Prevention and Management of sports injuries

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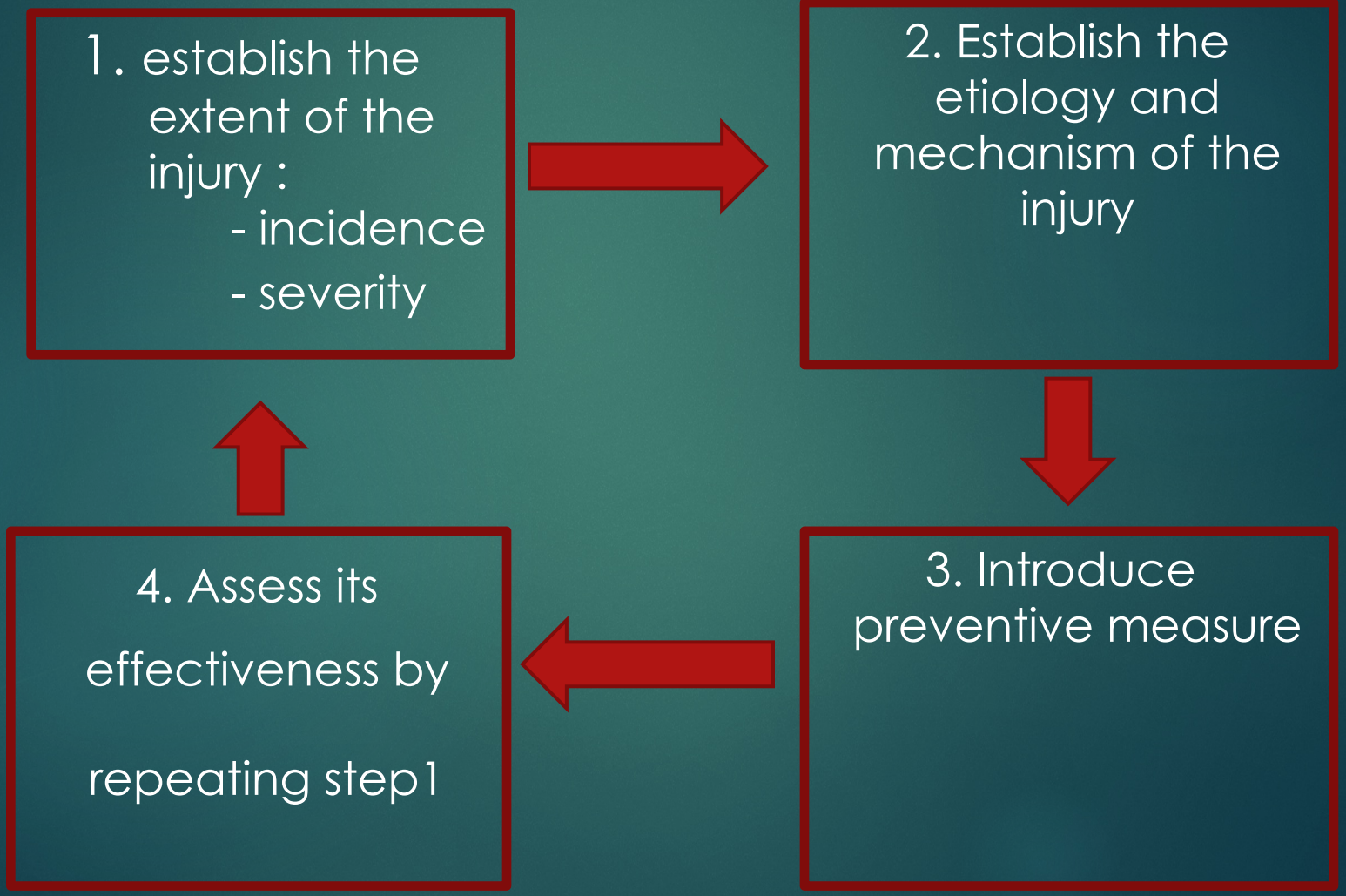
Sequence of sports injury prevention



Risk factors for sports injury

- **Intrinsic** - factors inherent to the athlete
  - Modifiable
  - Non modifiable

- **Extrinsic** - factors not inherent to the athlete

Intrinsic factors

- **Non modifiable**

  - Age
  - Gender
  - Genetics

Intrinsic factors

- **Modifiable**
  - Muscle strength / power
  - Flexibility (determines range of motion)
  - Skill level
  - Health (history of previous injury and joint instability)

Extrinsic factors

- Training
- Nutrition
- Hydration
- Equipment
- Environment
- Others

Factors in the prevention of sports injuries

- Warm up
- Stretching
- Taping and Bracing
- Protective Equipment
- Suitable Equipment
- Environmental factors
- Appropriate Training
- Psychology
- Nutrition
- Cooling down

Warm Up

- Warm Up are the exercises done prior to sports
- It is of 2 types
  - General exercises e.g. Jogging
  - Specific exercise (appropriate movements for the particular sport or activity)

Warm Up

The possible benefits of warm up include :

- Increased blood flow to muscles
- Increased delivery of oxygen to muscles due to increased break down of oxyhemoglobin
- Decreased vascular resistance
- Reduced muscle viscosity lading to smoother muscle contraction
- Increased speed of nerve impulses
- Enhanced metabolism

Warm Up

- Decreased number of injuries due to increased range of motion (ROM)
- Decreased stiffness of connective tissue leading to decreased likelihood of tears
- Increased cardiovascular response to sudden strenuous exercise
- Decreased sensitivity of muscle stretch

Warming Up Exercises

Warm Up

- There are no data to prescribe the intensity and duration of warm up
- This allows athletes to determine their own warm up regimen
- However one guideline is to produce some mild sweating without fatigue
- The effect of warm up lasts approx. 30 min, so it is important not to warm up early.

Stretching

- **Basic principles of stretching :**
  - Warm up prior to stretching
  - Stretch before and after exercise/sport
  - Stretch gently and slowly
  - Stretch to the point of tension but not pain

Stretching

- How does stretching prevent injury?
- Joints and muscle become stiff as a result of inactivity , over activity and injury
- Increased flexibility attained through stretching may decrease musculotendinous injuries and alleviate muscle soreness especially in sports that have a high intensity of muscle-tendon stretch-shortening cycle

  e.g. : football and basketball

Stretching

- Types of stretching :
  - Static stretching
  - Ballistic stretching
  - Proprioceptive neuromuscular facilitation stretching

Stretching

- **Static stretching:**
  - The stretch position is assumed slowly and gently held for 20-30 sec and relaxed
  - The athlete should not experience any discomfort.
  - Static stretching produces least amount of stretch and is the safest method to increase flexibility.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Stretching

- **Ballistic stretching:**
- The muscle is stretched to near its limit, then stretched further with a bouncing movement.
- Stretching a muscle against increased tension heightens the chances of injury, hence not commonly used.
- It is particularly used in gymnastics, ballet and dance under appropriate training where maximum ROM is advantageous.

Stretching

Proprioceptive Neuromuscular Facilitation Stretching(PNF) :

- Performed by alternating contraction and relaxation of both agonist and antagonist muscles
- PNF stretching may produce greater flexibility than other stretching techniques
- Major disadvantage is tendency to overstretch
- Performed under supervision.

Hydration

- 250 ml of water / isotonic drink required to maintain optimal physical workout.

- Athletes should take copious fluids intake during camps and tournaments/competition
- Isotonic drinks consist of water ,glucose, salts, and trace elements.
- Importance of glucose, salts, and trace elements

Hydration

Importance of Hydration

- 70% of body composition is water(mostly I/C)
- Dehydration results in adverse effects cell metabolism
- Fluid loss after 1 hour heavy workout results in almost 1-2% body weight through sweating
- If fluid lose amounts 4-5 % of body weight, **then capacity of physical work is reduce to 50%, ultimately resulting in injury or collapse.**

Nutrition

- Inadequate repletion of glycogen occurs due to under-nutrition causes a reliance on fat and protein stores resulting in protein breakdown which in turn leads to soft tissue injury.
  - Intense training causes skeletal muscle breakdown which is exacerbated by inadequate protein intake.
  - Inadequate hydration may compromise blood flow to working muscles increasing susceptibility to injury.
  - Inadequate intake of micro-nutrients like calcium, phosphorus result in altered bone metabolism resulting in injury.

Cool-Down Benefits

- Slowly ending your workout gives your body a chance to:
  - Relax
  - Decrease your heart rate
  - Decrease your breathing rate
- Energy conservation by glycogen storage.
- Excretion of waste products and oxidants from the body.
- Reduces potential for muscle soreness
- Decreasing the chances of injuries.

Taping and bracing

- Taping(or strapping) and bracing are to used to restrict undesired, potentially harmful motion and allow desired motion.
- Indication for the use of taping and bracing:
  - prevention- used as a preventive measure in high risk activities
    - e.g. basketball player's ankles
  - Rehabilitation- used as a protective mechanism during the healing and rehabilitation phases.

Taping

Taping

Taping and bracing

- **Taping :**
  - Restrict undesired motion
  - Good tape should be adhesive strong and non irritant
  - Suitable joints for taping are ankle , wrist 1st metatarsophalangeal etc
  - Taping may enhance proprioception besides mechanical support.

Taping and bracing

- **Complications of taping :**

  - reduced circulation due to tight taping
  - skin irritation
  - failing of support when the material material threshold is exceeded

Taping and bracing

- **Bracing:**

  - provide mechanical support and prevent undesired motion.

  - Athlete can put brace by himself/herself

  - slipping during use, weight of the brace, sizing are the major disadvantages

Knee brace

Protective equipment

- They shield various body parts against injury without interfering with sporting activity.
- They can also be used on return to activity after injury to prevent direct contact with the injured part
- Protective equipment include helmets, face shields, knee pads, shin pads, shoulder pads, wrist guards gum shields gloves etc

Suitable equipment

- Equipment should be used according to the capacity of the athlete.

  e.g. children should use junior racquets for tennis, smaller bats for cricket

- Equipment should be sport specific.

  e.g. using running shoes for football will lead to injury of forefoot.

- A defective equipment can lead to injury.

Environmental factors

- Extreme cold and hot weather can cause injury to sportsmen.
- Extreme heat can produce heat cramps and heat prostration.
- Extreme cold may cause frostbite and hypothermia
- Uneven, wet, icy surfaces cause falling, collision, sliding of the players.
- Athletes must be aware of signs of hypothermia, heat prostration
- They must be well prepared for the extreme weather with appropriate clothing and training.

Appropriate training

- This includes giving sport specific training towards improving performance in the given sport.
- There should be adequate rest between competitions
- Training must be according to individual needs as every individual differs in their skill, power, strength, food habits, tolerance etc

Psychology

- psychological arousal can result in decrease in sporting performance and increase the risk for injury
- Loss of concentration can predispose to injury by giving athlete less time to react
- Under arousal can also predispose to injury.

  e.g. if a player has be Excessive relegated to

  lower level of competition, he/she

  may not warm up as diligently as

  normal.

Management Of Sports Injuries

- Price
- Physiotherapy
- Pharmacological treatment
- Local and intra-articular injections
- PRP
- Arthroscopic surgery
- Open surgeries
- Return to play criteria

Price

- P-Protect
- R-Rest
- I-Icing
- C-Compression
- E-Elevation

Physiotherapy

- Manipulation
- Use of modalities
  - Superficial heating modalities
  - Deep heating modalities
  - Tractions
  - Laser
  - Aqua

Pharmacological Treatment

- Nsaids
- Muscle Ralaxants
- Local Application
- Vitamins
- Disease modifiers

Local and intra articular injections

- Long and intermediate acting steroid injections
- Lubricant injections

PRP

- Platelet Rich plasma treatment
  - Platelet-rich plasma, also known as autologous conditioned plasma, is a concentrate of platelet-rich plasma protein derived from whole blood, centrifuged to remove red blood cells
  - **Benefits of PRP Facial Rejuvenation:**
    - Increases collagen production.
    - Reduction of fine lines and wrinkles.
    - Firmer, tighter skin.
    - Improves moisture retention.
    - Enhances skin tone and texture

PRP

- Benefits
  - To-delay surgery
  - Very few side effects
  - PRP injections can be effective for **6-9 months**.
  - PRP is **a safe and efficient therapeutic option for the treatment of knee osteoarthritis**.
  - When treating a meniscal tear with PRP Prolotherapy, the concentrated platelets (PRP) are placed at the site of the tear. Growth factors are released which **will stimulate healing of the tear**. The growth factors in the PRP will cause proliferation and regeneration of the injured tissue.

Arthroscopic surgery

Return to play criteria

- Full strength
- Free from pain
- Skills performance test
- Emotional readiness
  - Counseling will help athlete work through any hesitation about returning to play after sustain injury
  - Athlete who do not perform at 100% will be prone to new injuries
  - Always ask the athlete if they are ready
    - An athlete who is hesitant or does not feel ready should not be allowed to return

Q & A

THANK YOU