



# Physiotherapist's Tips for OTW 2019

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1<sup>ST</sup> QUESTION :

WHAT IS YOUR TARGET?

- Finish the event?
- 24? 36? 48?
- Under 18? 16?

# OXFAM TRAILWALKER

- Ultra Endurance
- Mind Training

CONCEPT 1:

“MY LEGS SHOULD BE MASSAGED TO  
SOOTH THE SORENESS ?”

## Fact:

- Your muscle soreness is caused by **muscle micro-trauma (Lactate?)**.
- Massaging your legs will make you feel better but your muscle could be **“too relaxed”** which makes it harder to endure a long lasting exercise event.
- In fact, the most efficient way is **to strengthen your body through pre-competition training**. Your body could be trained to endure longer exercise and become less vulnerable to muscle pain.
- Besides, you could also **take short break** during the competition and **repeat the stretching exercise** during your walk. It will improve your endurance.

## CONCEPT 2:

“I feel so exhausted during the walk... better take a one-hour break or have a nap ??”

## Fact:

- If you take an extensive break, the accumulated lactic acid inside your muscles will intensify the **fatigue** and increase your muscle **stiffness**/soreness.
- You will also find your joints more **stiff** and **difficult to bend and stretch**. It will even take a longer time for your body to warm up. In other words, **taking extensive break would increase your chance of injury**.
- If you still have muscle pain one week after the event, your injury need professional attention. Please consult your Physiotherapist or doctor for further assessment and treatment (speedy recovery).

## Concept 3:

“My right ankle hurts when I walk.

I should hold my walking stick on the right hand side for support?”



- **Fact:**
- You should hold the walking stick at the side of your '**stronger**' leg.
- If you hold the walking stick on the same side of your injured ankle, your walking posture will be skewed to one side. It will **strain the other parts** of your body and might even cause **injury**.
- If you or your colleagues do have one more stick, please use **TWO** sticks with **both hands**!



## 100公里麥理浩徑 The 100km MacLehose Trail

CP = 檢查站

終點  
Finish

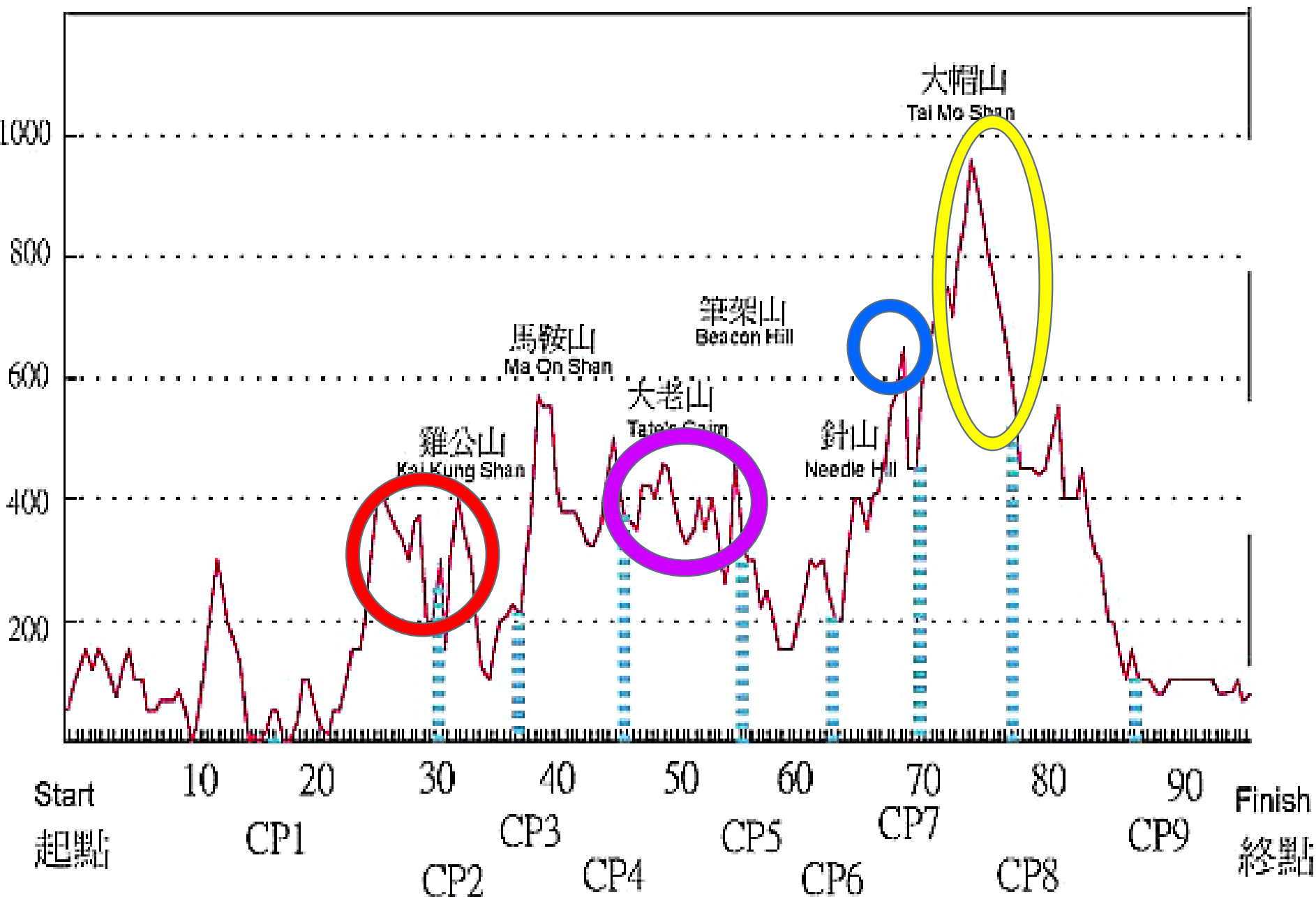


起點  
Start

Route	Distance (KM)
Start to CP1	16.1
CP1 to CP2	8.8
CP2 to CP3	10.1
CP3 to CP4	12.5
CP4 to CP5	7.8
CP5 to CP6	6.1
CP6 to CP7	8.7
CP7 to CP8	9.0
CP8 to CP9	9.6
CP9 to Finish	11.3
Total: 100 km	

—Height (m) 高度 (米)

Distance (Km) 路程 (千米)



# TIP:

## Training

- If training frequency 3-5 days a week
  - 3 short distance around 5-10 km
  - 1-2 long distance around 20-50 km
- If training frequency once a week
  - 10-45 km progressively in a month
- If training frequency few times a month
  - Add oil
  - Below 15 km each training
  - Increase your training frequency

## Focus

- Increase the CardioPulmonary function
- Improve your muscle endurance
- Improve your fatigue tolerance
- Improve your muscle performance and speed
- Slow down your training progression and decreasing muscle break down proportion
- Reconditioning
- Injury prevention (decrease injury risk)

# HOW DO YOU PREPARE YOURSELF

- Reasonable goal
- Reasonable training regime
- Training log book
- Addressing extrinsic factors & intrinsic factors leading to injury of yourself
- Shoes wear

# HOW DO PHYSIOTHERAPISTS HELP?

## Injury Management / Prevention

- Common Injury
- Management
- Technique
- Shoes wear

## Training

- Field training
- Gym training
- *Progressi*



# FACTORS MAKE YOU SUCCESS:

## Basic

- Proper Training/ Proper **technique**
- **Endurance** training (Gleu Max, Gleu Med, Quadriceps)
- **Stretch** to maintain muscles flexibility
- Proper and comfort footwear
- External support

## Advance / Super / Monster

- **Coordination**
- **Proprioception**
- **Muscle Control**

- **Technique**  
(route mapping, foot placement, strategy, teammate)
- **Strategy**  
(teammate position, supporting point, etc)
- **Training regularity (FITT)**
- **Luck** (weather, temp, terrain)



# PROPRIOCEPTION, BALANCE & STRENGTHENING



Single Leg Perturbation on BOSU

捕速球單腳平衡及干擾



Medicine Ball Catch and Throw on BOSU 博速球上單腳平衡藥球扔接

Highlight 重點:

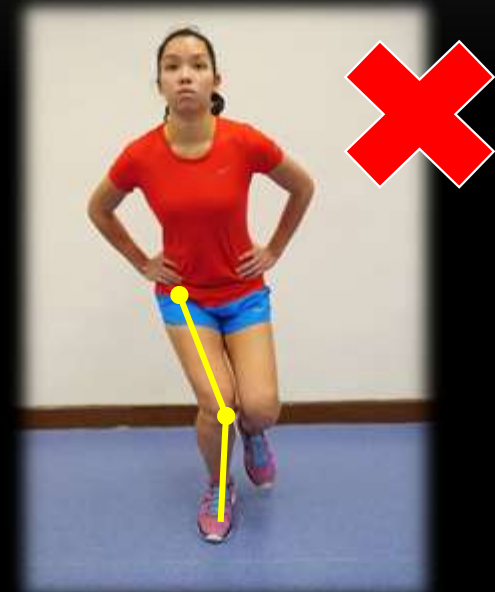
1) **Catch and throw tasks are distraction technique to advance the neuromuscular control to more subconscious level. We train the brain and knee, not muscles!**

扔和接任務是分散注意力技巧，是針對潛意識的高水準神經肌肉控制訓練，所以我們是在訓練腦部和膝部，而不是肌肉

# AGILITY AND ECCENTRIC CONTROL



Single Leg Hop 單腳小跳



Poor Landing with Valgus  
含膝外翻不良著地姿勢

## Question 問題:

- 1) If valgus is noticed during double/single leg landing, what should we do?  
如果雙/單腳跳落地時有明顯膝外翻, 我們應該如何?
- 2) If she has no pain on double leg jump/hop but mild discomfort or pain on knee joint in single leg hop, do you think it is good for jogging/running now?  
如果她雙腳跳不痛, 但單腳跳時出現微微膝疼或不適, 你認為可以開始跑步練習嗎?

# BALANCE / PROPRIOCEPTION PROGRESSION

## 平衡/本體感受進階



Basic Balance  
(Conscious level)  
基本平衡  
(有意識)



Distraction by other tasks /  
Functional moves (Subconscious  
level)

其它事/功能動作分散注意  
(潛意識水平)



Jump and land  
(Reflective level)  
跳及著地(反射水平)



Distraction + Reflective  
反射+分散注意

- To train the neuromuscular system fast, reactive and multi-task instead of just static balance on expensive props
- 訓練神經肌肉系統讓它變快, 反應更好, 多工而不是單純靜態平衡於昂貴花巧工具上



A first-person perspective photograph showing a person's legs and feet. They are wearing grey patterned socks and heavily worn, brown leather hiking boots with black laces. The boots show significant signs of use, with scuffed leather and dirt. The person is standing on a light-colored, textured surface, possibly concrete or asphalt. Overlaid in the center of the image is the text "On field Sports Physiotherapy Service" in a bright pink, bold, sans-serif font.

# On field Sports Physiotherapy Service



















# STATISTICS

## The most common injuries:

- Iliotibial Band Syndrome (ITBS)
- muscle cramp
- sprain and strain

## Site:

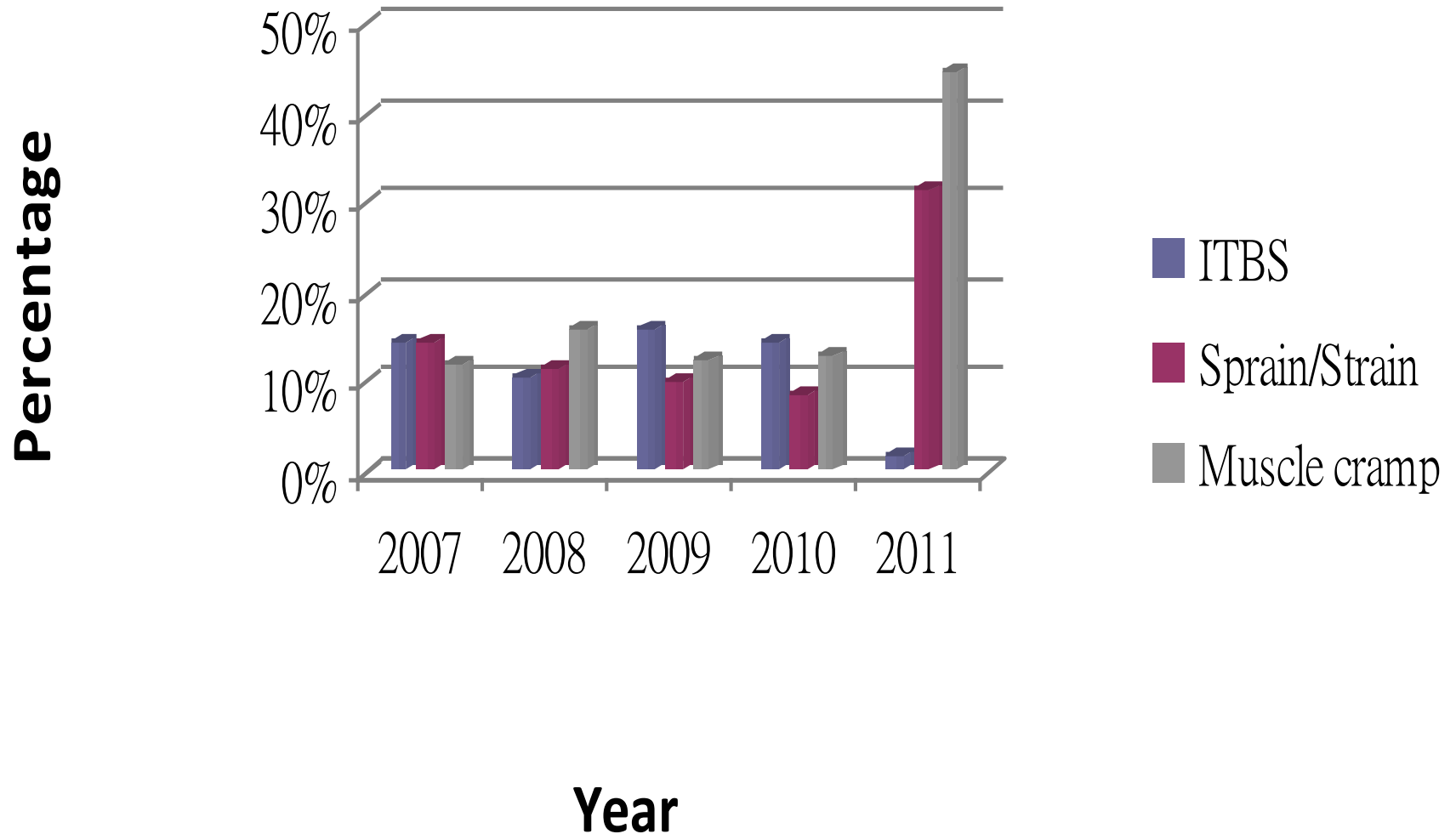
- Over 70% were lower limbs problems,
- with knee joint being the mostly affected region, followed by ankle and hip (See Chart 2).

# STATISTICS

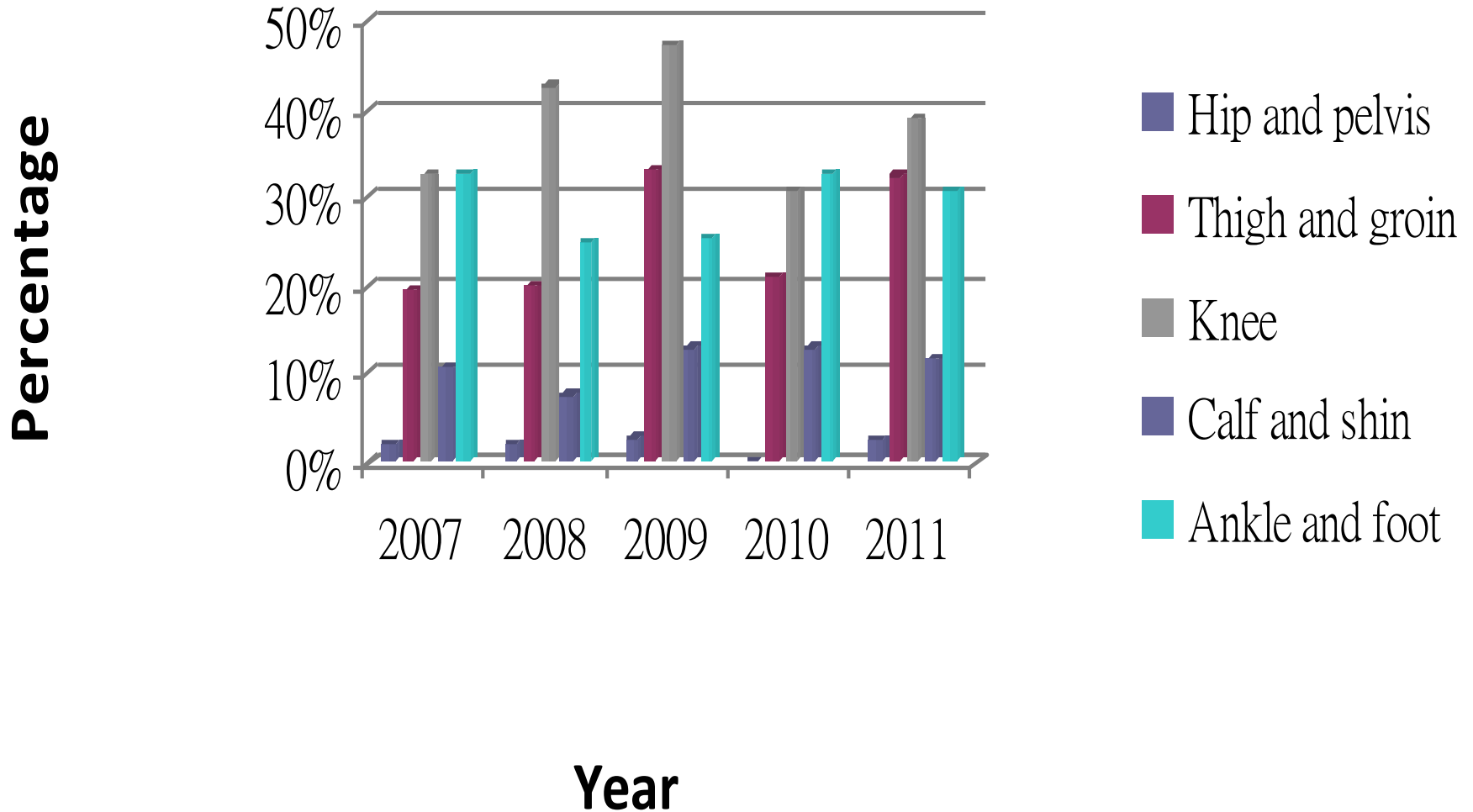
## Treatments:

- Soft Tissue Management  
(Release, Manipulation, Remodeling)
- Sports taping
- R.I.C.E. treatment  
(Rest, Ice, Compression and Elevation)
- Stretching exercises

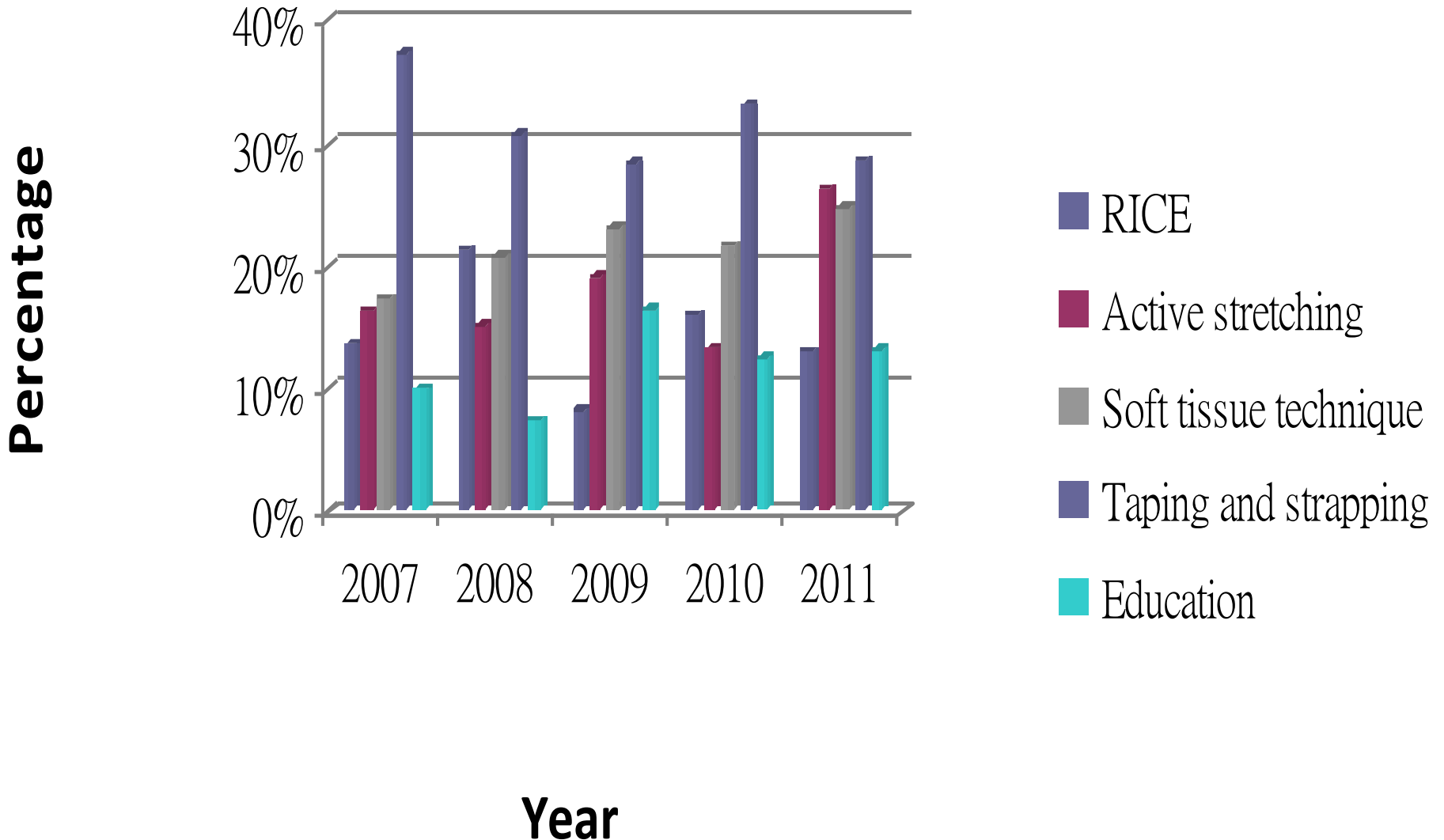
# Chart 1. Provisional Diagnosis



## Chart 2. Injury Sites



# Chart 3. Management



# IS INJURY PREVENTABLE?



# Performance

The diagram is shaped like a house. The roof is a dark triangle with the word 'Performance' in white. It is supported by four yellow pillars: 'Cardiovascular' and 'Nutrition' on the left, and 'Psychological' and 'Knowledge' on the right. In the center is a staircase with six steps of different colors: pink ('Power'), grey ('Endurance'), blue ('Strength'), purple ('Flexity, Stabty'), yellow ('Status of recovery'), and green ('Pre-race condition'). Below the pillars is a green base labeled 'Control of Extrinsic Factors'. At the very bottom is a grey foundation labeled 'Strategy, Team management, Support'. A red oval encircles the four pillars and the central staircase steps.

Cardiovascular

Nutrition

Power

Endurance

Strength

Flexity, Stabty

Status of recovery

Pre-race condition

Psychological

Knowledge

Control of Extrinsic Factors

Strategy, Team management, Support

# EXTRINSIC FACTORS

- Temperature, Humidity, UV Index, Wind ....
- Trail surface and condition
- Lighting
- Gear – Clothing, Footwear, Hiking pole, Flashlight / Headlamp, ...



# INTRINSIC FACTOR

- Foundation
  - Medical background, Body alignment, Cardiopulmonary function
- Balance / Core control / Stability
- Muscle flexibility, strength, power, endurance
- Technique and foot placement (coordination and plyometric)

## RECOMMENDATION

- Before the walk and after long rest - stretch the muscles
- Water break / Check point – Reasonable
- Speed - Slow and steady
- Daily Stretching - Change of degree of tightness
- Support Team!!!

# DEMAND

- Musculoskeletal
  - Lower limb joints for mobility
  - Spine for stability
  - Upper limb for holding of pole / weight

# INJURY

- Musculoskeletal Injury (**Load** exceeds the ability)
  - Acute Trauma
  - Overuse
- Injury may happen to
  - Muscles, Ligament, Joints
  - Spine, Hip, Knee and Ankle

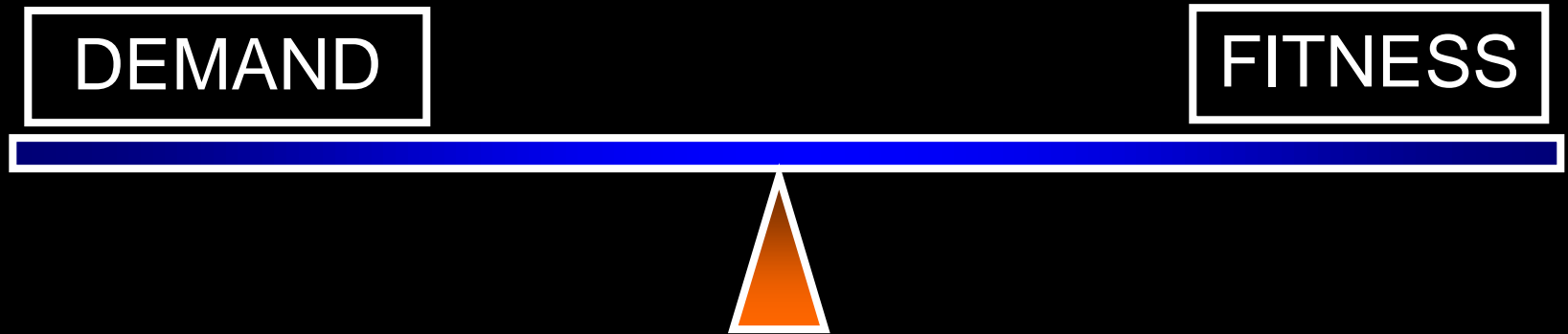


# MUSCULOSKELETAL INJURY

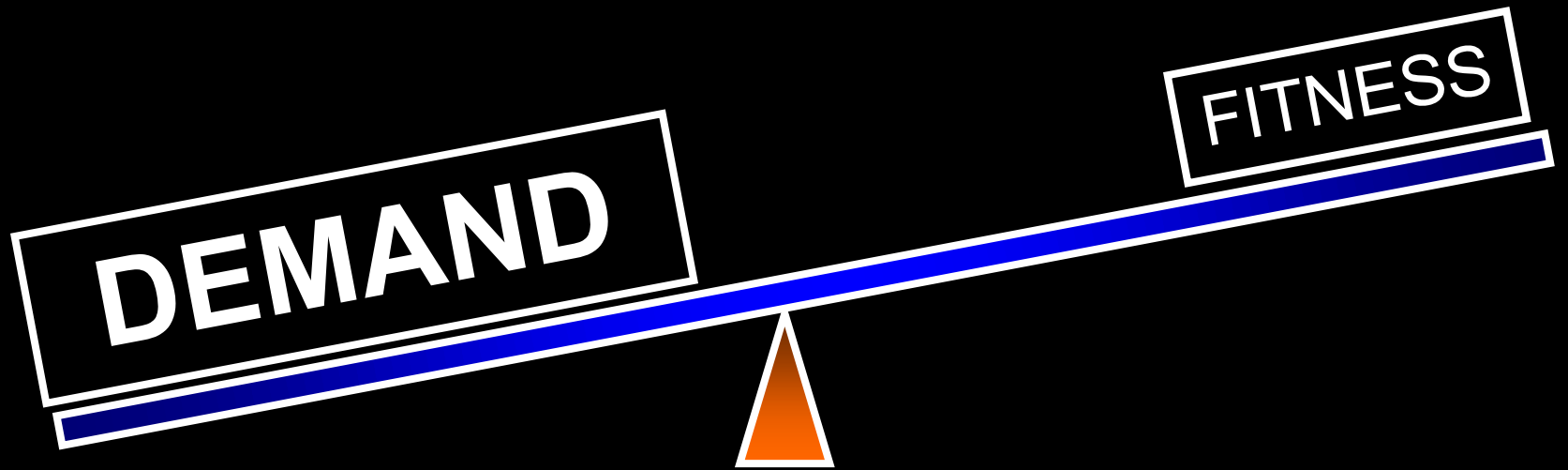
# OVERUSE INJURY



# PREPARATION



# INJURY





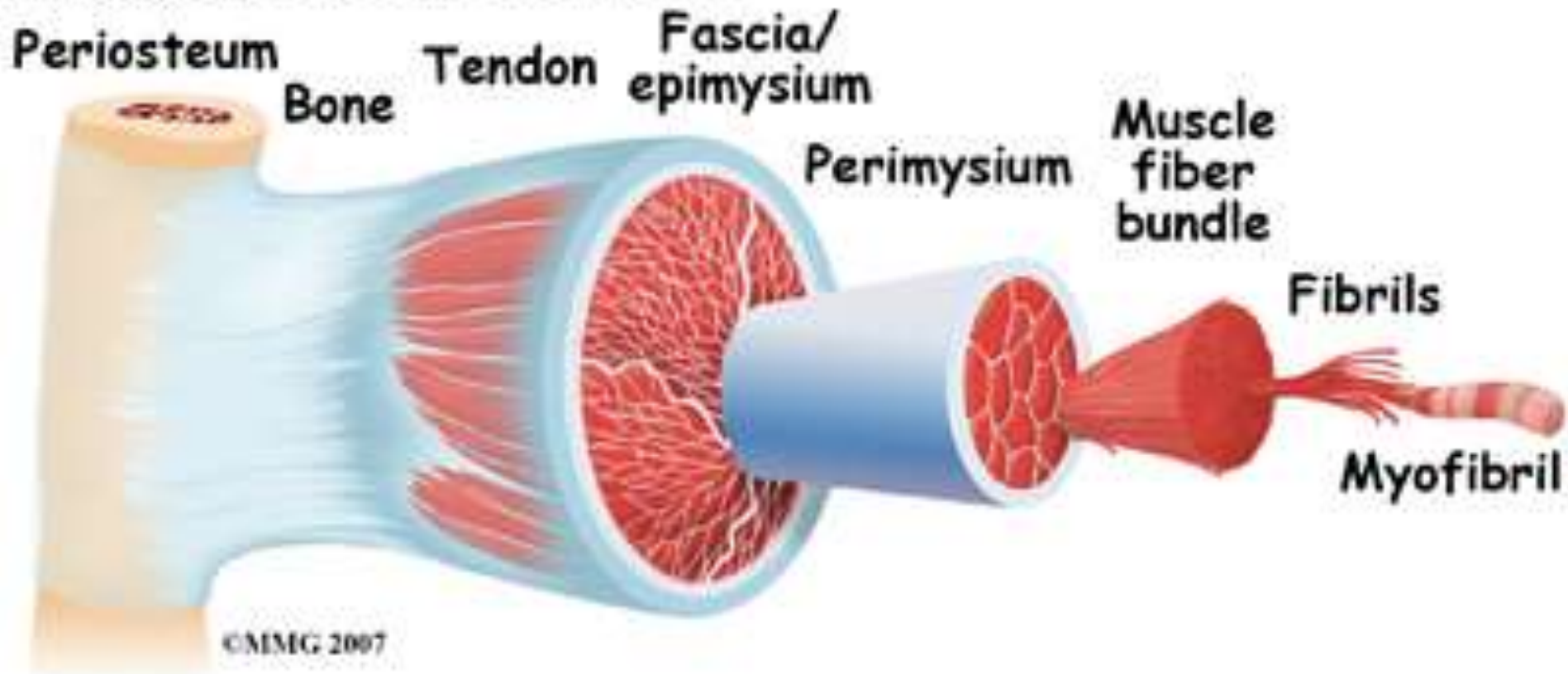
# OVERUSE INJURY

- Muscle strain / **Cramp**
- Anterior knee pain
- Iliotibial band friction syndrome (**ITB**)
- Plantar fasciitis (Sole / Heel pain)
- Tendonitis (Knee-patella tendon, ankle)

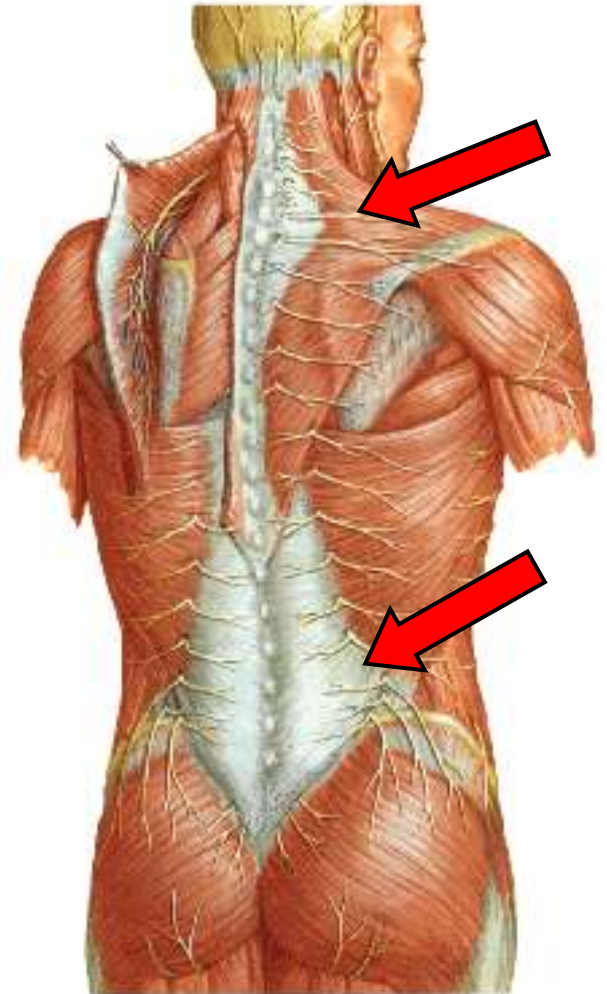
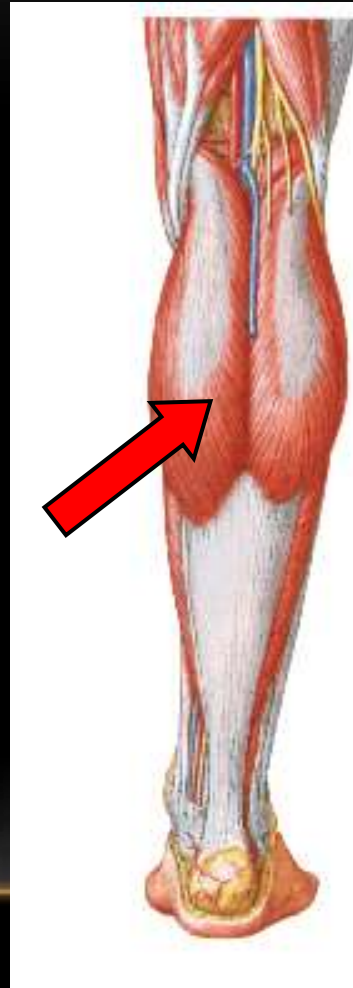
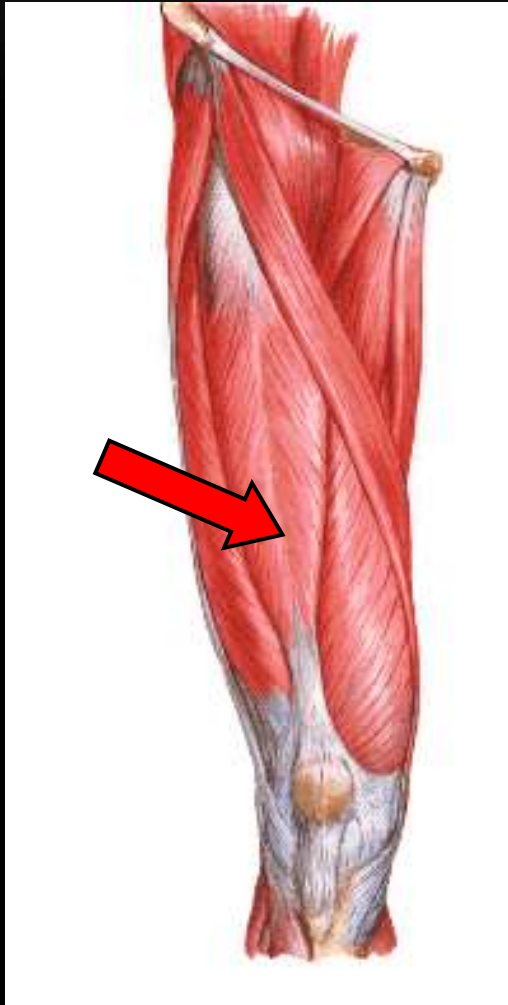
# MUSCLE CRAMP / STRAIN

- Dehydration / Insufficient electrolytes
  - More generalized
  - Water and electrolyte supplementation
- Muscle Micro-trauma
  - During / after exercise
  - Muscle fibre break down (micro-tear)
  - Training, improve circulation
- Overload - damage
  - Concentric – muscle shortening
  - Eccentric – muscle lengthening
  - Training, aid / support

# Muscle Structure



# MUSCLE OVERLOAD



# MANAGEMENT

- Proper use of muscles
- Replenish of water and electrolyte
- Rest
- Stretching
- **GENTLE** massage





# Quadriceps

1. Grab hold of a fixture or use a wall for support.
2. Grab your right foot with left hand, with right thigh perpendicular to your shoulder.
3. Feel the mild tension in front of the thigh and hold the position for 15 to 30 seconds.
4. Repeat 4 times.
5. Switch to the other side.









# ANTERIOR KNEE PAIN / ITB FRICTION SYNDROME

- Front knee pain and Side knee pain
- Repeated loading (Overuse)
- Related to
  - Insufficient muscle Endurance
  - Mal-alignment / Biomechanical fault
  - Insufficient hip, knee & ankle control
  - Insufficient flexibility
  - Increase loading to the patellofemoral joint / distal portion of ITB

# ANTERIOR KNEE PAIN

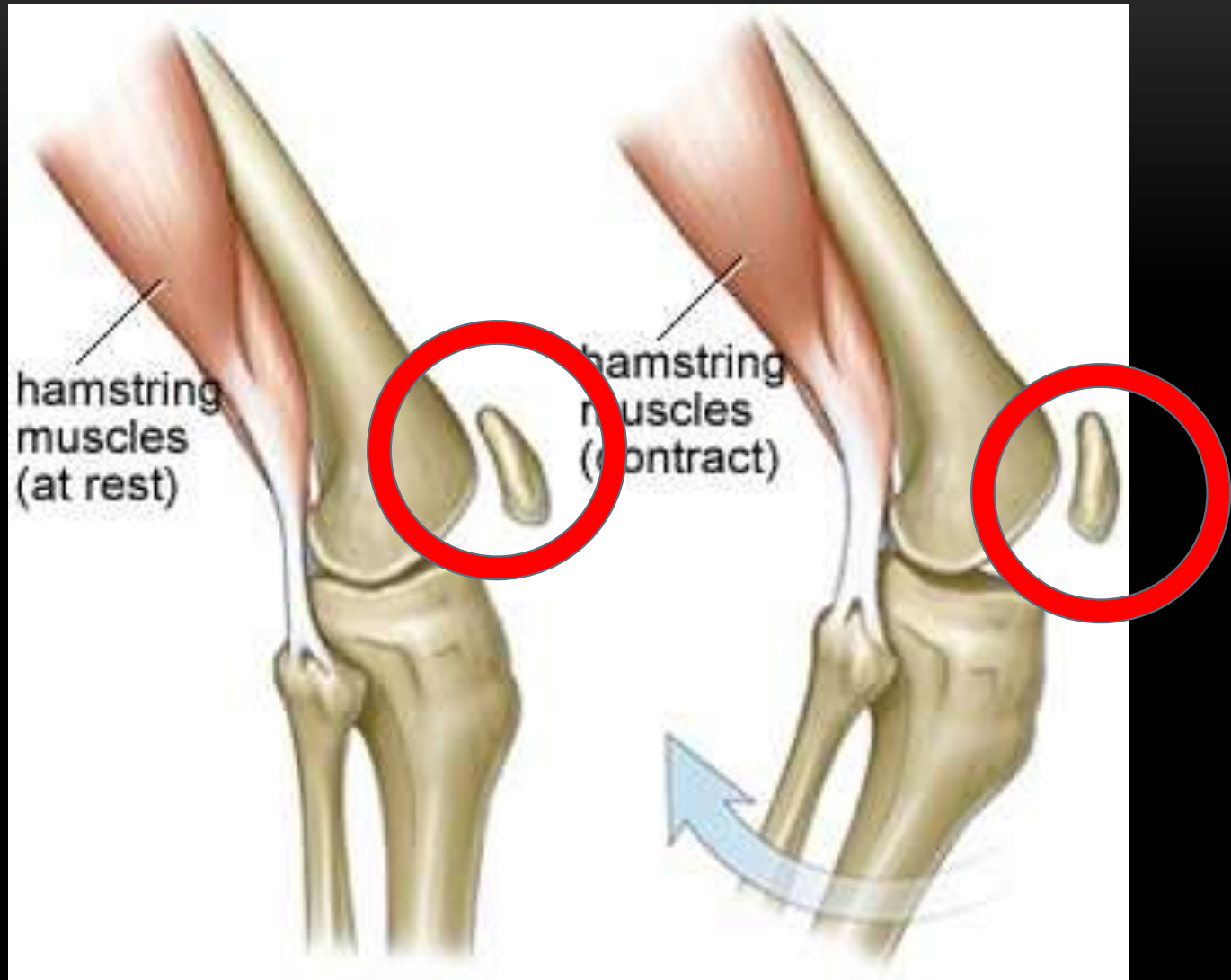


## LEG MOVEMENT



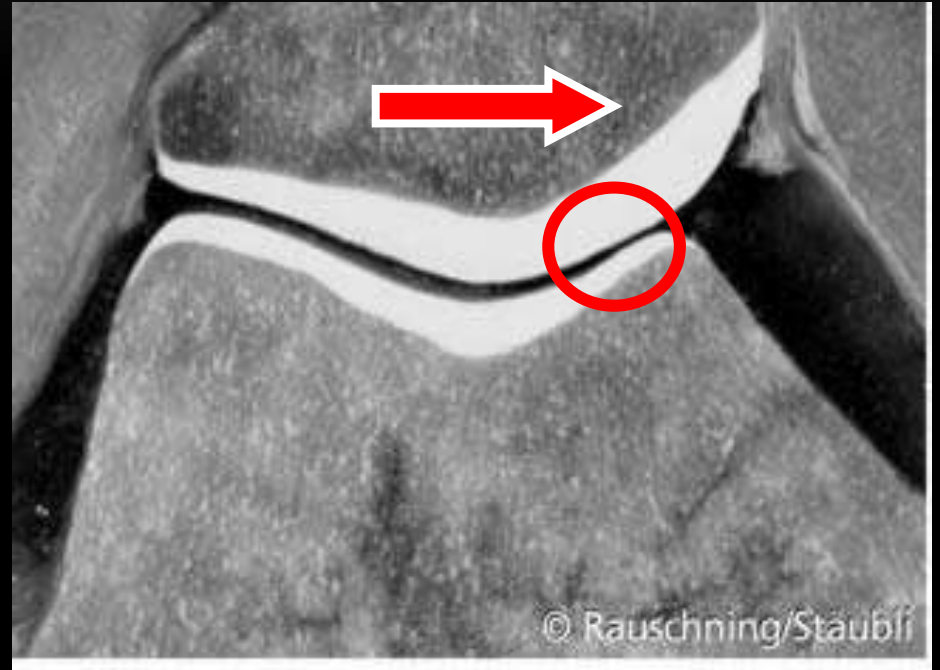
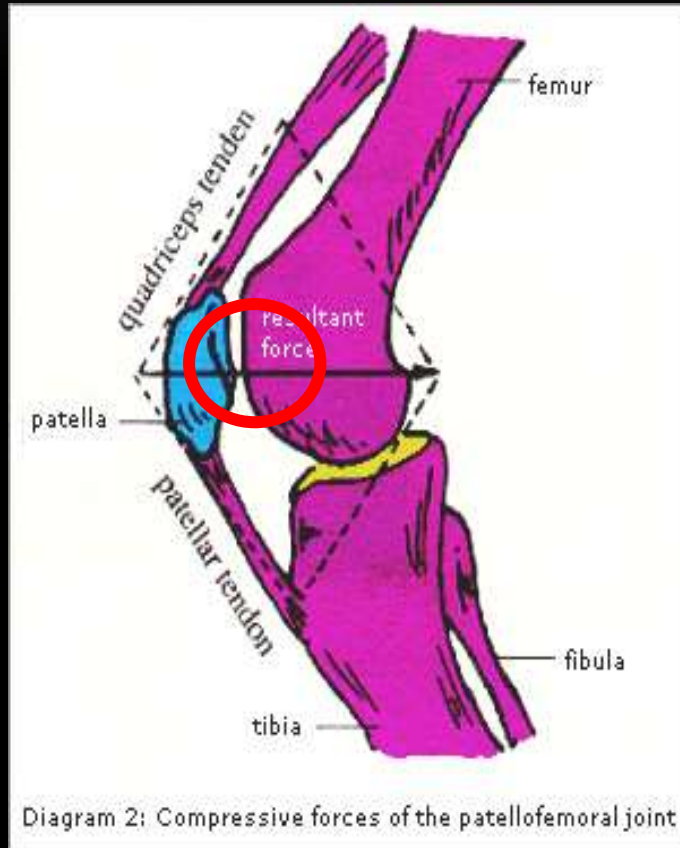
extension of upper  
and lower leg



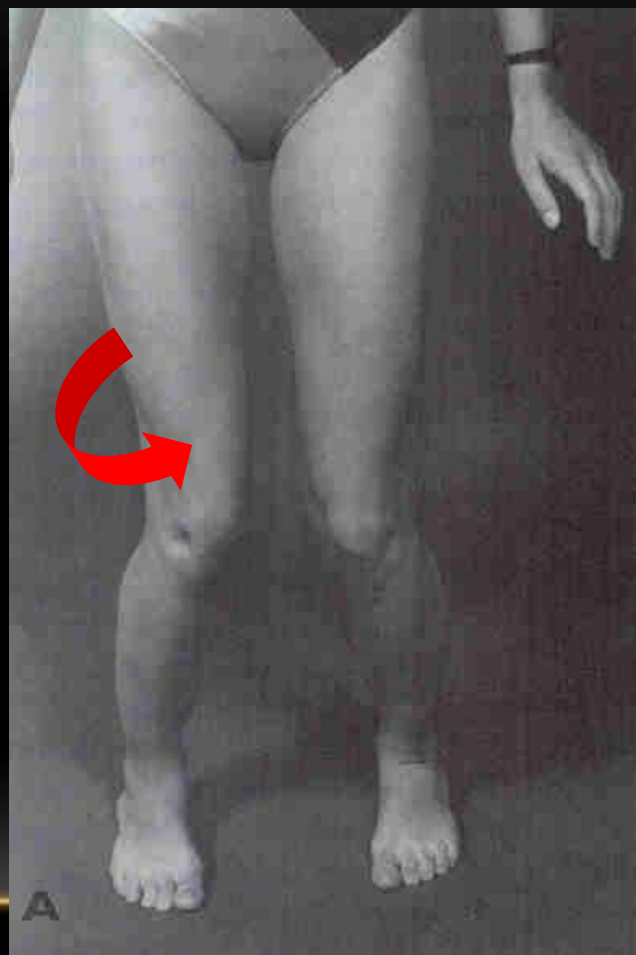




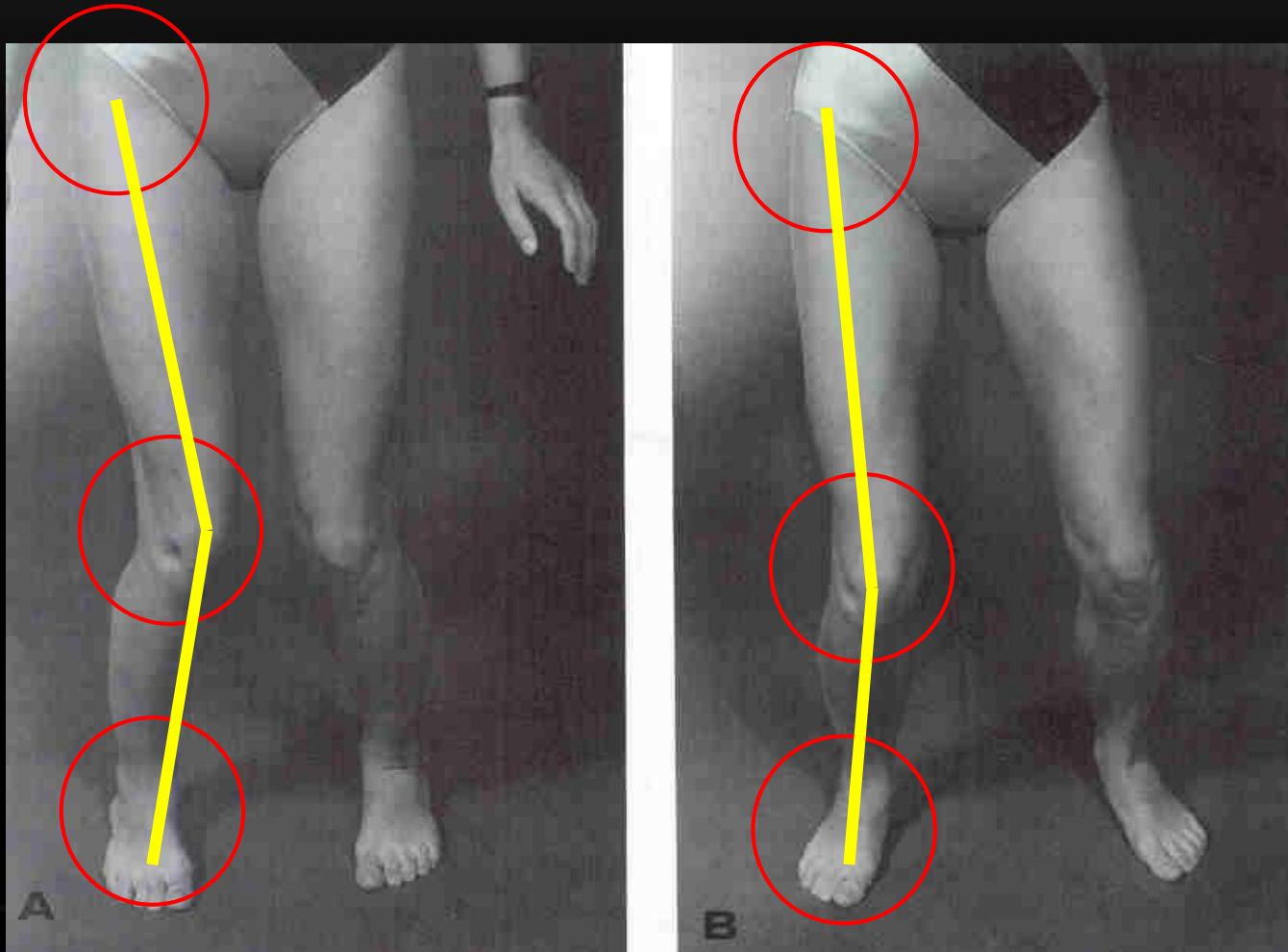
# BODY ALIGNMENT



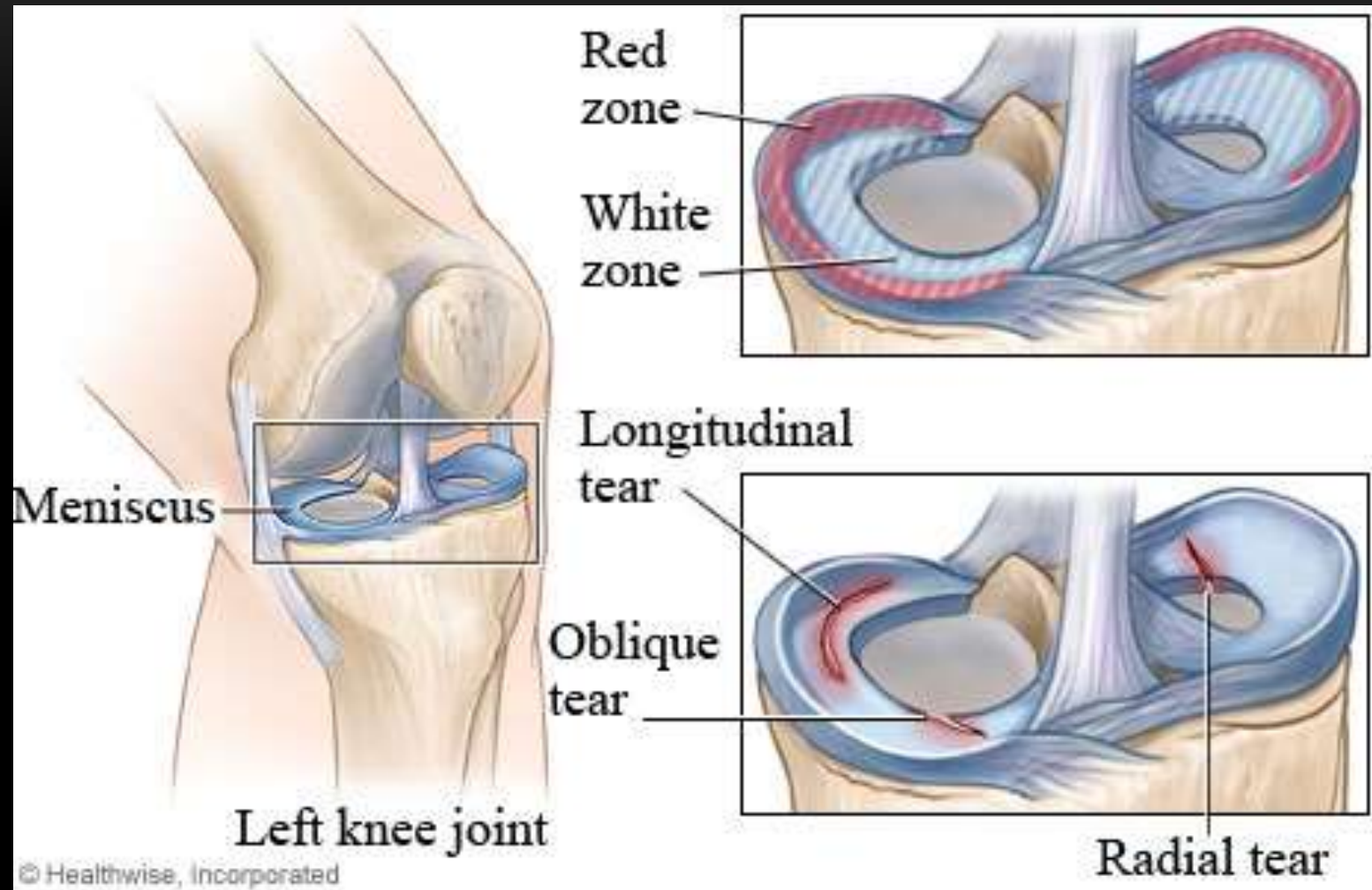
Right knee MRI film  
JBJS(Br)1999 81-B: 452-8

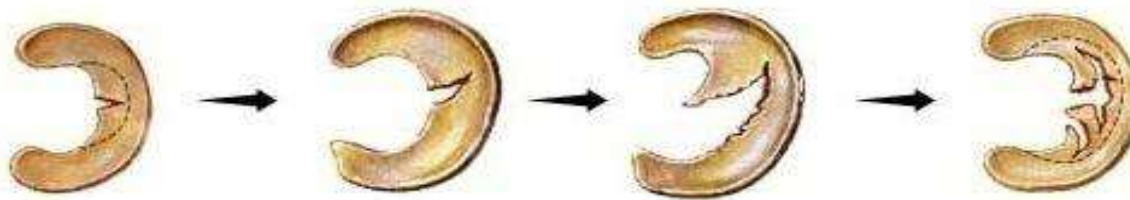


# BODY ALIGNMENT









A: Radial Tear (small)

Radial Tear (large)

Progresses to  
a Flap Tear

Progresses to  
Complex or  
Degenerative Tear



B:

Flap Tear



Flap Tear



Double Flap Tear



C: Discoid Meniscus



D: Peripheral Tear



Repaired  
Peripheral Tear



E: Horizontal  
Flap Tear



Displaced Flap  
Tear (horizontal)



F: Longitudinal  
Tear (short)



Longitudinal  
Tear (long)



Longitudinal Tear  
(displaced bucket-handle)



# PREVENTION

- Proper Training/ Proper technique
- Endurance training (Gleu Max, Gleu Med, Quadriceps)
- Stretch to maintain muscles flexibility
- Proper and comfort shoes
- Don' t jump

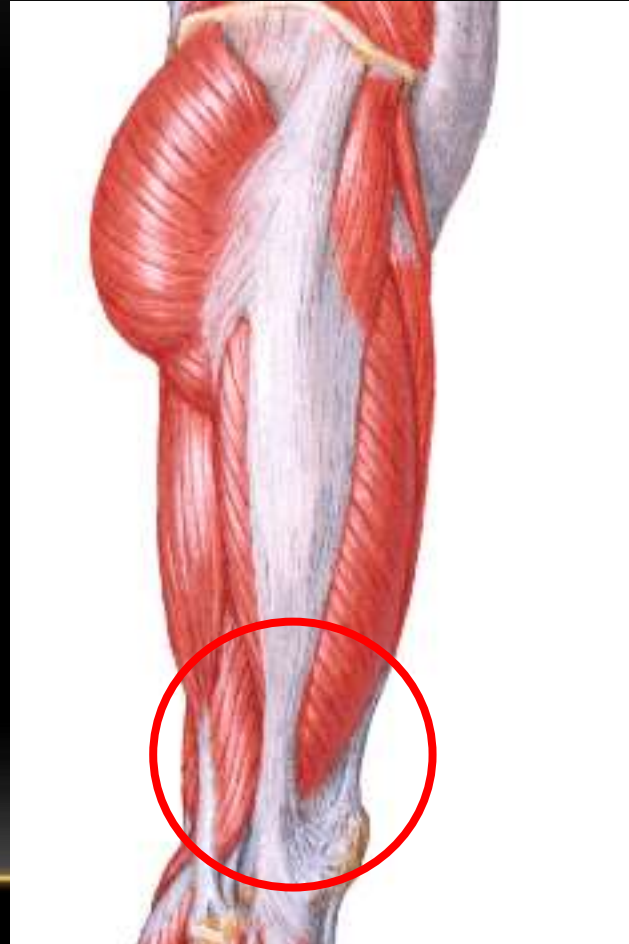




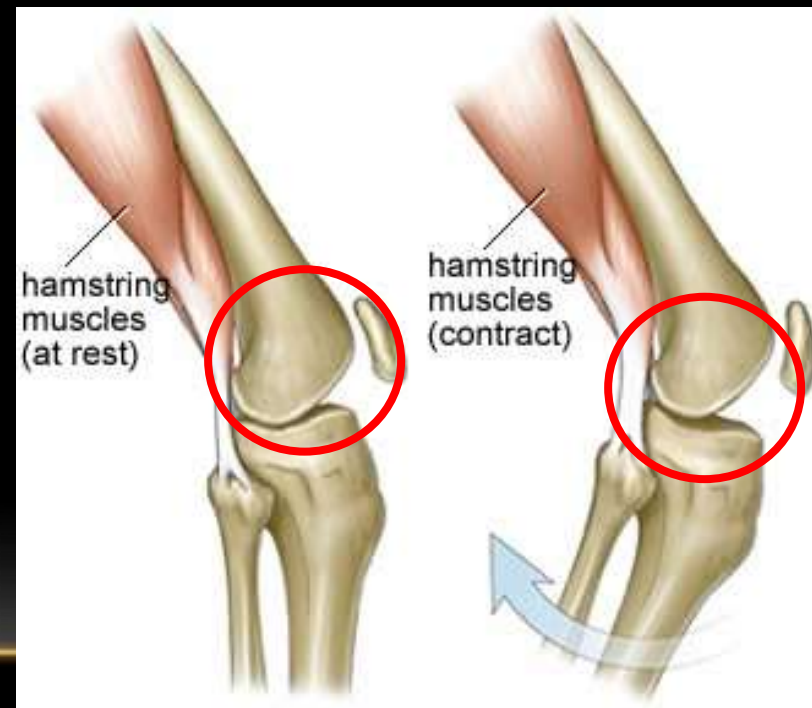
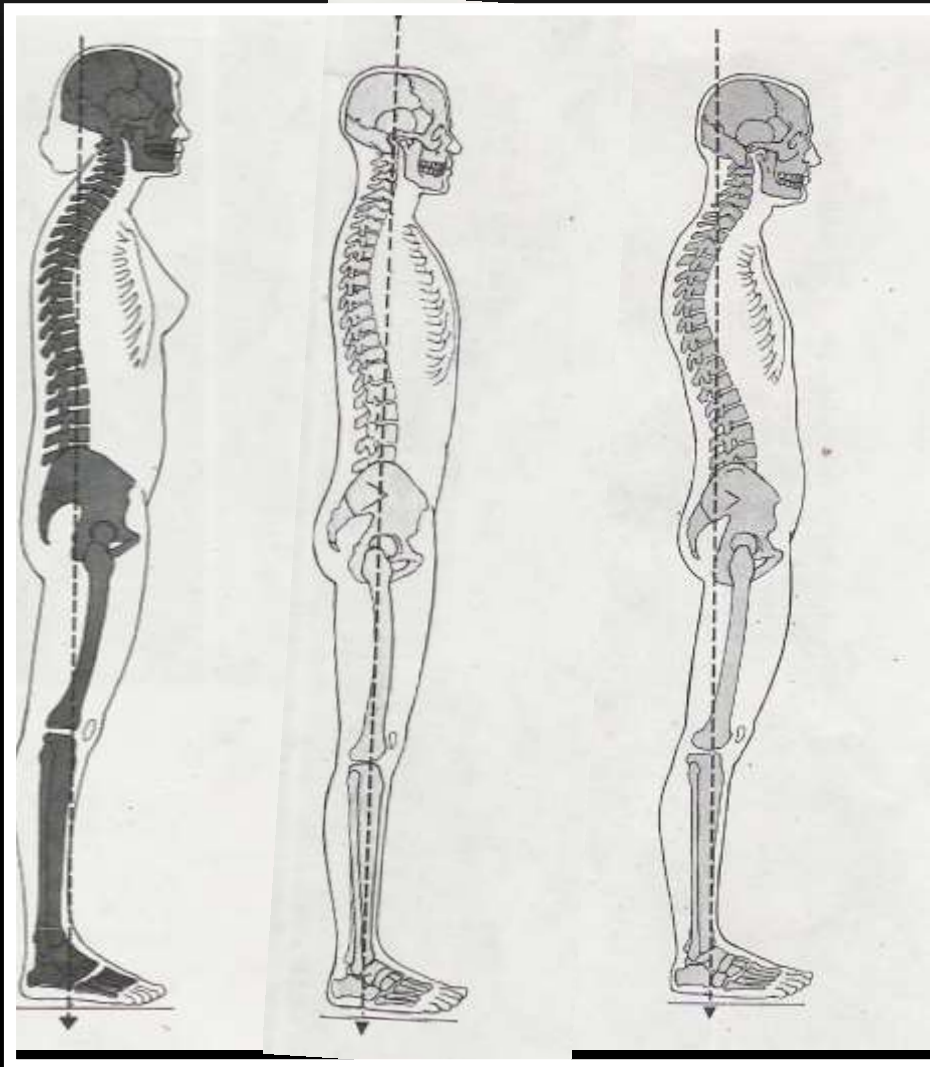
# ITB FRICTION SYNDROME

- repeated flexion and extension of the knee will cause the iliotibial band to rub against the lateral femoral epicondyle
- making the area inflamed and then resulting in pain.

# ILIOTIBIAL BAND FRICTION SYNDROME



# BODY ALIGNMENT





# SYMPTOMS

- A stinging sensation along the iliotibial band or outer part of knee joint during training or competitions
- Redness, hotness, swollen and painful knee cap
- Unable to flex or extend knee joint
- Intensified pain on walking downhill or downstairs
- For serious injuries, clients will experience the pain on daily activities or even at rest.

# WHAT SHOULD I DO?

- Train up your Gluteus muscles and Quadriceps muscles
- Keep stretch your Gluteus muscles and Quadriceps muscles to improve flexibility
- Proper shoes wear (especially flat feet)



## Iliotibial Band (ITB)

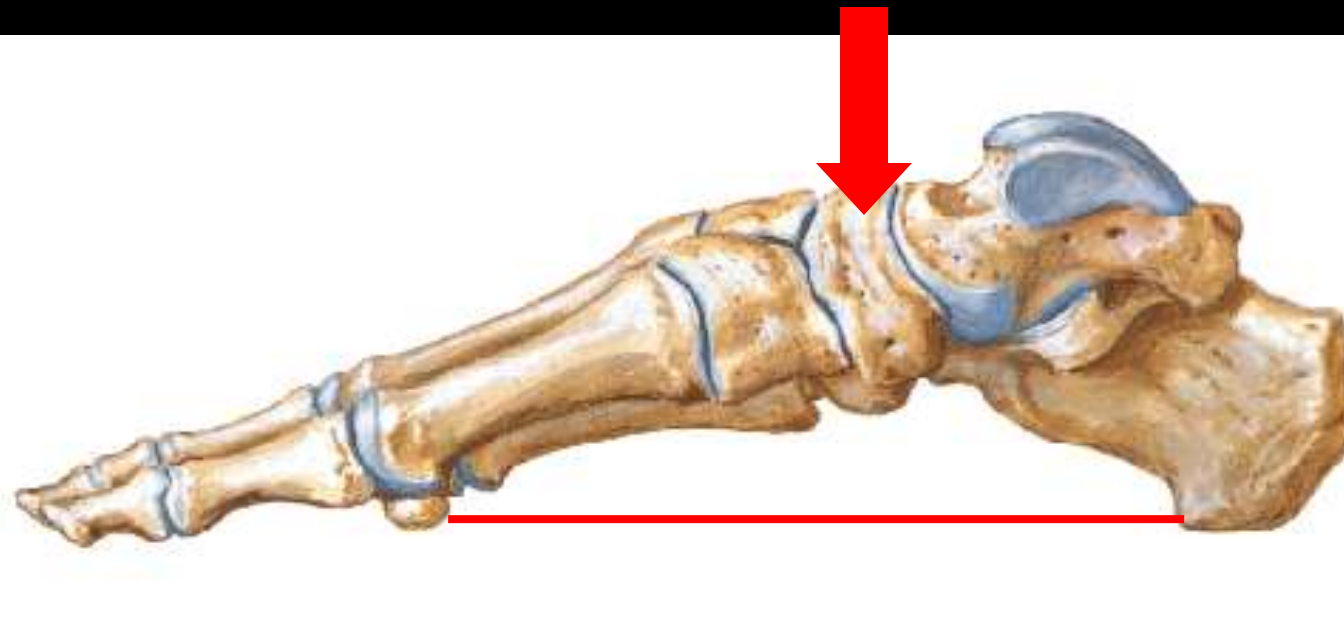
1. Lie on your side with left foot stepping forward to support your body.
2. Press the outer part of your right thigh muscles against the foam roller and roll up and down.
3. Repeat 20-30 times.
4. Switch to the other side.

# PLANTAR FASCIITIS

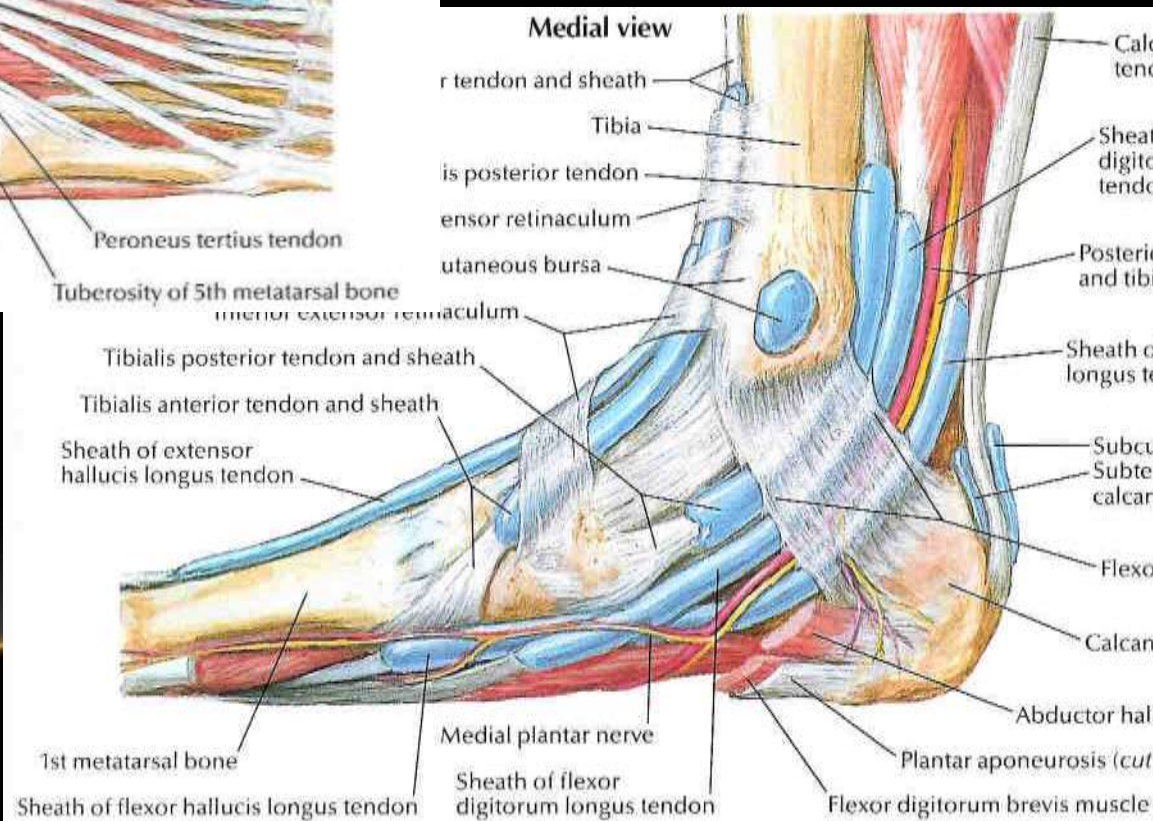
- Heel pain
- Loading exceeding the flexibility of plantar fascia
  - Overweight
  - Increase pronation



# PLANTAR FASCIITIS











# WHAT SHOULD I DO?

- Good shoes wear and insole
- Train up your muscles endurance (Tibialis Anterior).
- Keep stretch and improve (Gastronemius/Soleus) flexibility

## Toe-Crunch Exercise For Strength And Mobility

Lay a hand towel on the floor. Put half of your heel on the towel, half, on the floor. By curling the toes, pull the towel toward you all the way to the arch....

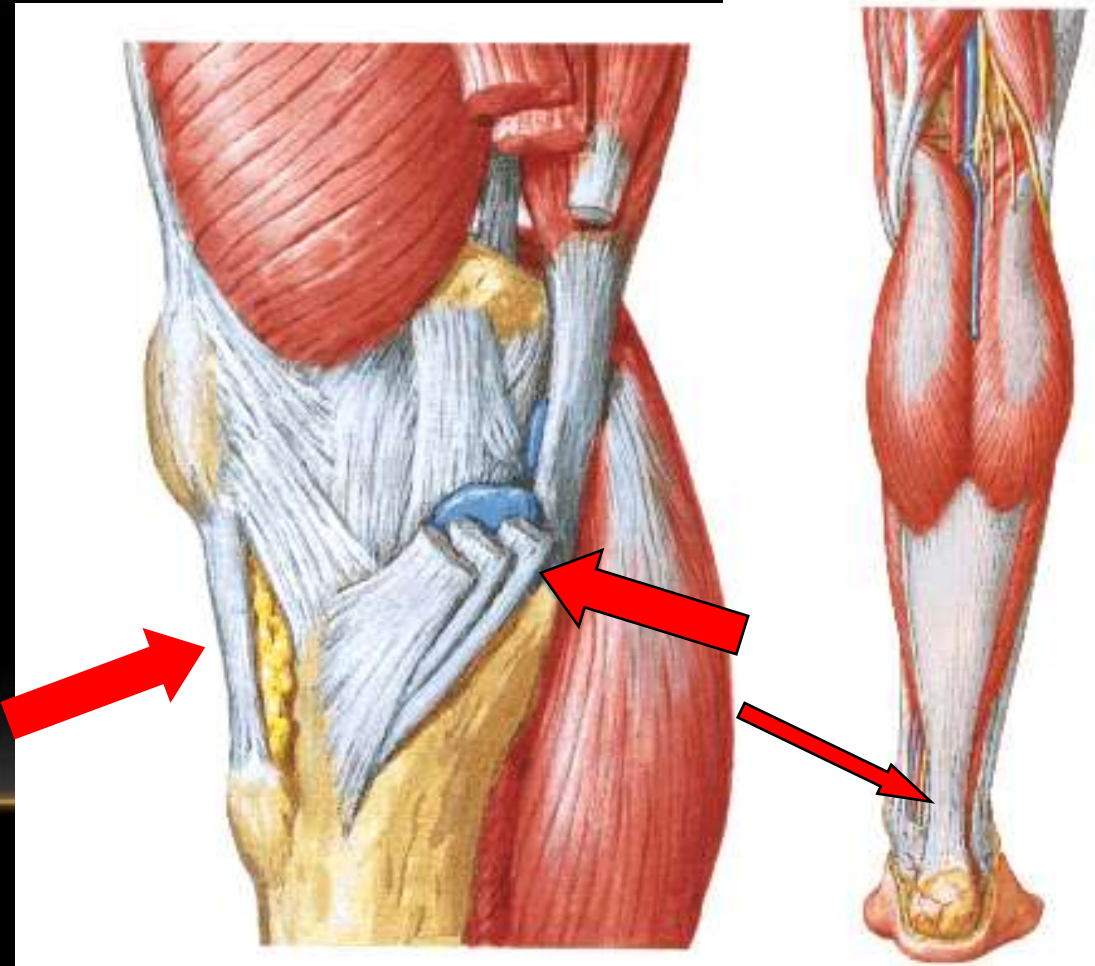


...Do 10 repetitions to start and increase gradually over time. A soup can (as shown in the illustrations) can be used to make the exercise more challenging.

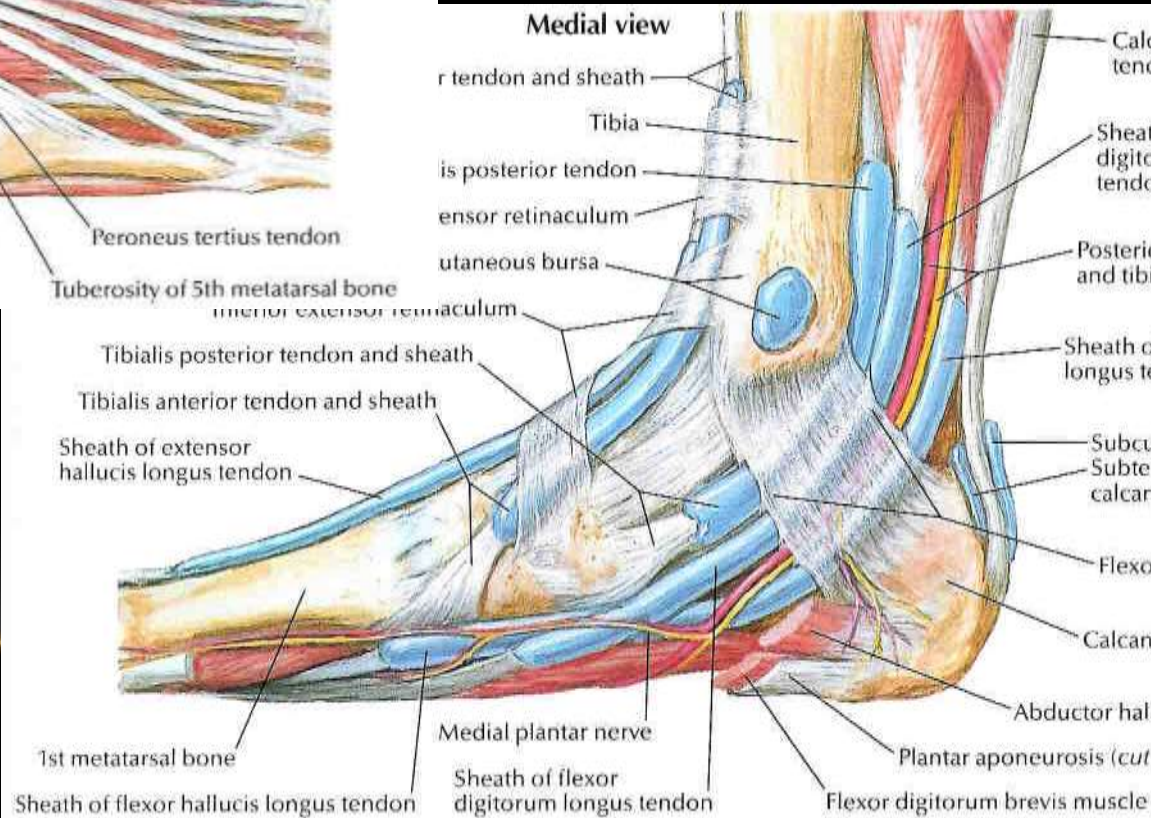
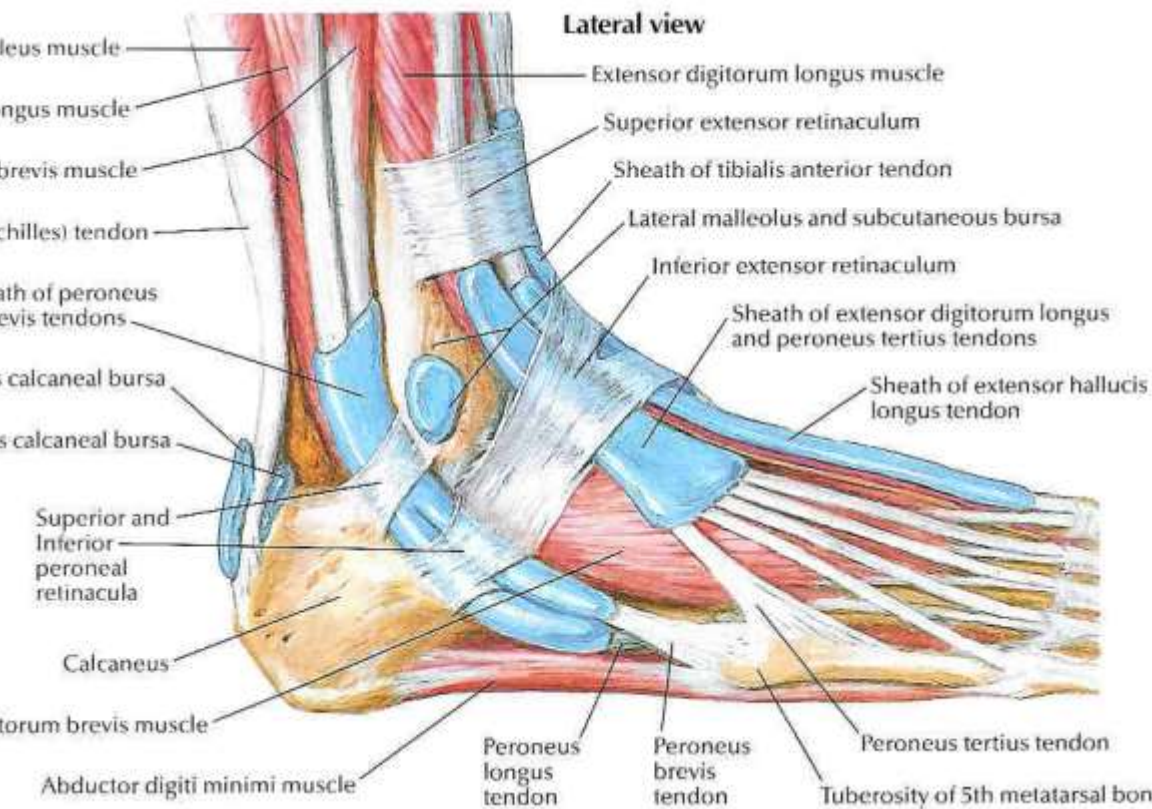


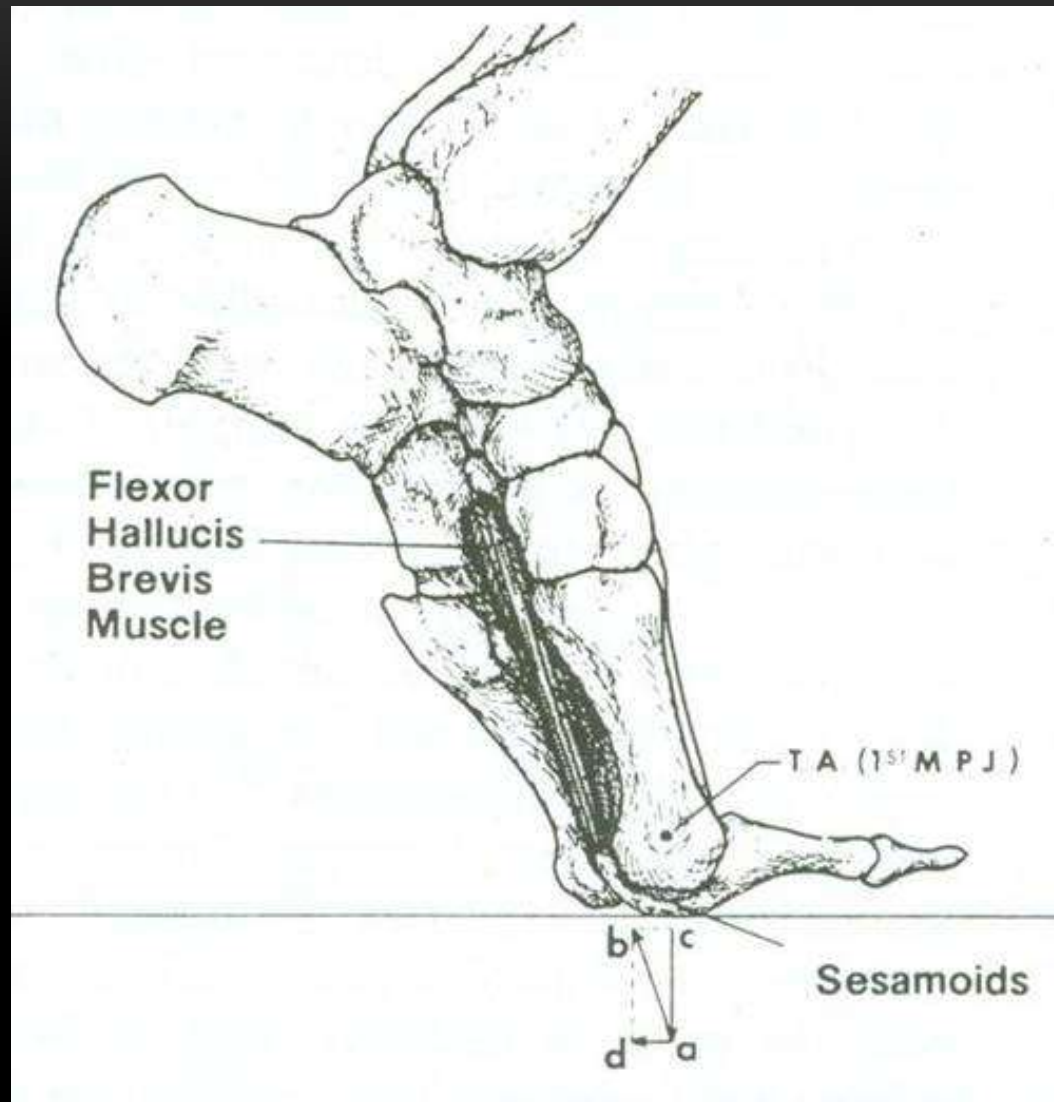
# TENDONITIS

- Inflammation of tendon
- Overuse due to Repeated concentric eccentric cycle











# INFLAMMATION

- Normal body response to 'problem'
- Acute phase - Increased circulation
  - Sign and symptoms
    - Redness, Swelling, Increase temp, Pain
  - Management
    - Control sign and symptoms
    - R.I.C.E

# INFLAMMATION

- Sub-acute stage
  - Repairmen of the damage
  - Management
    - Controlled activities
- Chronic Stage
  - Remodeling
  - Scar formation
  - Management
    - Restoring normal function
    - Range, Strength, Power, Endurance, Proprioception





# PREVENTION:

- Avoid **RAPID** increase training intensity
- **Stretch** more!!!
- Proper footwear and insole

# PREVENTION:

- Listen to your body
- Understand your body
- Train up your body
- Avoid from injury



# TRAUMATIC INJURY

# TRAUMATIC INJURY

- Ligamentous sprain
- Muscle tear
- Fracture
- Dislocation

# LIGAMENTOUS AND MUSCLE INJURY

- Grade I to III
  - **Grade I** – Minor injury, no laxity, function well preserved
  - **Grade II** – Moderate Injury, Laxity (lig.), functional disturbance
  - **Grade III** – Complete torn, Laxity or even dislocation, Great functional disturbance

# SITE OF COMMON LIGAMENT SPRAIN

- Anterior Talofibular Ligament
- Anterior Cruciate Ligament
- Medial / Lateral Collateral Ligament



# STRETCHING EXERCISES

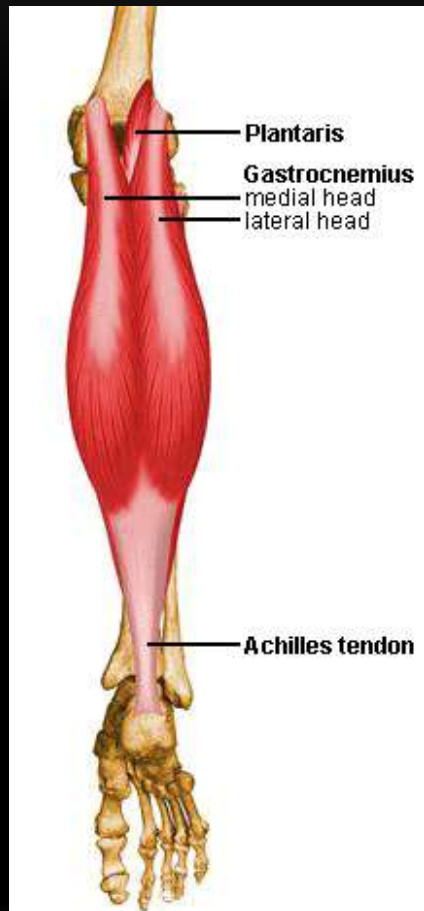




# GUIDELINES FOR STRETCHING

- Know the muscle **direction** and **location**
- Chose a stable position
- **Slow and steady stretch**
- **Avoid** overstretch
- Normal breathing
- **Hold for 15-30 seconds**
- **Repeat 2-4 times**

# GASTRONEMIUS







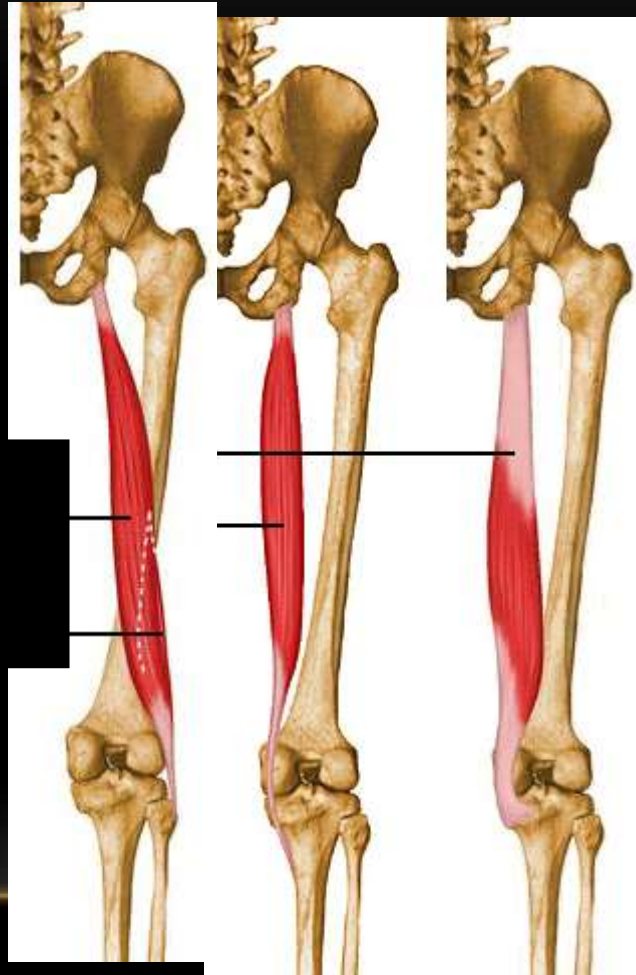








# HAMSTRINGS (腓繩肌)





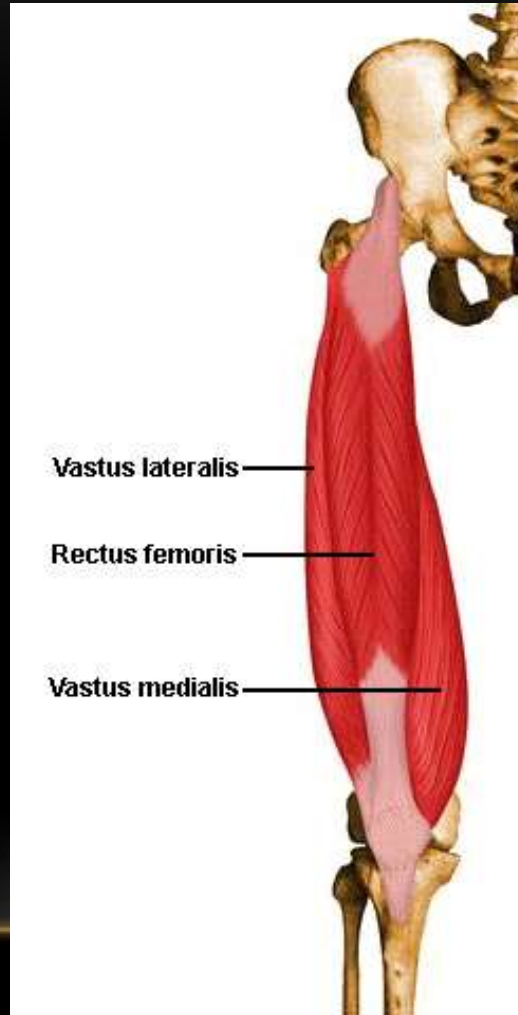
# HAMSTRING STRETCH







# QUADRICEPS (股四頭肌)

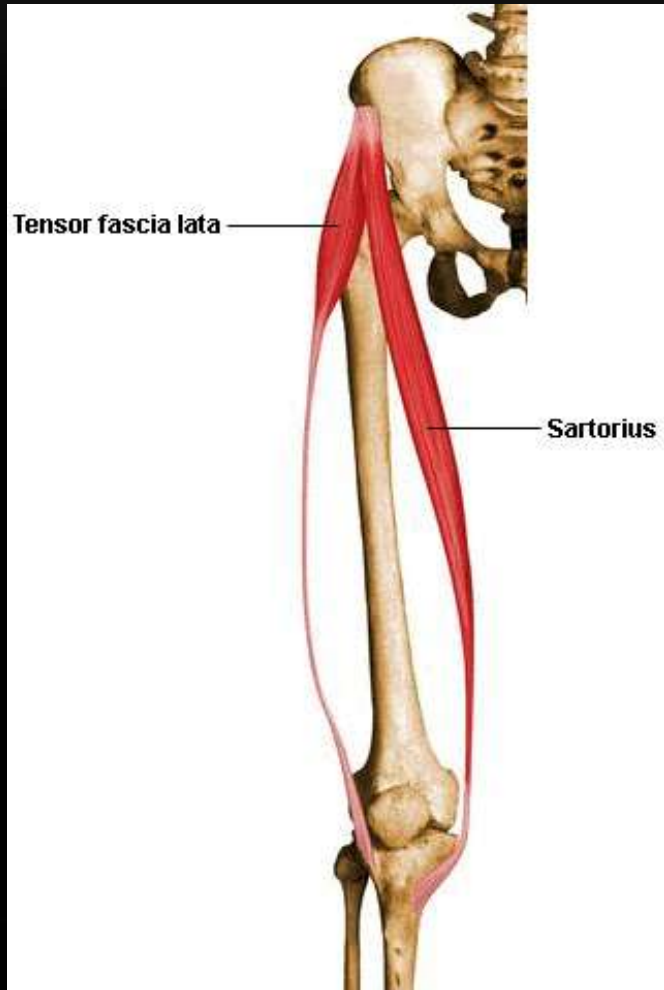


# QUADRICEPS STRETCH





# ILIOTIBIAL BAND (髂脛束)

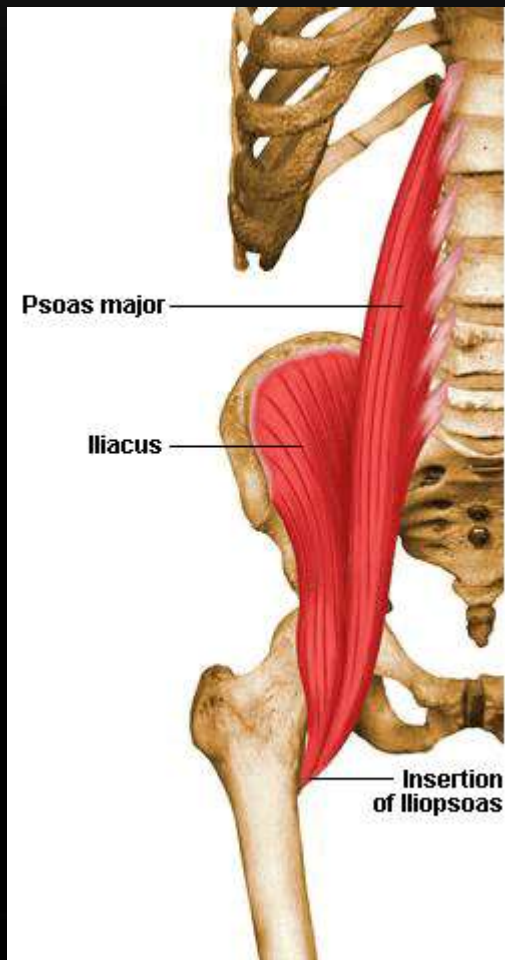






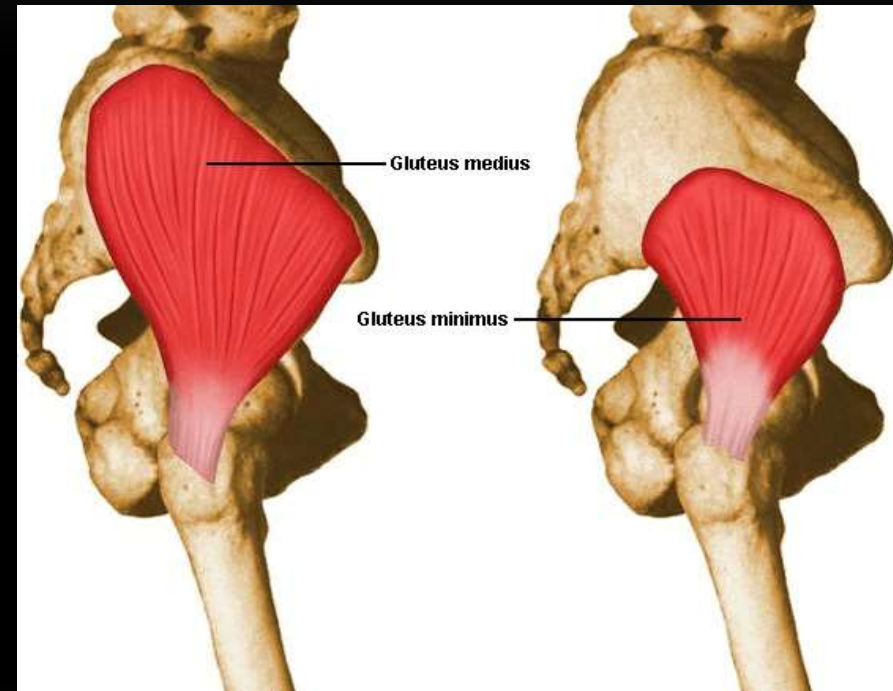
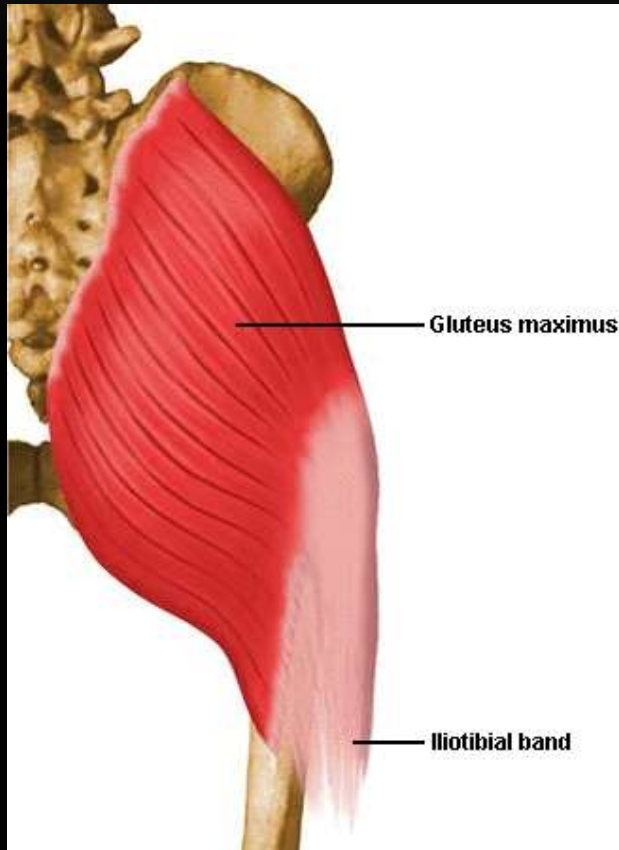


# ILIOPSOAS (髂腰肌)





# GLEUTEUS MAXIMUS, MEDIUS, MINIMUS (臀大、中、小肌)



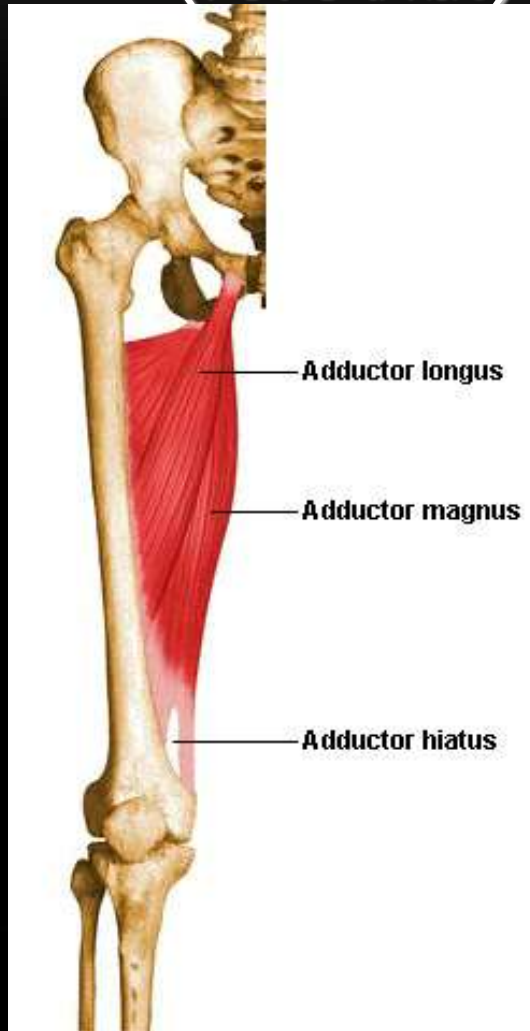








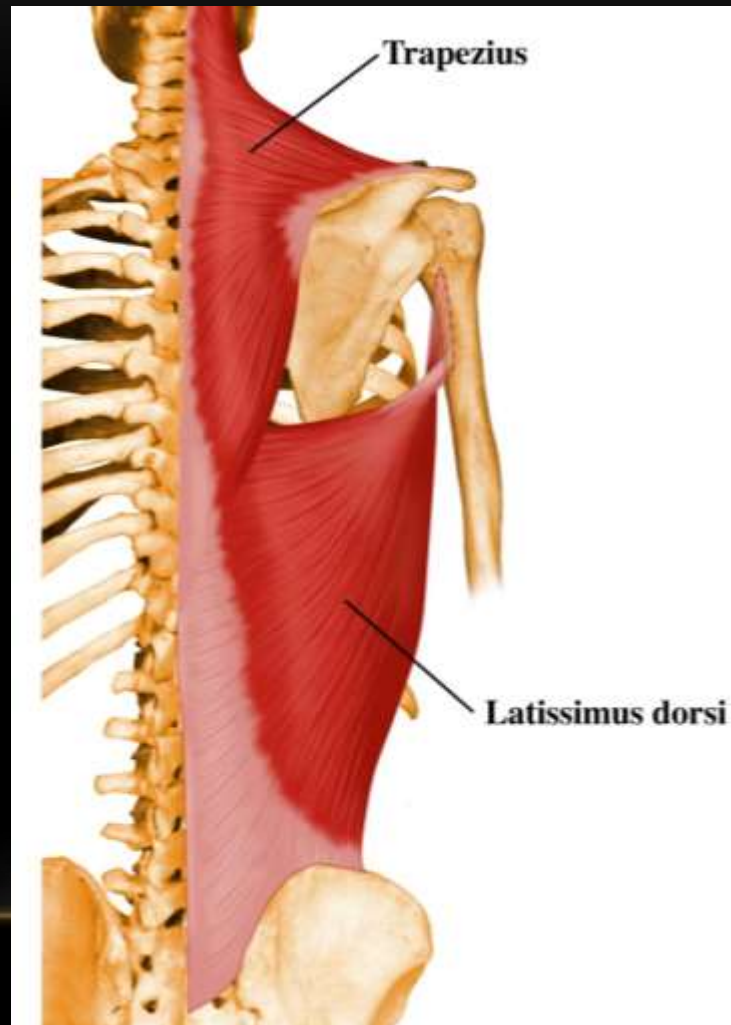
# ADDUCTOR LONGUS, MAGNUS (臀內收肌)



# INNER THIGH STRETCH



# UPPER TRAPZIUS (上斜方肌)





# NECK AND CHEST STRETCH







# LATISSIMUS DORSI (背闊肌)



# BACK STRETCH



# 背肌





# CHOICE OF SHOES

A collection of various shoes, including sandals and sneakers, displayed on a wooden rack. The shoes are arranged in rows, with some hanging from the top and others placed on the lower shelves. The colors range from dark brown and black to light tan and red. The background is a wooden wall, and the floor is made of wooden planks.



# FUNCTION OF SHOES

- Maintain foot stability
- Shock Absorption
- Provide firm lever system for propulsion

# FOOT TYPE AND STABILITY

Neutral



Optimum

Neutral

High Arch



Rigid

Cushion

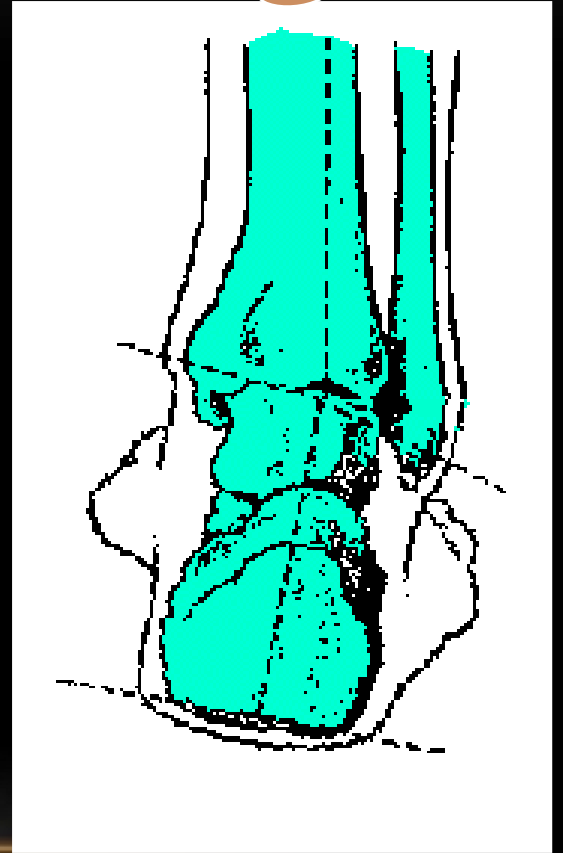
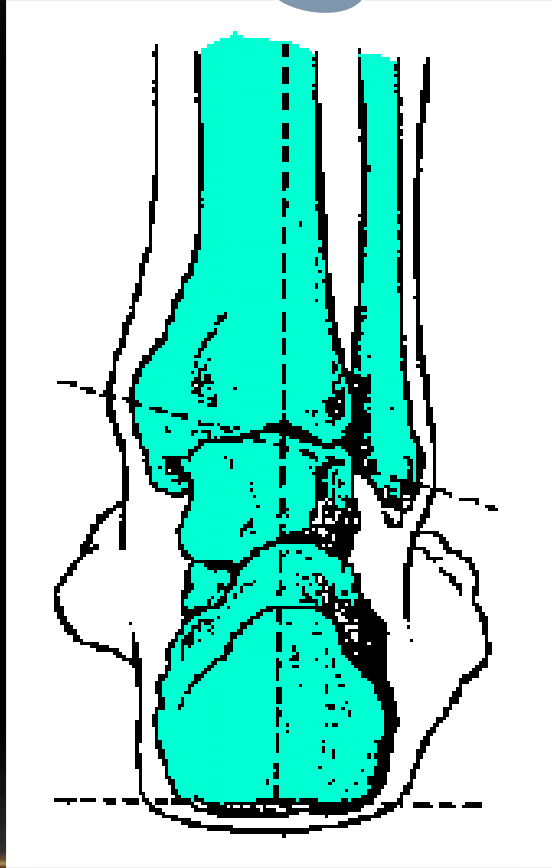
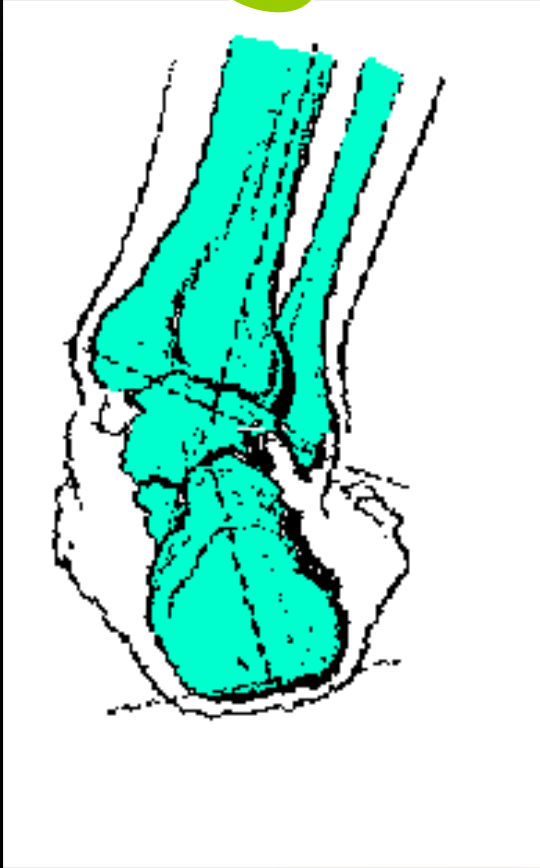
Flat Feet



Floppy

Support







- 內翻形  
Hyperpronated

- 正常腳形  
Neutral

- 外翻形  
Hypopronated

- 支撐形運動鞋  
Support shoes

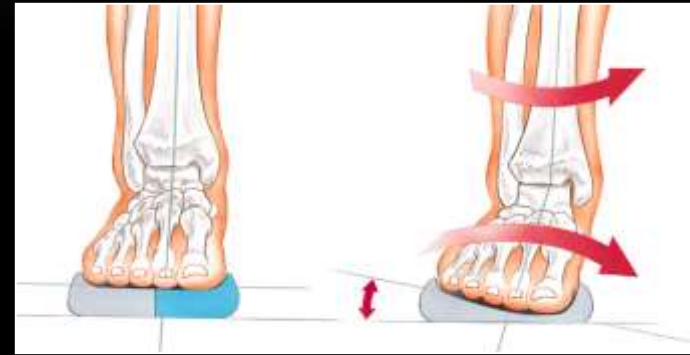
- 普通運動鞋  
Neutral shoes

- 保護形運動鞋  
Cushion shoes

## CHOICE OF SHOES

- Trainer for Section 1,2, 8 to 10
- Hiking shoes / boot at night when poor vision may lead to twisting of ankle
- Hiking shoes / boot for rainy day for Section 1 as it's slippery in San Wan Shan's trail

# SUPPORTING SHOES (固定及支撐腳弓)







# Proper shoes wear

- The hiking boots should provide good ankle support, shock absorption and strong leverage for the forward motion.
- **Caution:** Don't wear new shoes on the Trailwalker event day.

# BLISTER MANAGEMENT

- Check whenever feel feet discomfort
- Blister may form in pressure area with repeated rubbing
- Advice
  - Good fitting shoes
  - Change socks
  - Double layers socks
  - Apply cream
  - Apply second skin



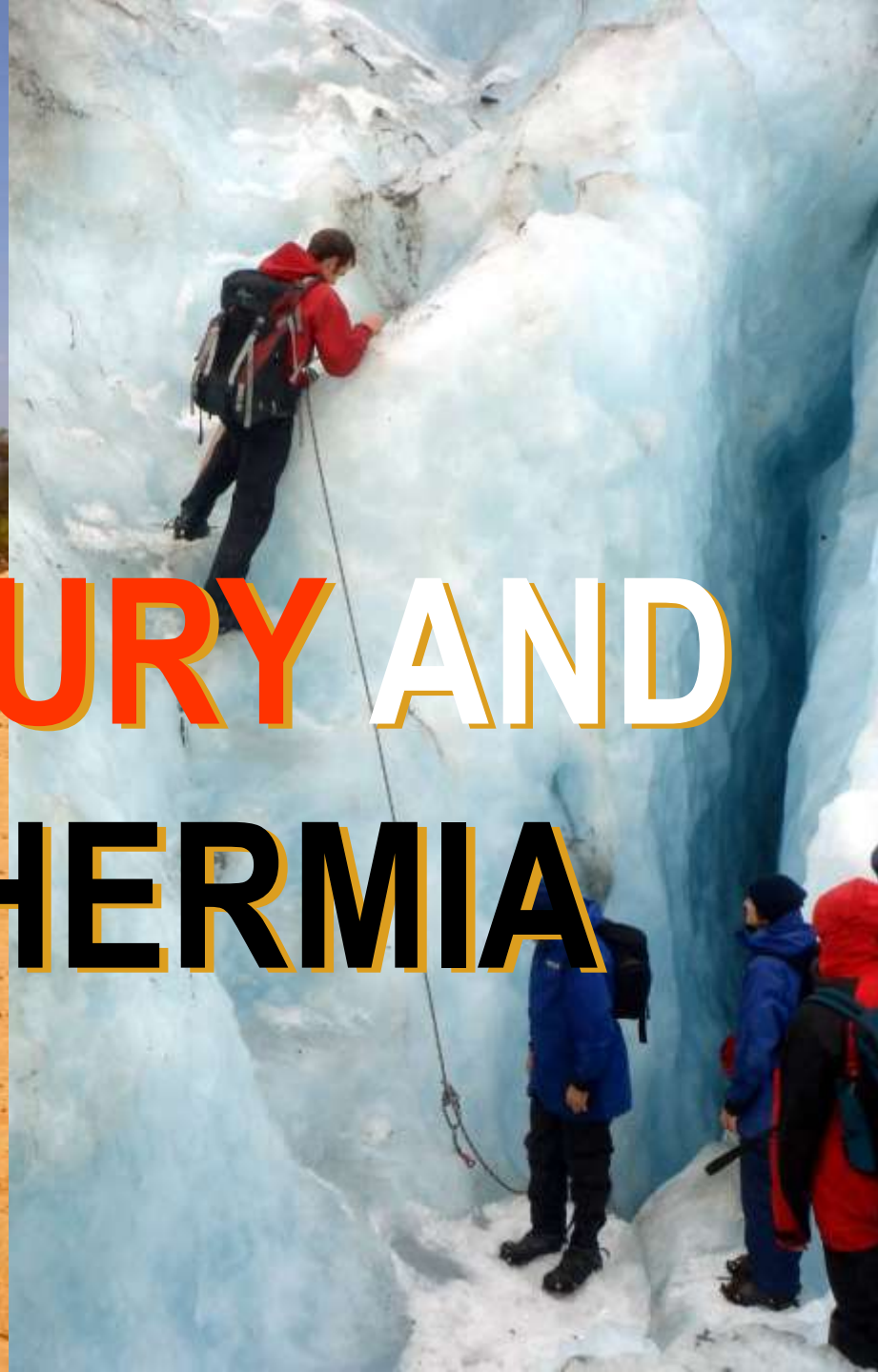




- Application of second skin
- Secure it with tapes
- Avoid creating another pressure area







# HEAT INJURY AND HYPOTHERMIA

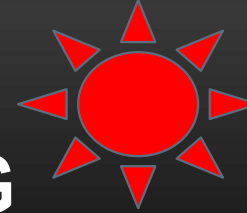








# FIELD TRAINING



## Speed VS Injury/Trauma

- Walking Pattern
- Foot placement
- Agility
- Eye–Foot Coordination
- Proprioception
- Eccentric control

## Training VS Overuse

- Training:
  - Frequency
  - Intensity
  - Type
  - Time
- Post-Training Care
- Training Progression









# GLUTEUS MUSCLES (MAXIMUS, MEDIUS, MINIMUS)



Clam Shell 蚌式



Hip abduction 髖外展



Hip extension  
髖伸展



Hip extension with knee flexed  
髖伸展並同時膝屈



Terminal Knee Extension  
終端膝伸展



## Question 問題:

- Why these exercises are important before weight bearing training? If weak VMO / gluteus medius, what will happen to the injured knee joint?
- 為什麼這些運動在著地負重訓練前是極為重要? 如果股內側和臀中衰弱, 受傷的膝會如何?



# VMO (VASTUS MEDIALIS OBLIQUE)



Mini wall squat 靠牆微蹲



60° Free Squat  
60度蹲舉



60° Double Leg Squat  
On Balance Disc 平衡墊上60度  
蹲





# BALANCE AND ECCENTRIC CONTROL



Single leg stand  
balance 單腿平衡

Eyes closed  
閉眼

Single leg stand balance on  
Disc/BOSU 平衡墊/博速球單腿平  
衡



Forward Step Down  
向前下臺階

Lateral Step Down  
側面下臺階

Hip Hiking Glute Med  
骨盆上揚臀中訓練

# GLETEUS MEDIUS MAUCLE



Monster Walk with Band  
橡皮帶怪獸走路



Standing Hip Diagonal  
Abduction with Band  
站立橡皮帶對角髖外展

Three Questions 三個問題:

- 1) What muscle is focused? 這主要練什麼肌肉
- 2) Which leg is focused (standing/swinging) 練哪一條腿(站立/擺動)?
- 3) Why is this exercise important to prevent knee pain and re-injury?  
為什麼這個訓練對預防膝蓋疼痛和再受傷是很重要的?

# NORDIAC HAMSTRING



Nordiac Hamstring Exercise  
北歐膕繩肌練習

## Highlight 亮點:

- A new but famous exercise for hamstring strain, tendinopathy and ACL reconstruction
- If too hard to weak player, assistance by elastic band/cord can be considered
- 一個較新但很有名的針對膕繩拉傷, 肌腱炎及前叉重建康復的練習
- 如果對抗高強度的選手太困難, 可以考慮用橡皮帶增加協助

# PRINCIPLES OF TRAINING

- Major objective in training is to cause **biological adaptation** in order to improve performance in a specific task (McArdle et al 1986)



# PRINCIPLES OF TRAINING

- **Overloading Principle**
  - “For a tissue or organ to improve its function, it must be exposed to a load to which is not normally accustomed. ”
- **Specificity Principle**
  - Training effect derived from an exercise program are specific to the exercise performed and muscles involved.  
(ACSM guidelines for exercise testing and prescription)
- Individual difference principle
- Reversibility

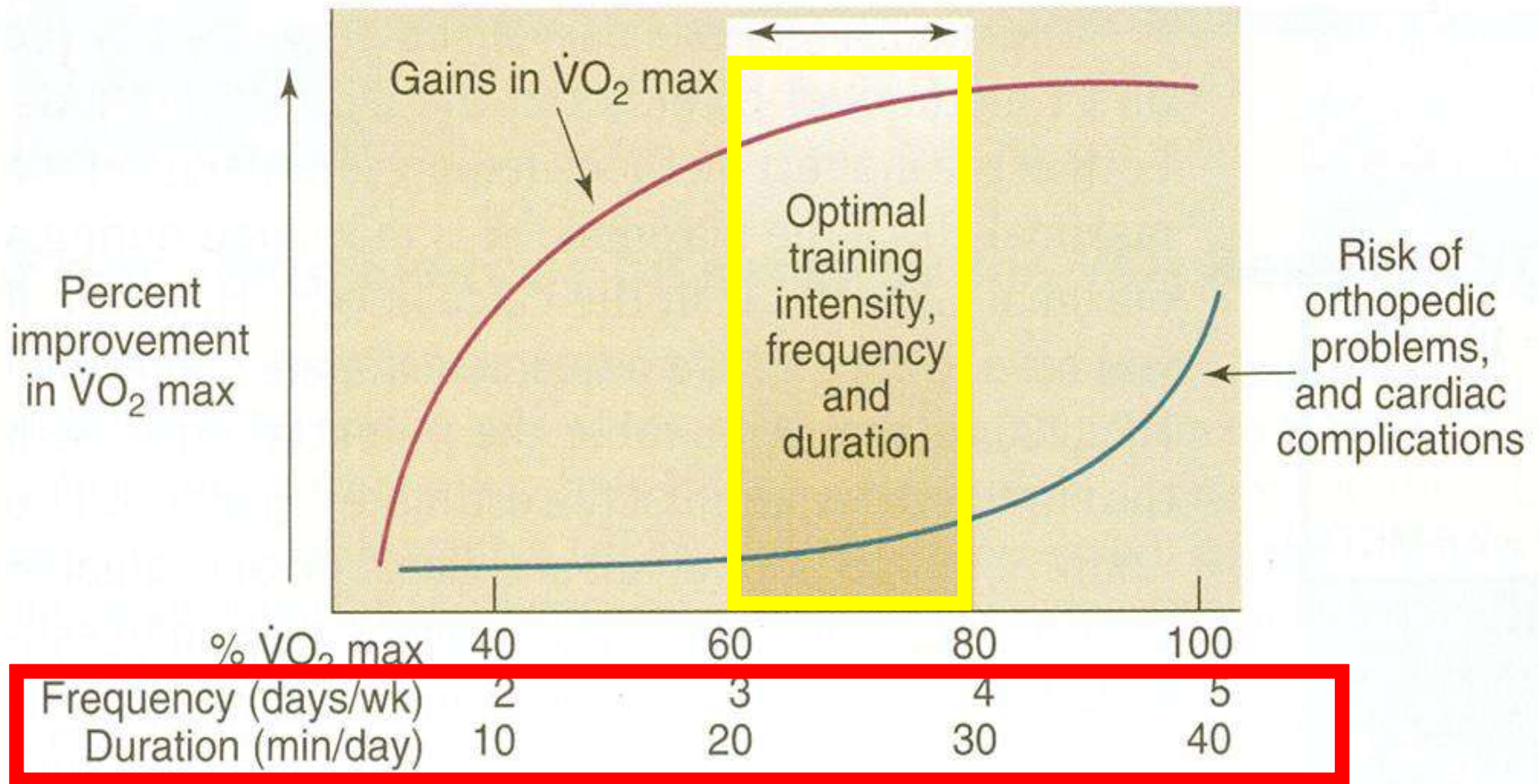
# EXERCISE TRAINING SESSION

- Warm Up
  - 10-20 mins
- Endurance/ Conditioning Phase
  - Depend on sports and aims
- Cool Down
  - 5-10 minutes

# AEROBIC EXERCISE - INTENSITY

- Maximum HR ( $HR_{max}$ )
  - $220 - \text{age}$
- Heart rate reserve (HRR)
  - difference between heart rate maximum and resting heart rate.
  - $HR_{max} - HR_{rest}$
- Maximum Oxygen Consumption ( $VO_{2max}$ )
  - Use for estimation of energy expenditure (metabolic calculation)
  - Functional Capacity ( $\text{mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ )
  - Metabolic Equivalents (METS)
- Rate of perceived Exertion (RPE)
  - Range from 6-20
  - Average range from 12-16 to achieve physiologic adaptation.

# F.I.T.T. PRINCIPAL & INJURY PREVENTION





# EXERCISE PRESCRIPTION:

## SPECIFY VARIABLES - **FITT**

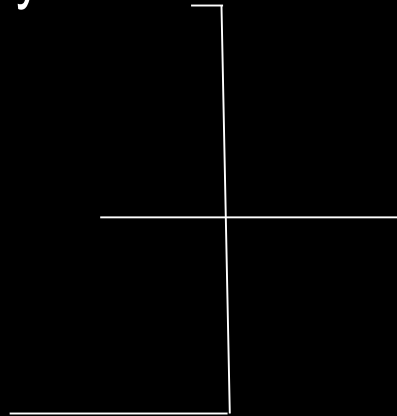
*(ACCORDING TO THE EFFECT ON DIFFERENT PARAMETERS OF PHYSICAL FITNESS)*

- **F** – Frequency

- **I** – Intensity

- **T** – Time

- **T** - Type



Denotes the total training volume which will affect the outcome of exercise

Determines the parts of the body which will gain benefit

# AEROBIC EXERCISE - INTENSITY

## HR VS HRR

HR <sub>max</sub> (beats·min <sup>-1</sup> )	Resting Heart Rate							
	HR <sub>max</sub> Method		Heart Rate Reserve Method					
			60 beats·min <sup>-1</sup>		70 beats·min <sup>-1</sup>		80 beats·min <sup>-1</sup>	
	70%	85%	60%	80%	60%	80%	60%	80%
140	98	119	108	124	112	126	116	128
150	105	128	114	132	118	134	122	136
160	112	136	120	140	124	142	128	144
170	119	145	126	148	130	150	134	152
180	126	153	132	156	136	158	140	160
190	133	162	138	164	142	166	146	168
200	140	170	144	172	148	174	152	176

\*Calculated for age adjusted estimates of maximal heart rates for 20 to 80 year olds (220 – age) using both the percent of maximal heart rate and the heart rate reserve methods, with 3 different resting heart rates (60, 70, 80 beats·min<sup>-1</sup>) used in the latter calculation.

# How can Physiotherapist's helps?

## Before the event

Provide training tips to participants at the briefing session for **injury prevention and management**, including demonstration of **proper stretching techniques**.

# How can Physiotherapist's helps?

## During the event

Provide **on-site physiotherapy support** to participants, e.g.  
emergency physical treatment  
of injury

(Soft tissue management,  
muscle recondition and applying  
sports taping, etc.)



# SUMMARY

- **Prevention** is better than cure
- More tired, more injury
- Everyone should overuse, take **good care** to your own body

# SUMMARY

- Listen to your body
- **Enjoy** and complete the walk with teammates!!

A scenic landscape at sunrise or sunset. The sun is a bright, glowing orb in the upper center, casting a warm, golden light across the sky. Below the sun, a range of mountains is visible, their peaks softened by a light haze. The middle ground is filled with a thick layer of white, fluffy clouds that appear to be rising from the valleys. In the foreground, the dark silhouettes of trees and foliage are visible against the lower edge of the clouds. The overall mood is peaceful and majestic.

**THANK YOU!**

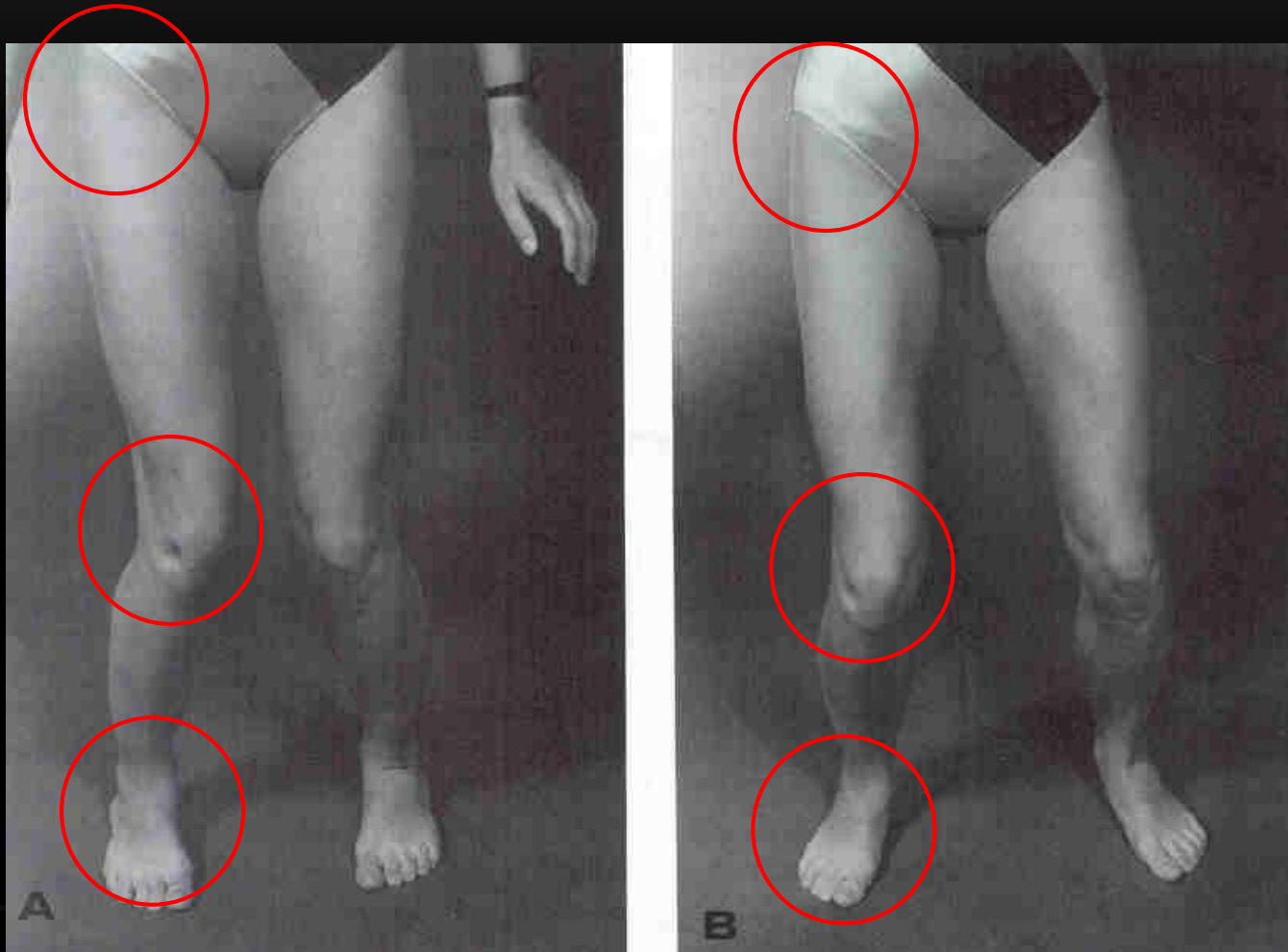
**ENJOY YOUR WALK!**

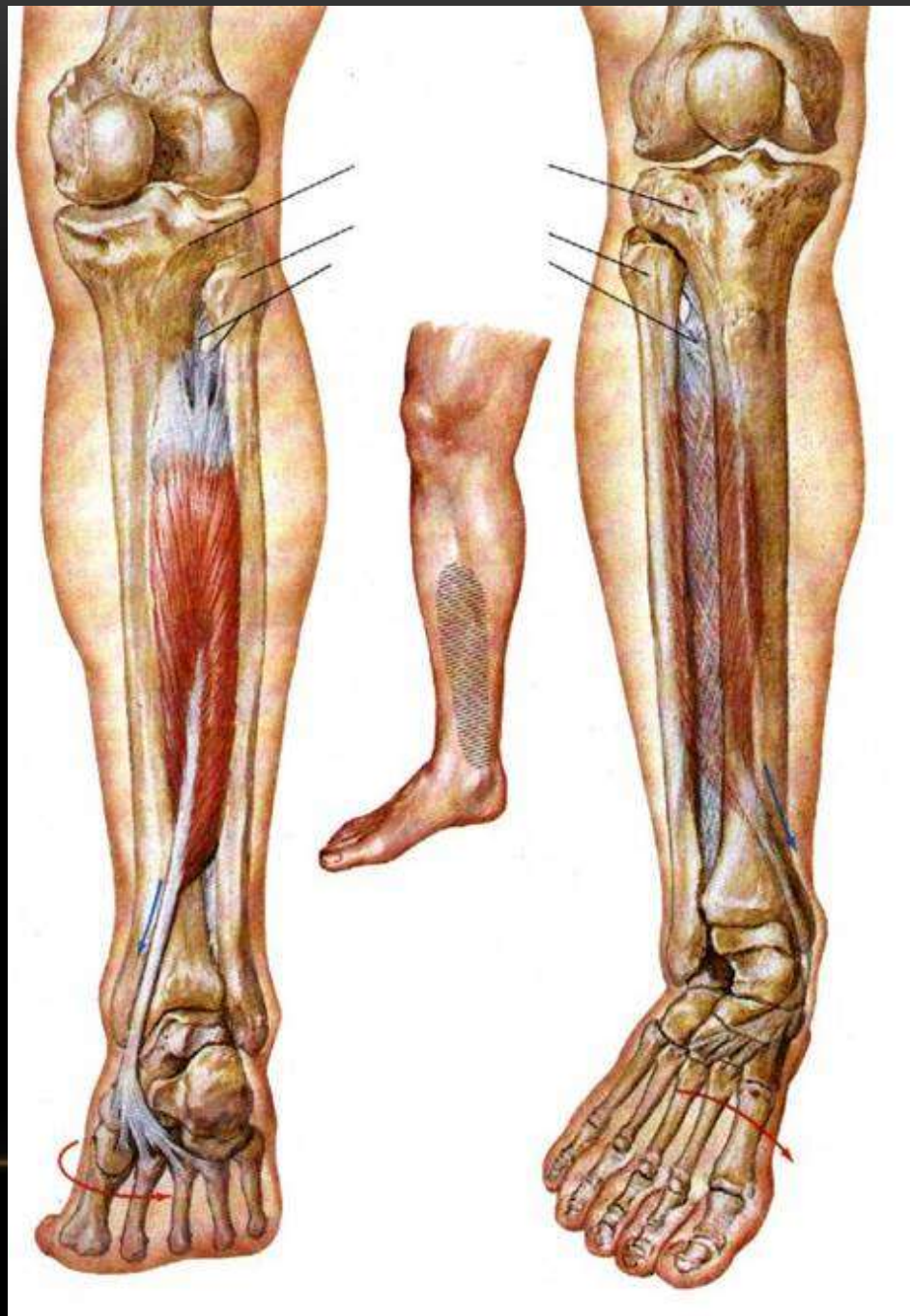
Physiotherapy 物理治療 CP8  
Podiatry 足病診療 CP8





# BODY ALIGNMENT

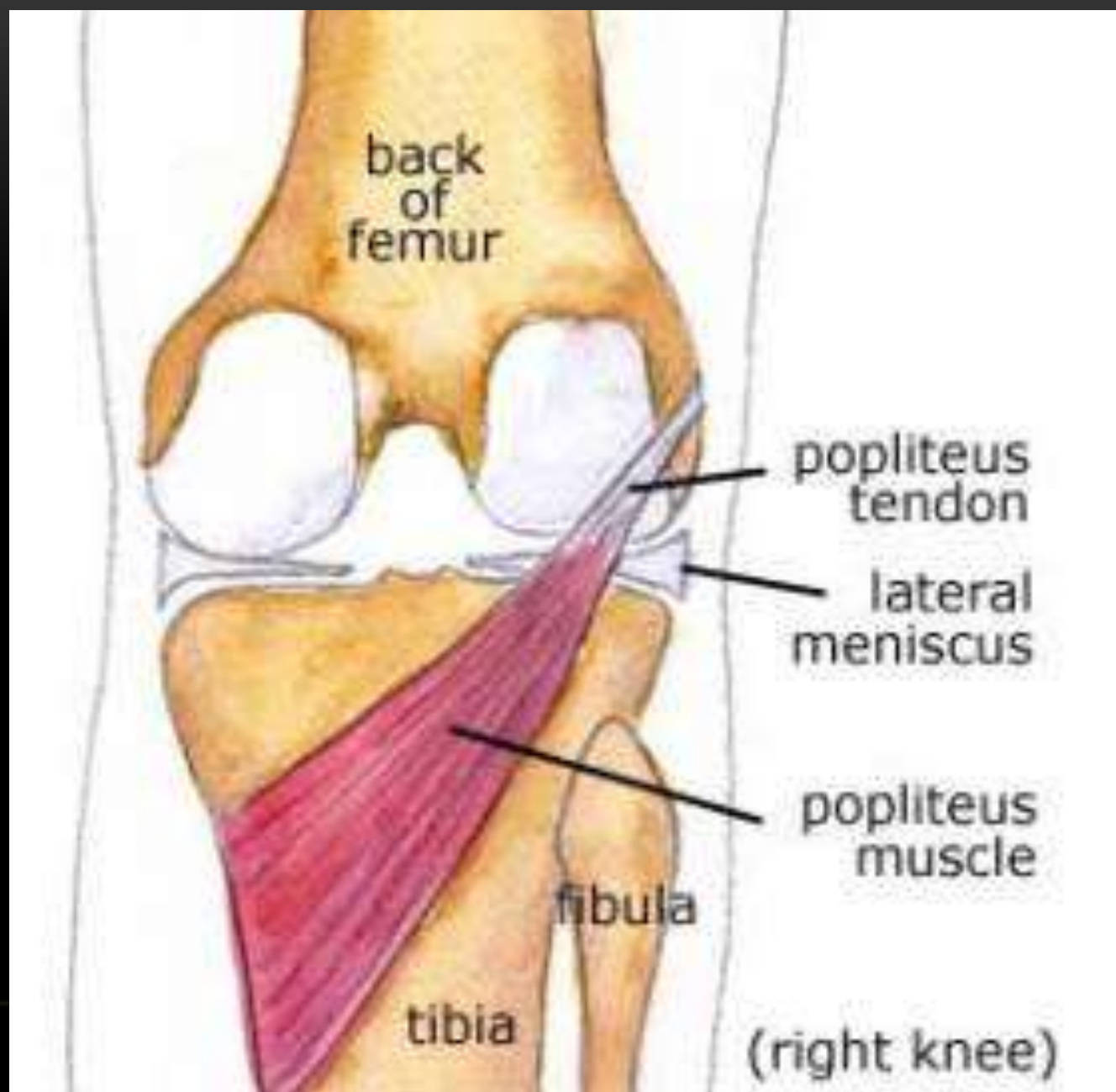






Physiotherapy 物理治療 CP









# Physiotherapy 物理治療

CP8







# HEAT REGULATORY SYSTEM

**Heat (Metabolism)**  
**Exercise**  
**Shivering**  
**Radiation**

**Heat  
Generation**

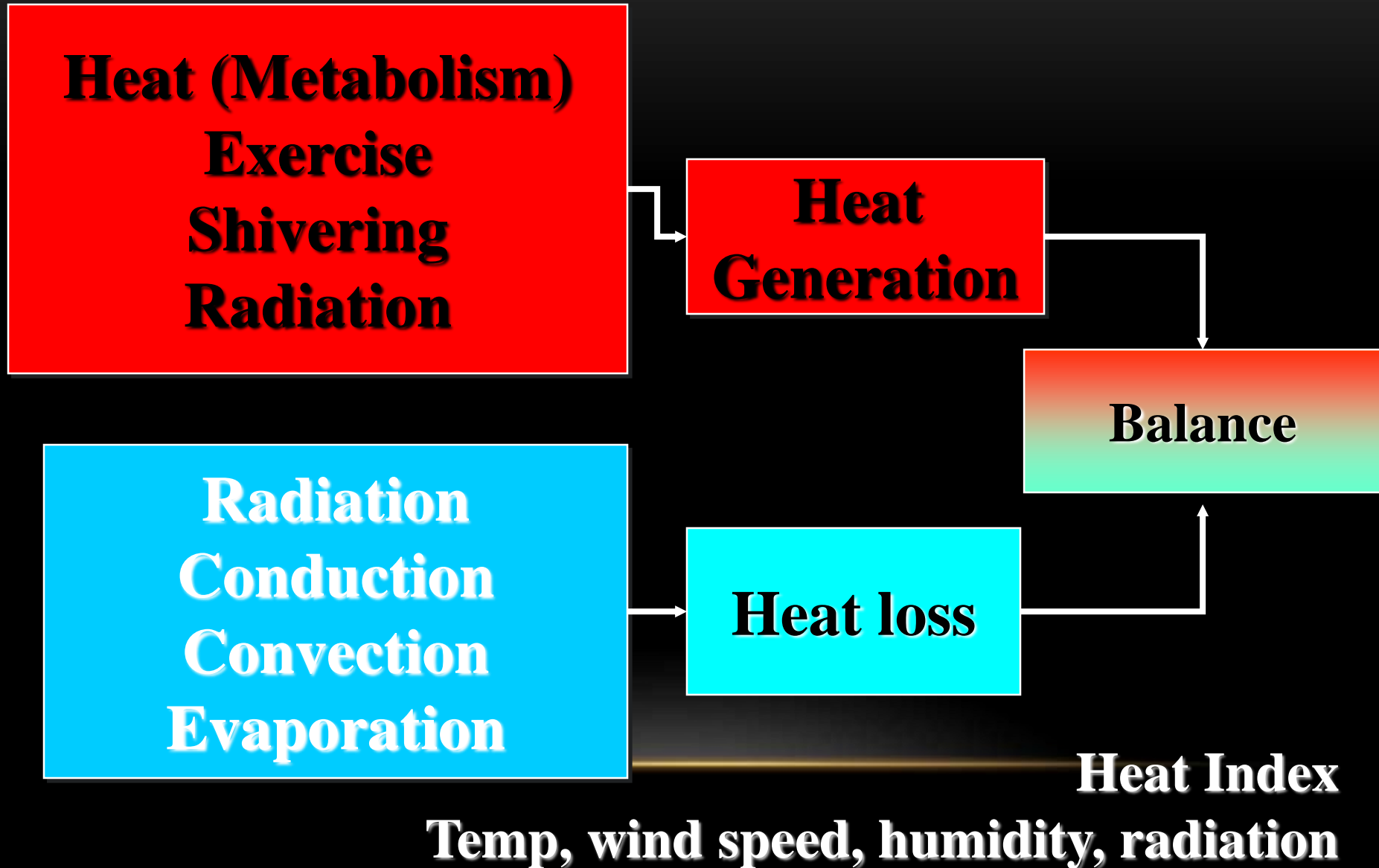
**Balance**

**Radiation**  
**Conduction**  
**Convection**  
**Evaporation**

**Heat loss**

**Heat Index**

**Temp, wind speed, humidity, radiation**





# HEAT INJURY

**Electrolyte loss**

**Hot and humid  
weather without  
adequate fluid  
supply**

**Heat Cramp**

**Dehydration**

**Sweating+++**

**Headache**

**Weakness**

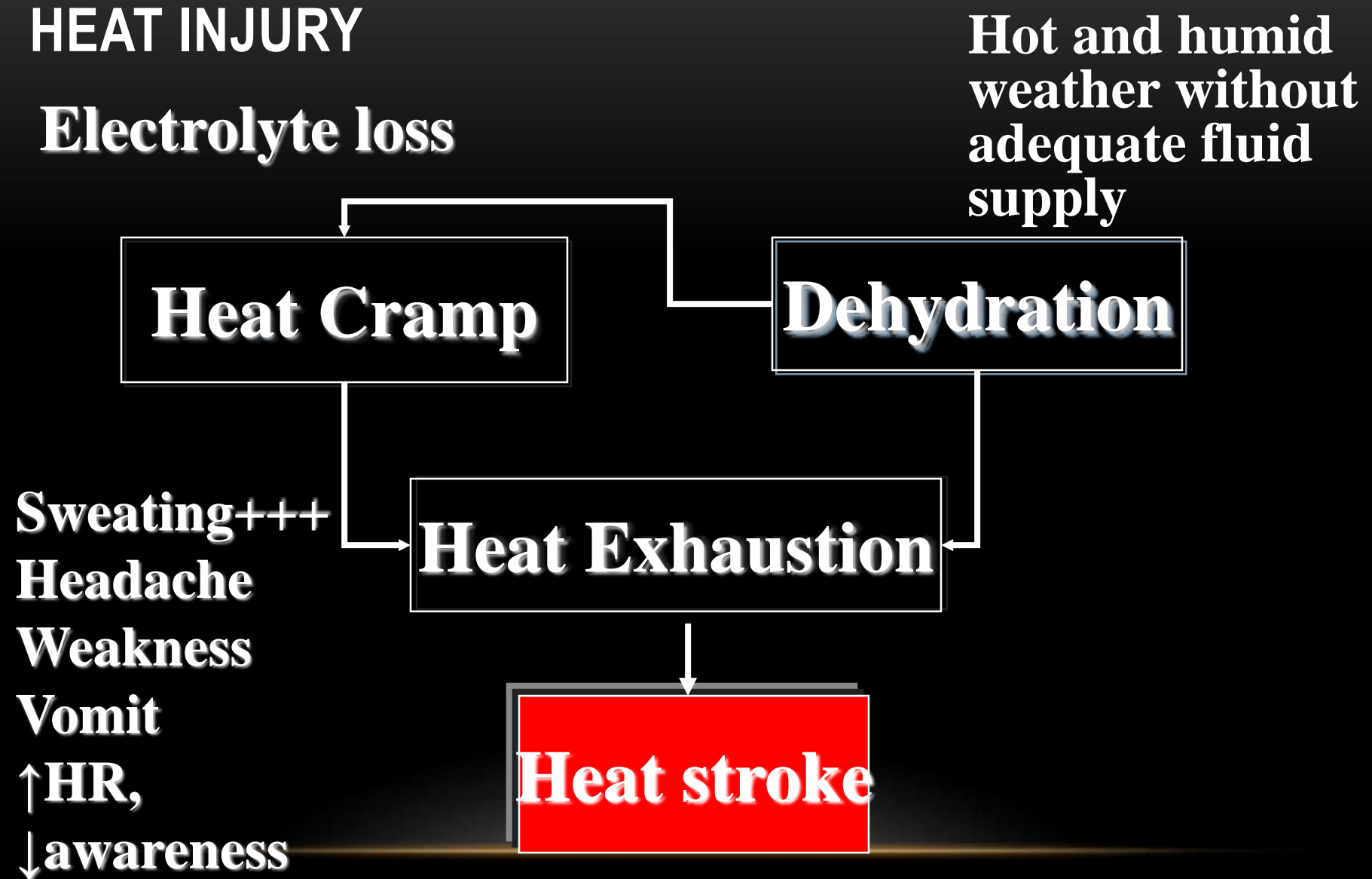
**Vomit**

**↑HR,**

**↓awareness**

**Heat Exhaustion**

**Heat stroke**



# HEAT INJURY

**Drink / electrolyte**

**Pre-ex,  
replenish during ex**

**Heat Cramp**

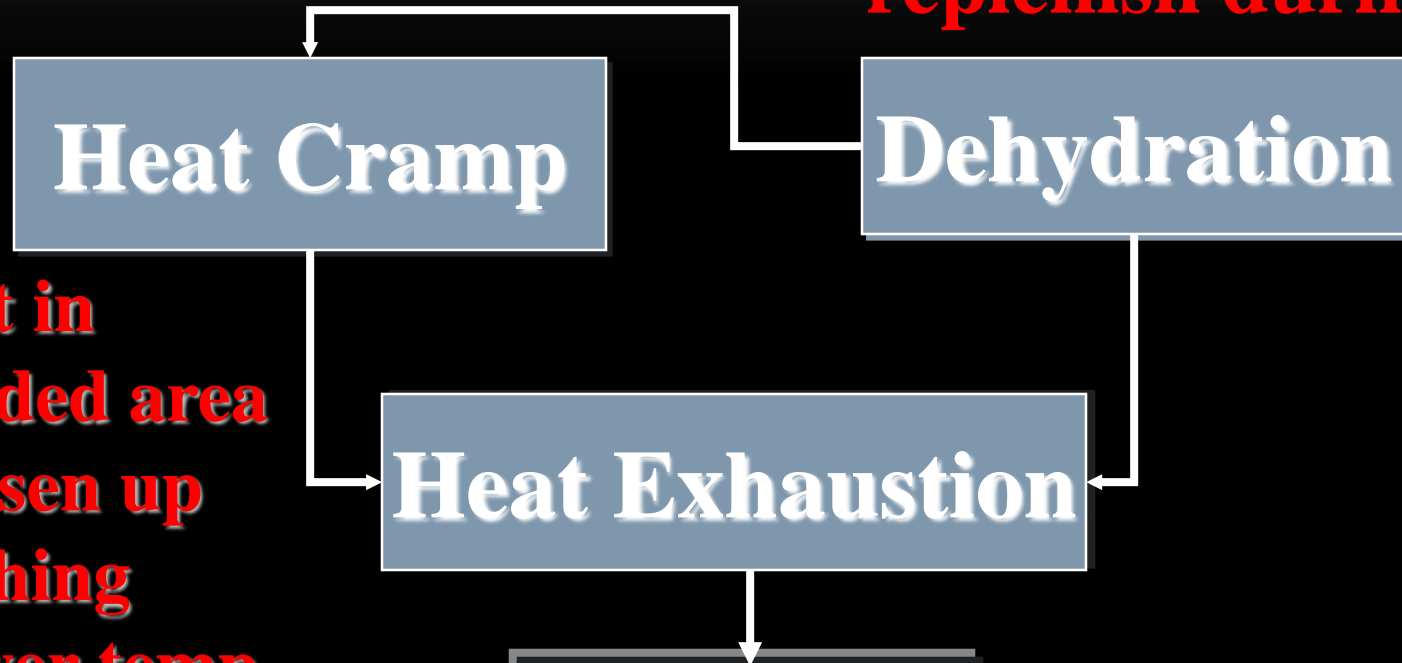
**Dehydration**

**Rest in  
Shaded area  
Loosen up  
clothing  
Lower temp  
Water supply  
Observe  
Send to hosp**

**Heat Exhaustion**

**Heat stroke**

**Medical  
Emergency !!**



# HYPOTHERMIA

## Mild

- 33 – 35°C
- Cold extremities
- Shivering
- Rapid pulse and breathing
- Urine urgency
- Slight in-coordination

## Moderate

- 31 – 32°C
- ↑ in-coordination
- ↓ shivering
- fatigue
- Slurred speech
- Drowsiness / Amnesia
- Poor judgment
- Dehydration

# MANAGEMENT FOR HYPOTHERMIA

## Mild

- Remove from cold
- Insulation
- Warm, sweet drink
- **NO Alcohol**
- External heat over torso area

## Moderate

- **Ask for help !**
- Removed from cold
- Insulation
- Don't immediate re-warm actively
- Monitored continuously