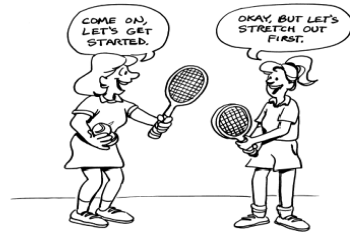


體適能與運動處方 Principle of Training

第二講



By
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BENEFITS OF WARMING-UP

1. It helps to make you feel like exercising.
2. It increases the blood supply to your muscles and joint tissues.
3. It creates heat in the muscles and joint tissues, which makes them more flexible and resistant to injury.

HOW TO WARM-UP

A. GENERAL COMPONENT

1. Large muscle activity (walking) to increase heart rate and muscle temperature
2. Static stretching

B. SPECIFIC COMPONENT

1. Perform movements specific to the sport or activity.



BENEFITS OF COOLING-DOWN

1. It helps to prevent blood from pooling in the muscles you were using.
2. If you do not cool-down, less blood will return to your heart and you may feel light-headed.
3. It prevents some muscle soreness from developing after exercise.

HOW TO COOL-DOWN

- A. Large muscle activity (walking) to prevent blood from pooling.
- B. Perform same static stretches as done in the warm-up.
- C. The cool-down should last as long, if not longer, than the warm-up.

Training Principles

運動訓練之原則

超超負荷原則 (PRINCIPLE OF OVERLOAD)

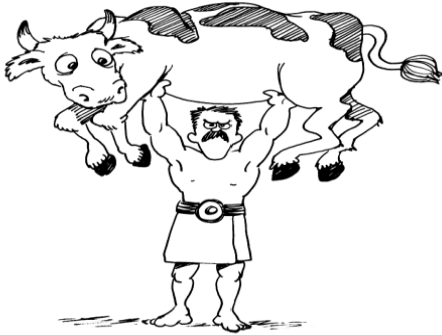
增加平常所能應付的運動量，給與身體足夠的刺激。要比習慣訓練方法鍛煉得更刻苦些。

例如：要增長體力，你必須？

要增加肌肉圍度 (size)，你必須？

增加局部肌肉的耐久力，你必須？

**MILO OF CROTONA
LEGENDARY USE OF
OVERLOAD PRINCIPLE**



USE F.I.T. TO OVERLOAD

FIT = FREQUENCY + **I**NTENSITY + **T**IME

SUN	MON	TUES	WED	THUR	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

• AT LEAST 3 TIMES PER WEEK



- 60-90% MAXIMAL HEART RATE RESERVE
- 20 TO 60 MINUTE DURATION OF TIME RECOMMENDED

PRINCIPLE OF PROGRESSION

The workload must be progressively increased for improvement to occur.

TRAIN - DON'T STRAIN



**MINIMUM PRINCIPLES
OF TRAINING GUIDELINES**

Summary of Flexibility Training Guidelines

- Frequency: At least 3 times per week
- Intensity: Controlled stretch until mild tension is felt
- Time: Static: Hold each stretch from 15 to 30 seconds. Dynamic: 10 to 20 repetitions and 1 to 3 sets

Summary of Cardiovascular Endurance Training Guidelines

- Frequency: At least 3 times per week
- Intensity: 60 to 90% maximum heart rate or 50 to 85% maximum heart rate reserve
- Time: Minimum of 20 minutes continuous large muscle group activity

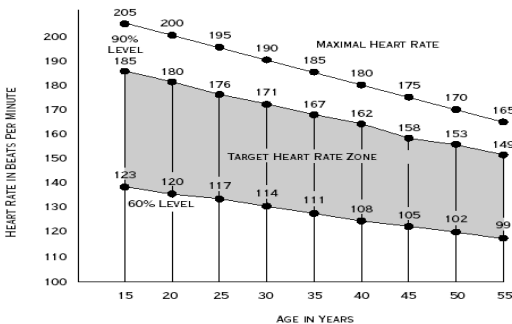
Summary of Muscular Fitness Training Guidelines

- Muscular Endurance:
 - Frequency: Every other day for each muscle group
 - Intensity: Low resistance (30 to 50% 1 RM)
 - Time: High repetitions (12 to 20 reps, 1 to 3 sets)

Muscular Strength:

- Frequency: Every other day for each muscle group
- Intensity: Heavy weights (60 to 90% 1 RM)
- Time: Low repetitions (4 to 8 reps, 1 to 3 sets)

MAXIMAL HEART RATE



220 - Age = Maximal Attainable Heart Rate

TARGET HEART RATE FORMULA

Using Percentage of Maximum Heart Rate

$(220 - \text{age}) \times 60 \text{ percent} = \text{lower level of target heart rate zone}$

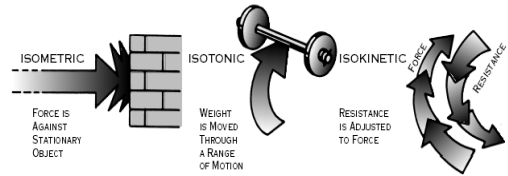
- | | | |
|---|-----------------------|-----------------------|
| | Lower
Limit | Upper
Limit |
| 1. Subtract age (14) from 220 to obtain maximum heart rate (206). $220 - \text{age} = \text{maximum heart rate.}$ | 220
-14
206 MHR | 220
-14
206 MHR |
| 2. Determine percent of lower limit (60%) of target heart rate zone and safe upper limit (90%) for training effect. | $\times 60\%$ | $\times 90\%$ |
| 3. Multiply Step 2 times the value of Step 1.
It was determined that 123.6 was the lower limit of target heart-rate zone and 185.4 was the safe upper limit. | 123.6 | 185.4 |

TARGET HEART RATE FORMULA

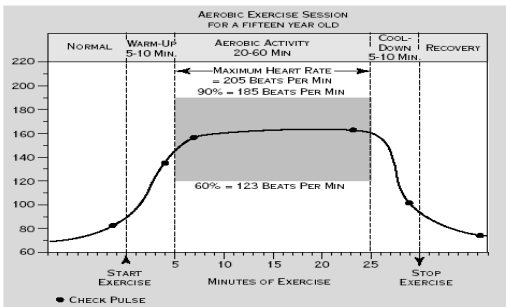
Using Percentage of Heart Rate Reserve
 $[(220 - \text{age}) - \text{resting heart rate}] \times 50 \text{ percent} + \text{resting heart rate} =$
 lower level of target heart rate zone

	Lower Limit	Upper Limit
1. Subtract age (14) from 220 to obtain maximum heart rate (206). 220 - age = maximum heart rate.	220 - 14 206 MHR	220 - 14 206 MHR
2. Determine resting heart rate (70), and subtract from 206.	- 70 RHR 136	- 70 RHR 136
3. Determine percent of lower limit (50%) of target heart rate zone and safe upper limit (85%) for training effect.	$\times 50\%$	$\times 85\%$
4. Multiply Step 3 times the value of Step 2.	68	122.4
5. Then add resting heart rate to Step 4.	+ 70 RHR	+ 70 RHR
6. It was determined that 138 was the lower limit of target heart-rate zone and 186 was the safe upper limit.	138	185.6

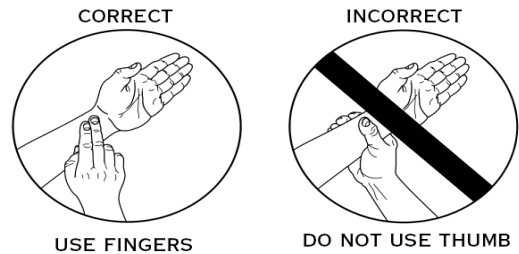
METHODS OF DEVELOPING MUSCULAR FITNESS



EXERCISE TRAINING PATTERN



TAKING YOUR PULSE



10 seconds x 6 = 60 seconds or 1 minute

RECOVERY HEART RATE

Check pulse after exercise session.

Heart rate 5 minutes after workout = 120 bpm

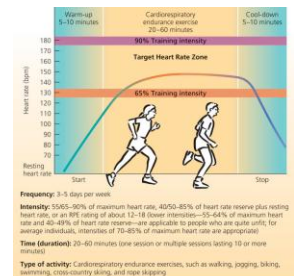
Heart rate 10 minutes after workout = 100 bpm

What should you do if your heart rate is above this level?

What should you do if it is below this level?



Cardiorespiratory Endurance: FITT



Building Cardiorespiratory Fitness

- Rate of improvement depends on age, health status, initial level of fitness, and motivation
- Initial phase (1–4 weeks): 3–4 days per week, low end of target heart rate zone, 20–30 minutes
- Improvement phase (2–6 months): 3–5 days per week, middle to upper end of target heart rate zone, 25–40 minutes

Fahey/Insel/Roth, *Fit & Well: Core Concepts and Labs in Physical Fitness and Wellness*, Chapter 3
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Maintaining Cardiorespiratory Fitness

- Continue to exercise at the same intensity on 3 nonconsecutive days per week
- If you have to stop, start the program again at a lower level
- Cross-training maintains motivation

Fahey/Insel/Roth, *Fit & Well: Core Concepts and Labs in Physical Fitness and Wellness*, Chapter 3
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Training Principles

運動訓練之原則

Principle of FITT



運動頻率(Frequency): 每星期的運動次數

運動強度(Intensity): 身體所要承受超負荷的水平

運動時段(Time): 運動要持續的時間

運動種類(Type of Exercise): 不同的運動類型，可分為有氧運動和無氧運動。

Training Principles

運動訓練之原則(續)

個別性原則 Principle of Individuality

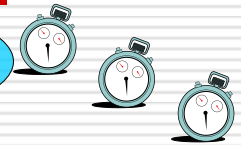
每個人的體能和運動技術，都有其獨特之處，因此在訓練的時候，絕對不可以採取一視同仁的做法。

上法煉鋼，是否適用每一個人？

Training Principles

運動訓練之原則

全面性原則 Principle of All-Rounded

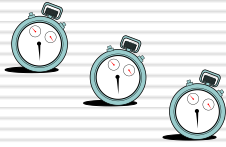


必須適當地安排訓練計劃，務求身體各部位以及各種體適能要素皆可獲得發展機會。

Training Principles

運動訓練之原則(續)

反覆性原則 Principle of Repetition



身體的組織、器官及各機能的增強，並不是單靠幾次的練習便可輕易得到，必須要經過長時間的重覆練習才有所成。

Training Principles

運動訓練之原則

反覆性原則 (Principle of Repetition)

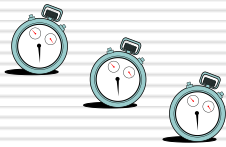
身體的組織、器官及各機能的增強，並不是單靠幾次的練習便可輕易得到，必須要經過長時間的重覆練習才有所成。

What is 1RM? Repetition Maximums

Training Principles

運動訓練之原則(續)

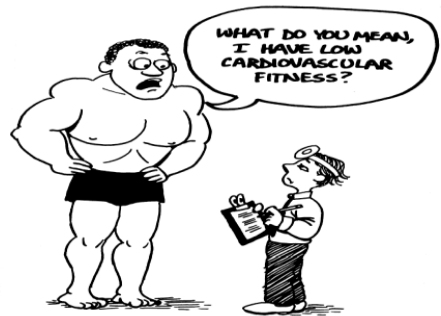
特殊性原則 Principle of Specificity



在編排運動訓練計劃前，必須先了解所欲從事之運動的獨特技術和體能要求。

PRINCIPLE OF SPECIFICITY

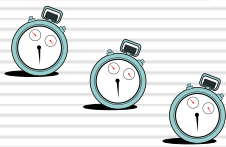
You must do SPECIFIC exercises to improve SPECIFIC components of physical fitness in SPECIFIC body parts.



Training Principles

運動訓練之原則(續)

倒退性原則 Principle of Reversibility



從訓練所獲得的身體生理素質改善會因停止練習而逐漸倒退，所以體適能訓練計劃需持之以恆。

Training Principles

以肌肉適能為主的運動處方

1. 動作: 安排身體大肌群動作至少有8至10個動作。
2. 重量: 由輕而重循序漸進。
3. 運動前後: 均要暖身與伸展。

Training Principles

重量訓練

重量訓練各變項介紹

- RM (Repetition Maximum) : 最大反覆 (最大肌力)
- Intensity (強度-重量) : 負荷量為最大反覆的百分比
- Repetition (反覆次數) : 在沒有休息的狀況下重複實施一個動作
- Set (組數, 回合) : 做某個動作所要求的反覆次數
- Rest interval (組間休息) : 原則上20秒-2分鐘
- Training volume(訓練量) : 負荷量x反覆次數x所有組數

Training Principles

重量訓練

重量訓練的注意事項

- 三階段原則 (暖身、主運動、緩和)
- 動作範圍要完整
- 適當的呼吸 (用力時吐氣)

Training Principles

重量訓練

運動的順序

大肌肉群優先於小肌肉群

1. 髖和下背
2. 腿部 (股四頭肌、腿後肌腱群和小腿)
3. 軀幹 (背、肩和胸)
4. 手臂 (肱二頭肌、肱三頭肌和前臂)
5. 腹部 (很多動作必須使用腹部肌群, 此動作必須放在較後順序)
6. 頸部

Training Principles

重量訓練

多組數訓練原則

Principle of Set System Training

如果你要最大限度地單獨發展某一部位的肌肉, 就要儘可能使主要作用力的肌肉與其他肌肉活動分開。你可以從解剖學的位置上來進行變換。

例如: 斜椅彎舉, 單獨練上臂肱二頭肌比反手窄握單槓引體上升要好。

Training Principles

重量訓練

孤立訓練原則

Principle of Isolation Training

多組數 (有時最多3 ~ 4組) 的訓練原則, 以便使肌肉群完整徹底地鍛煉和使肌肉發脹到最大限度。

Training Principles

重量訓練

肌肉混淆訓練原則

Principle of Muscle Confusion Training

如果你固定採用相同的動作、組數、次數和角度, 就不能獲得調節訓練強度的刺激。因此, 要使肌肉不斷地增長和加強刺激, 必須採取混淆訓練。