exercise.
- **The intensity of training** - is the qualitative component of training, containing all training activities performed in a given unit of time.
- **The frequency of training** - refers to the number of training sessions within a given timeframe, e.g., a day or a micro cycle.
- **The specificity of training** - refers to the content or “direction” of training performed during a training session, or a given period of time.

# DEFINITION OF TERMS

- Terminologies differ between countries/sports.
- Macrocycle
  - preparatory period
  - competitive period
  - transition period
- Mesocycles (3-6 microcycles).
- Microcycles (1 week).
- Individual session.

# MACROCYCLE

- Macrocycle is the time span sufficient to lead players towards new, higher level of physical and psychological conditioning.
- Players perform definite succession of training blocks to develop general and specific motor abilities, fitness and technical skill.
- Some blocks of training workloads may be performed simultaneously, but some blocks are not compatible and therefore must be performed successively.
- No individual training regime can induce all the biological adaptations simultaneously - each facet follows a different time course.

# STRUCTURE OF MESOCYCLE

- Each Macrocycle consists blocks – mesocycles or periods of training.
- Recovery and Transitional Mesocycle - usually after the break of the season and in the middle of the season (after “winter” season).
- Pre-Competitive Mesocycle.
- Basic Training Mesocycle.
- Specific Training Mesocycle.
- Competitive Mesocycle.

# STRUCTURE OF MESOCYCLE

- Mesocycles - training units aiming to develop 1-2 objectives of preparation - work capacities.
- The duration of mesocycle should be long enough to provide stable long-term adaptation of targeted physiological functions and motor abilities - usually not shorter than 2-3 weeks.
- The qualitative parameters of training should in the same mesocycles improve from macrocycle - macrocycle

# STRUCTURE OF MICROCYCLE

- A limited number of training & rest days
- Structure
  - 6:1, 5:2, 4:1, 3:1, 2:1
- Microcycle usually includes:
  - 3-5 workouts pursuing the main objective of training in the given mesocycle;
  - 2-3 workouts for development or maintenance of the other motor abilities;
  - 1-3 recovery workouts and rest periods.

# STRENGTH v ENDURANCE

- General consensus - incompatibility of these training modes.
- However, Hickson et al (1988)
  - added heavy resistance training to the training of runners/cyclists already at a steady state
  - 3 days/week for 10 weeks led to 30% increase in leg strength, no change muscle fibre areas or citrate synthase activities.
  - $\text{VO}_{2\text{max}}$  unchanged and no change in long-term running but cycling to exhaustion increased
  - short-term endurance up 11-13%.
  - no negative performance effects, but endurance performance requiring fast twitch fibre recruitment can be improved.

# KOREAN NATIONAL TEAM



- Explosiveness – (2 x 8) 10m sprints with 30 sec rec.
- Extensive Endurance – (3 x 10 min) 10 v 10 (80 – 90% H.R. max).
- Extensive Interval – (6 x 3 min) 3 v 3 (95% H.R. max).
- Repeated Sprints – (2 x 6) 15m sprints with 10 sec rec.
- Intensive Endurance – (5 x 8 min) 7 v 7 (90 – 95% H.R. max).

# PROGRESSION – POWER PYRAMID

- Seven floors
  - strength endurance (3x10, 50% 1RM)
  - base strength (4x4, 80%1RM)
  - power ex (multi hops, skips)
  - absolute strength (4x1, 1RM)
  - heavy power (Olympic lifts)
  - dynamic power (explosive hops, bounds, vertical jumps)
  - speed and quickness ex
- The next schedule of exercises potentiates the action of the previous one



# SEQUENCING OF ACTIVITIES

- Training sessions
  - Uni-directional training session
  - Multi-directional training session
- Microcycles
  - Block-loading
  - Mixed-loading
  - Quality should always come first
  - Anaerobic “alactic” and skill before anaerobic “lactic” or aerobic training
  - Anaerobic lactic before aerobic
  - Higher quality aerobic before lower quality aerobic training (interval, aerobic interval, Fartlek, LSD)
  - Identify the specific objectives if order is changed.

# TRAINING ALTERNATIVES

- Qualities that cannot be improved in a state of fatigue:
  - Pure speed
  - Acquisition/refinement of new motor skills (technique)
  - Speed-strength
  - Maximal strength
- Qualities that can be improved in a state of low fatigue:
  - Speed-endurance (lactic power)
  - Strength-endurance
  - Skill (if the objective is to stabilize technical skills under a variety of conditions).

# TRAINING ALTERNATIVES

- Qualities that can be improved in a state of moderate fatigue:
  - Lactic capacity
  - Aerobic power
  - Aerobic capacity
  - Skill (if the objective is to stabilize technical skill under a variety of conditions, i.e. simulating final minutes of a match, or the last gates of a slalom run etc)
- Qualities that can be improved in a state of moderate to high fatigue
  - Aerobic Capacity
  - Flexibility (???)

# TRAINING ALTERNATIVES

- This timing is critical when subsequent loadings are applied at the peak of supercompensation.
- Application of the next training load too early or too late does not have the desired effect of progression
- Progressive Overload - by increasing volume, duration or intensity but only one at a time by no more than 10% per week the athlete can create an overload the body can cope with.

# ADAPTATION

- To induce adaptation training should be modified by:
  - training volume
  - training intensity
  - frequency per week of training units or intensive workouts
- Changing the proportion of training sessions
- Environmental conditions or by □ the regenerative training between intensive workouts
- A combination of changes
- The time required for adaptation depends upon
  - (a) the complexity of the skill
  - (b) the physiological/psychological difficulty

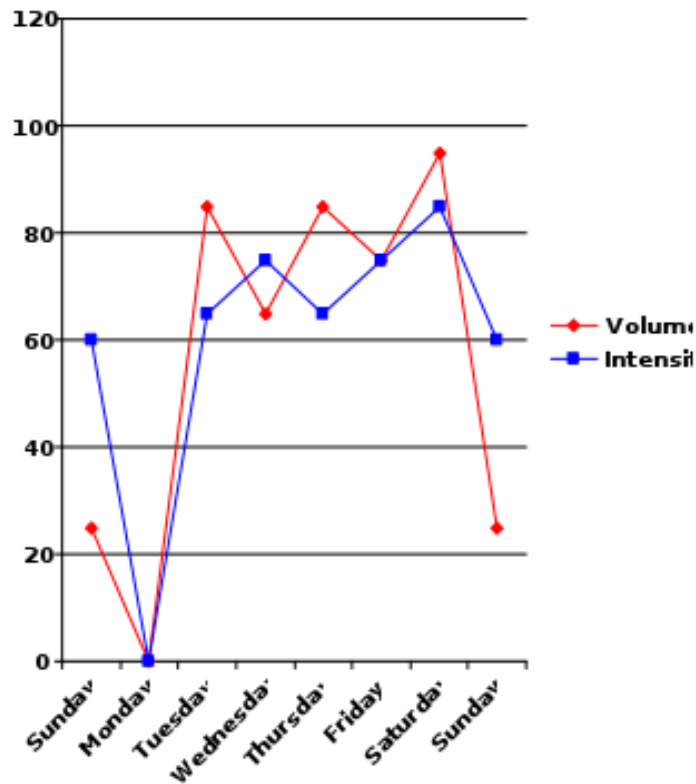
# GROUP TASKS

- Plan Blackburn Rovers Pre-Season incorporating Intertoto Cup.
- Plan Blackburn Rovers Pre-Season without incorporating Intertoto Cup.
- Assess practical Speed Plan.
- Assess Juventus training week.
- Assess P.S.V. Training week.
- Assess C.C.F.C. Academy training week.
- Assess A.C. Milan pre-season plan.
- Assess Chelsea pre-season plan.

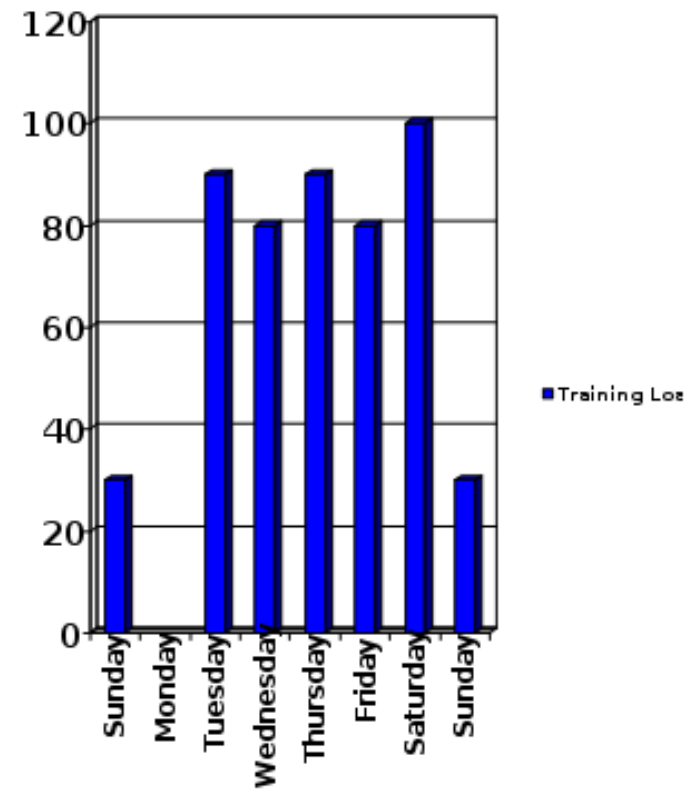
# General Preparation Microcycle

(Team Sports - Early Pre-Season Microcycle)

## Volume and Intensity of Training In Percentage



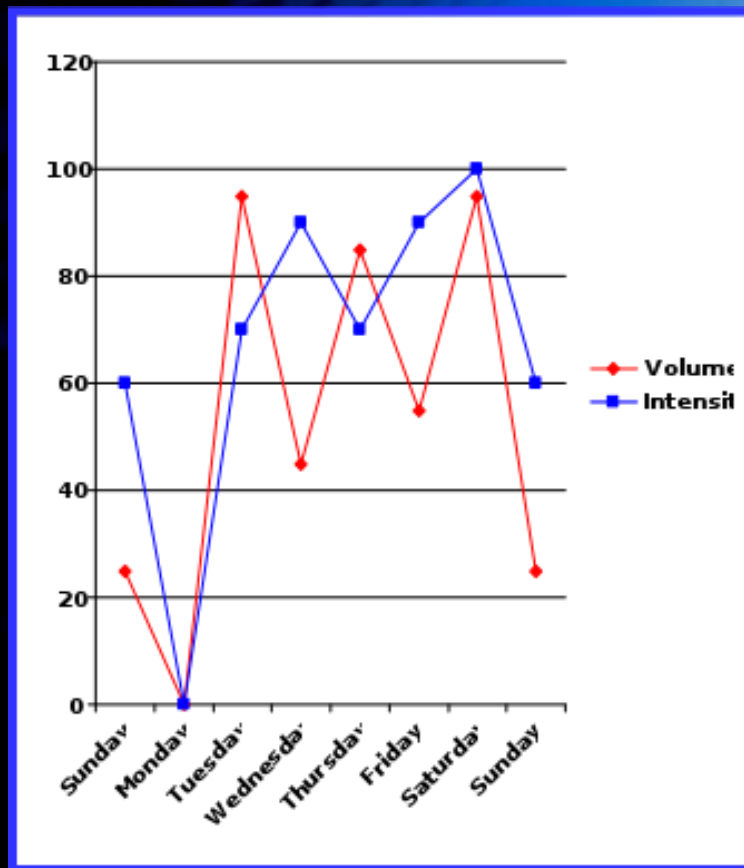
## Training Load In Percentage



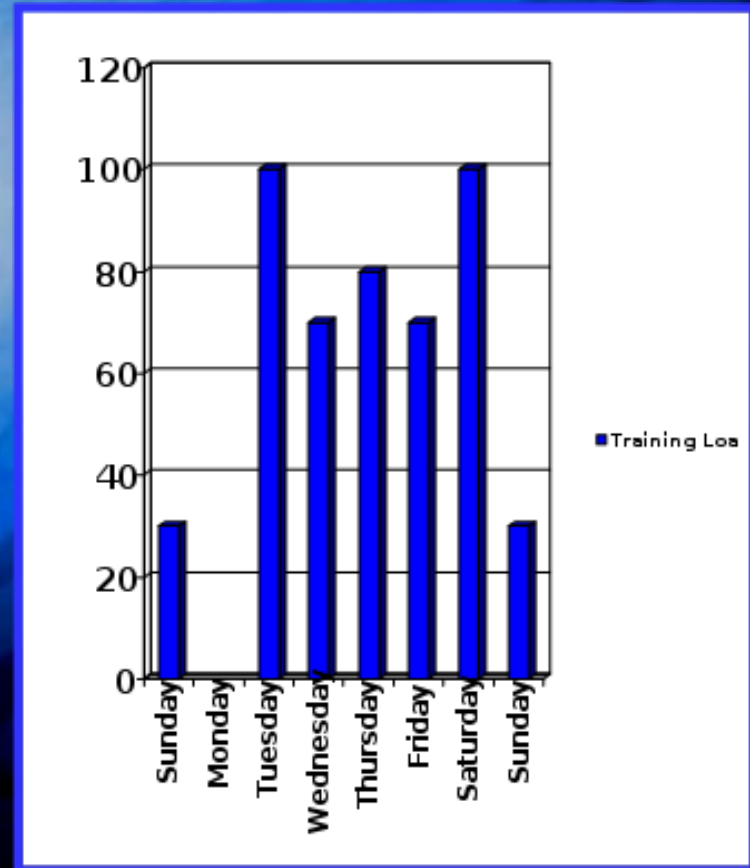
# Specific Preparation Microcycle

(Team Sports - Mid-Pre-Season Microcycle)

## Volume and Intensity of Training In Percentage



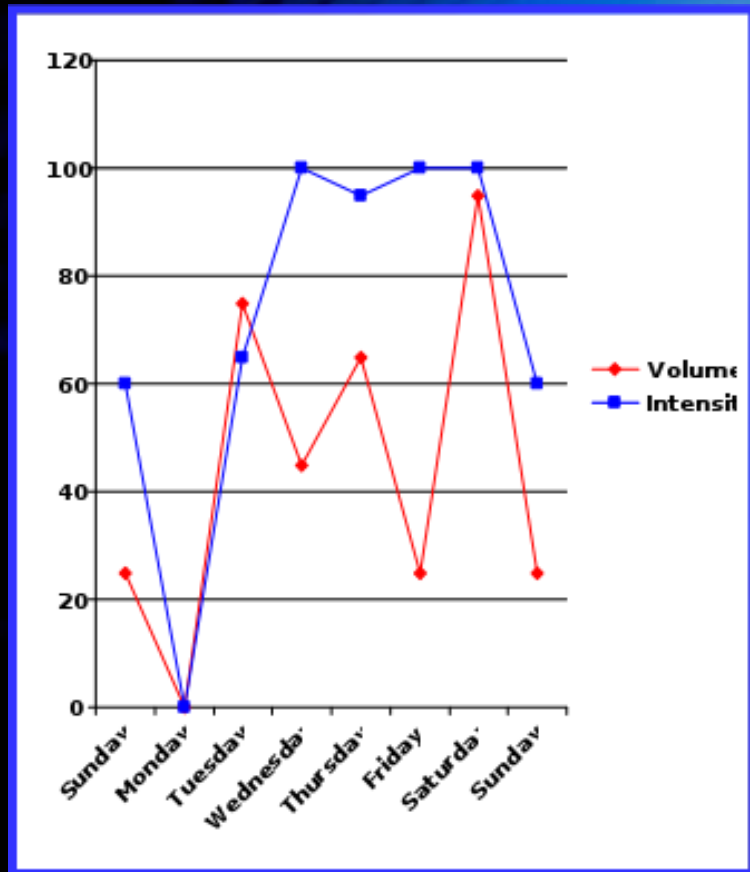
## Training Load In Percentage



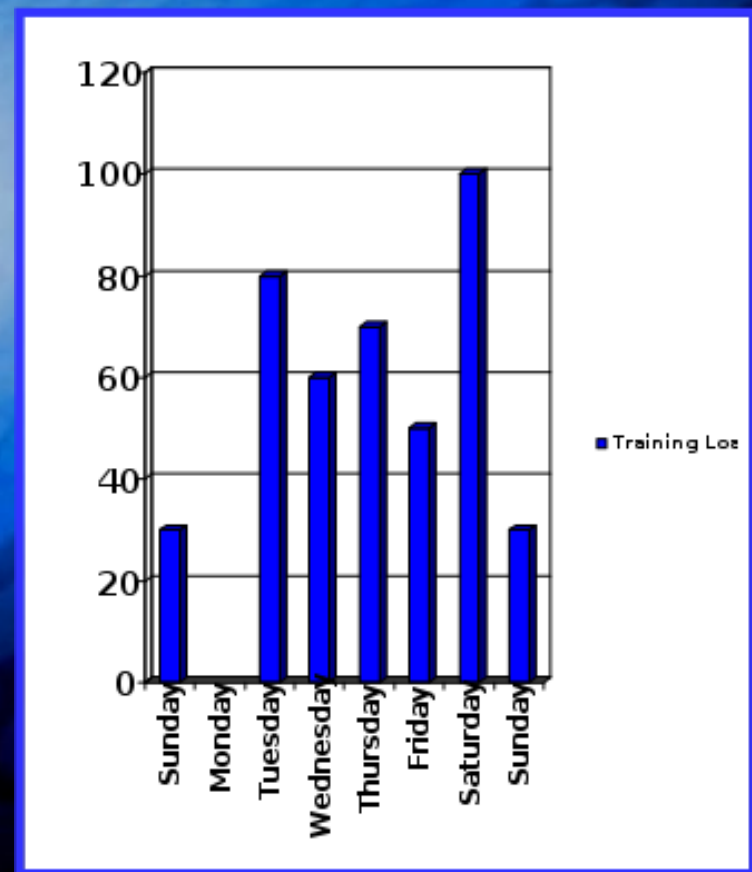
# Pre-Competition Preparation Microcycle

(Team Sports - Late-Pre-Season Microcycle)

## Volume and Intensity of Training In Percentage



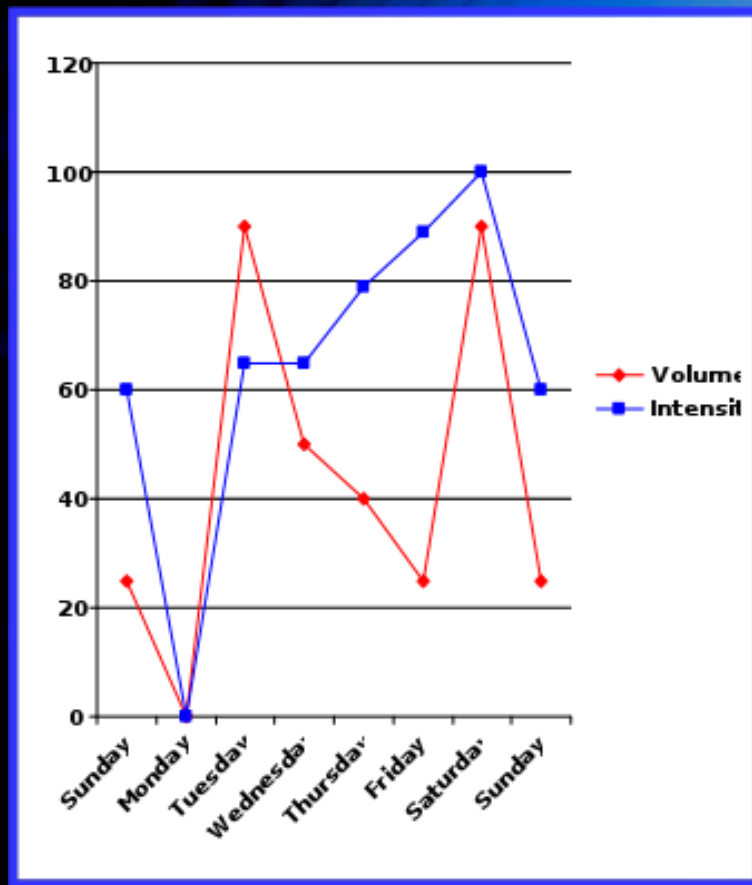
## Training Load In Percentage



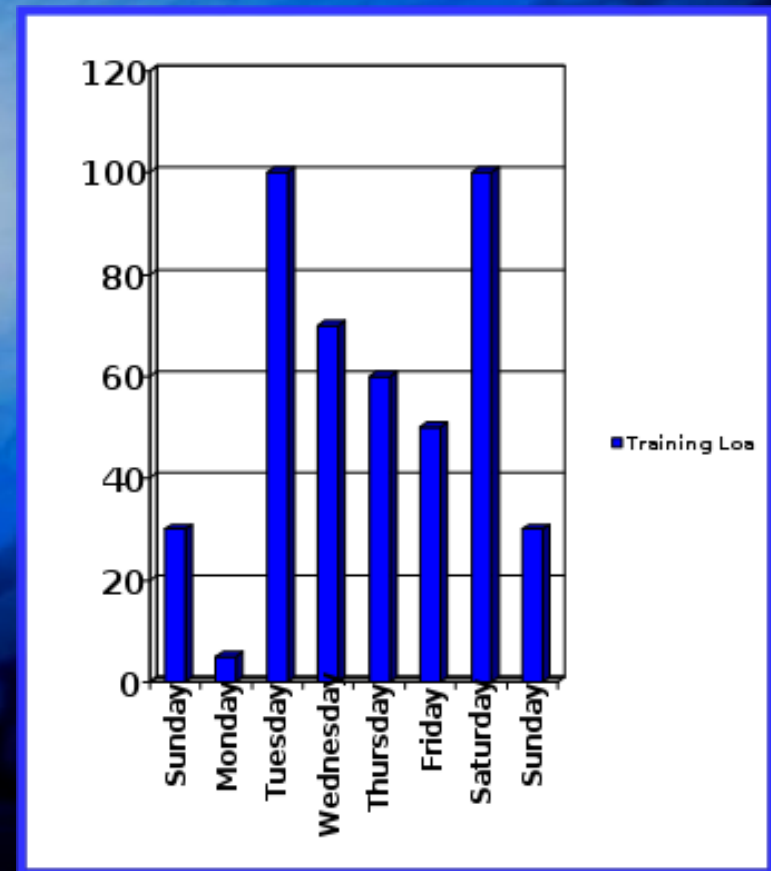
# Competition Microcycle

(Team Sports – In Season Microcycle – Weekend Match)

## Volume and Intensity of Training In Percentage



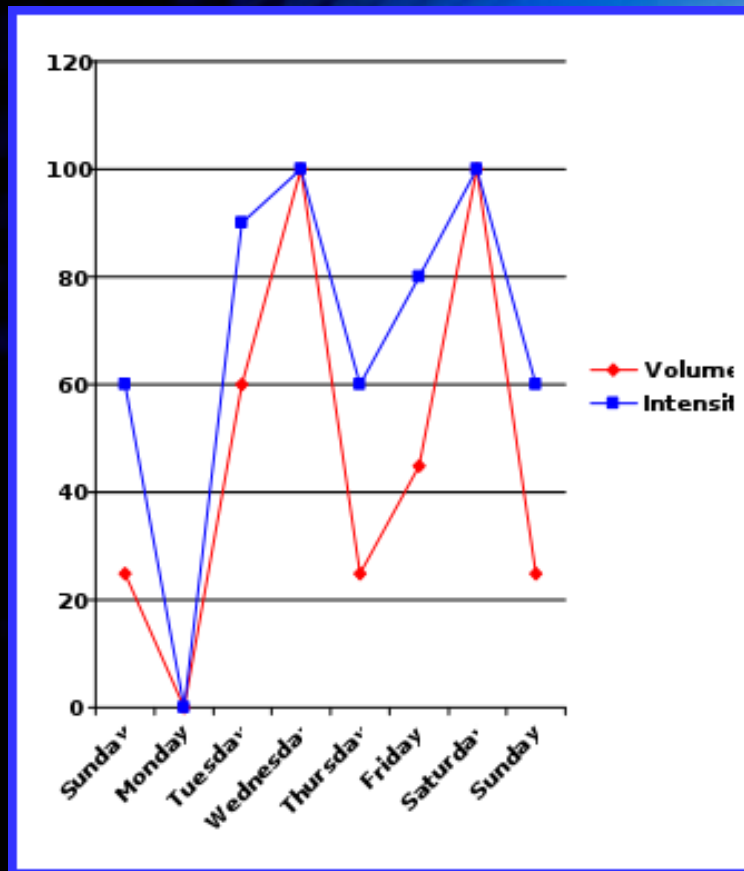
## Training Load In Percentage



# Competition Microcycle

(Team Sports – In Season Microcycle – Mid-Week and Weekend Match)

## Volume and Intensity of Training In Percentage



## Training Load In Percentage

