



Physiotherapist's Tips for

CHAN Kwai Wing, Willis

Physiotherapist

External Vice Chairman

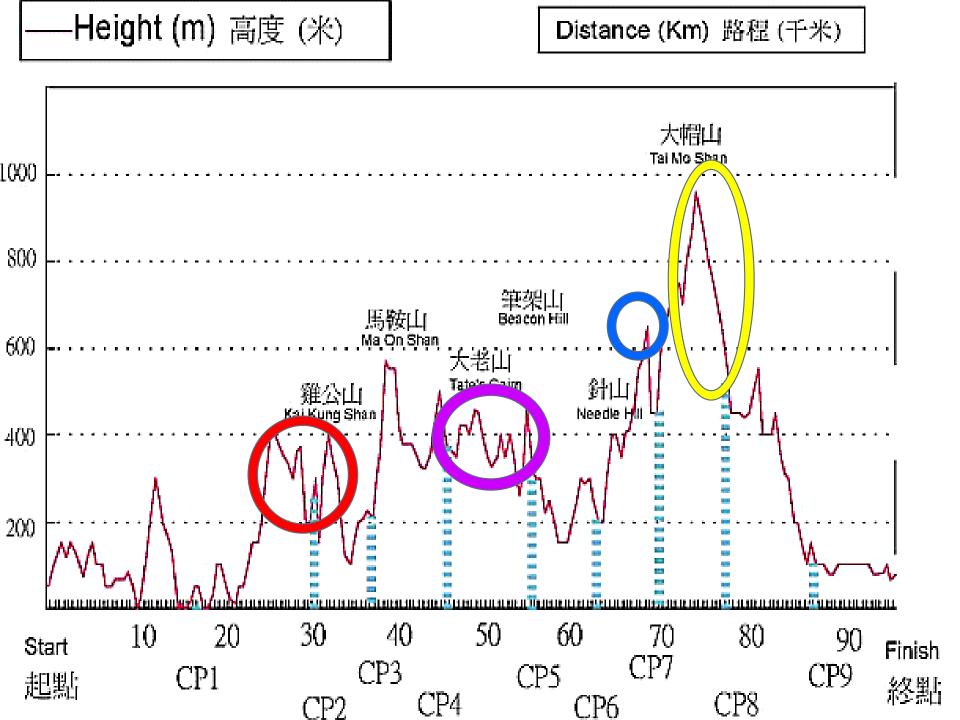
Sports and Exercise Specialty Group

Hong Kong Physiotherapy Association

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

Route	Distance (KM)
Start to CP1	15.5
CP1 to CP2	9.2
CP2 to CP3	10.4
CP3 to CP4	12.6
CP4 to CP5	7.5
CP5 to CP6	5.9
CP6 to CP7	8.5
CP7 to CP8	8.9
CP8 to CP9	9.5
CP9 to Finish	11.3
	Total: 99.3 km



DEMAND

Musculoskeletal

Lower limb joints for mobility

Spine for stability

Upper limb for holding of pole / weight

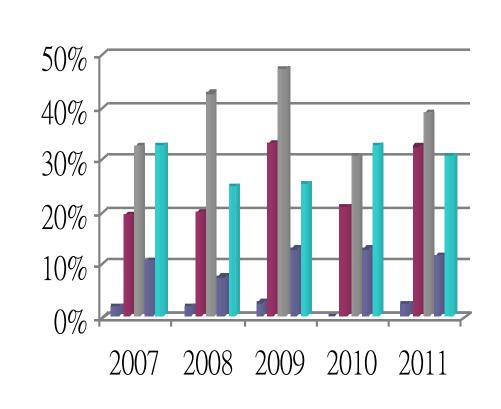
INJURY

- Musculoskeletal Injury (Load exceeds the ability)
 - Acute Trauma
 - Overuse

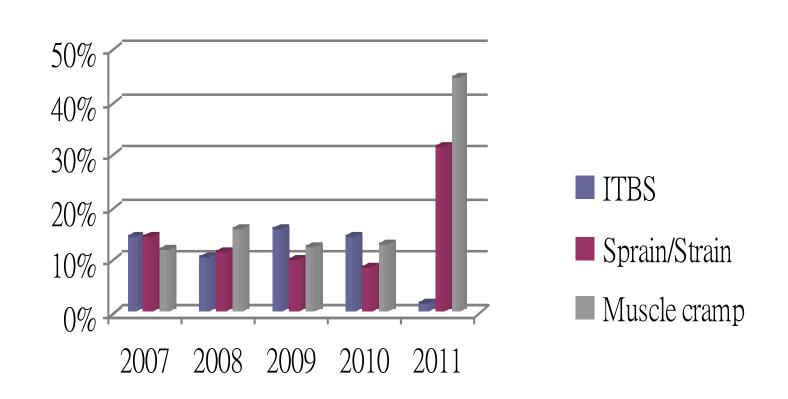
- Injury may happen to
 - Muscles, Ligament, Joints
 - Spine, Hip, Knee and Ankle

Chart 2. Injury Sites





- Hip and pelvis
- Thigh and groin
- Knee
- Calf and shin
- Ankle and foot



Year

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

HOW DO PHYSIOTHERAPISTS HELP?

Injury Management / Prevention

Training

- Common Injury
- Management
- Technique
- Shoes wear

- Field training
- Gym training
- Progression!





FACTORS MAKE YOU SUCCESS:

Basic

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

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 fatique tolerance
- Improve your muscle performance and speed
- Slow down your training progression and decreasing muscle break down proportion
- Reconditioning
- Injury prevention (decrease injury risk by overuse)

PROPRIOCEPTION, BALANCE & STRENGTHENING



Single Leg Perturbation on BOSU

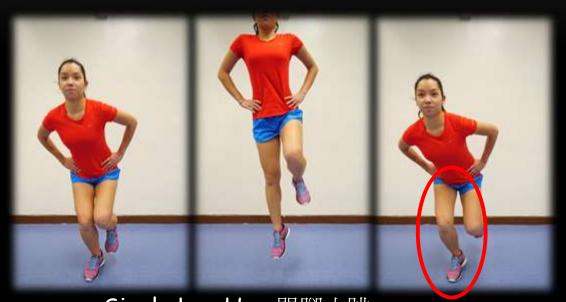
博速球單腳站立平衡及扞擾



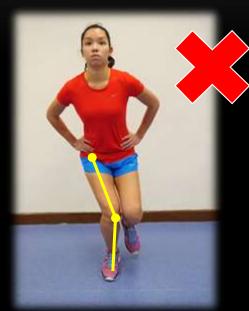
Medicine Ball Catch and Throw on BOSU 博速球上單腳平衡藥球扔接

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

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側,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



(Conscious level)

基本平衡

(有意識)





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





Distraction by other tasks / Functional moves (Subconscious level) 其它事/功能動作分散注意 (潛意識水平)

Distraction + Reflective 反射+分散注意

To train the neuromuscular system <u>fast</u>, reactive and <u>multi-task</u> instead of just static balance on expensive props

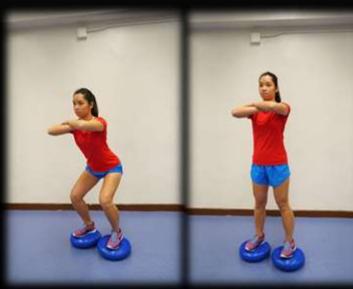
• 訓練神經肌肉系統讓它變快,反應更好,多工而不是單純靜態平衡於昂貴花巧工具上

QUADRICEPS MUSCLES RECRUITMENT



Mini wall squat 靠牆微蹲





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

60° Free Squat 60度蹲舉

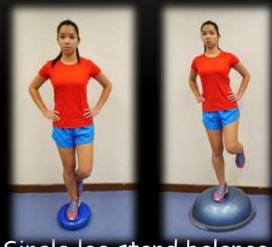
QUADRICEPS AND CORE MUSCLE RECRUITMENT



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



Forward Step Down 向前下臺階

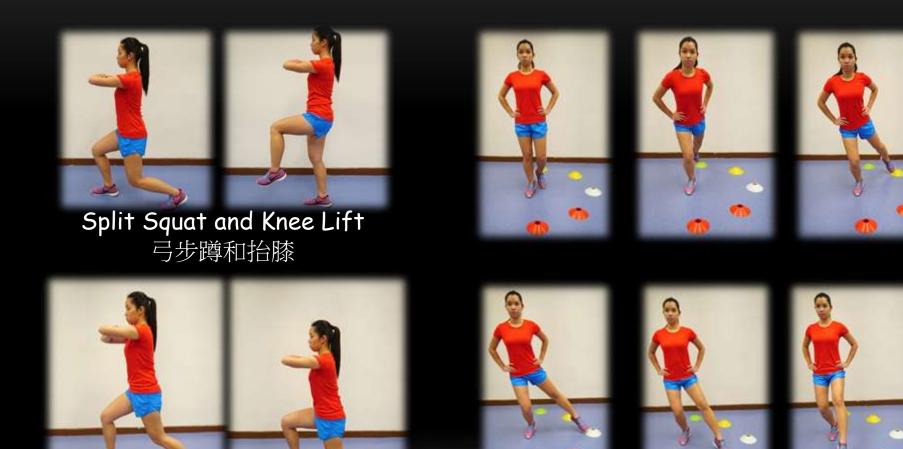


Lateral Step Down 側面下臺階



Hip Hiking Glute Med 骨盆上揚臀中訓練

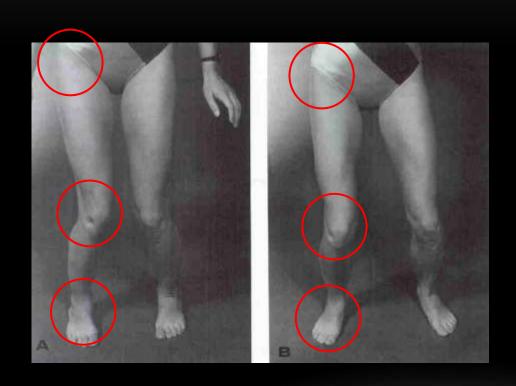
STABILITY TRAINING



Split Squat on Balance Disc 平衡墊上弓步蹲

Half Squat and Multidirectional Reach 半蹲及多方向對側腿伸出

AVOID WEAKNESS POSITION





Poor knee position with Valgus 含膝外翻不良姿勢

ADVANCE STABILITY TRAINING



Bulgarian Lunge 保加利亞弓步蹲



Bulgarian Lunge on BOSU 博速球保加利亞弓步蹲

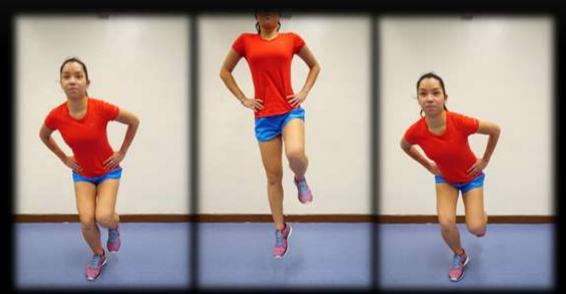


Question問題:

Lunge with Elastic Cord 彈力繩索弓步蹲

1) Before he/she can do these exercises, what elements/criteria should be satisfied first? 在他/她可以做這些動作前, 要先滿足哪些元素和條件呢?

AVOID POOR LANDING



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?

NORDIAC HAMSTRING







Nordiac Hamstring Exercise

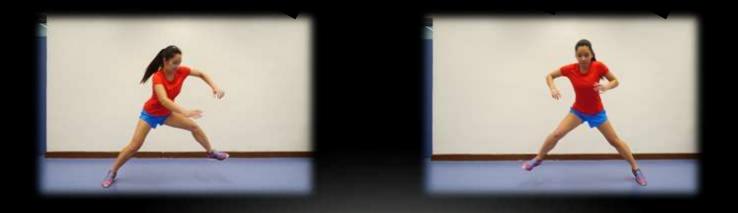
北歐膕繩肌練習

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
 如果對較衰弱的選手太困難, 可以考慮用橡皮帶拉力協助

DYNAMIC AGILITY





Lateral Bounce 側面彈

Single Leg Hopping

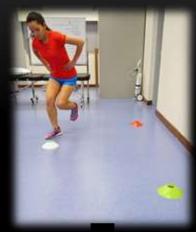


Multi-directional Hop 多方向小跳

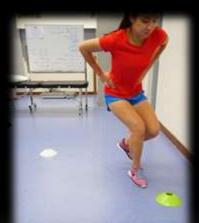
BODY CONTROL AND STABILIZATION













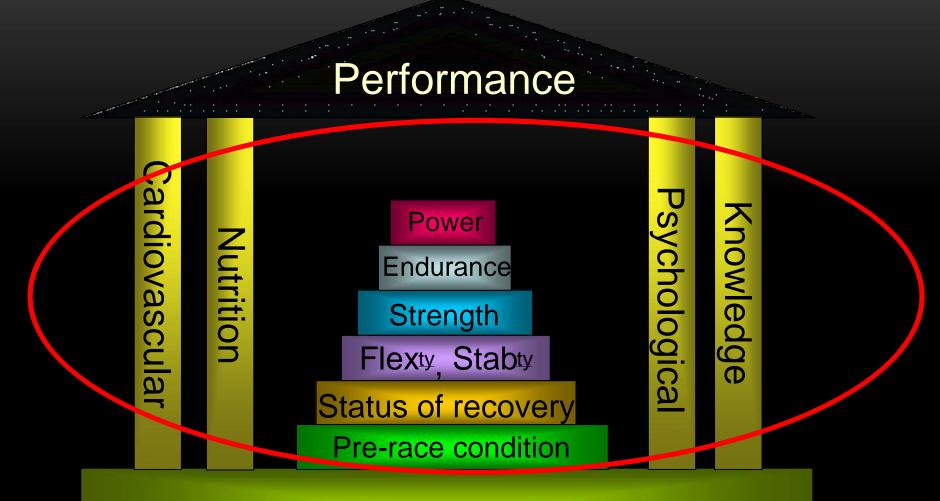
1-meter Zig-Zag Hop and Land Stabilisation 1米蛇形小跳及落地穩定

Progression

- Land and stabilise/hold for 2 second 落地及穩定 / 保持2秒
 Speed up to plyometric based hop immediately after landing 加速變快速伸

IS INJURY PREVENTABLE?





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!!!

PREVENTION:

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



FUNCTION OF SHOES

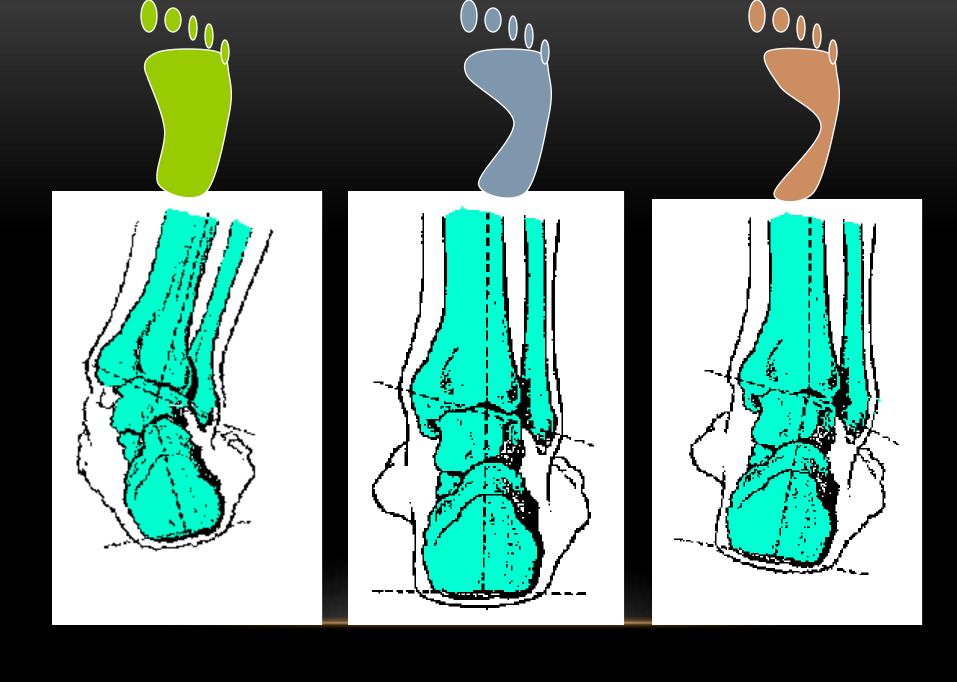
- Maintain foot stability
- Shock Absorption
- Provide firm lever system for propulsion

FOOT TYPE AND STABILITY

Flat Feet Neutral High Arch **Floppy Optimum** Rigid Neutral Cushion 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

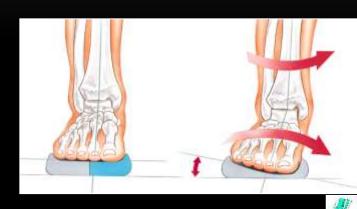
· 保護形運動鞋 Cushion shoes

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





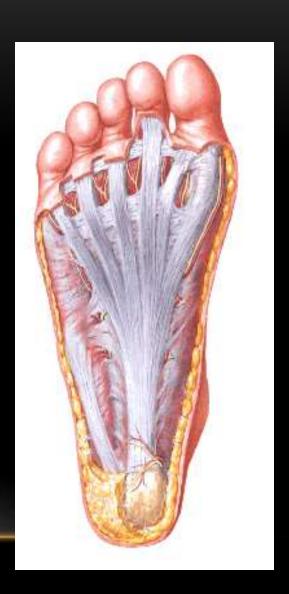




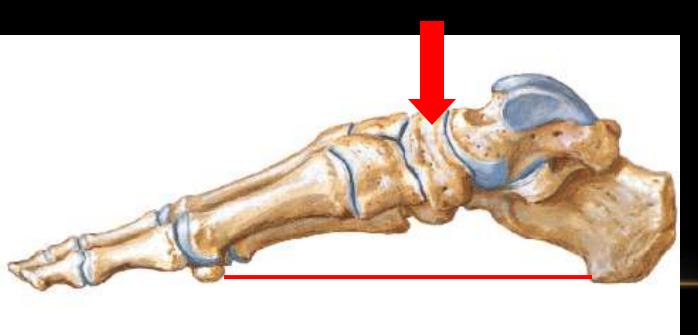
- Application of second skin
- Secure it with tapes
- Avoid creating another pressure area

PLANTAR FASCIITIS

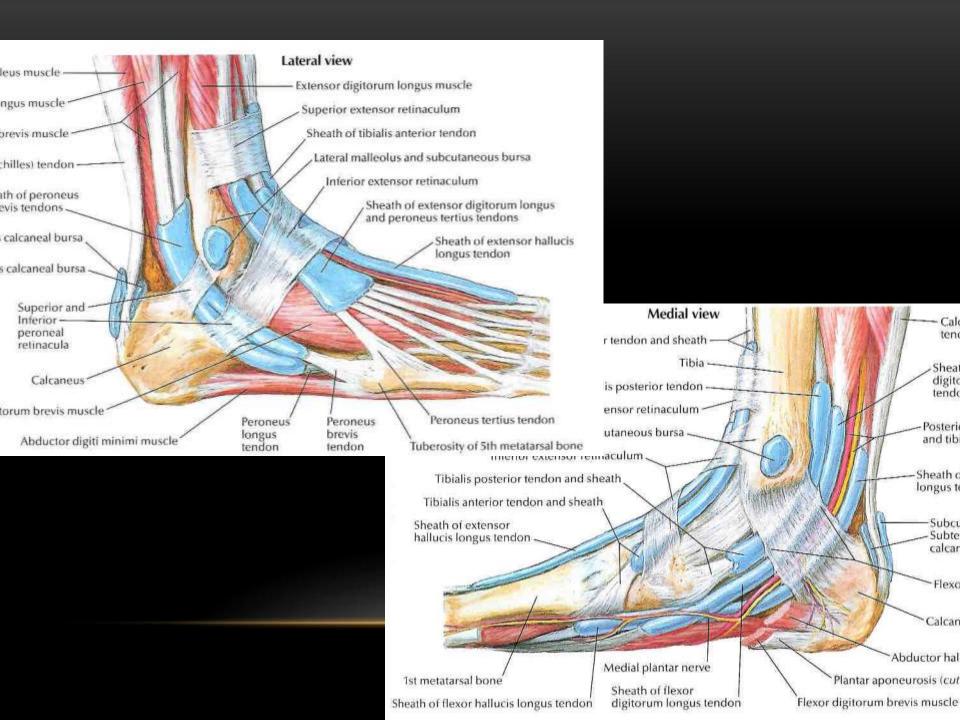
- Heel pain
- Loading exceeding the flexibility of plantar fascia
 - Overweight
 - Increase pronation



PLANTAR FASCIITIS







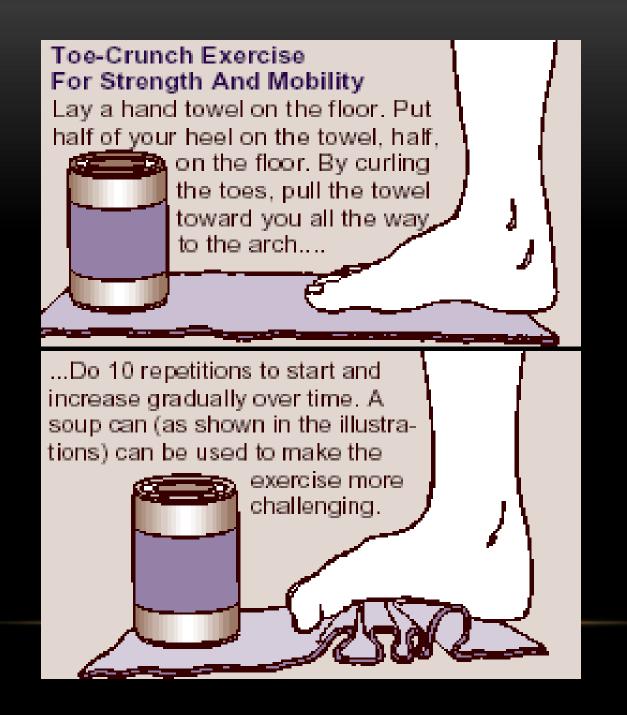


WHAT SHOULD I DO?

Good shoes wear and insole

• Train up your muscles endurance (Tibialis Anterior).

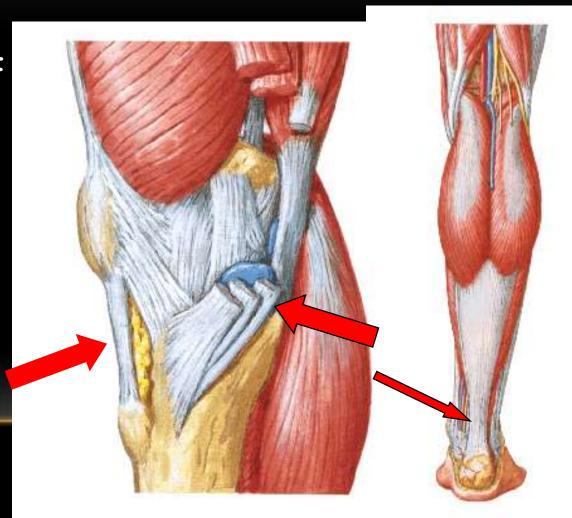
 Keep stretch and improve (Gastronemius/Soleus) flexibility

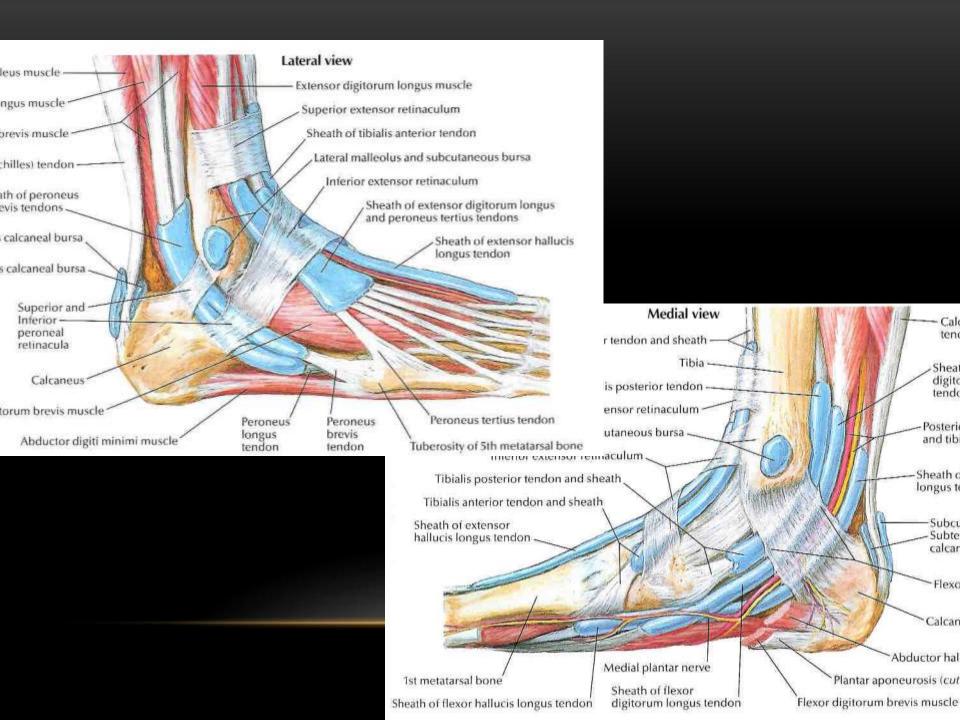


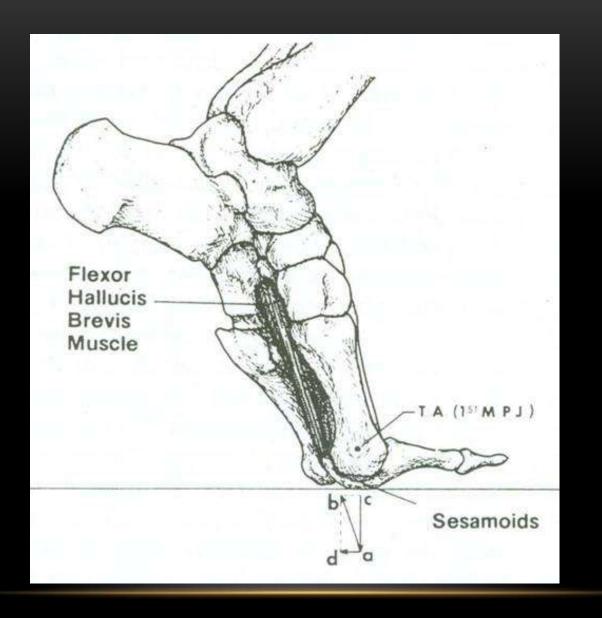
TENDONITIS

 Inflammation of tendon

 Overuse due to Repeated concentric eccentric cycle

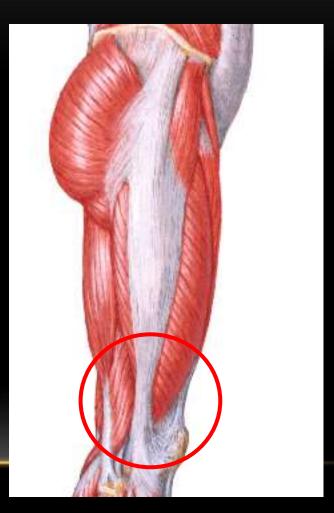






ILIOTIBIAL BAND FRICTION SYNDROME

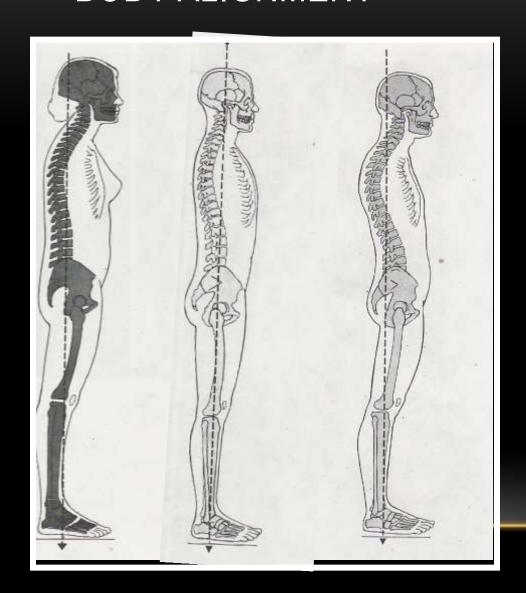


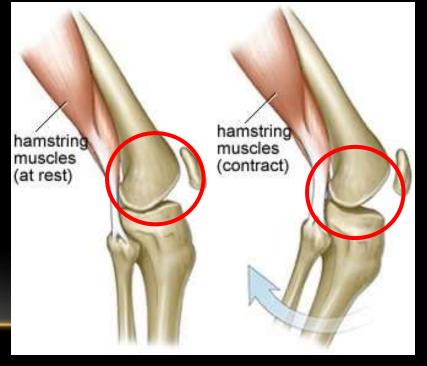


ILIOTIBIAL BAND (ITB) FRICTION SYNDROME

- 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.

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.

STRETCHING EXERCISES

GUIDELINES FOR STRETCHING

- Chose a stable position
- Slow and steady stretch
- Avoid overstretch
- Normal breathing
- Hold for 15-30 seconds
- Repeat 2-4 times





Speed VS Injury/Trauma

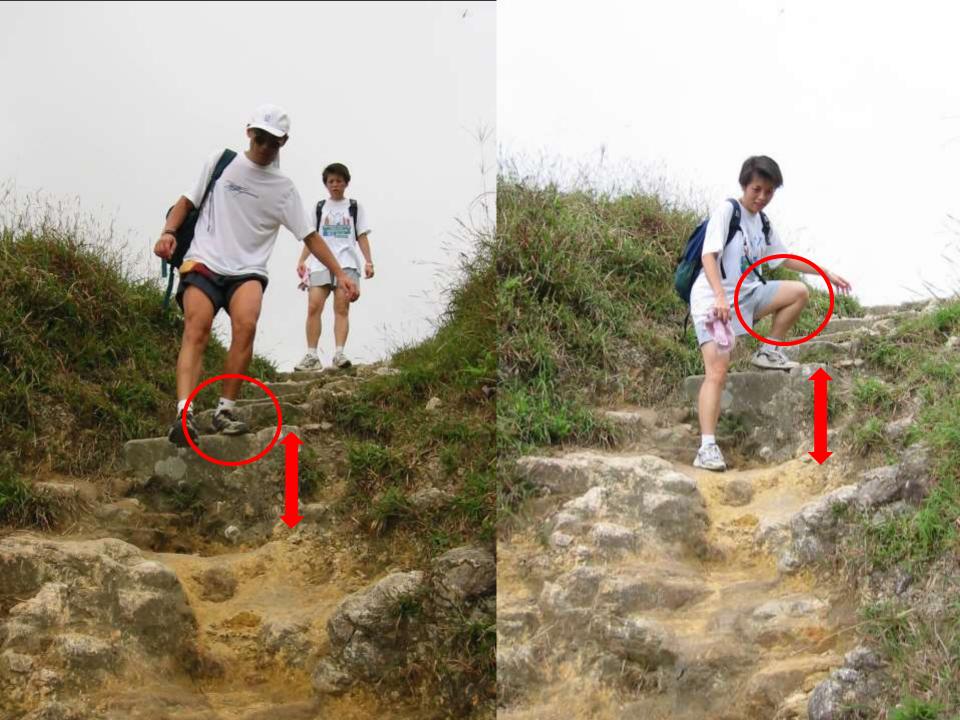
- Walking Pattern
- Foot placement
- Agility
- Eye–Foot Coordination
- Proprioception
- Eccentric control

Training VS Overuse

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

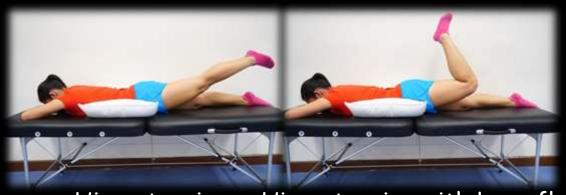
Training Progression





GLUTEUS MUSCLES (MAXIMUS, MEDIUS, MINIMUS)







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

VMO (VASTUS MEDIALIS OBLIQUE)



Mini wall squat 靠牆微蹲





60° Double Leg Squat On Balance Disc 平衡墊上60度蹲

60° Free Squat 60度蹲舉

BALANCE AND ECCENTRIC CONTROL



Single leg stand balance 單腿平衡



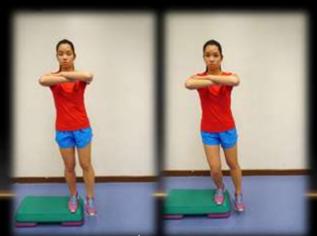
Eyes closed 閉眼



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
- 如果對較衰弱的選手太困難,可以考慮用橡皮帶拉力協助

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

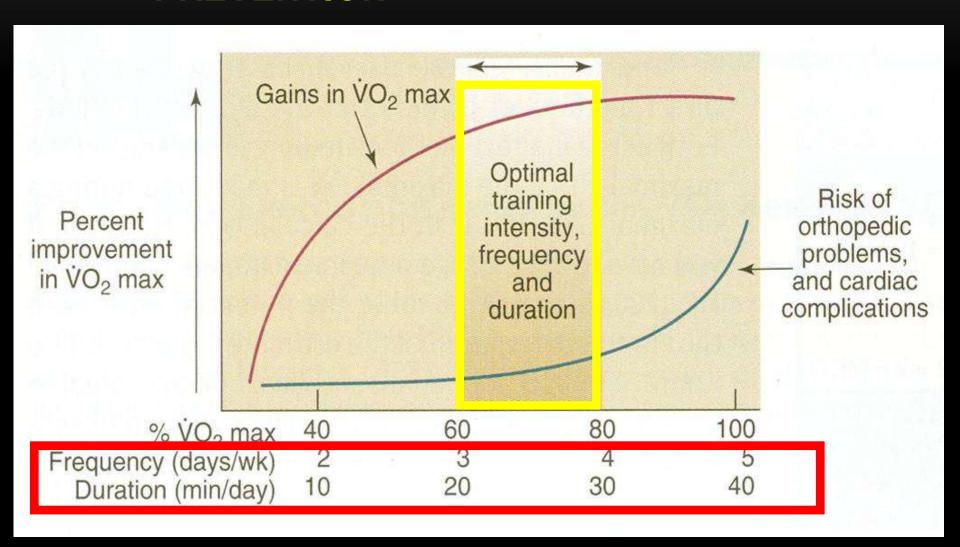
- Warm Up
 - 10-20 mins

- Endurance/ Conditioning Phase
 - Depend on sports and aims
- Cool Down
 - 5-10 minutes

AEROBIC EXERCISE - INTENSITY

- Maximum HR (HR_{max})
 220-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 (mL·kg⁻¹·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)



I – Intensity

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

• **T** – Time

T - Type

Determines the parts of the body which will gain benefit

AEROBIC EXERCISE - INTENSITY HR VS HRR

			Resting Heart Rate					
			60 beats∙min ⁻¹		70 beats∙min ⁻¹		80 beats∙min ⁻¹	
HR _{max}	HR _{max} Method			Heart	Rate Re	eserve	Method	
(beats·min ⁻¹)	70%	85%	60%	80%	60%	80%	60%	80%
140	98	119	108	124	112	126	116	128
150	103	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⁻¹) 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.)

TIP:

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

TIP:

- 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!!!

FACTORS MAKE YOU SUCCESS:

Basic

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

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 fatique tolerance
- Improve your muscle performance and speed
- Slow down your training progression and decreasing muscle break down proportion
- Reconditioning
- Injury prevention (decrease injury risk by overuse)

GUIDELINES FOR STRETCHING

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- Normal breathing
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- Repeat 2-4 times



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

WHAT SHOULD I DO?

Good shoes wear and insole

• Train up your muscles endurance (Tibialis Anterior).

 Keep stretch and improve (Gastronemius/Soleus) flexibility

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!!



1ST 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 <u>take short break</u> 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 wound increase your chance of injury.

 If you still have muscle pain <u>one week</u> 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!











