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# My Learning Journal

10<sup>th</sup> ASEAN SCHOOL GAMES  
| Singapore | July 2018 |

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# Sports Science For Optimal Performance

## Maximal Training Gains



A youth athlete is like a car. Optimal fuel makes the car run better.

Likewise, eating **necessary types** of nutrients at an **ideal time** and in **adequate amounts** can help the athlete perform and recover better.



## Optimal Mental State

Equipping youth athletes with essential **mental skills** helps them combat **anxiety**, **negative self-talk** and **pressure**. This prepares them well psychologically and puts them in the best mental state to perform.



## Injury Risk Mitigation



Sports injury in youth athletes are largely due to physical and physiological aspects of growth and **overload (i.e overuse)**. **Timely and comprehensive** injury prevention and **management** can prolong the sporting lifespan of a youth athlete.

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# EXECUTIVE SUMMARY

# Sports Science For Optimal Performance



## TRAINING/ COMPETITION

### BEFORE

- Eat adequate carbohydrates according to training intensity
- Drink sufficient fluids to ensure hydration



## NUTRITION

## PHYSIOTHERAPY



## PSYCHOLOGY

- Effective warm-up

- Set simple process and performance goals
- Use imagery to focus
- Know how to, and how much to relax/activate

### DURING

- Refuel with simple carbohydrates for moderate-high intensity > 60 min
- Rehydrate according to fluid needs
- Replenish electrolytes when needed

- Targeted, regular strength and conditioning incorporated into training regime

- Use cue words to refocus
- Smile
- Breathe:
  - 4 seconds in,
  - 7 seconds hold,
  - 8 seconds out

### AFTER

- Carbohydrate and protein as soon as possible (immediately up to 2h post)
- Protein in 20g doses
- Replenish fluid losses
- Fruits & vegetables for enhanced tissue repair

- Adequate recovery
- Twin principles of P.O.L.I.C.E and H.A.R.M to self-manage acute minor injuries

- Progressive muscular relaxation
- Imagery
- Breathing exercises

### TOOLS

- Recovery Tube
- Recovery Bottle

- No special tools needed. Just your standard issue foam roller and trusty trigger ball

- Mental Skills Toolkit

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NUTRITION

# SPORT NUTRITION

## BASIC SPORT NUTRITION

### Basic Sport Nutrition Information: Nutrient Timing

Sports nutrition is all about key points: **Type**, **Amount**, and **Timing** (TAT). Meaning, it is important to eat **important nutrients** at an **ideal time** and in **necessary amounts**, in relation to training and/or competition. Elite athletes plan their meals and snacks around their training or competition events. There are three important timings to remember – *before, during and after* trainings and competitions. Using the diagram below, it will be beneficial for you to consume food based on these timings. The amount you need every day to eat depends on your **training load**.

In this chapter of sports nutrition, you will learn to plan the time of fuel for yourself. You will also find answers to 3 key questions that you should always ask yourself as an athlete:

1. **What** should I be eating?
2. **How** much should I be eating?
3. **When** should I be eating?

## IMPORTANT NUTRITION TIME-POINTS





## BACKGROUND: AN ATHLETE IS LIKE A CAR.

### Carbohydrates

An athlete's glycogen stores is similar to a car's petrol tank. Carbohydrates are the main building blocks of these glycogen stores. This makes adequate carbohydrates essential to ensure that an athlete has sufficient energy to maintain



exercise intensity and workload imposed by the body to perform during training and competition. In addition to rice and alternatives, fruits and starchy vegetables can also be good sources of carbohydrates.

### Proteins



Muscles are akin to the engine and wheels of the car, necessary to keep the body moving and working.

Proteins are the key building blocks of muscles.



Consuming sufficient amounts of protein at an ideal time helps to maximise muscle protein synthesis.

### Vitamins & Minerals

Fruits and vegetables are rich in vitamins and minerals, which are often also antioxidants. Physical exertion during training and competition, especially when done at a



moderate-high intensity, increases tissue breakdown in athletes. Antioxidants help to enhance the rate of tissue repair induced by training and promote adaptation. They also help to boost immunity and reduce muscle soreness.

### Water & Fluids



The body produces heat in large amounts under intense physical exertion seen during training and competition. Adequate water and fluids are critical to ensure timely removal of excess heat from the athlete's body. This prevents symptoms associated with dehydration and heat exhaustion.



## NUTRITION GOALS



### BEFORE *FUEL UP & DRINK UP*

Like a car, an athlete should not train/compete empty.

**Adequate carbohydrates** are important to fill up the glycogen stores of an athlete.



**Adequate fluids** are important to ensure hydration.

TRAINING /  
COMPETITION

### DURING *STAY FUELLED, STAY HYDRATED*

Glycogen stores are limited and they decline during exercise. If training/competition sessions are more than 60 minutes with moderate-high intensity workload, **additional carbohydrates** are needed.



**Adequate fluids** also essential for the body to buffer the workload.

### AFTER *RECOVER & REPLENISH*



2 hours post training the most important time to maximise training adaptations and enhance muscle protein synthesis (MPS). **Adequate carbohydrates** to open the door to MPS and replenish glycogen stores.



**Drive maximal MPS** with high-quality protein (20-25g)

- As soon as possible (immediately to 2hr)
- Every 3-hourly thereafter



**Fruits & Vegetables** provide antioxidants to enhance tissue and muscle repair

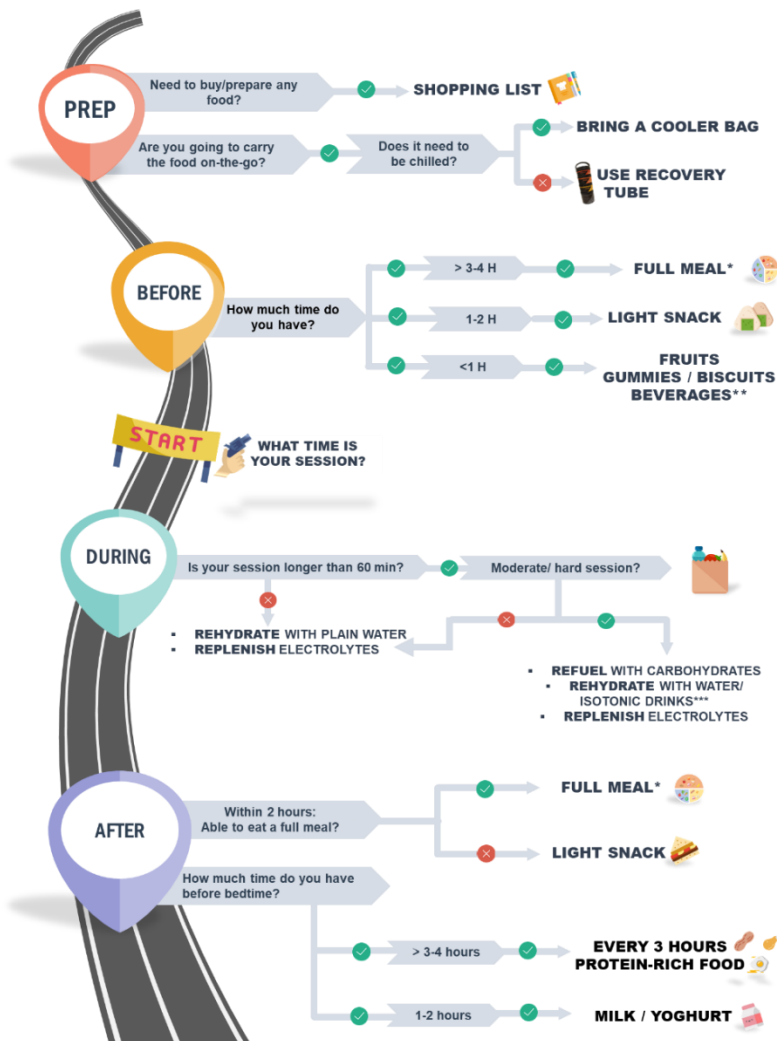
**Adequate fluids** to replenish fluid losses



## COMPETITION NUTRITION

### What should you do before the competition period?

Based on the competition/training schedule, plan your daily meals and snack based on the following flowchart.





## Nutrient Timing Flowchart Notes (\*/\*\*/\*\*\*)

\***FULL MEAL:** Depends on training intensity

\*\***SWEETENED BEVERAGES** like soya bean drink and isotonic drinks are useful and quick sources of carbohydrates in these situations. However, excessive consumption of non-nutritive drinks with added sugar (soft drinks, sweetened bubble tea etc) should be avoided. The consumption of caffeinated drinks in youths is not encouraged

\*\*\***WATER** should be enough in most situations and should be the first choice. Many isotonic drinks contain carbohydrates. If this is chosen:

- During session: additional refuelling with carbohydrates may not be necessary
- After session: carbohydrate intake may be decreased
- Excessive intake is not encouraged and may cause gastrointestinal distress due to fructose content

## NUTRITION TIMING – PLANNING AHEAD

You may find yourself at training/competition venues where you have limited food/snack choices. Therefore, some form of planning and preparation may be required. You will be given a recovery tube as shown below, which is very useful to carry snacks to training/ competition. Great for food items that do not need to be chilled!



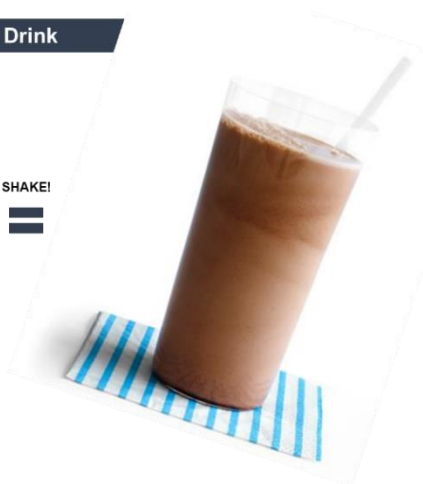
Potential Snack Combinations



Flavoured Milk As A Recovery Drink



Chocolate-Flavoured  
Skim Milk Powder





## ACTIVITY TIME – NUTRITION TIMING

The table below shows some examples of snacks you can eat. Together with the flowchart on the previous page, we are going to use the following worksheets to guide your planning. Let's start!

Before or after training/competition	Suggested snacks
1 -2 hours before <b>OR</b> Immediately after training/competition	<ul style="list-style-type: none"> <li>• Flavoured low fat milk ( e.g. chocolate milk)</li> <li>• Flavoured low fat milk (e.g. chocolate milk) + low fat cheese</li> <li>• Breakfast cereal + milk</li> <li>• Tuna + bread/ crackers</li> <li>• Low fat yogurt</li> <li>• Low fat yogurt + Muesli bar</li> <li>• Sushi</li> <li>• Peanut/Red Bean Pancake</li> <li>• Red Bean Pau</li> <li>• Popiah</li> <li>• Fruits</li> </ul>
3- 4 hours before <b>OR</b> Immediately after training/competition	<ul style="list-style-type: none"> <li>• Sandwiches/Wrap with lean meat/ chicken/ fish filling/peanut butter together with either:               <ul style="list-style-type: none"> <li>○ Fruits</li> <li>○ Yoghurt/Milk/Soy milk (calcium-fortified)</li> </ul> </li> <li>• Sushi</li> <li>• Tuna + bread</li> <li>• Flavoured low fat milk (e.g. chocolate milk) + 2 hard-boiled eggs</li> </ul>

Nutrition Strategy	Planning Needed
<b>Before training/competition</b>	
<b>2-4 hours before:</b> Proper meal	
<b>30-60 minutes before:</b> Light snack	
<b>During training/competition</b>	
Adequate hydration	
Additional carbohydrates if needed	
<b>After training/competition</b>	
<b>Immediate – 2 hours:</b> Consumption of proper meal with adequate carbohydrates and protein	
<b>Every 3 hourly:</b> Consumption of high-quality protein	
<b>Before bed:</b> Caesin-rich food item	

## HYDRATION

Dehydration leads to reduced concentration and performance. It happens commonly when athletes do not drink enough to replenish their losses, and can be prevented easily!

### HYDRATION – ACTIVITY TIME!

How do you know how much you need to drink? That is what the next activity is going to show you! You will be given a recovery bottle to help you!

#### Design A



#### Design B







## ACTIVITY TIME – HYDRATION

STEP  
#1

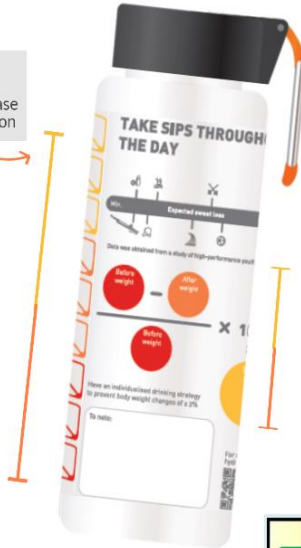
### WRITE YOUR NAME

Avoid sharing of bottles to decrease risk of contacting illness & infection



STEP  
#2

Use the sipping markers to track your water intake!



STEP  
#3

## HYDRATION MONITORING STRATEGIES



% Body Weight Change

More than 2% body weight loss have shown to impair sporting performance



Urine Colour Chart

Continue monitoring your hydration status using a urine colour chart!

WELL-HYDRATED			DEHYDRATED			SEVERELY DEHYDRATED		
1	2	3	4	5	6	7	8	9

TRY IT OUT!



TIP

Replace 125% - 150% of fluid loss over the next 4 - 6h

EXAMPLE

Pre-competition weight: 50kg  
Post-competition weight: 49kg  
Body weight change: - 1kg

Therefore,  
 $1 \times 1.25 \text{ (\& } 1.5) = 1.25 - 1.5\text{L}$

STEP  
#1

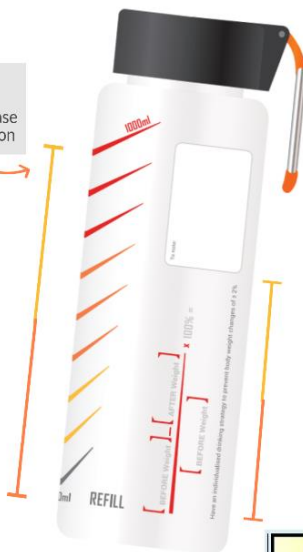
WRITE YOUR NAME

Avoid sharing of bottles to decrease risk of contacting illness & infection



STEP  
#2

Use the sipping markers to track your water intake!



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## TRAVELING NUTRITION – DO'S AND DON'TS








The following should be followed, especially when food safety and hygiene standards are questionable.

### ✗ AVOID

- ☐ Ice in drinks 
- ☐ Unfamiliar food
- ☐ Food sold at roadside stalls/carts
- ☐ Cold foods (e.g. salads, dessert)
- ☐ Raw foods (e.g. sushi) 
- ☐ Cut fruits (or fruits not peeled in your presence)
- ☐ Store-bought fresh fruit juice 
- ☐ Food left uncovered for extended duration, including cakes with cream
- ☐ Food not served steaming hot (including buffet) foods that is only partially cooked e.g. soft-boiled eggs
- ☐ Food that is infested with houseflies/insects 
- ☐ Drinking water from shower/pools 
- ☐ Storing raw meats **ABOVE** raw foods like fruits, vegetables and cheese in the refrigerator 

 **\*ALWAYS CHECK AHEAD** and ensure that the food items are permitted in the country to avoid having your food items confiscated at the airport

### ✓ DO

- ☐ Wash hands frequently with soap and water, especially before and after eating.  Ensure hands are washed for at least 30 secs
- ☐ Choose only fully-cooked food 
- ☐ Drink only bottled water/fluids that has been opened in your presence 
- ☐ Eat only whole fruits. Wash and peel all fruits  
- ☐ Prepare a packing list of familiar, portable, non-perishable snacks\*
- ☐ Prepare a shopping list to purchase familiar items from local supermarket 
- ☐ When preparing food, keep raw foods like fruits and salads away from food that needs to be cooked. 
- ☐ Use separate chopping boards and utensils for cooked and raw foods.
- ☐ Keep mouth close while showering
- ☐ In the refrigerator, store raw meats **BELOW** cooked food and raw foods like fruits, vegetables and cheese.

**FOOD EATEN RAW**  
(E.g. fruits, vegetables, cheese)

**COOKED MEATS**

**RAW MEATS**



## TRAVELING NUTRITION – USEFUL ITEMS TO PACK



- Jam, honey, peanut butter
- Powdered milk
- Concentrated fruit juice
- Baked beans and spaghetti
- Cereal bars
- Breakfast cereal
- Canned snack pack fruits
- Dried fruit
- Instant porridge/noodles



PHYSIOTHERAPHY

# SPORT INJURY PREVENTION AND MANAGEMENT

## WHAT IS A SPORTS INJURY?

A sports injury is any damage to the body that occurs in relation to a sporting activity. Injuries occur when stress (load) exceeds the capacity of the body (particular tissue/structure). Injuries can be broadly classified into 2 groups as follows:

Acute	Chronic
Acute injuries are sudden in onset and tend to be caused by a traumatic event. (e.g. accidents, sprains and strains)	Chronic injuries are gradual in onset and tend to be a result of over-loading, over-using a joint or muscle. (e.g. shin splints, runner's knee, tennis elbow)

### Common Injuries in Youth Athletes by Sport

SPORT	INJURY
<b>Badminton</b>	Thigh and back strains, ankle sprains, back strains/sprains, growth plate injuries, patella tendinopathy, stress fractures
<b>Basketball</b>	Ankle sprains, finger sprains, finger fractures, knee sprains, growth plate injuries, Osgood-Schlatter's disease
<b>Bowling</b>	Finger sprains, wrist and elbow related tendinopathies, ankle sprains, knee sprains, patella-femoral pain syndrome, shoulder strains, low back strains
<b>Gymnastics</b>	Back strain/sprain, wrist sprains, ankle sprains, medial tibial stress syndrome (shin splint)
<b>Netball</b>	Finger sprains, ankle sprains, shoulder strains, knee strains/sprains, Osgood-Schlatter's disease, achillies tendon strain
<b>Swimming</b>	Shoulder strains, knee strains, neck and back strains
<b>Sepak Takraw</b>	Neck strains, thigh muscle strains, knee and ankle sprains

SPORT	INJURY
<b>Table tennis</b>	Elbow strains, thigh muscle strains, ankle sprains
<b>Track and Field</b>	Patella and Achilles tendinopathies, growth plate injuries, stress fractures, Osgood- Schlatter's disease, thigh and calf muscle strains
<b>Volleyball</b>	Finger sprains, finger fractures, knee sprains, growth plate injuries, Osgood-Schlatter's disease, ankle sprains, patella and Achilles tendinopathies

### **Sport Injuries in Youth Athletes and its impact**

As a youth, you will undergo a period of growth spurt, and during this period you may be at a higher risk of injury.

Common injuries during this period are firstly stress fractures between the growth plate and bone, as this area is still undergoing growth changes and hence more susceptible to injury if high impact forces are sustained.

Bones generally grow faster than muscles, and since muscles are attached onto bones, they (muscles) tend to become tight. The tension from the muscle can cause discomfort over the muscle itself or where it attaches onto bone. Therefore, another common injury occurs at the area where your growing bone is subjected to high pulling forces (e.g. the heel bone and the bony prominence at the front portion of the shin).

The above injuries may have a negative impact on your life as an athlete (e.g. having to sit out of training, missing major competitions and/or selections). However, if intervention strategies are implemented early, these injuries can be prevented from happening or getting worse. These strategies will be covered in the next topic.

## SPORTS INJURY PREVENTION

We cannot avoid injuries completely, however if we can identify the risk factors of sports injuries we can implement strategies to lower these risks and therefore the occurrence of injuries.

Risk factors can be classified into two categories:

Extrinsic (Environment)	Intrinsic (Athlete)
<b>Training errors</b> <ul style="list-style-type: none"> <li>- Excessive volume</li> <li>- Excessive intensity</li> <li>- Rapid increase</li> <li>- Inadequate recovery</li> <li>- Faulty technique</li> <li>- Lack of proper warm up and cool down</li> </ul>	<b>Age</b> <b>Gender</b> <b>Muscle imbalance</b> <b>Muscle weakness</b> <b>Poor balance and agility</b> <b>History of previous injury</b> <b>Lack of flexibility</b> <ul style="list-style-type: none"> <li>- Generalized muscle tightness</li> <li>- Restricted joint range of motion</li> </ul>
<b>Surfaces</b> <ul style="list-style-type: none"> <li>- Too hard</li> <li>- Too soft</li> </ul>	
<b>Equipment</b> <ul style="list-style-type: none"> <li>- Inappropriate</li> <li>- Wrong sizes</li> <li>- Worn out condition</li> </ul>	
<b>Environmental conditions</b> <ul style="list-style-type: none"> <li>- Hot</li> <li>- Cold</li> <li>- Humid</li> </ul>	



## Injury Prevention Strategies

Listed below are some strategies we can implement to lower the common risk factors for injuries.

Risk Factor	Strategy
<b>Muscle Imbalance, muscle weakness, lack of flexibility, lack of required balance and agility</b>	*Stretching and soft tissue release *Strength and conditioning
<b>Lack of proper warm up</b>	*Sports specific warm up
<b>Equipment and shoes</b>	Avoid using brand new equipment or shoes (preferably broken into)
<b>Environment</b>	Ensure any potential danger is removed from competition ground. Ensure that competition ground is in good condition.

\*These topics will be further elaborated upon.

### 1) Sports specific warm up

As the name suggests, the purpose of warm up is to increase the temperature of the body/muscles to prepare the body for upcoming physical demands. This would help improve performance and lower the risk of injury.

A warm up lasting at least 10 minutes will be able to raise muscle temperature sufficiently. It is also advisable to start on the main exercise/training within 5-15 minutes after warming up.

The amount of time spent on warm up and the exercises chosen can vary based on your sport, so it is important to follow the instructions of your coaches to complete your warm up thoroughly, as they would have structured the warm up based on your sport.

## 2) Stretching

Stretching and soft tissue release are an important part of recovery. Hence, though you might be a busy student athlete, it is important to allocate time for it in your training session. To maximise effectiveness and time spent, you could incorporate active stretches. We discuss the basics and give some examples:

### STATIC STRETCHES

1

#### Why?

Improve joint range of motion and muscle compliance for optimal athletic performance and reduced injury risk.



PECS

2

#### When?

After exercise. When done prior to activities that require power and speed, static stretches have been shown to negatively impact performance.



HIP FLEXORS

3

#### How Long?

Generally, 15-30sec, repeating 3-5 times per muscle group.



GLUTES

### SOFT TISSUE RELEASE

Self-massage techniques are also useful for easing tension in muscles post-training. For tension throughout the muscle bulk, the foam roller is ideal and consideration should be given to start with muscles further away from the heart e.g. calves before hamstrings. For localised tension, a small ball is ideal to do some trigger point release. Below are some examples that correlate to the static stretches above.







### ACTIVE STRETCHES

Active stretches leverage on the idea that muscles work in pairs. As one muscle contracts, the other relaxes. For example, your triceps relax whilst your biceps contract to bend your elbow.

In an active stretch, you would work the weaker muscle in the pair to stretch out the tighter one. For example, most student athletes tend to have tighter hip flexors from sitting to study all day with comparatively weaker gluteal muscles (hip extensors). Hence, a useful active stretch would be a slow hip bridge.



### Other Common Static Stretches:

Lower Body	Upper Body
<b>Quadriceps</b> 	<b>Triceps</b> 
<b>Hamstrings</b> 	<b>Wrist Flexors</b> 
<b>Adductors</b> 	

### 3) Strength and Conditioning

As explained earlier, muscle weakness, poor balance and agility can increase your risk of injury; hence the purpose of strength and conditioning is to equip you with the required physical strength, power and agility to perform well for your sport.

It is therefore important to follow your coach's instructions on the exercises to do for your strength and conditioning program, as they would have selected exercises specific to your sport, and program the intensity based on your competition periods.



#### ACTIVITY TIME: INJURY & RISK FACTORS

Based on the sport you are in, list out some of the common injuries you have seen or experienced personally.

Also list out some risk factors in your sport (both intrinsic and extrinsic) that you think can contribute to the occurrence of an injury.

Common injuries in your sport	Common risk factors
	(e.g. shoes that are too big)

## SPORTS INJURY MANAGEMENT

Although due care and effort is given to prevent injuries from happening, it is inevitable that injuries will occur in sports. Hence it is important to know how to recognize an injury and be able to manage them appropriately.

These are the **5** distinct signs and symptoms of an acute injury:



*If a serious injury (e.g. fracture, dislocation, severe pain and/or swelling) is suspected, emergency first aid should be called upon. You should be kept calm until emergency services personnel arrives.*

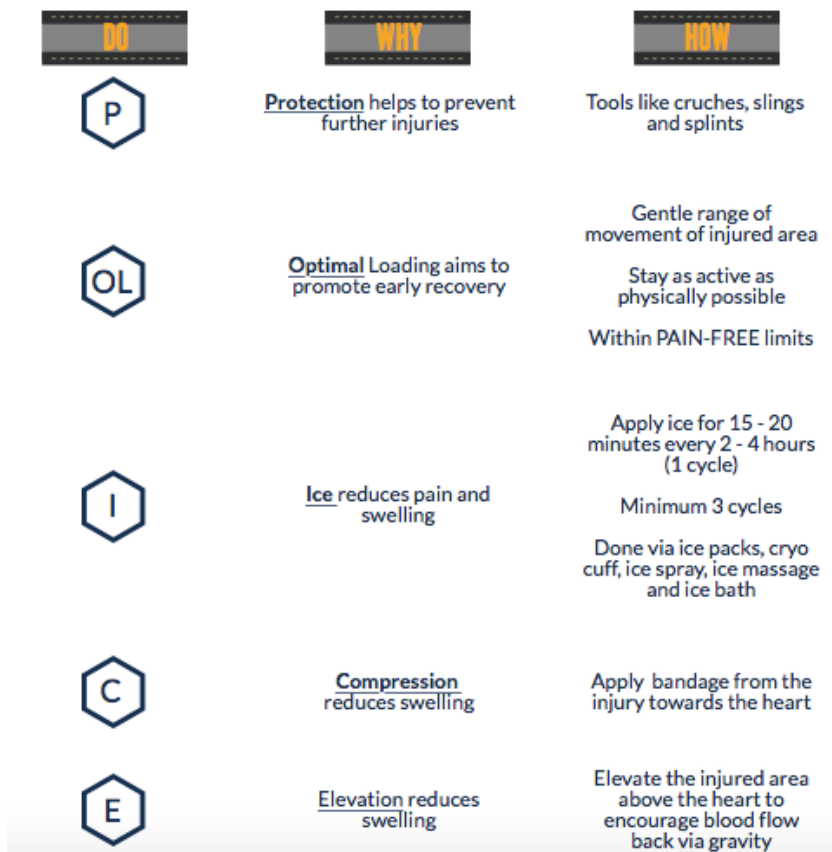
When you are at the ASEAN School Games, seek help from the medical doctor and/or physiotherapists via your team manager/coach.

If it is an emergency, you could be sent to any one of the following hospitals with pediatrics department (*up to 16 years old*):

1. KK Women's and Children's Hospital
2. National University Hospital

## Managing acute injuries

Other less severe acute injuries can be safely managed using the P.O.L.I.C.E principle. It is important for you to know the basics of managing a newly sustained injury (for the *first 72 hours*) so that you or your teammates can practice it while help is sought. The acronym is represented by this infographic.



It is also important to DO **NO H.A.R.M** during the first 72 hours to prevent aggravating the injury




**Heat:** Avoid heat or heat rubs, as they increase bleeding at the injury site. Examples of these are hot baths, hot showers, saunas, heat packs and heat rubs.

**Alternate Treatment:** Some alternate treatment may involve vigorous massage and heat and hence should be avoided.

**Running/moderate activity:** Any activity that could cause re-injury to the injury site should be avoided.

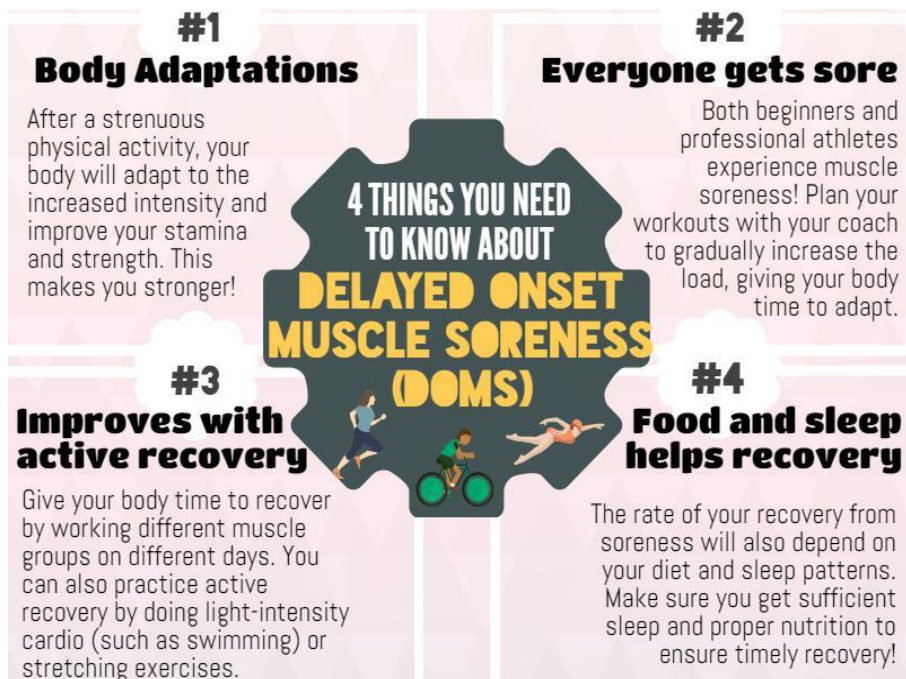
**Massage/vigorous soft tissue therapy:** This should be avoided for the first 24 to 48 hours as doing so may cause further swelling and bleeding at the injured area.

## Identifying the difference between soreness and injury pain

 <i>Identify the difference between</i> <b>MUSCLE SORENESS &amp; INJURY PAIN</b>		
<i>Cramping or burning feeling during training, with dull ache and tightness at rest</i>	<b>SENSATION</b>	<i>Sharp, intense pain at rest and/or during training</i>
<i>24 - 72 hours after activity</i>	<b>ONSET</b>	<i>During exercise and/or within 24 hours of activity</i>
<i>2 - 3 days</i>	<b>DURATION</b>	<i>May persist &gt;3 days if left untreated</i>
<i>Generalised area of soreness along the muscle</i>	<b>LOCATION</b>	<i>Localised to area of injury</i>
<i>With stretching and movement</i>	<b>IMPROVES</b>	<i>With ice and rest</i>
<i>Practice stretching, foam-rolling, or active recovery with low intensity cardio</i>	<b>WHAT YOU SHOULD DO</b>	<i>Seek professional help if pain is severe or last &gt;3 days</i>

Muscle soreness also known as Delayed Onset Muscle Soreness (DOMS) describes the discomfort in the muscles due to increased training intensity. As the name suggests, you may experience the soreness from 1 to 2 days after an intensive training.



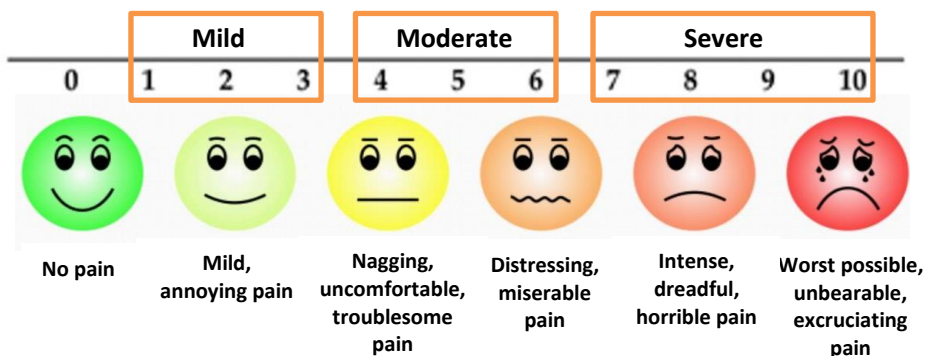


### Why is this information important?

Understanding the differences allows you to know when you should stop training and seek treatment, so that you can prevent any injuries from worsening and optimize performance!

## Knowing your level of pain

Below is the Wong Baker FACES Pain Scale. It provides you with a guide to rate the intensity of your pain so you know when to cease training (refer to table below), as well as for medical professionals to understand how much discomfort you are experiencing.



## What should you do?

1. Your coach(es) and parents should be informed whenever you are training with pain.
2. Monitor the pain to know what aggravates or eases it - this would make it easier for professionals to diagnose/treat.
3. Use the table on the next page to help you in #2.

## INTENSITY OF PAIN AND WHAT TO DO

Pain Intensity	What to Do
<b>Mild</b>	<p>Monitor the level of pain and request to modify your training load for the day if the pain increases in intensity.</p> <p>It is advisable to consult a physiotherapist or a doctor if the pain persists for more than 2 weeks and/or affects your daily function.</p>
<b>Moderate</b>	<p>If the condition is unknown, request to modify your training load for the day and monitor for any progress. Perform P.O.L.I.C.E (refer to SPORTS INJURY MANAGEMENT) if needed.</p> <p>It is advisable to consult a physiotherapist or a doctor if the pain increases in intensity, persists for more than 2 weeks and/or affects your daily function.</p>
<b>Severe</b>	<p>Perform P.O.L.I.C.E (refer to SPORTS INJURY MANAGEMENT)</p> <p>Cease all activity and seek professional help.</p>



PSYCHOLOGY

# SPORT PSYCHOLOGY

## INTRODUCTION TO MENTAL SKILLS

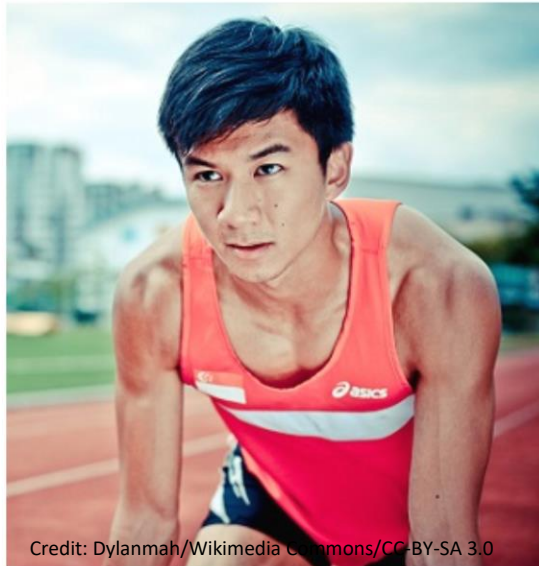
The mental aspect of sports is receiving increasing attention and people start to realise its impact on performance. In this chapter on Sport Psychology, you will learn the reason behind the use of, and also instructions on how to use basic mental skills like goal-setting and imagery. You will also find answers to key questions that you may be asking as an athlete:

- 1) How do I deal with **anxiety**?
- 2) How do I handle **pressure**?
- 3) How can I **prepare** for my competitions?
- 4) What should I do **after** my competition?

### Key Objectives for Optimal Mental Skills in Athletes

1. **BEFORE** competition:
  - **Set Goals**- know what you want to achieve for this competition
  - **Practise mental skills like imagery and relaxation**- practising beforehand helps you to familiarise yourself with these skills and understand how they can help your performance
2. **DURING** competition:
  - **Relax**- Know your optimal state of arousal so that you know how relaxed you should be to perform optimally
  - **Imagery**- See yourself achieving success
3. **AFTER** competition:
  - **Reflect**- Think through where you did well and affirm yourself. Also think about areas you can improve on before your next competition
  - **Relax**- Ensure that your body is sufficiently relaxed by using Progressive Muscular Relaxation (PMR) or breathing exercises if necessary

## GOAL SETTING



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### **Calvin Kang, SEA Games Medallist**

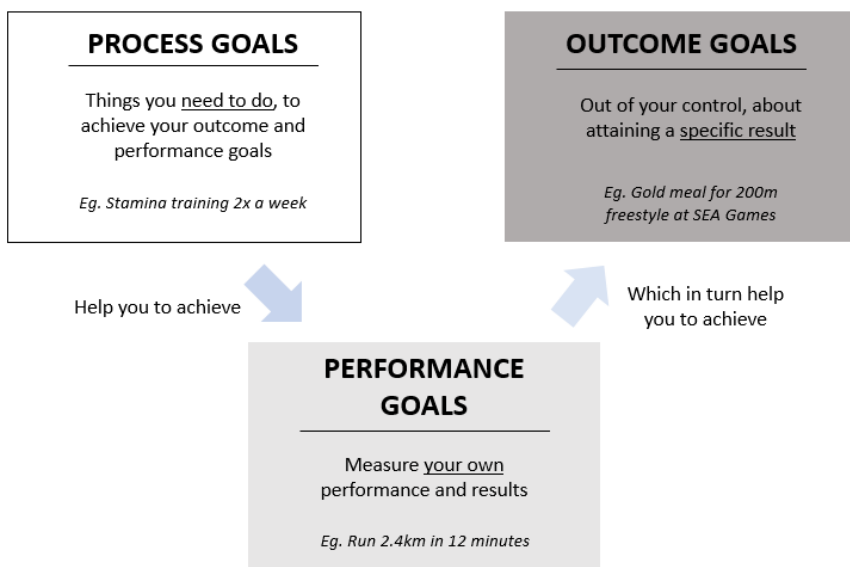
*“Never stop dreaming. When I first began sprinting, I always wanted to represent Singapore. I have achieved that and I am still pushing greater boundaries to run even faster.”*

## Why Set Goals?

Pursuing a goal is like a journey. You need to 1) know where you want to go, so that you can 2) plan your journey there.

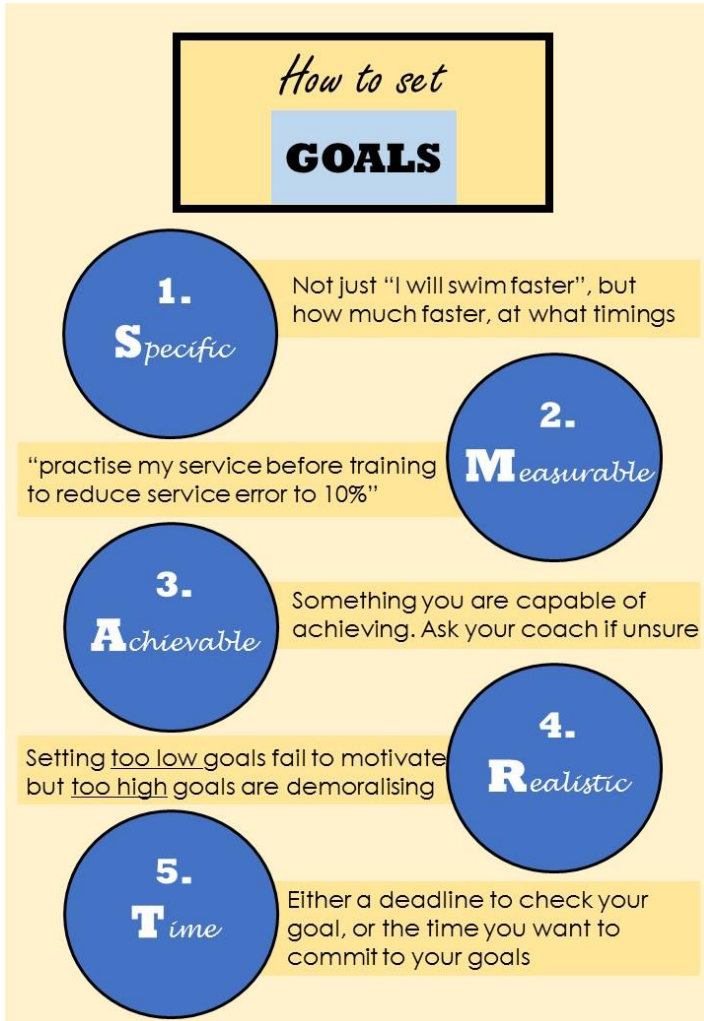
### #1 Know Where You Want To Go

It is important to know what it is that you want to achieve, so that you know what you are working towards. There are three types of goals:



## #2 Plan How To Get There

When setting goals, you can use the acronym **SMART/ER** to set your goals.



**E:** Evaluate your goals after time

**R:** Revise them if there is a need



This is an example of the goals of a junior elite athlete (swimming).

<b>Name of Competition</b>	ASEAN Youth Games 2018
<b>Date of Competition</b>	July 2018
<b>GOALS for the Competition</b>	1. Qualify for finals 2. Hit personal best for pet event
<b>ACTION: What am I going to work on in trainings to help me achieve this goal</b>	Physical – increase strength and stamina (gym training) Technical – work on strokes/turns Tactical – work with coach on swimming tactics Mental – learn to control emotions

Now it's your turn! Identify your goals for the upcoming ASG 2018, and what are some of the things you are going to work on during trainings.



## ACTIVITY TIME: GOAL SETTING

<b>Name of Competition</b>	ASEAN School Games 2018
<b>Date of Competition</b>	
<b>GOALS for the Competition</b>	
<b>ACTION: What am I going to work on in trainings to help me achieve this goal</b>	

As a team, discuss what your goals are for the upcoming competition. Team goals can pertain to **performance goals** (e.g., top 3 placing), or **non-performance goals** (e.g., encouraging and cheering for each other during the competition).

**TEAM GOALS:**

## IMAGERY



Credit: Chensiyuan/Wikimedia Commons/CC-BY-SA 4.0

### Shanti Pereira, 200m SEA Games Gold Medallist

*"I have had dreams of winning this event so many times and it would replay in my head from time to time."*

### Joseph Schooling, SEA Games and Olympic Medallist

On the pool deck, you can't see the athletes' lips move, but some are in animated conversation with themselves. *"I take my clothes off, look down, breathe in, **visualise**."* Then Joseph tells himself: *"You put so much effort (in training), don't chicken out."*

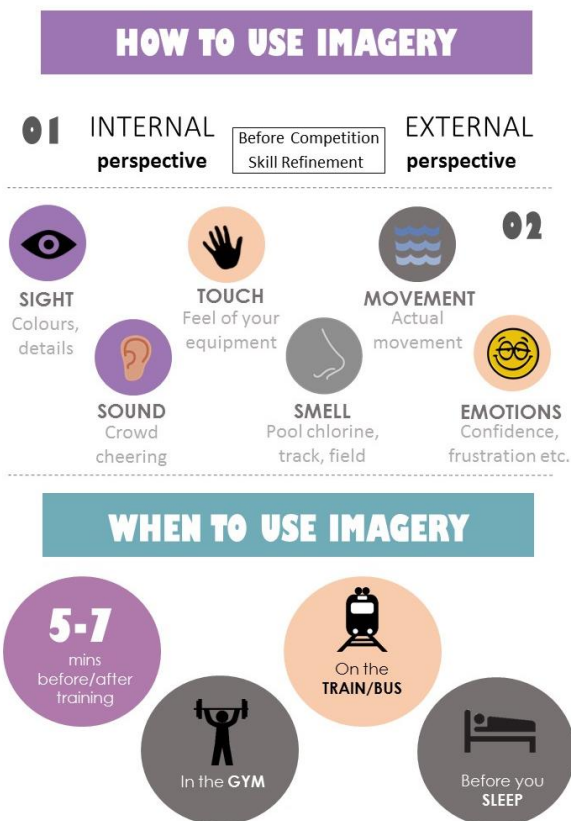
*The Straits Times (2013, September 3)*



Credit: Raj Kiran Chobey/Flickr/CC-BY-NC 2.0

## Why Mental Imagery?

As you can see from the quotes, athletes both past and present have revealed their secret to success as being able to **SEE** success. Mental imagery not only builds confidence, it also helps you to prepare mentally for your competitions. Below are some guidelines on how you can practise mental imagery:



To help you in mental imagery, it may be useful to write down a “mental script”. For example, describe the perfect competition. What will you be doing and thinking?

**Sample Script for All Sports**

Think back about a time when you performed really well in a competition. Which competition was it? Try to remember where it was held, the location of the competition. How was the set up? Try to put in as many details as possible. For example, what sounds did you hear? Can you hear the crowd cheering, talking? Who were there, can you see your coach? Or your parents, or teammates? Picture yourself in your competition gear... what was the colour of your jersey? Try to put in as many details as possible, try to imagine the environment, or any sounds you may hear, or anything in particular that you might see.

Now try to think about what went on during the competition. What happened during the competition? How did you perform? See yourself executing the moves... try to feel it in your body as you are bringing yourself back to that moment in time. Bring yourself back to the competition, and try to recall what feelings you had...

Try to remember how well you performed during the competition... You are performing as well as you possibly can and feeling very confident. You are a tough opponent for anybody when you feel like this. You are unstoppable. Notice how intensely focused you are and how relaxed your body feels. Imagine yourself performing like this for a few more moments. Everything is easy, and you are celebrating every point.

Notice you are strong, reactive, and relaxed, but at the same time alert and confident... you know that nothing can get in your way, and you can handle anything. Try to recapture what you were feeling as well as thinking, and see yourself performing well. Remember this feeling. See yourself standing tall, and looking confident. Remember this feeling, this entire imagery.

Scenario: My Best Performance

Description:

## DEALING WITH ANXIETY



**Rachel Yang**  
**SEA Games Medallist (Pole Vault)**

*"I came in very nervous and was quite scared... but I told myself I need to build on the confidence of the last few months, so I had to throw away all the negative thoughts and just focus on the jump."*

*The Straits Times (2015, June 12)*

Everyone gets nervous before competition. Anxiety can be in two forms:

## 2 FORMS OF *anxiety*

### 01 PHYSICAL



Butterflies in your tummy  
Cold/clammy hands  
Going to the toilet more often  
Heart racing  
Sweating  
Muscle tightness

### 02 MENTAL



Negative thoughts  
Worries  
Frustration  
Feeling apprehension

More often than not, anxiety is caused by high expectations of success, thoughts of self-doubt, lack of confidence, and knowing that there will be an audience. There are some tips on the next page that can help you handle your nervousness. Before that, take some time to think through and recognize some of the anxiety symptoms you may be showing:

### My Anxiety Symptoms:



**PREPARE**

Prepare physically and mentally. Reach the competition venue early

**IMAGERY**

Take some time to imagine a successful performance.

**COMPETITION  
PLAYLIST**

Have a competition playlist containing songs that can help to motivate you.

**FOCUS**

Focus on what is important: Focus on strategies in the present, and avoid thinking about the outcome or competitors

**SMILE****BREATHE**

4secs in, 7secs hold. 8secs out

**REFLECT**

Reflect on your performance.

**PMR**

Use Progressive Muscular Relaxation to physically relax your muscles.

**BEFORE****DURING****AFTER**

## HANDLING PRESSURE



Credit: Singapore Sports Council/Flickr/CC-BY-NC-ND 2.0

### **Quah Zheng Wen, SEA Games Gold Medallist**

“As long as I can come out (of the Olympics) with no regrets, and knowing that I did my utmost best, I think that’s good enough, because my expectations (of myself) are most important. **For the pressure, it is always good to have a certain amount of it, and I can deal with this added pressure.**”

*TODAY (2015, July 7)*

## So What Is Pressure?

Pressure usually refers to the feelings an athlete has about performing in a sporting situation. Actually, pressure is a feeling that is created by ourselves, when we react to particular events or situations. But you have to understand that pressure is not all bad – in the right amount, it can actually **enhance motivation, concentration and enjoyment**. Feeling pressure can also keep you on your toes, and help you get ready for the competition.

## So, where does pressure come from?

Pressure can come from a variety of internal and external sources.

Tick those that apply to you:

- ☐ parental expectations to perform
- ☐ expectations about the competition (desired result, anticipated reward, selection opportunities)
- ☐ other people's expectations (especially team mates and coaches, but also from other people such as friends, relatives)
- ☐ press and media expectations (newspaper, etc.)
- ☐ preparation for competition (how well prepared you feel, and how ready you feel on the day)
- ☐ crowd or audience effects (their reactions to performance, either supportive or derisive)
- ☐ importance of this competition (selection, one last medal and then retirement)
- ☐ lack of self-confidence (doubting your ability to perform)
- ☐ Others: \_\_\_\_\_

## TIPS TO HANDLE PRESSURE

## DEALING WITH PRESSURE

- 01** Understand what is CONTROLLABLE and what is not

CONTROLLABLES	UNCONTROLLABLES
Training, Fitness, Attitude	Officials, Competitors, Crowd

- 02** Practise pressure situations during training

- 03** Use relaxation exercises to keep you calm and focused

- 04** Share how you feel with others!



- 05** Strive for excellence, not perfection

- 06** Identify skills/techniques that suffer most when you are under pressure- practise them

- 07** Let go of things you cannot control



## PRE-GAME MENTAL PREPARATIONS



Credit: Whyehgee Singapore 2010/Wikimedia Commons/CC-BY-2.0 4.0

### **C Kunalan, Olympian, Singapore Sprinting Legend**

*"You need to have a winner's mentality... And if others beat you, it just means they have done better training, so you need to evaluate your performance, then work harder."*

*TODAY (2015, April 18)*

When you are competing at a high level, most competitors have similar characteristics of being fast and strong. Some competitors are able to triumph all the time, while some others underperform. Why?

In 1998, ten athletes from the US World Championships Swim Team were interviewed to uncover how they approach/ deal with the mental aspect of swimming. Interestingly, even though the athletes prepared for their races differently, ***all of the athletes had a routine or plan to get mentally ready to race.***

### 3 Things You Can Do To Prepare Mentally For Competitions

#### GOALS

What are the things I have to do to achieve the best possible result in this competition?

Review goals to see which ones you have achieved, which ones you need to work on

#### Examples:

- Have breakfast/hydrate
- Use imagery
- Focus on self, not others
- Focus on specific techniques/tactics

#### IMAGERY

See and feel yourself performing optimally

**! Practise the night before and before competitions**

#### Tips:

- Find a quiet place
- Close your eyes
- Take 3 deep breaths and exhale slowly
- Count to 4 as you inhale, hold for 7 counts, and count to 8 as your exhale
- Imagine how you want your performance to go
- Feel the sensations, hear the sounds
- Slowly open your eyes after imagery

## RELAXATION & ACTIVATION

Everyone has a different Individual Zone of Optimal Functioning (IZOF)

	Anxiety Level	
<b>Low IZOF</b>	<b>Optimal performance</b>	Poor performance due to high anxiety
<b>Moderate IZOF</b>	Poor performance due to low anxiety	<b>Optimal performance</b>
<b>High IZOF</b>	Poor performance due to low anxiety	<b>Optimal performance</b>

Tips on reaching your IZOF

	To <b>relax</b>	To <b>activate</b>
<b>Breathing</b>	Slow, deep rhythm. Inhale to 4 counts, hold your breath for 7 seconds and exhale slowly to 8 counts.	Faster breathing
<b>Relaxed muscular state</b>	Tense specific muscle groups for 10 seconds, then relax	Dynamic warm ups, to activate muscles
<b>Imagery</b>	Calm pictures, imagining being in control, with confidence	Energizing images of perfect performances
<b>Self-Talk</b>	Relaxing cue words (calm, relax, smooth)	Powerful, confident talk (get tough, go for it)

**Competition Ready**

## Create a Pre-Competition Routine

	What do you need <b>MENTALLY</b>	What do you need <b>PHYSICALLY</b>
<b>On the way to the competition</b>		
<b>Before the competition</b>		
<b>During the competition</b>		




## MENTAL SKILLS TOOLKIT




The Mental Toolkit is a portable, lightweight box comprising various items that help provide national youth athletes like yourself with the resources to better prepare psychologically for training and/or competition. You are encouraged to bring along your toolkits for trainings and competitions, to aid you whenever necessary. Bringing the toolkit for your training sessions can help familiarise you to the items in the toolkit and help you to use them better during competitions.

The following items may be found in the tool kit:


**01**   
**STRESS BALL**

Can be used to facilitate progressive muscular relaxation

*TIP: Use it anywhere and at any time- before/after trainings or competitions etc.*


**02**   
**FLASH CARDS**

Contain bite-sized pieces of information on mental skills and how you can use them

**03**   
**EYE MASK & EAR PLUGS**


Help shut out external environment to refocus

*TIP: Use with imagery to prepare for upcoming performances or to reflect on past ones*

**04**   
**MARKER & TAPE**

Write down motivational or instructional phrases

*TIP: Use tape to stick these phrases up in an easily noticeable spot*

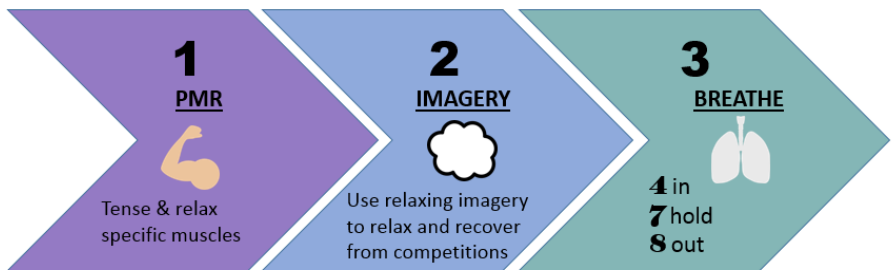


**MENTAL SKILLS TOOLKIT**

## RECOVERY

As an athlete, knowing how to recover after your competitions is as important as preparing for your competition. Here are some ways that you can recover after your performance:

### 3 STEPS TO *recovery*



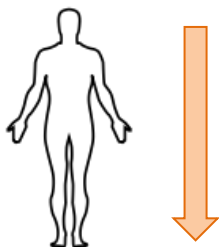
Here is a sample PMR script that you can use when required.  
Other times that you can use PMR include:

- Before/ during competitions, to calm down
- The night before competition, before sleeping
- After competitions to relax tired muscles

## Sample Script for All Sports

Sit down in a comfortable position, and try to put yourself in a relaxed state. Close your eyes and take a long, slow deep breath through your nose, inhaling as much as you can. Then exhale slowly and fully. Feel the tension leave your body as you exhale. Take another deep breath and let all the tension and problems you feel leave your body as you exhale. Do not strain to relax, just let it happen naturally. During this period, try not to move unnecessarily. Progress through a few muscle groups and for each muscle group, tense it for approximately 5 to 7 seconds, and relax it for 20-30 seconds.

Tense the muscles in the forehead and face by scrunching up your face. Feel the tension in your head and face. Okay, relax and let go of the tension. Notice the difference between tension and relaxation. Scrunch up your face one more time. <After 5 to 7 seconds> Now, relax and focus the release of tension in your lower arm. **<Continue for rest of body>**



! Tip: Start tensing from the head to the feet in a systematic manner if using PMR for recovery

## COMPETITION JOURNAL

Date:

Competition Details:

Competition Notes/Reflections

Things I did well today:

Things I learned today:

Date:

Competition Details:

Competition Notes/Reflections

Things I did well today:

Things I learned today:

Date:

Competition Details:

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Things I did well today:

Things I learned today:

## REFERENCES

### **Sport Nutrition**

Selected icons used in infographics were made by RoundIcons, Freepik, Ddara, Becris from [www.flaticon.com](http://www.flaticon.com).

Bass S, Inge K: Nutrition for special populations: children and young athletes; in Burke LM, Deakin V (Eds): Clinical Sports Nutrition. Sydney, McGraw- Hill, 2006, pp 589– 632

Desbrow, B., McCormack, J., Hislop, M., Sawyer, S., Burke, L., Cox, G., ... Leveritt, M.

(2014). Sports dietitians Australia position statement: sports nutrition for the adolescent athlete. *International Journal of Sport Nutrition and Exercise Metabolism*, (5), 1–44. <http://doi.org/10.1123/ijsspp.2015-0012>

National Health and Medical Research Council [NMRC]. (2006). Nutrient Reference Values Australia and New Zealand: Including recommended dietary intakes. Canberra: Commonwealth of Australia.

### **Sport Injury Prevention**

American Physical Therapy Association. (n.d.). Soreness vs Pain: What's the Difference? Retrieved December 8, 2015, from

<http://www.moveforwardpt.com/Resources/Detail.aspx?cid=1d04bab9-44f2-44d7-b510-7337125c88e9#.VOcoKLOUc8Q>

American College of Sports Medicine. (n.d.). ACSM Information on Delayed Onset Muscle Soreness. Retrieved December 8, 2015, from

[http://www.acsm.org/docs/brochures/delayed-onset-muscle-soreness-\(doms\).pdf](http://www.acsm.org/docs/brochures/delayed-onset-muscle-soreness-(doms).pdf)

Bleakley, C. M., Glasgow, P., & MacAuley, D. C. (2012). PRICE needs updating, should we call the POLICE?. *Br J Sports Med*, 46:220–221. doi:10.1136/bjsports-2011-090297

Smith, M. (2005). A review of the initial management of soft tissue sports injuries. *Journal of Orthopaedic Nursing*, 9(2), 103-107.

Wong, D. L., & Baker, C. M. (1988). Pain in children: comparison of assessment scales. *Pediatr Nurs*, 14(1), 9-17

### **Sport Psychology**

#### **Goal Setting**

Singapore Athletics Association (2015, June 1). Calvin Kang Li Loong – SEA Games 2015 Athletics Squad. Retrieved from <http://www.singaporeathletics.org.sg/calvin-kang-li-loong-sea-games-2015-athletics-squad>

Jordan, M. & Miller, S. (1994). I Can't Accept Not Trying: Michael Jordan on the Pursuit of Excellence. San Francisco: Harper.

Van Raalte, J. L. (2003). Provision of sport psychology services at an international competition: The XVI Maccabiah Games. *The Sport Psychologist*, 17, 461-470.

#### **Visualization**

Pereira, S. V. (2015, June 26). SEA Games 2015 – Dreams Came True. Retrieved from [www.walkingkissesandtracktimes.blogspot.sg](http://www.walkingkissesandtracktimes.blogspot.sg)

Brijnath, R. (2013, September 3). The hardest thing for me: Joseph Schooling. *The Straits Times*. Retrieved from <http://news.asiaone.com/news/sports/hardest-thing-me-joseph-schooling?nopaging=1>

/hardest-thing-me-joseph-schooling?nopaging=1

Phelps, M. & Cazeneuve, B. (2008). Michael Phelps: Beneath the Surface (2<sup>nd</sup> Ed). USA: Sports Publishing LLC.

**Dealing with Anxiety**

Neo, I. (2015, June 12). Rachel Yang raises bar with 3.9m leap. The Straits Times (Online). Retrieved from <http://www.straitstimes.com/sport/rachel-yang-raises-bar-with-39m-leap>

Goodes, J. (2015, February 8). 3 Steps to Nip Youth Performance Anxiety in the Bud. Breaking Muscle. Retrieved from <http://breakingmuscle.com/family-kids/3-steps-to-nip-youth-performance-anxiety-in-the-bud>

**Handling Pressure**

Wong, A. (2015, July 7). Quah looks to repay the faith. Today Online. Retrieved from <http://www.todayonline.com/singapore/national-swimmer-quah-becomes-second-spore-athlete-receive-long-term-ns-deferment>

**Pre-Game Mental Preparation**

Wong, A. (2015, April 18). Singapore SEA Games Athletes Should Turn Pressure Into Gold. Channel News Asia. Retrieved from <http://www.channelnewsasia.com/news/sport/singapore-s-sea-games/1792076.html>

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