



CITYU SCOPE

RUNNING CLASS

2017-2018

Coach: Wong Tak Shing

Goals for Running

- Just for **health & fitness**
- Just to **finish** the race
- To achieve **personal best**
- To obtain **medals**

Singer (1986, p. 31)

- “If you don’t know where you’re going, it is difficult to select a suitable **means** of getting there.”



What is Training?

Klafs & Arnheim (1981)

- Training is a systematic process of **repetitive** and **progressive** exercise of work.
- Through systematic training and constant repetition, movements become more automatic and require less concentration by the higher nerve centers.
 - As a result, the amount of **energy** expended is **reduced**.



How to Train?

- **What** to train?
 - **Running**, cycling, swimming, weight training
- **How much?**
 - More is better?
 - Practice makes perfect?
- **How hard?**
 - No pain, no gain?



More is Better?

Grand, et al. (1984)

- Mileage↑ ⇒ Performance↑ (but, $r^2 = 0.1444$)
- 74% of runners who trained an average of **60 km/week** claimed that they had different degrees of overuse injuries.

Fredericson, et al. (2007)

- Risks of running injuries significantly increase when the weekly mileage **exceeds 40 miles (64 km)**.

Practice Makes Perfect?

Vernacchia, McGuire & Cook (1992, p. 105)

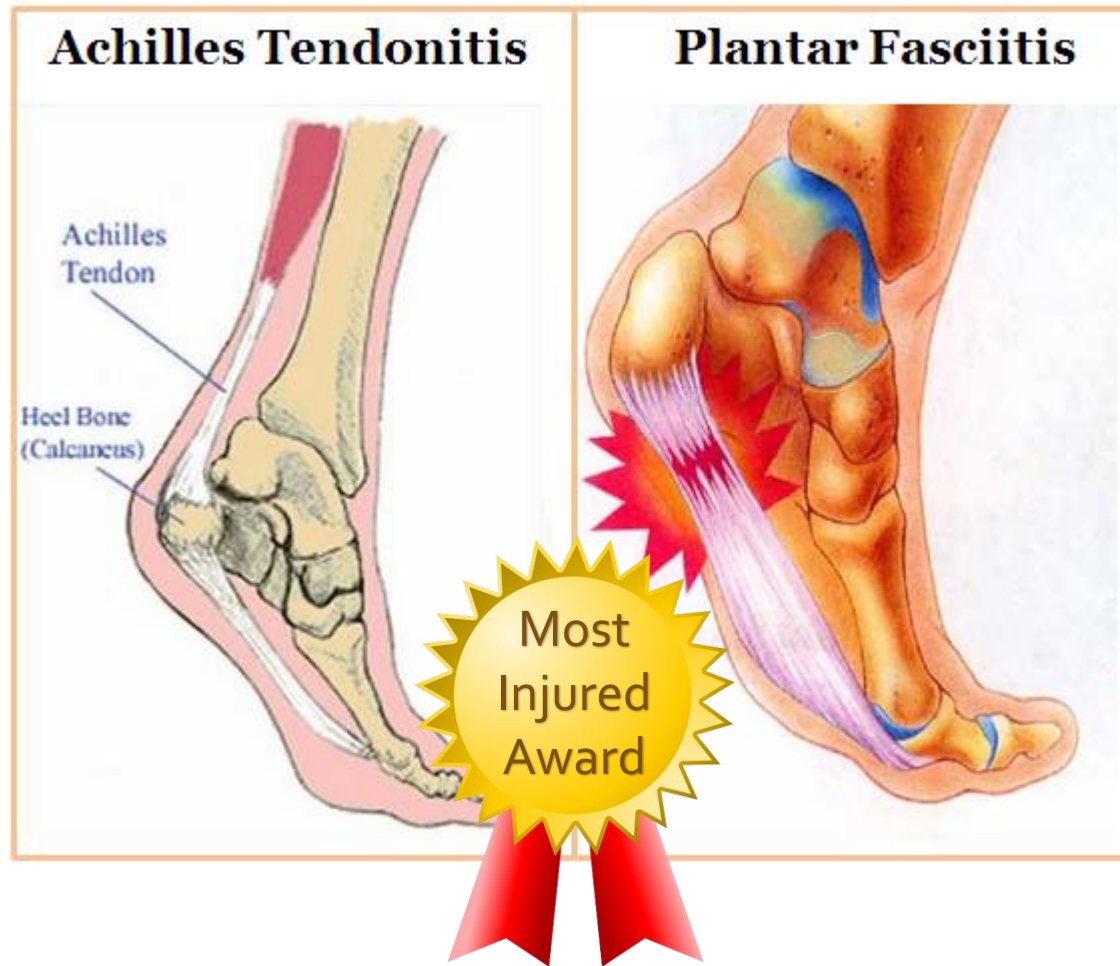
- “Practice **does not** make perfect; **perfect, planned, purposeful** practice makes perfect.”



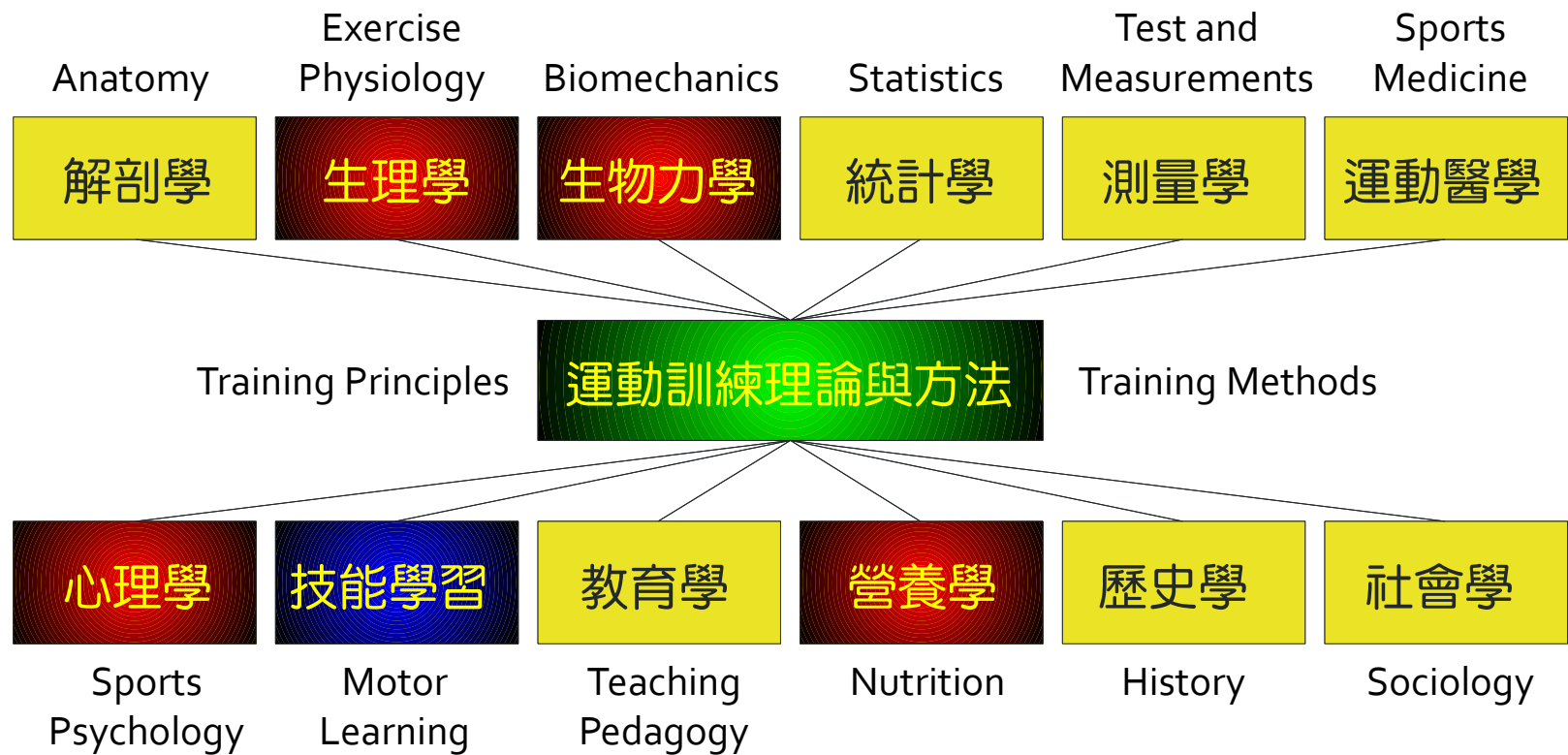
No Pain, No Gain?



No Pain, No Gain?

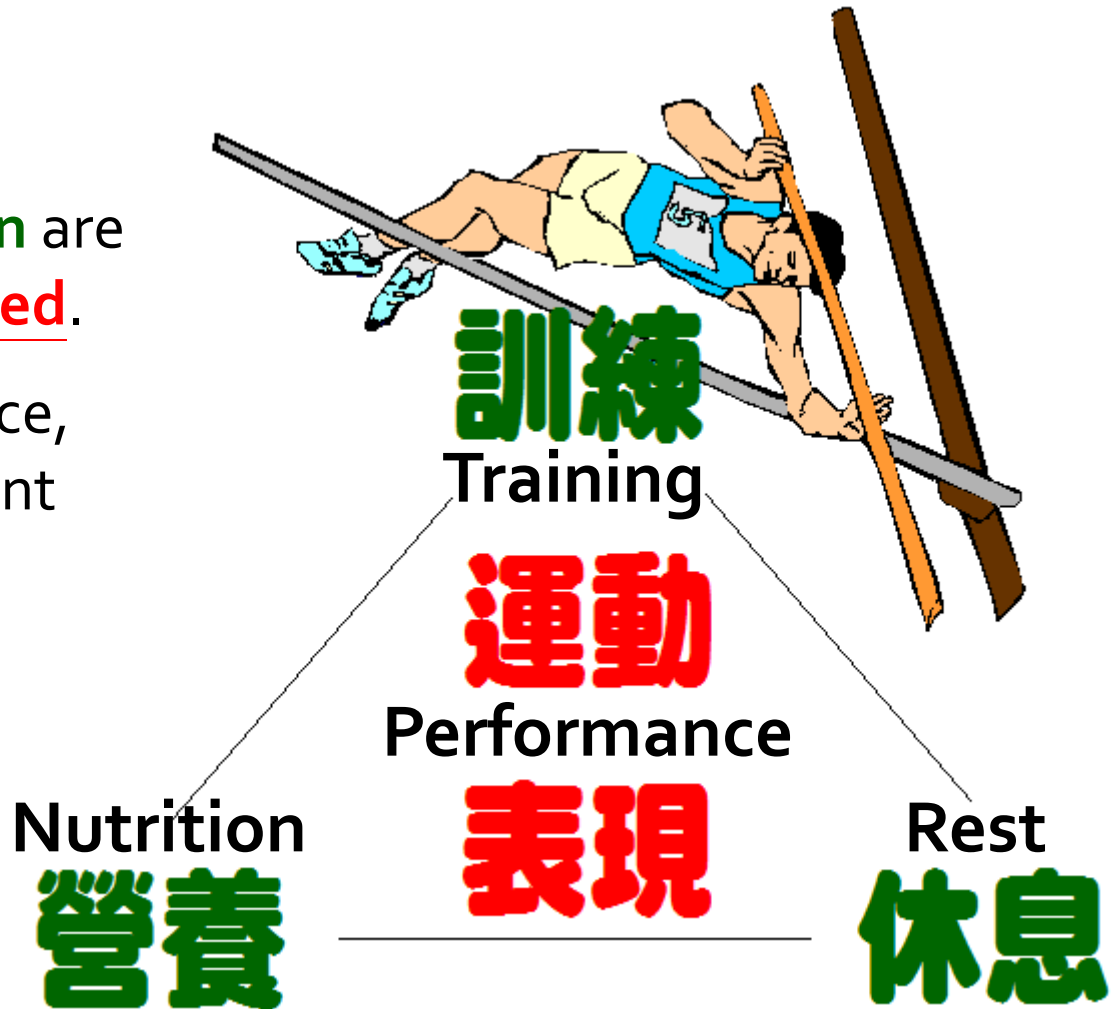


The Scientific Basis of Training



The Scientific Basis of Training

- **Rest** and **nutrition** are too often neglected.
- The longer the race, the more important is **nutrition**.



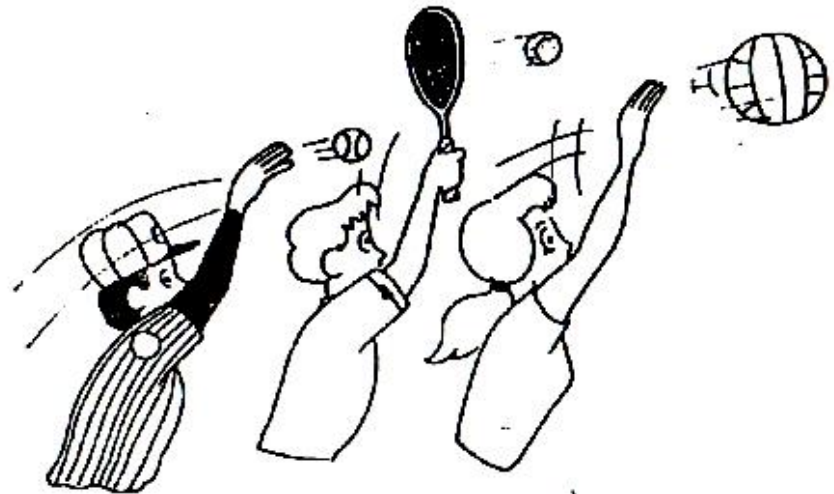
The Scientific Basis of Training

- **Sports Psychology**

- **Psychological skills:** goal setting, arousal management, concentration & relaxation, imagery, building up confidence, ...
- **Cognitive strategies:** association and dissociation

- **Motor Learning**

- Acquisition of skills
- Transfer of learning



The Scientific Basis of Training

- **Biomechanics**
 - Analysis of **running skills**
 - Running economy
 - Wind resistance & equipment



The Scientific Basis of Training

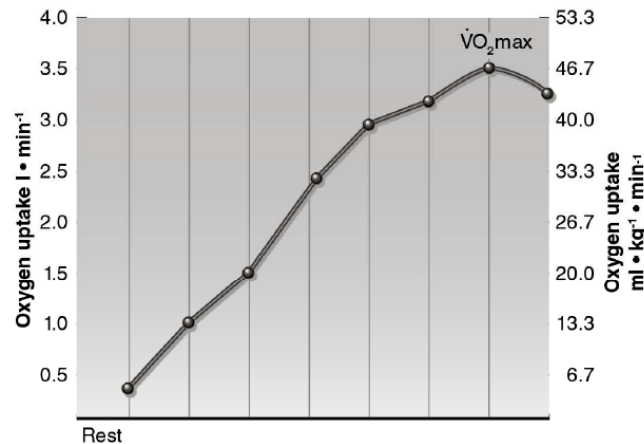
- **Nutrition**

- Energy systems of the human body
- Balanced diet & weight control
- **Water replacement** and **fuel supply** during training and competition
- **Pregame meal** & carbohydrate loading



The Scientific Basis of Training

- Exercise Physiology
 - Principles of Training
 - Training Methods



Exercise on the treadmill

Speed km/h	4.8	8.0	11.2	11.2	11.2	11.2	11.2
Treadmill grade, %	0	5.5	7.5	9.5	11.5	13.5	15.5
Time, min	0-2	2-4	4-6	6-8	8-10	10-12	12-14



Mo Farah – London Olympics 2012 5000 m Final



Body Position

- Upper body erects, without leaning too much to the front.
- Eyes look forward at a distance far away.
- Face and neck muscles relax.

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Drive and Swing

- As the swinging leg moves forward and upward, the driving leg impulsively extends its hip joint, followed by the knee and ankle joints.

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Drive and Swing

- Finally, push-off the ground with the toes.

Mo Farah – London Olympics 2012 5000 m Final



Drive and Swing

- The lower leg of the swinging leg should be relaxed all the time, hanging loosely from the knee.
- At the end of the drive phase, the driving leg (i.e., the support leg) extends almost completely

Mo Farah – London Olympics 2012 5000 m Final



Recovery

- As the driving leg breaks ground-contact, the heel of this foot rises towards the hip.
- The knee of the other leg (i.e., the swinging leg) has to relax, getting ready for the landing.

Mo Farah – London Olympics 2012 5000 m Final



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Landing and Support

- The foot forward of the body should make ground-contact (with knee slightly bent) within 30 cm in front of the projection of the body's centre of gravity

Mo Farah – London Olympics 2012 5000 m Final



Landing and Support

- The outer edge of the ball of the foot makes ground-contact first.
- Immediately afterward, the foot rolls inward and the heel comes to the ground to bear the full weight of the body, preparing for the drive.

Remarks:

1. The ground-contact can also be made with flatted foot.
2. Do not deliberately avoid the heel from touching the ground.

Mo Farah – London Olympics 2012 5000 m Final



Landing and Support

- The knee of the supporting leg is slightly bent when the foot rest flat on the ground.
- The swinging leg should be flexing towards the hip as it advances forward.

Mo Farah – London Olympics 2012 5000 m Final



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Mo Farah – London Olympics 2012 5000 m Final



Arm Movement

- Hold the fists lightly, with the thumbs resting on the index fingers.
- Elbows bend at 90 degrees or smaller.

Mo Farah – London Olympics 2012 5000 m Final



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Arm Movement

- Arms keep close to the body.
- Shoulders and chest should be relaxed, and arms should be swinging naturally just to counterbalance the momentum of the leg movements.

Mo Farah – London Olympics 2012 5000 m Final



Arm Movement

- No forceful arm actions should be emphasized.

Landing

Lieberman, et al. (2010)

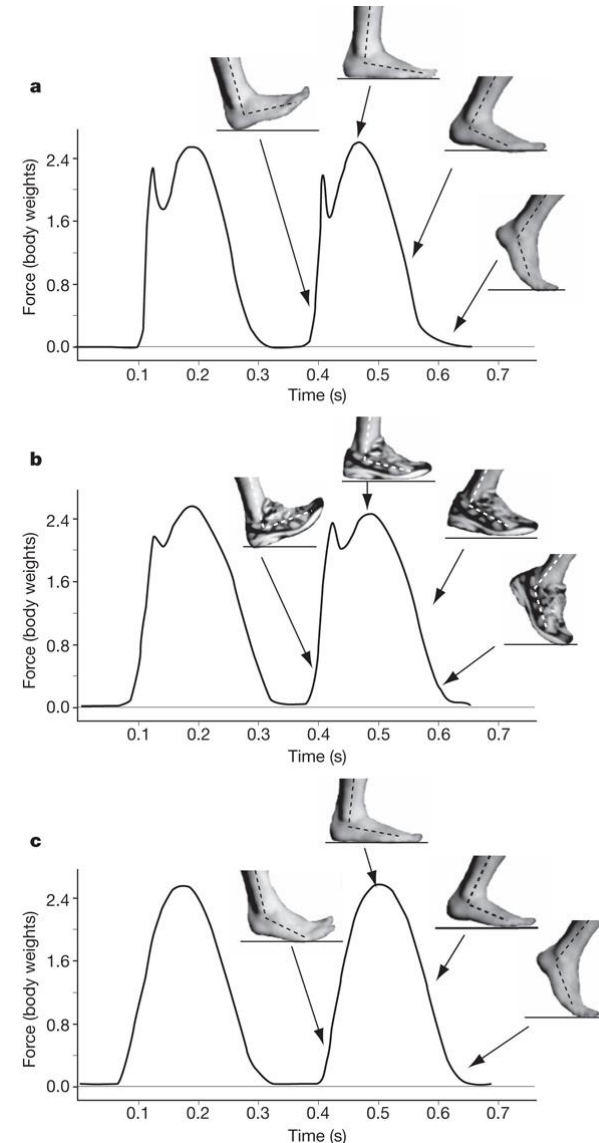
1. Rear-foot (heel) strike , RFS
2. Mid-foot strike , MFS
3. Forefoot strike , FFS



Landing

Lieberman, et al. (2010)

- Landing with the **heel** (with or without shoes)
 - Have to repeatedly overcome a spike resulting from the **normal reaction** force, which is about **1.5 to 3 times** the body weight.
 - Increase the risk of running injuries.



Landing



Do not prevent the **heel** from touching the ground even when using the **forefoot** strike.

Landing

Payne (1983)

- In a group of 18 international **sprinters** competing in events up to 200 m, only one did not lower the heel to the track.
- In another group of 41 international runners competing over 400-1500 m, only 6 used the same technique.

Wong-Sir's Comments on Running Skills

- **Vertically** aligned head and body.
- Look **forward** and **further away**.
- Arms bent at **90° or smaller** at the elbow.
- **Do not over stride**.
- Use **forefoot** strike or **mid-foot** strike, **avoid heel** strike.
- Land **within 30 cm** in front of the projection of the C.G. on the ground.
- Run in a **steady** and **relax** manner.
- **Do not overemphasis** arms movement.

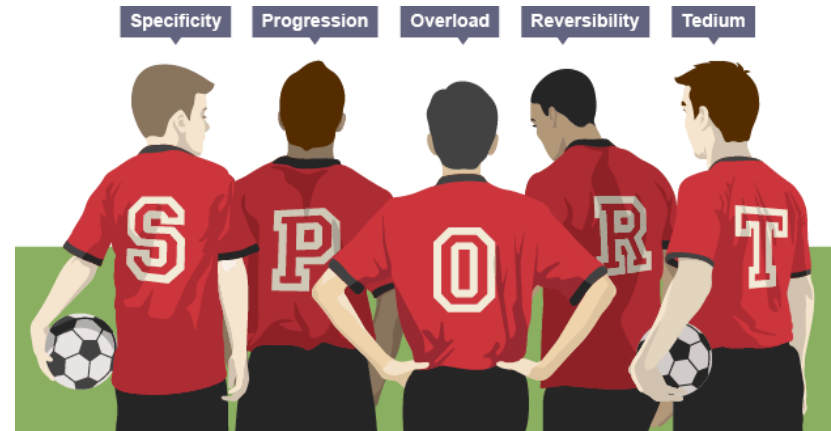


Principles of Training

- Principle of Specificity

1. Energy system
2. Exercise mode

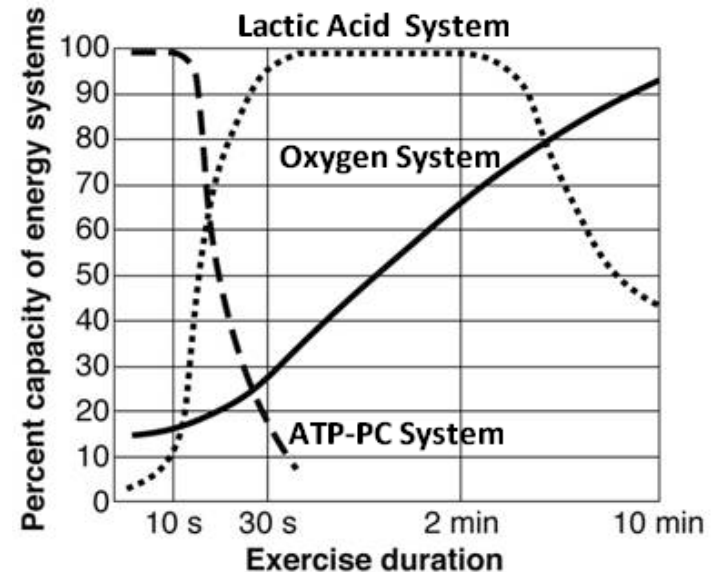
- Principle of Progressive Overload
- Principle of Hard and Easy Days
- Principle of Periodization



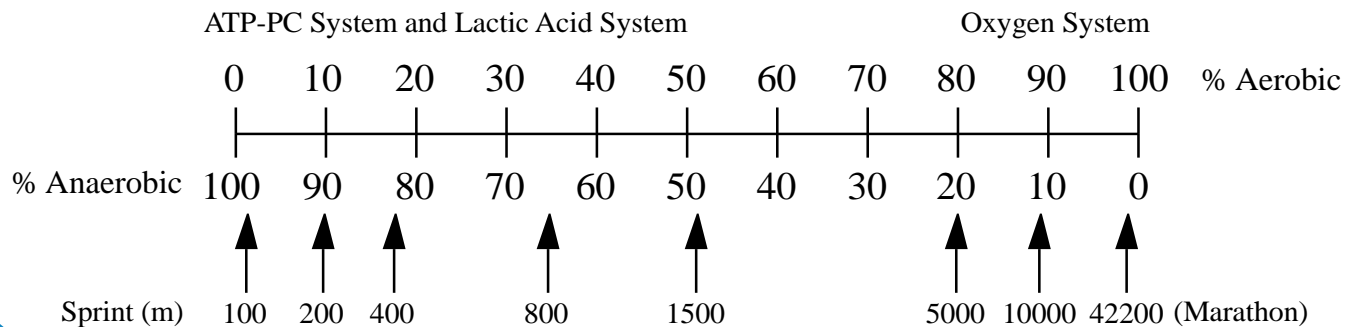
Principle of Specificity

1. Specificity of Energy System

- ATP-PC system: Less than 10 s
- Lactic acid system: 30 s to 2 min
- Oxygen system: Over 3 min



The Energy Continuum for Selected Track Events



Principle of Specificity

2. Specificity of Exercise Mode

- Cyclists should pedal
- Swimmers should swim
- **Runners should RUN**

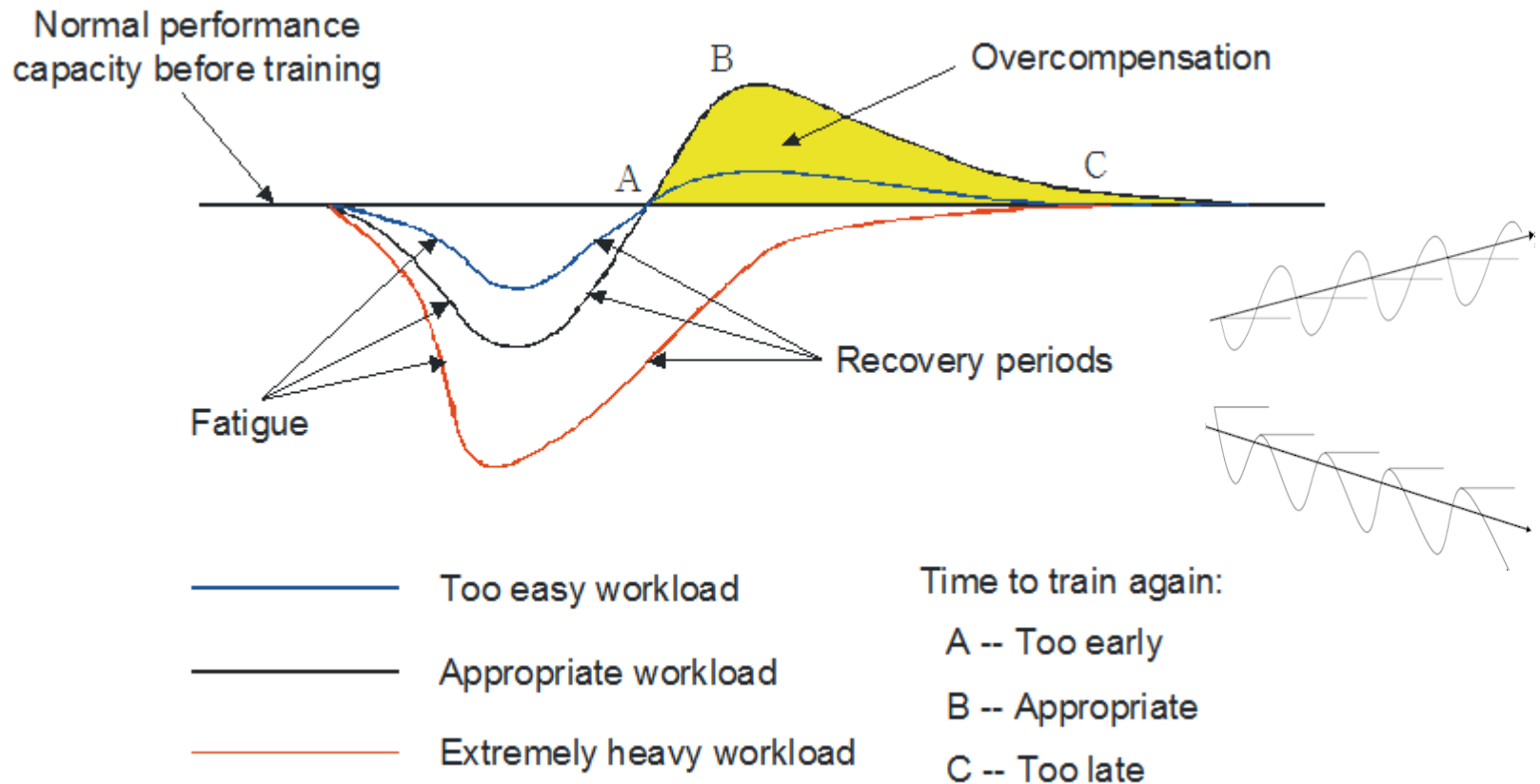


Principle of Progressive Overload

- Once the athlete has **adapted** to a workload of the training program, the workload should be **increased**.
- The workload should be increased **progressively throughout** the training program whenever the condition of the athlete has been improved so that the workload is always **near to** the **maximal** fitness capacity of the athlete.



Principle of Progressive Overload



Principle of Hard and Easy Days

Grobler, et al. (2004)

- **Prolonged, exhaustive endurance** exercise can induce skeletal muscle damage and temporary impairment of muscle function.

Knitter, et al. (2000)

- If the exercise involves a large **eccentric** component, such as downhill running, damage is generally more severe.



Principle of Hard and Easy Days

Gómez, et al. (2002)

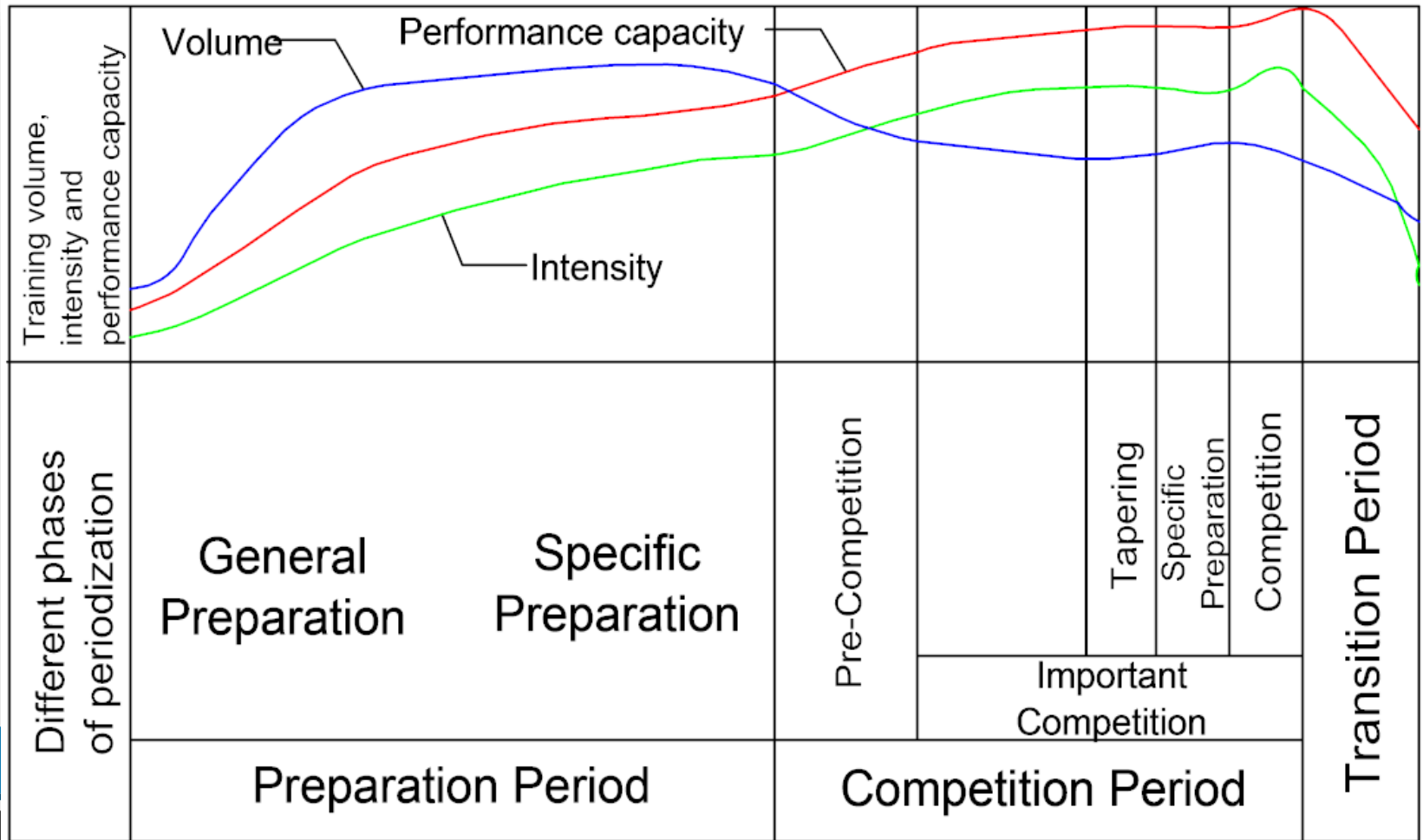
- It took about **48 hours** to recover from a 10-Km race.

Grobler, et al. (2004)

- Evidence suggested that the repairing process after a 42.2 Km Marathon race might take **1 to 10 weeks** to be completed.



Principle of Periodization

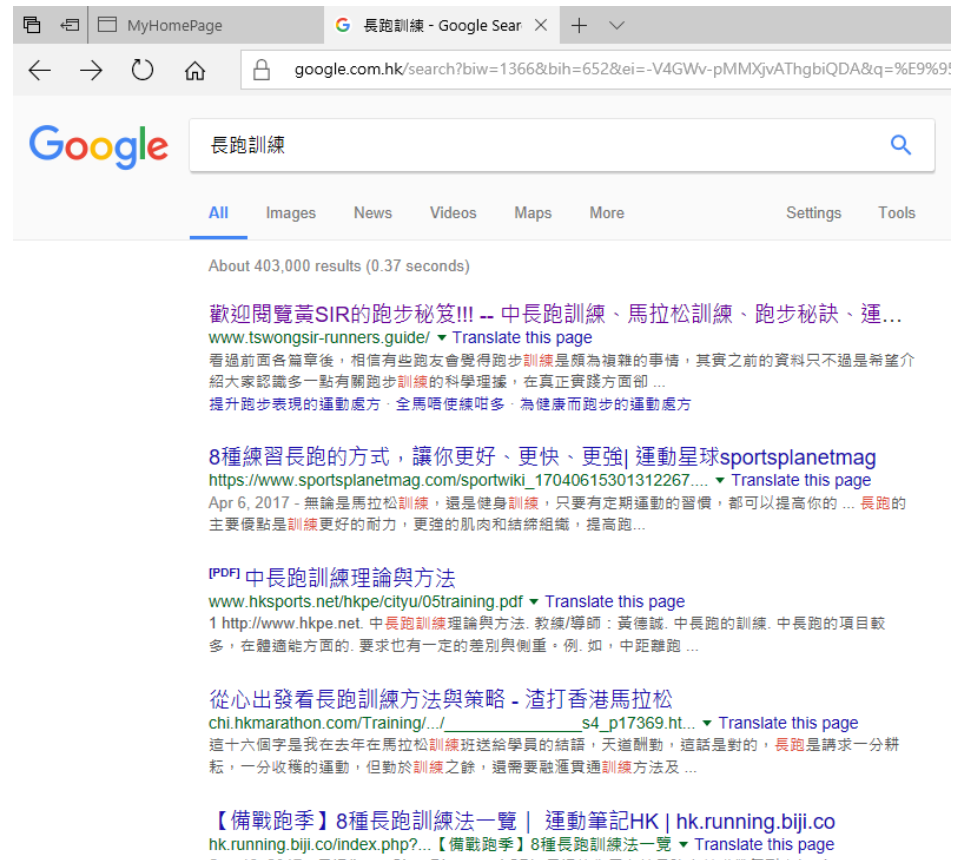


Running Training Q&A

長跑訓練

Q & A

Want to know more...



<http://www.tswongsir-runners.guide>