PLEASE CLICK ON THE FOLLOWING LINK TO WATCH THE LECTURE ONLINE:-

https://www.youtube.com/watch?v=jXmxrhaEG7M&list=PLuBRb5B7fa_eLlhgRt2DFNKetmQ5nDLZJ&index=4

Specific Sport Injuries

Dr. Moh Alsukour

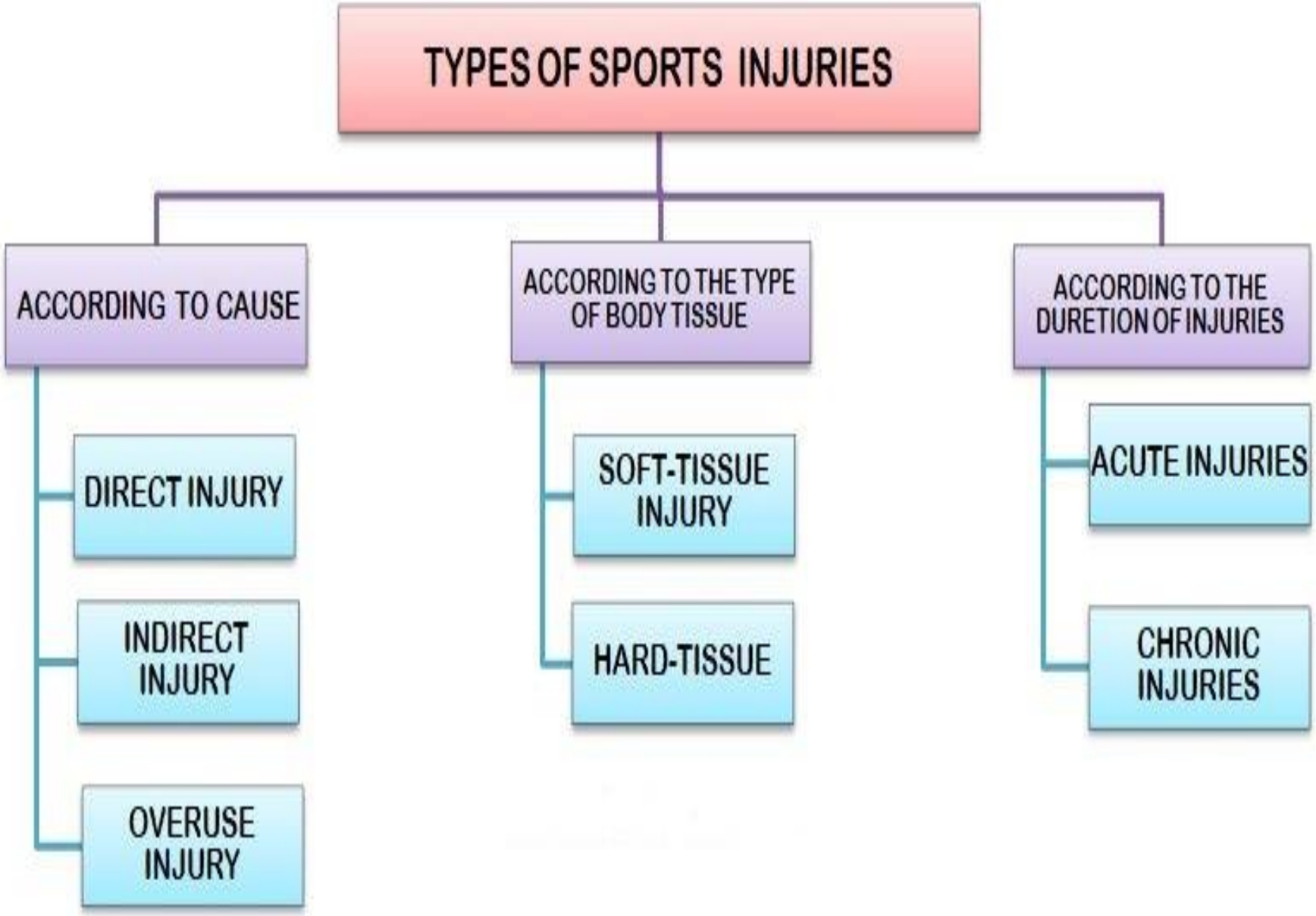
- The kind of injuries that most commonly occur during sports or exercise.
- sports injuries result from accidents, poor training practices, improper equipment or insufficient warm-up or stretching.
- injuries of the musculoskeletal system.

Objective

- Classification/types
- Terminology; Sprain ,Strain , Contusion, Muscle Cramp.
- Risk factors
- Common injuries – in some sports.
- Instructions of participant/ preventive measures.
- Injury management options.

Sport Injury Symptoms

- Symptoms and causes of injury differ according to the type of injury.
- Some injuries, like a torn muscle are not visibly obvious, where others, such as a knee dislocation or cut are obvious.
- In most cases it's pain that gives us the first sign of injury.


TYPES OF SPORTS INJURIES
ACCORDING TO CAUSE
DIRECT INJURY
INDIRECT INJURY
OVERUSE INJURY
ACCORDING TO THE TYPE OF BODY TISSUE
SOFT-TISSUE INJURY
HARD-TISSUE
ACCORDING TO THE DURETION OF INJURIES
ACUTE INJURIES
CHRONIC INJURIES

Sprains

- “ligament injury”
- Severity;
- grade 1 - stretching / minor torn
- grade 2 - partial torn (<90% fiber)
- grade 3 - complete torn
- Symptoms; pain, swelling, bruise, limit ROM
- Treatments; RICE

RICE

- Rest : avoid activity, gait aids
- Ice : vasoconstriction;

(20min/session - q.2-3 hr.)

- Compression : pressure effect
- Elevation : reduce swelling

Sprains

- 1+ instability: < 5mm
- 2+ instability: 5-10 mm
- 3+ instability: > 10 mm

Strains

- • “muscle injury”
- • caused by a sudden stretching force or a very forceful contraction of the muscle
- Distension rupture
- • Severity;
- • grade 1 - <10% muscle fiber damaged
- • grade 2 - 10-90% fiber damaged
- • grade 3 - complete rupture of muscle


a)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Strains

- SYMPTOMS
- • Sudden pain or feeling that the muscle has tightened
- • Pain on contraction
- • Tenderness
- • Pain on stretching
- • Swelling and bruising
- • Decrease ROM

- TREATMENTS
- Initial : RICE
- stretching exercises can usually begin within 48 hours / pain free
- More severe injuries need longer rest

Contusions

- “direct impact to muscle”

- Compression rupture

- causes local muscular damage and bleeding as the muscle is crushed against the underlying bone.

- Pain, bruising, swelling are common.

- There may be a decrease in motion.

- Contracting the muscle will be painful.

Muscle Cramp

- ✤ Brisk muscle contraction- cramping seizure.
- ✤ Common : thigh and calf
- ✤ Exercise in extremely hot or cool environment
- ✤ Dehydration
- ✤ Decrease potassium, calcium, magnesium
- Rx: Massage, stretching, hydration

ACUTE INJURIES

- sudden appearance of symptoms usually associated with a single traumatic incident.
- Pain and loss of function are immediate.
- These can be classified as either:

❖ Direct: caused by external force as collision between two players or between player and equipment

➢ Bruises

➢ Fracture

➢ Cuts

- Indirect : caused by internal force as over stretching a ligament in sudden change direction in turnover in basketball
- Strain
- Sprain
- Tear

Chronic Injury

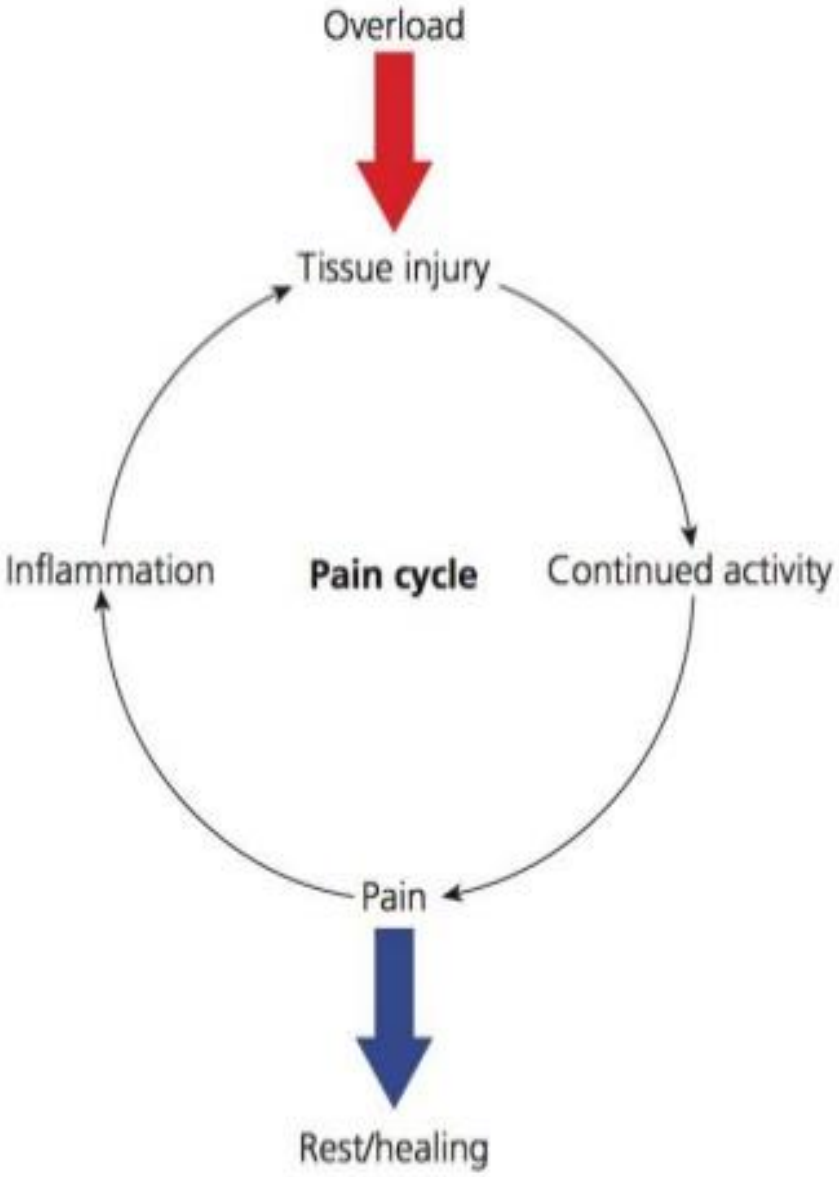
- acute /trivial repetitive micro trauma
- factors : intensity & frequency
- predisposed : malalignment & muscular imbalance
- start out as acute injuries and then reoccur as a result weakness to the injured site or insufficient rehabilitation after injury.
- Pitching a baseball

Overuse injuries:

- Due to excessive and repeated use of the same muscle, joint or bone.
- Gradual increase of pain.

shin splint

Overuse Injuries



Stress Fractures

- incomplete fracture, hairline fracture, fatigue fracture
- femur, tibia, fibula, metatarsals, navicular, calcaneus, talus, ribs
- Low velocity, repetitive
- Track athletes, dancers
- Pain on exertion, night pain, point of tenderness
- radiographic changes(2-3 weeks)

Stress Fractures

- Treatments:

• Modified rest for six to eight weeks

• NSAIDs

• Stretching and flexibility exercises

• Non weight-bearing with crutches

Tendonitis

- Overuse injury which gradually develops over time.
- ‘Tendonitis’ literally means inflamed tendon.

- SYMPTOMS

• Pain gradually over a period of time

• Worse when start and then ease off

• Morning stiff?

• Thicker, tender tendon

• Lumps /nodules within the tendon

- TREATMENT

• Initial treatments; reduce pain, stiffness and swelling

• Stretching exercise

• Eccentric strengthening exercise

• Electrotherapeutic

• Acupuncture

Bursitis

✣ Inflammation of ‘bursa’

✣Friction bursitis: Overuse condition occurs due to repeated rubbing of the overlying soft tissue.

✣ Hemobursa :Impact bursitis is due to bleeding into the bursa. Adhesion and loose bodies

✣ Chemical bursitis.

✣ Septic bursitis.

Risk factors for sport injuries

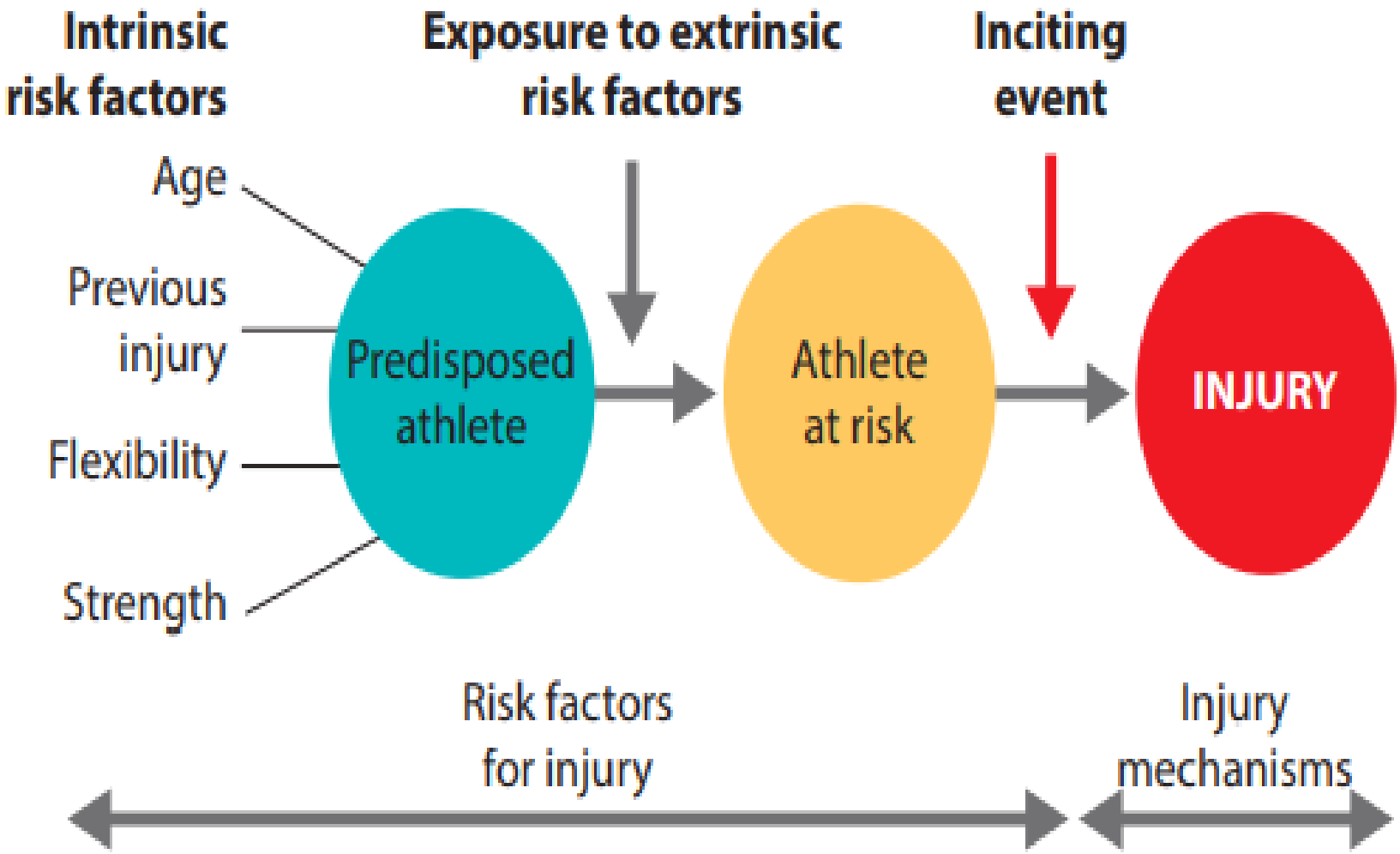
- Internal (intrinsic) risk factors

- Basic/fundamental factors

- Primary internal factors

- Secondary or acquired factors

- External (extrinsic) factors


Intrinsic risk factors
Exposure to extrinsic risk factors
Inciting event
Age
Previous injury
Flexibility
Strength
Predisposed athlete
Athlete at risk
INJURY
Risk factors for injury
Injury mechanisms

Internal (intrinsic) risk factors

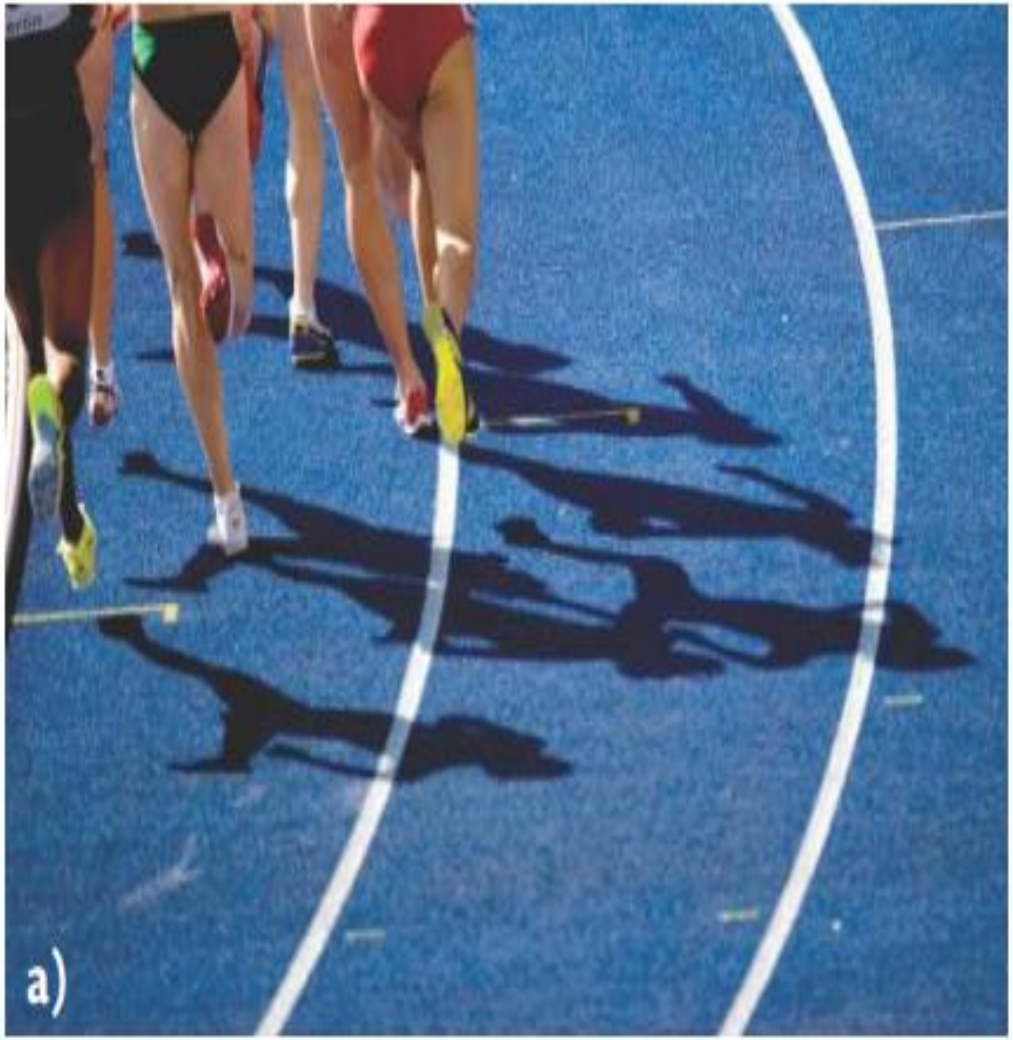
- Basic/fundamental factors;
- - sex, age, body growth, weight and length

- Primary internal factors
- - malalignments, leg length, muscle imbalances , insufficient strength, reduced flexibility and neuromuscular coordination

- Secondary or acquired factors: kinetic chain , previous injury

- External (extrinsic) factors

- environmental factors such as climate, surface, equipment and level of competition, improper training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GENERAL FACTS ABOUT SPORTS INJURIES

- About 95% of sports injuries are minor soft tissue traumas.
- The most common sports injury is a bruise (contusion).
- Sprains account for one-third of all sports injuries.
- Fractures account for 5-6% of all sports injuries. Stress fractures are especially common in ballet dancers, long-distance runners, and in people whose bones are thin.

Running and Jumping

- the annual injury incidence 61 and 76%.
- 80–90% in the lower extremities.
- most are overuse injuries, such as chronic tendon injuries (tendinopathy) and stress fractures.
- 2–2.5 times less frequent compared with injury in contact sports.
- an athletics injury is defined as ‘an injury where the athlete is forced to completely or partially refrain from participation in training and or competition in athletics’ for a period of at least 3 weeks in the past year (one-year prevalence), and at the time of measurement (point prevalence).

- medium/long-distance runners and jumpers foot/toe and knee injuries.
- overuse injuries are muscle and muscle fascias (27.2%), tendon and muscle attachments (21.6%), joint surfaces (15.9%), tendons and tendon sheaths (15.1%), bursae, bones and nerves (21.4%).
- The knee joint, which is the most common site of injury, was involved in 48% of all running injuries, followed by the lower leg/ankle(20.4%), the foot (17.2%), hips (6.0%), the leg/thigh (4.2%) and lumbar spine (4.1%.

	Men (%)	Women (%)
Patellofemoral pain syndrome	24.3	29.6
Overuse injury in the lower leg	7.2	11.4
Iliotibial band syndrome	7.2	7.9
Plantar fasciitis ('heel spur')	5.2	4.0
Patella tendon pain	5.1	3.1
Achilles tendon problem	4.7	2.7
Pain in the midfoot	3.1	3.8
	n = 2 359	n = 1 814

Throwing sports

- Throwing injuries are tennis and other racquet sports, javelin, discus and hammer throw, shot put, basketball and handball.
- swimming, baseball and volleyball.
- movement chain, larger parts of the body (legs and trunk) to a smaller (more injury prone) upper extremity.

- divided into phases

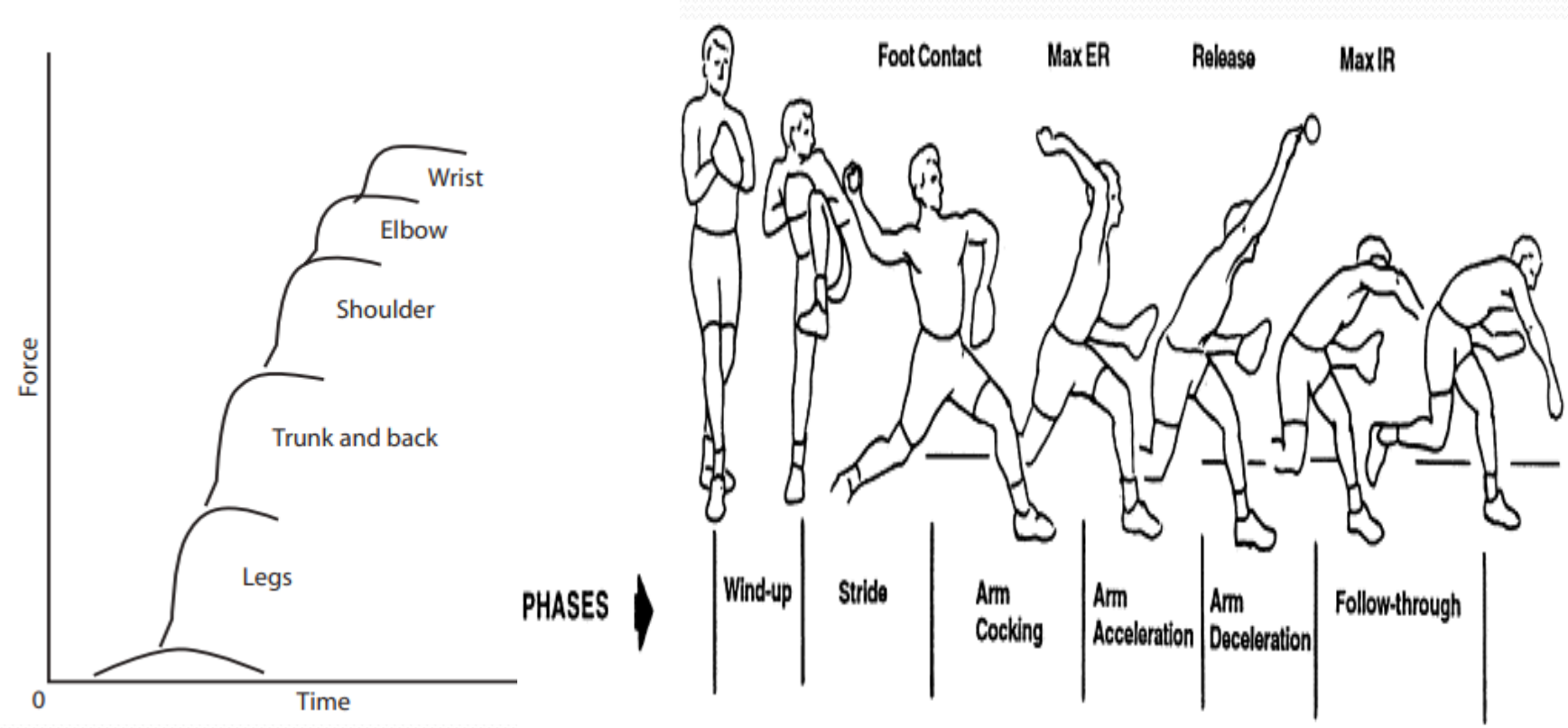
1- Preparation phase (wind-up)

2-Pulling the arm backward (cocking phase)

3-Arm acceleration (acceleration phase)

4-Braking of the arm (deceleration phase)

5-Follow through


Force
Wrist
Elbow
Shoulder
Trunk and back
Legs
0
Time
PHASES
Foot Contact
Max ER
Release
Max IR
Wind-up
Stride
Arm Cocking
Arm Acceleration
Arm Deceleration
Follow-through

- majority of the injuries were located in the lower extremities (31–67%), upper extremities (20–49%) and trunk (3–21%).
- The most common injuries in tennis are muscle ruptures (35%) as hamstring tears,, ankle sprains (26%) followed by ligament and tendon injuries.
- Acute injuries commonly occur in the lower extremity whereas chronic injuries occur in the upper extremity and trunk.
- Back pain in tennis is not going away!.

- Shoulder injury in players at all levels ranges from 4% to 17%. They are commonly due to repetitive use and related to scapular dyskinesis, rotator cuff pathology or glenohumeral internal rotation deficit, which results in internal impingement and/or labral pathology.

Football/Soccer

- Male players sustain 17–51 injuries/1000 match hours and 2–6 injuries/1000 training hours and in general, slightly more injuries than women.
- Between 60 and 90% of all football injuries were classified as traumatic and about 10–40 % were overuse injuries.
- 30–50% are due to un-fair play.
- Most injuries (60–90%) were at the lower extremities with the ankle, knee, and thigh being most affected.

Injury survey

- 70 and 90% of all injuries affect the lower extremities, 70% of them are traumatic injuries to the knee and ankle.
- during matches : body contact, 60% of men and approximately 55% of women, training: contact 40–50%, no contact only 25–35%
- Head injuries account for between 10 and 20% of injuries.

- The most common injury locations are the ankle (about 20%), knee (about 20–25%), thigh (around 25–30%), and groin (about 10%)
- Ankle injury
- Knee joint injury
- Thigh muscles
- Groin pain and injury

- Internal factors

- as age, sex, height, weight, nutrition, strength, endurance, and anatomical abnormalities

- External factors

playing field and weather conditions, rules, protective equipment, relationship of shoe to surface, foul play

Mixed Martial Arts

- combatants in warfare
- Mixed: blend of techniques from different systems
- Striking or Stand-Up Martial Arts Styles

Boxing,Karate,Kickboxing,Kung Fu,Muay Thai,Tae Kwon Do

- Grappling or Ground-Fighting Styles

Brazilian Jiu-Jitsu, Wrestling

- Throwing or Takedown Styles

Aikido,Judo

- Hybrid Fighting Styles: MMA

- Striking-Predominant Disciplines/percussive(kicks and punch): boxing, karate, Muay Thai and taekwondo
- kickboxing has higher rates of lower extremity injuries (26.1%)
- boxing has higher rates of upper extremity injuries (17%). facial abrasions, facial fractures (e.g., nose), periorbital injuries, and concussions
- Muay Thai high rates of acute and chronic lower extremity injuries

- foot receives approximately 18% of the injuries in tae kwon do
- kick boxers were callosity (59%), gastrocnemius contracture (57%), toe deformities (49.3%), wounds (10%) and heel pain (9%),bruises (29%), lacerations (17%) and digital jamming (25.8%)

- Submission-Predominant Disciplines/non-percussive(throw and lock)

- Brazilian jiu-jitsu, judo, Aikido and wrestling

- high rates of joint injuries

- knee and elbow, were the most common injuries during competition /Brazilian jiu-jitsu competitions (2005-2011) 78% elbow

-Judo, (throws and takedowns) shoulder, elbow, and knee joints are the most frequently injured joints

- wrestler shoulder was the most commonly injured joint (24%) followed by the knee (17%)

- Match stoppage

- head trauma was found to be the single most common reason for match stoppage (28.3%)

- musculoskeletal stress (16.5%)

- neck choke (14.1%)

skiing

- injury rate of 2.5 per 1000 person ski days.
- head injuries accounting for up to 20% of all injuries.
- ACL

–early 1970s accounted for less than 1% of all ski injuries, knee (sprain) 23% of all alpine ski injuries. (ACL) downhill and freestyle, represent 38%

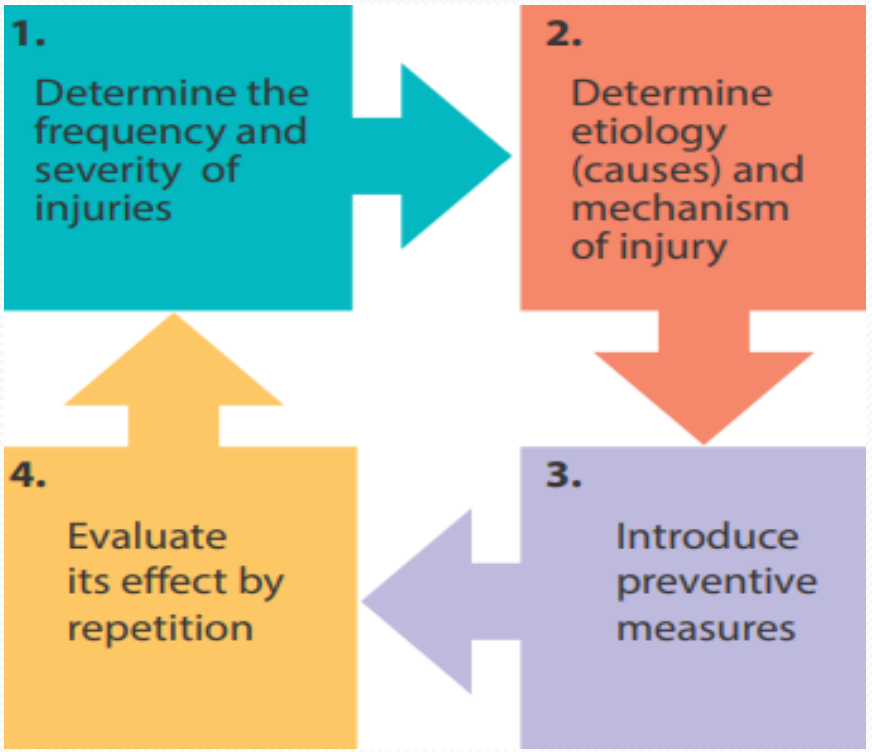
- ligament injuries of the thumb (10%).
- abrasion and cuts (8%).
- shoulder contusions (5%).
- crushing and clamping injuries caused by the edge of the ski boot (4%).
- Tibia fractures represent about 3–4%.

ACL in Skiing

- valgus load with external rotation.
- Ski boot-induced.
- Phantom foot.

- Every sport has its unique requirement profile, which means that the demands on the athlete in a particular sport are carefully analyzed., thus facilitating the creation of an overall prevention program.
- Incidence: injury/number of activity hours.
- Injury mechanism: own story/pic,video.
- Injury severity.

- Sequence of prevention



Instructions To Participate In Sports Injuries

- Ensure medical fitness/preseason examination
- Identified risk factor as biomechanical changes as maladaptation
- Adhere to rules of conduct
- Warming up, conditioning exercise
- Safety equipment's: orthosis, padding, shoes and turf
- Water intake:
- Concussions
- Recognize your playing capacity:
- Tackle emergency

Prevention of sport injuries

- Warm Up
- Cool Down
- Hydration
- Proper Technique
- Equipment
- Physical Conditioning
- Facilities Management
- Balanced Opponents
- Rules and Enforcement

Warm Up

- Blood flow 15-20% at rest, 10 min -70-90%
- Increase performance and prevent injuries.
- Large muscle group then more specific

stretching

- Move joint painlessly through FROM.
- Important Goal of rehabilitation ,improve performance and injury prevention.

- Static stretching.
- PNF
- Ballistic


a)


b)

Equipment in sport

- Shoes
- Protective equipment
- Head protection /helmet
- Face protection
- Protective eyewear
- Mouth guard
- Ear and hearing protection
- Neck protection
- Shoulder protection/Elbow protection
- Wrist protection/Hip guards
- Knee protective and preventive braces
- Shin guards
- Foot and ankle braces
- Ski safety bindings
- Ski poles and gloves

Shoes

- Most common piece of many sport
- Each sport has special design shoes.

- training program.
- Surface properties.
- Foot anatomy
- Sport demand
- Sole, outsole, heel


a)


b)


c)


a)


b)

Protective equipment

- Prevent and mitigate injuries in both short and long term.
- Not hamper athlete's activity and technique.
- Should be tested, high quality and effective.


a)


a)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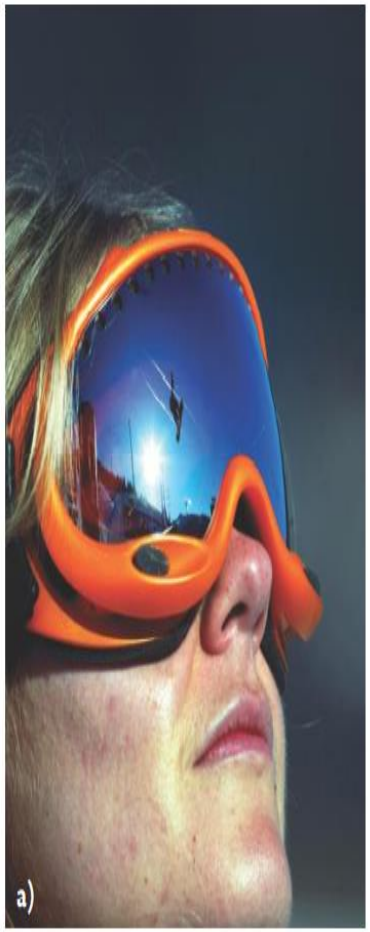
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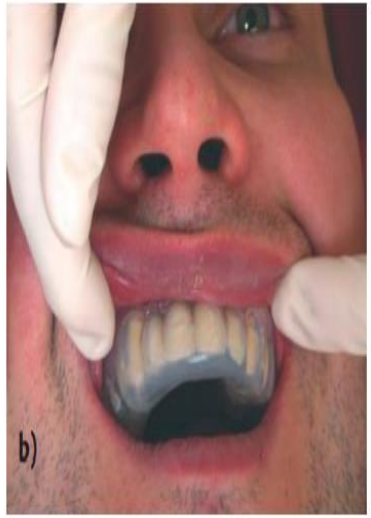
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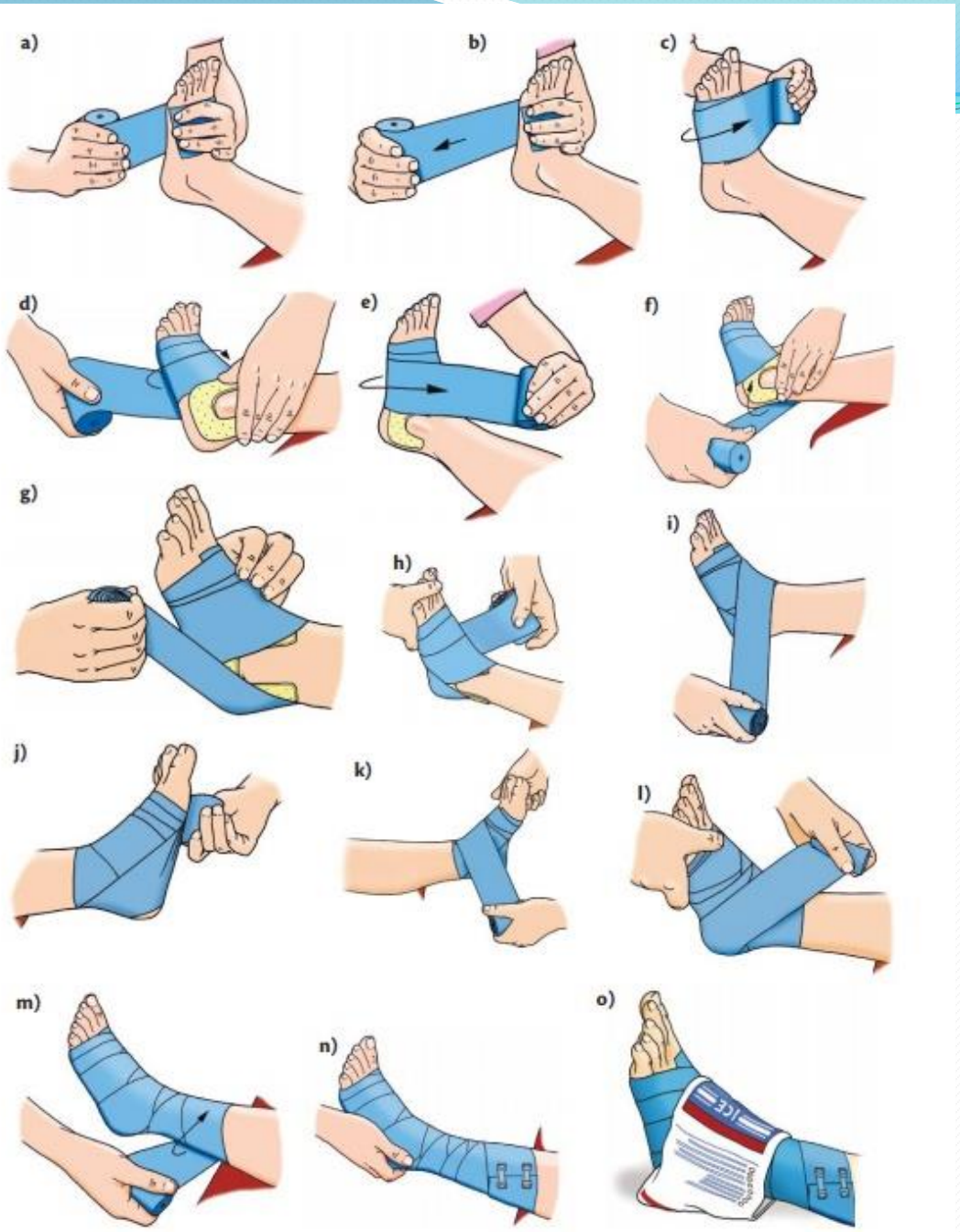
Injury management options

- Cold treatment (cryotherapy)
- Heat treatment (thermotherapy)
- Superficial heat treatment
- Deep heat treatment
- Ultrasound
- Phonophoresis
- Electrical stimulation
- Iontophoresis
- Acupuncture
- Massage
- Medications with both anti-inflammatory and analgesic effects
- Cortisone local injection

Compression bandages

- Reduce extent of the hematoma.
- Cold pack or foam pad.
- Apply ASAP ,Maintain few days- wks. till swelling subside.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Cold treatment (cryotherapy)

- Blood flow decrease to 50% after 10 min to depth 2 cm.
- As much as possible in 1st day.
- Later for pain relief.
- Best combined with compression.

Figure 7.7 Local cryotherapy (cold treatment) can be given in different ways. **a, b)** A cooling pack is a common way to apply cold to the injured athlete; **c)** an ice bandage is often given acutely to the athlete. (With permission, by Bildbyrån. Sweden.)

Heat treatment (thermotherapy)

- After 2-3 days.
- Increase blood flow and support healing.
- Increase elasticity and plasticity

- Used in preventive and rehabilitation phases/ overuse injuries

Deep heat treatment/ultrasound

- Penetration Inversely to frequency.
- Tissue absorb energy.
- As deep as 10 cm/ deep pain and inflammation.
- Increase extensibility so combined with stretching exercise.

Rehabilitation principles

- Regain normal mobility (range of motion) of the joints.
- Stretch connective tissue fibers of the tendons and muscles to an optimal length.
- Increase the strength and endurance of the muscles.
- Improve stability, balance, coordination and proprioception.

- criteria for a safe return include full, pain-free range of motion; normal and equal strength bilaterally; and ability to meet the demands of the sport without intermission, pain, or swelling

Muscle training

- Concentric work implies the muscles contract and shorten in length simultaneously/accelerates a moving object.
- Eccentric work implies that the muscles contract and lengthen simultaneously/deceleration.

Static (isometric) exercise

- isometric training can start immediately.
- increase in number of muscle contractions/repetitions should always precede increases in load.
- increases the load on the injured tissue gradually.
- in the early stages of rehabilitation of muscle–tendon injuries or when an injured limb is immobilized

Dynamic training

- later stages of rehabilitation.
- start with a low load ,expanded by increasing the frequency of the exercise rather than the load.
- isotonic training
- increase in joint load with weights (isotonic training).
- risk of overloading the joint at its weaker points.

-Isokinetic training

working at a constant speed, degrees/second

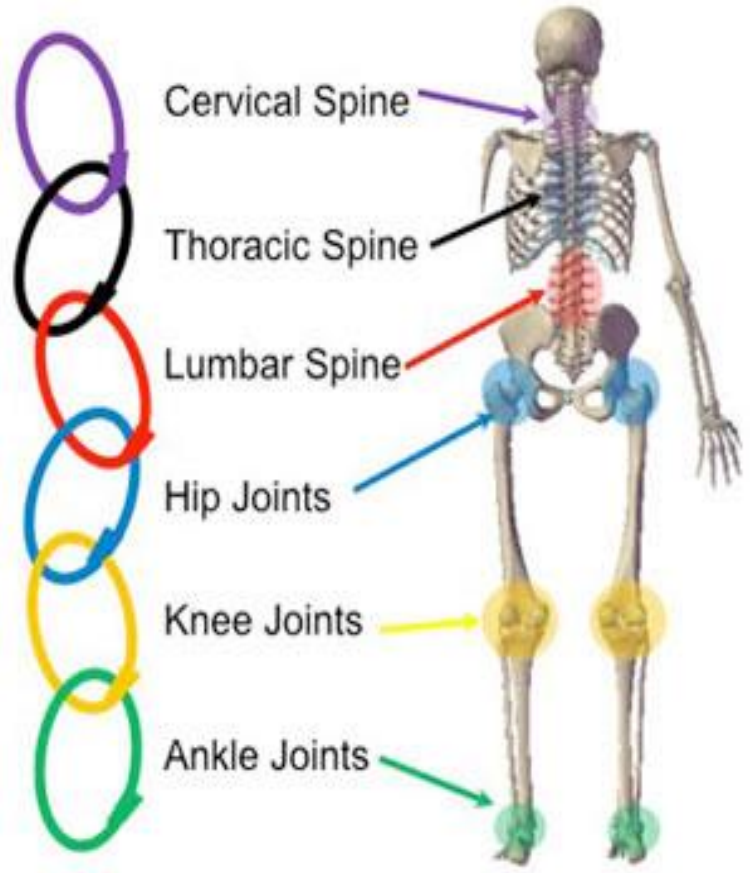
Open and closed kinetic chain exercises

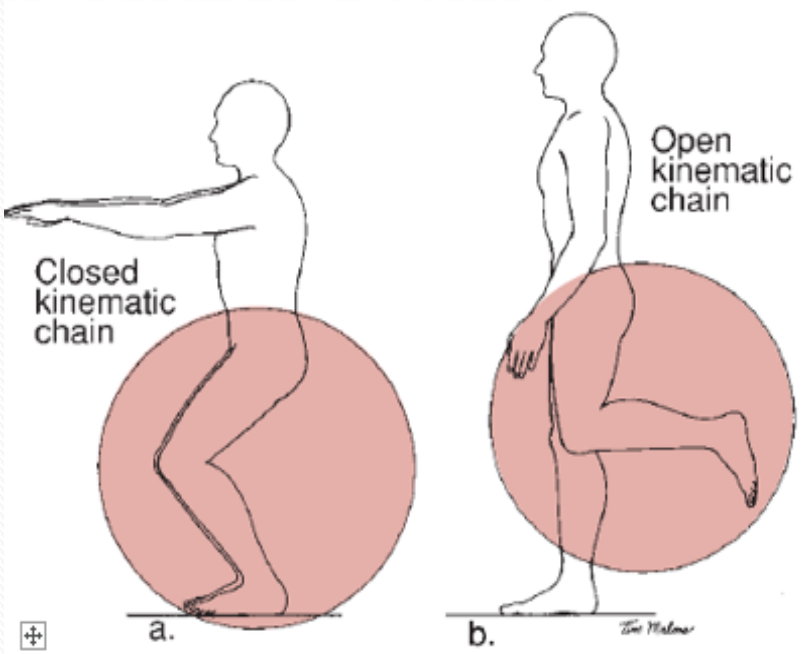
- Open kinetic chain (OKC) exercises :fixed proximal body segment and a distal segment a relatively free ROM.

-single joint or single plane motions

- reduce their ability to improve proprioceptive.

- Closed kinetic chain (CKC) exercises: fixed distal segment and a relatively free proximal segment
- multiple joint segments moving through multiple simultaneous arcs of motion.
- agonist/ antagonist co-contraction.
- joint shear forces, increased proprioceptive and improved postural and stabilization mechanics.





	OKC	CKC
Moving	Distal	Proximal
Fixed	Proximal	Distal
Charact.	Mobility	Stability + power
Speed	Fast mov't	Slow mov't