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.

ROAD ..\Road To Paris.mpgTO PARIS

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

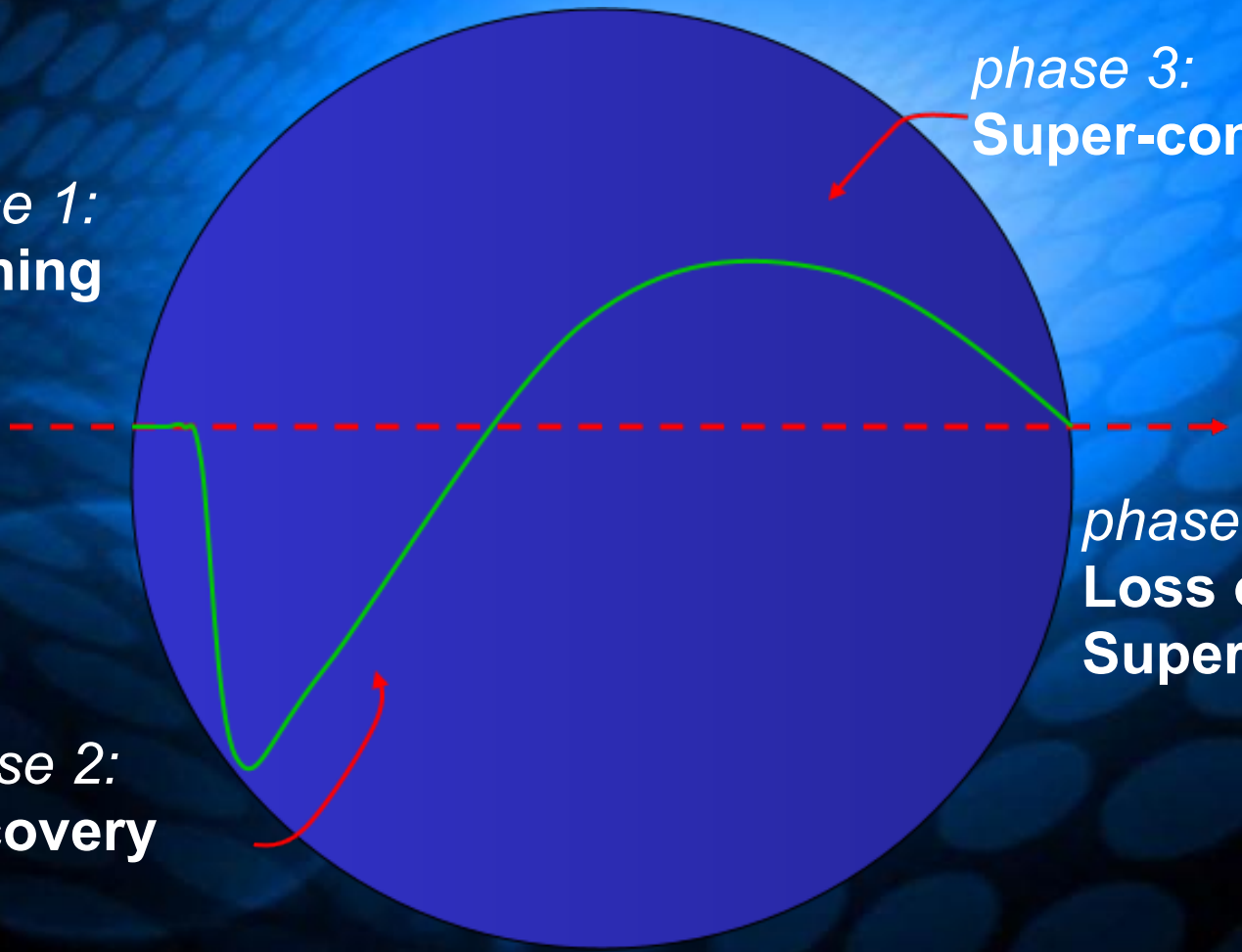
- Czechoslovakia, triple gold medallist at 1952 Olympics in 5000m, 10,000m and marathon.
- Most famous athlete to utilise advanced interval training techniques.
- Modernised training with low volume high velocity training.
- Repeated up to 100 x 400m repetitions per day, interspersed by 200m of recovery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

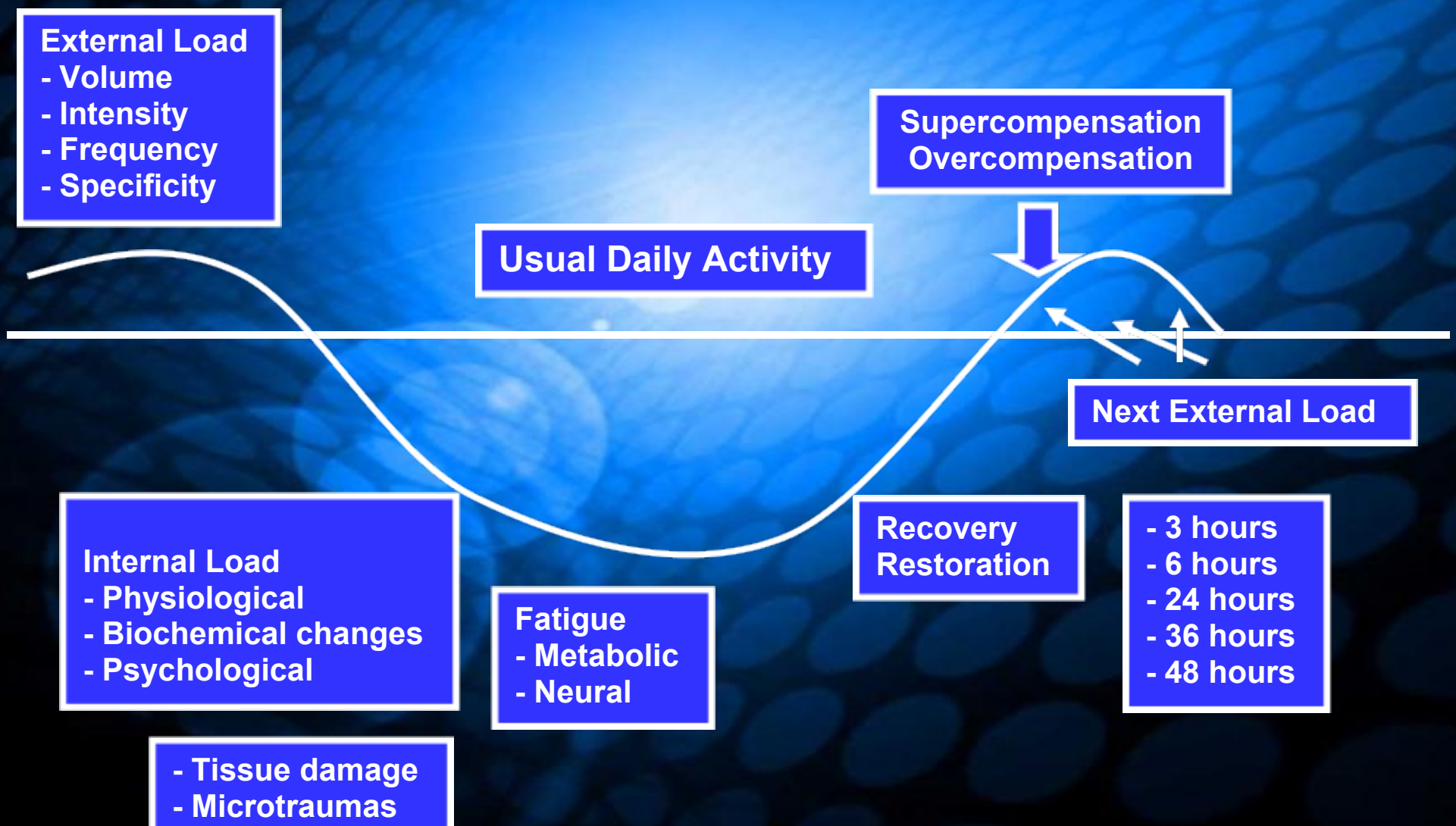
- The construction of a yearly season or macrocycle program requires the alteration of training phases for the purpose of peaking for the competitive season.

PRINCIPLE OF SUPER - COMPENSATION

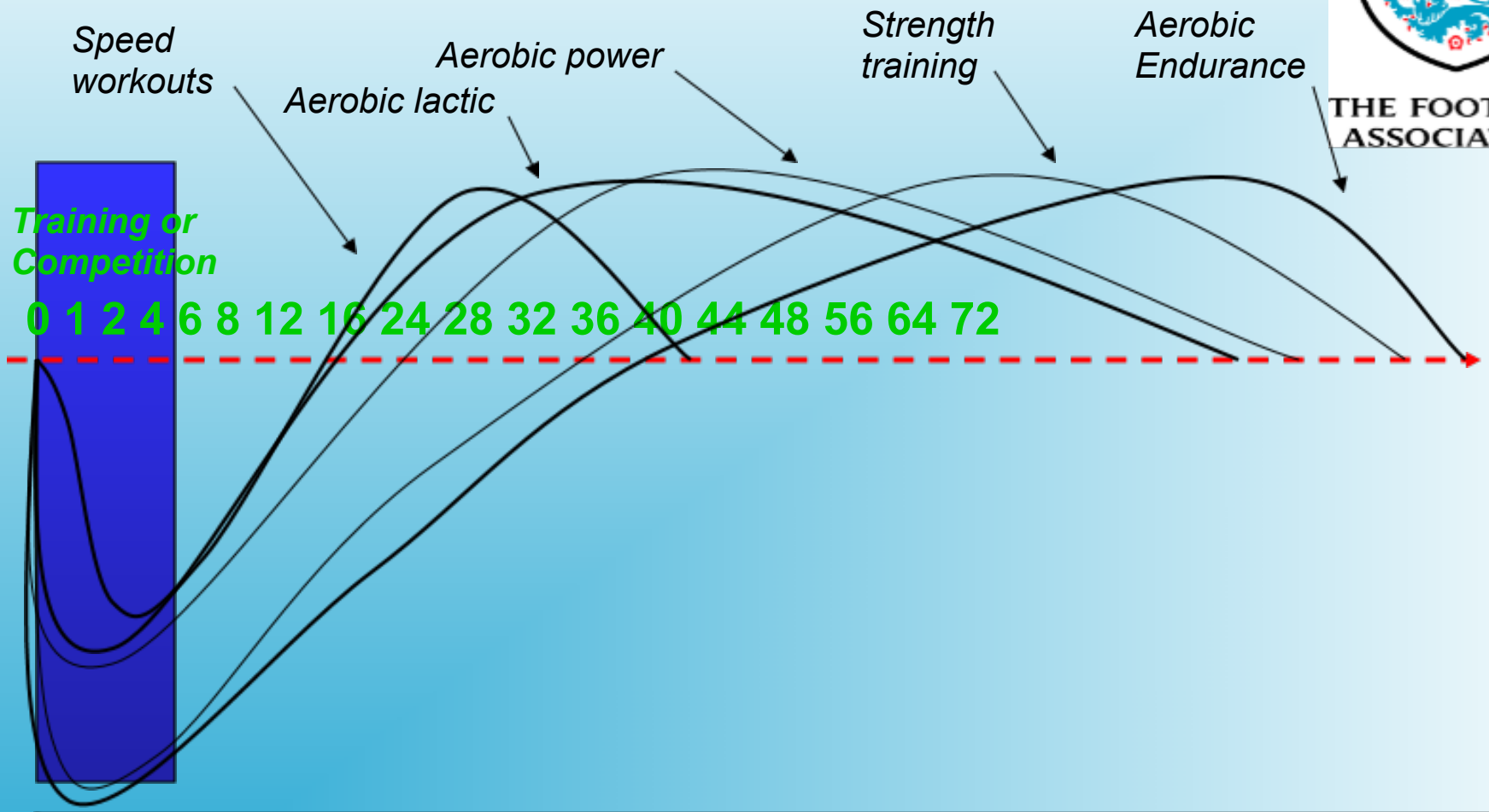


Schematic representation of "the principle of super-compensation"

ADAPTATION TO TRAINING



Time Required for Complete Recovery (Platanov, 1988)



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.
  - VO_{2max} 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

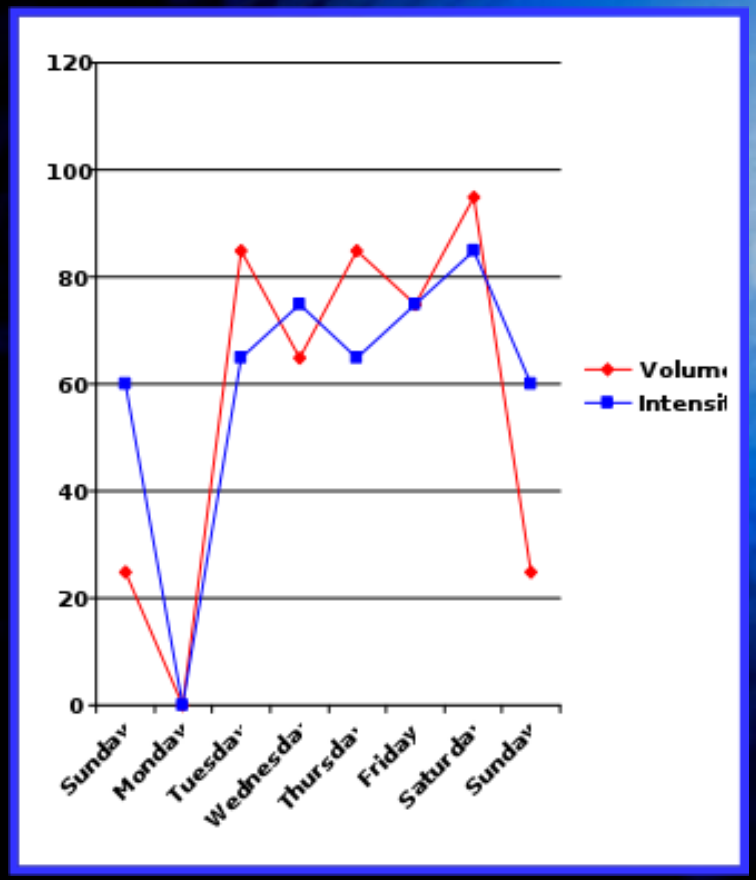
GROUP TASKS

- 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.

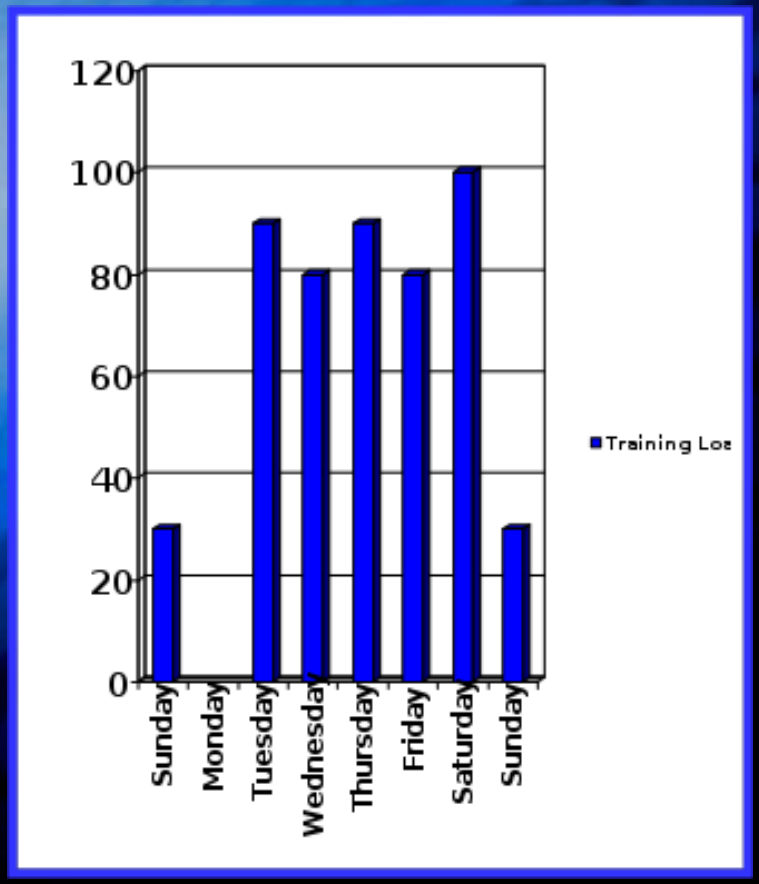
General Preparation Microcycle

(Team Sports - Early Pre-Season Microcycle)

Volume and Intensity of Training In Percentage



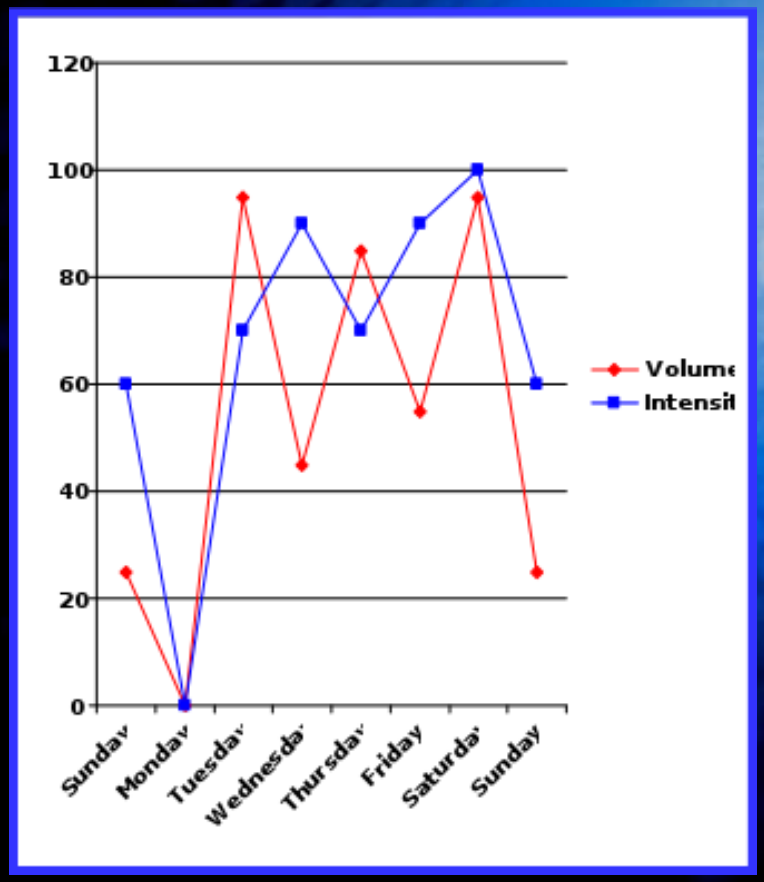
Training Load In Percentage



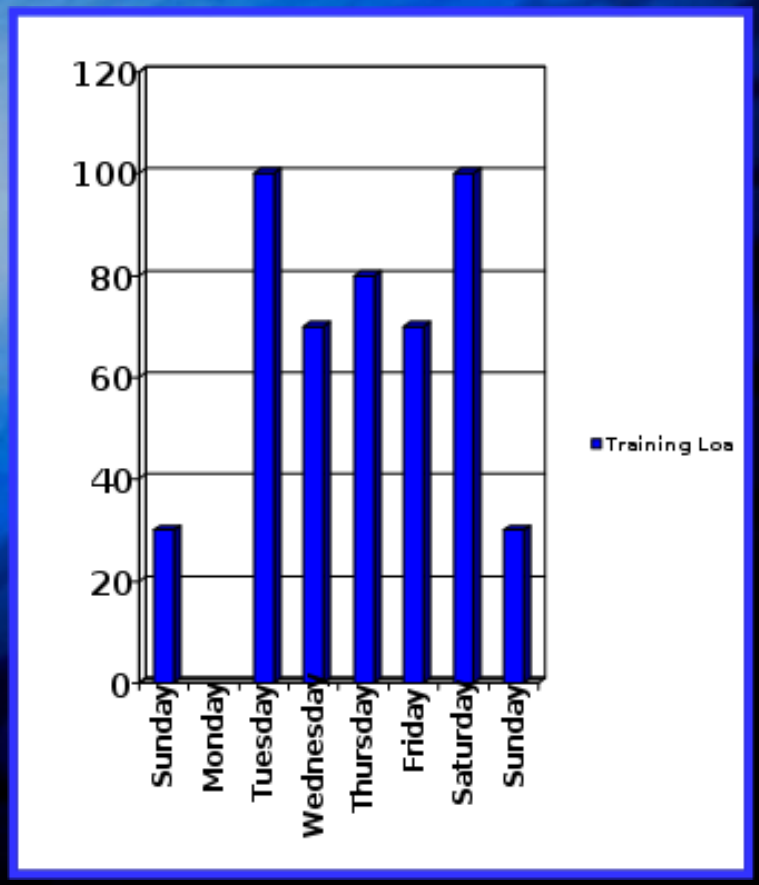
Specific Preparation Microcycle

(Team Sports - Mid-Pre-Season Microcycle)

Volume and Intensity of Training In Percentage



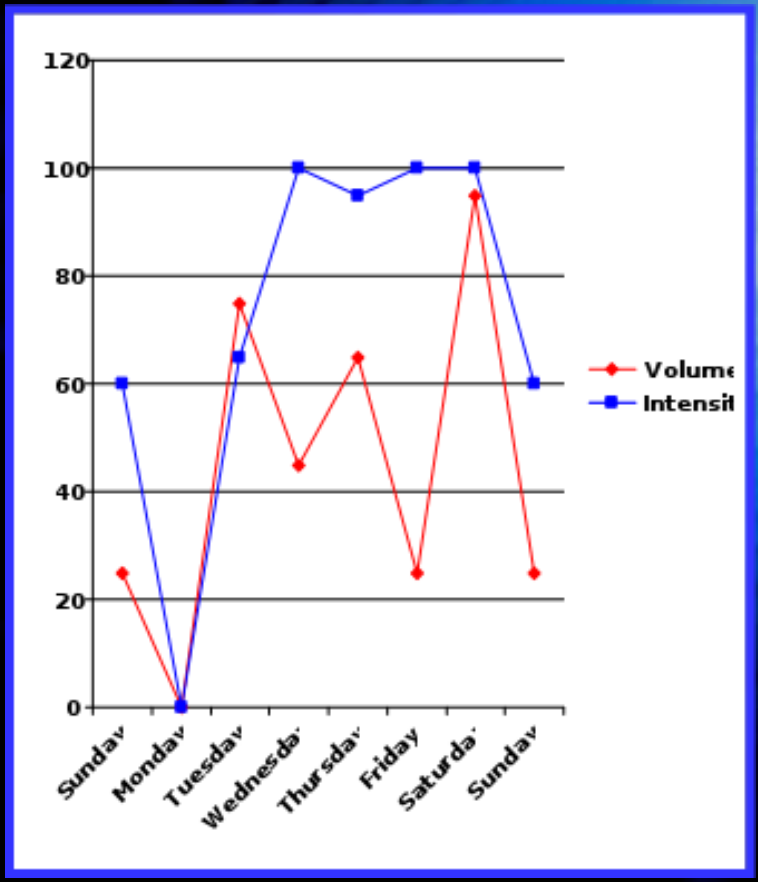
Training Load In Percentage



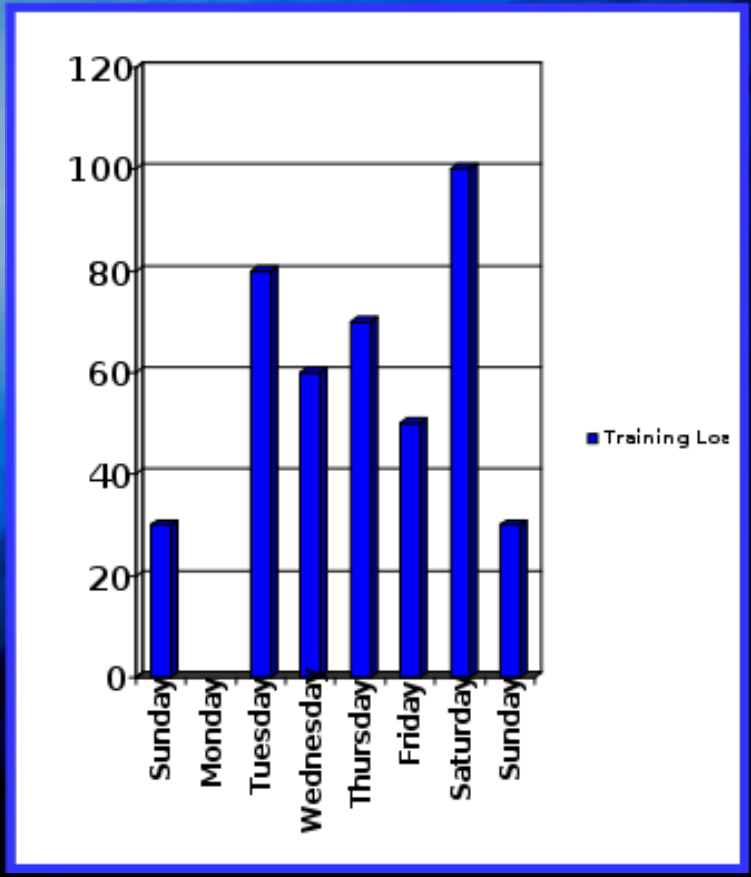
Pre-Competition Preparation Microcycle

(Team Sports - Late-Pre-Season Microcycle)

Volume and Intensity of Training In Percentage



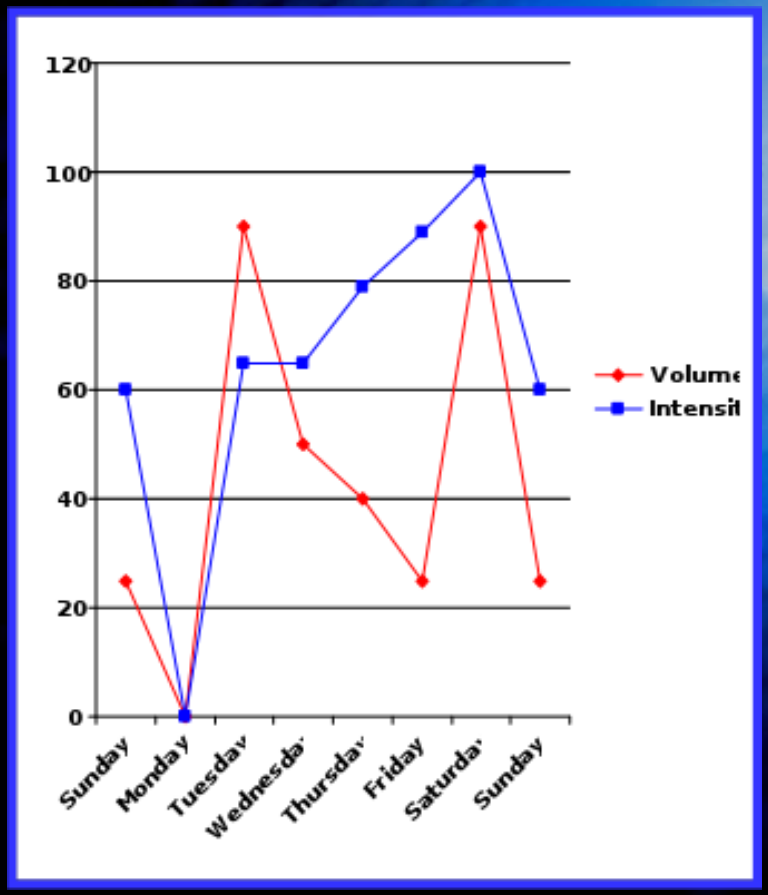
Training Load In Percentage



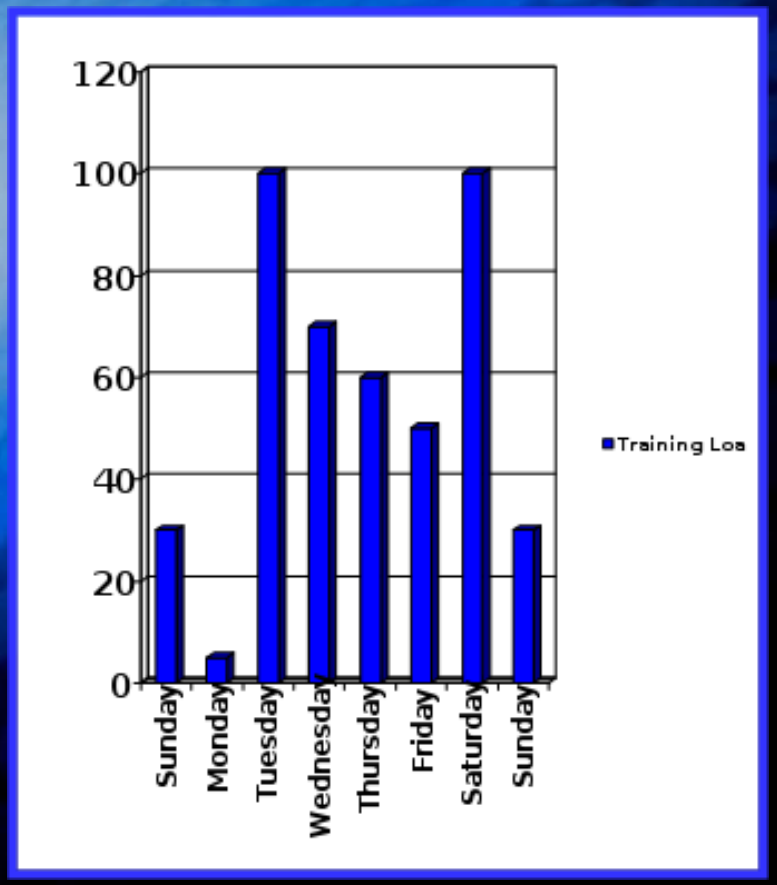
Competition Microcycle

(Team Sports – In Season Microcycle – Weekend Match)

Volume and Intensity of Training In Percentage



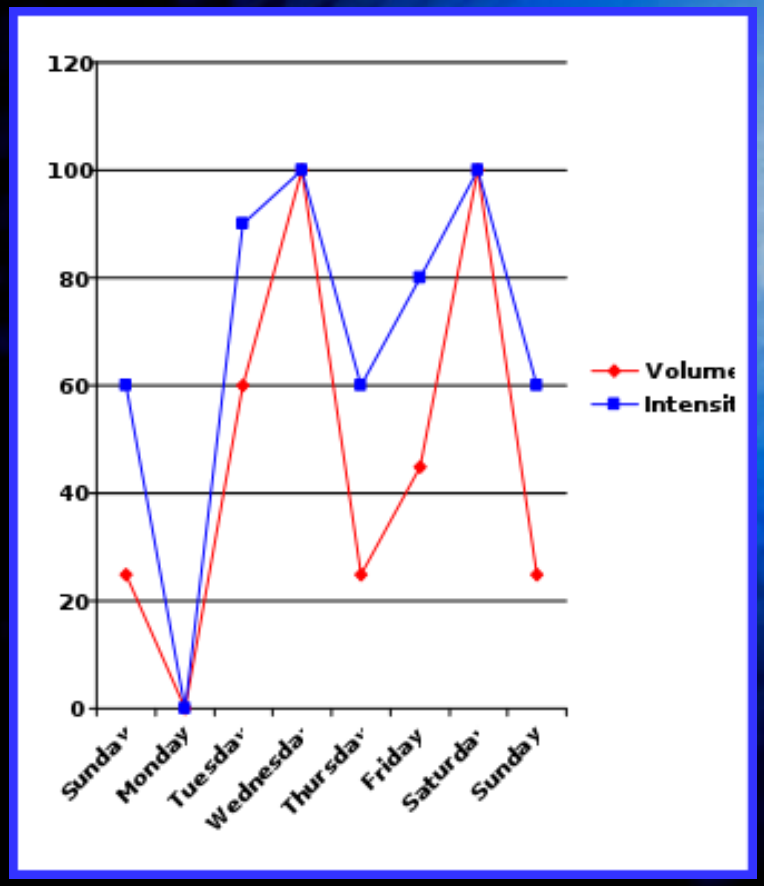
Training Load In Percentage



Competition Microcycle

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

Volume and Intensity of Training In Percentage



Training Load In Percentage