Injury Prevention-Boxing

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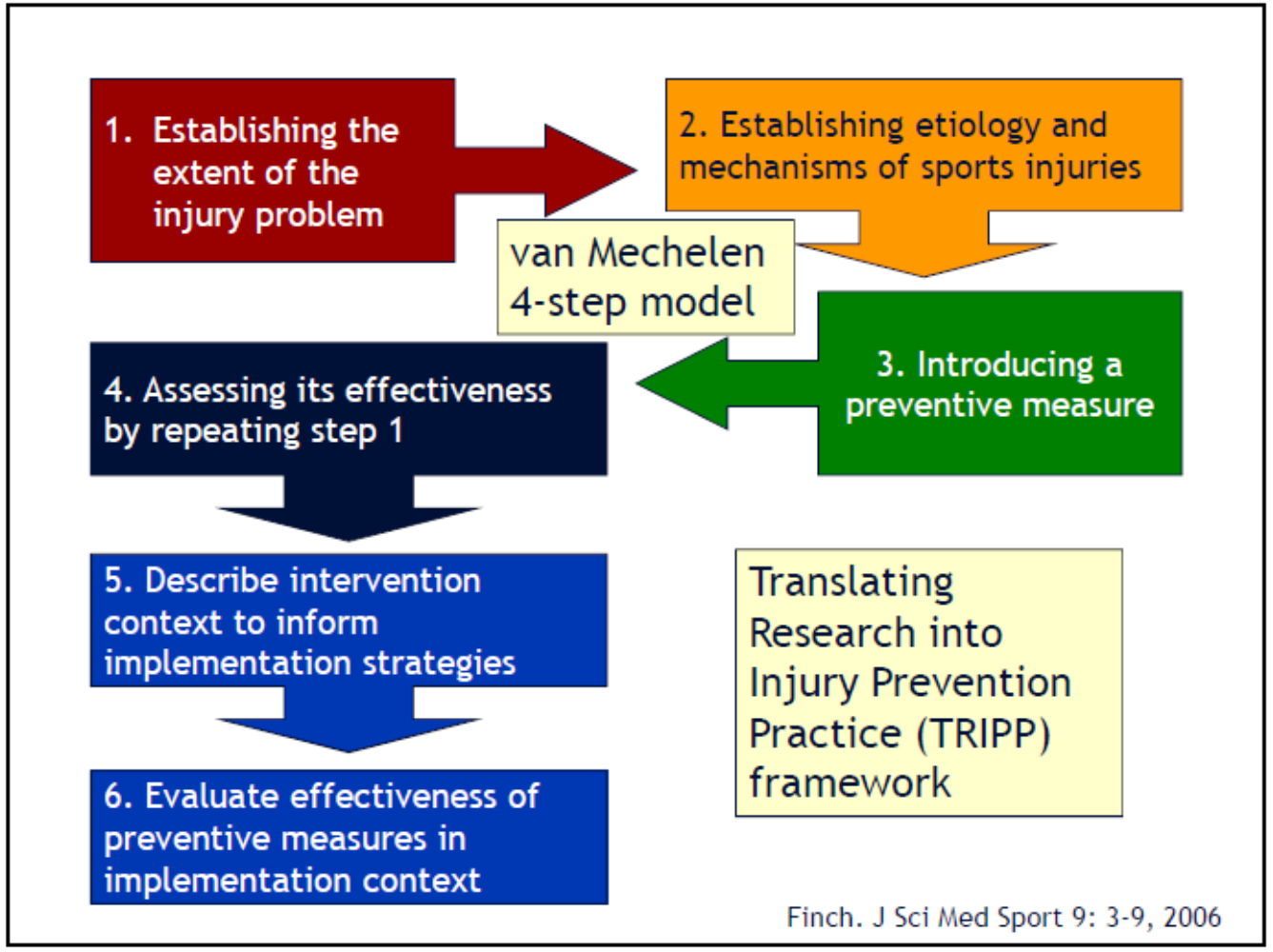
Why prevent injuries?

- Health is a priority
- Performance enhancement
- Economical aspects

Injury Prevention Model:



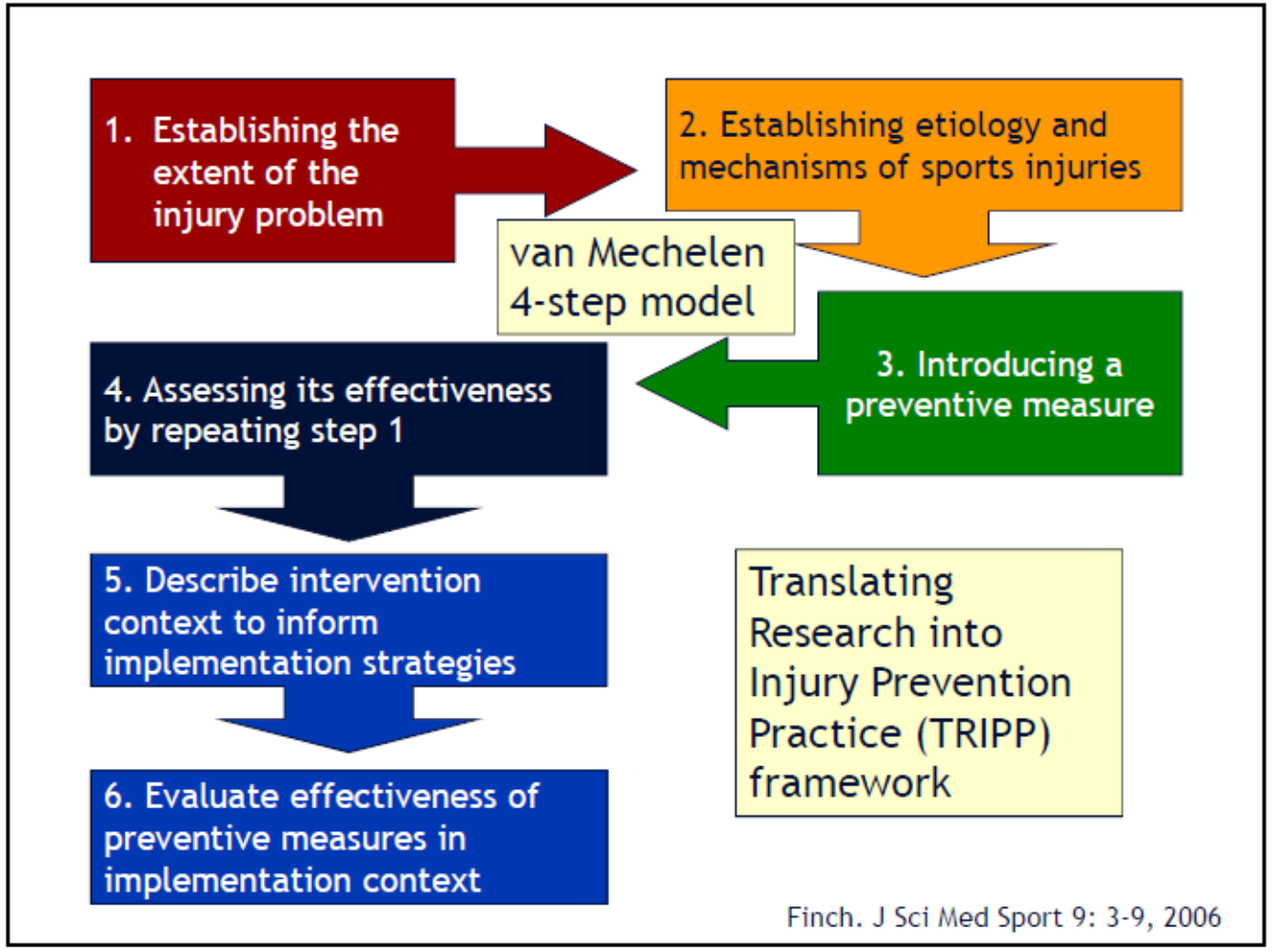
Prevalence of injury

OLYMPIC	No. of athletes	No. of injuries	Boxing
2008- Beijing	10,977	1055	15%
2012-London	10,568	1361	27%
2016-Rio	11,274	1101	30% (Rank 2)

Prevalence of injury

- Type of injury: Laceration/Abrasion (44%) > Contusion(bone/muscle) (18%) > Concussion (7%)
- Injured area : Head (65%) > Upper limb (21%) > Lower limb
- Punch type: Hook, straight, upper-cut
- Cause: Dehydration, poor posture (scapular dyskinesia, biomechanics), faulty technique
- Defeated boxers had thrice as injury as the winners

Injury Prevention Model:



Injury prevention: Levels

1. Primary (Avoid injury): pre-participation evaluation, physiological aspects of the sport, biomechanical, techniques, gear/equipment, play safe, follow rules, posture, injury prevention programs
2. Secondary (Early diagnosis and treatment): Do not ignore/hide the signs and symptoms, regular assessment
3. Tertiary (Preventing re-injury): Rehabilitation should be targeted towards reduction and correction of existing disability causing the injury.

Injury prevention

1. ASSESSMENT
2. TRAINING and TECHNIQUE
3. EQUIPMENT

Pre-participation evaluation

1. Medical status
2. Musculo-skeletal (posture, flags)
3. Physiological (aerobic capacity)
4. Strength and conditioning
5. Nutritional status
6. Mental health

Physiological aspects in injury prevention

- Boxing is 70-80% aerobic, 20-30 % anaerobic
- Primary goal is to increase lactic acid tolerance and improve VO_2 max

	Indian boxer	Britain
VO_2 max (ml/Kg/min)	49.8	63.8
Blood lactate(mMol/L)	8.24	13.5

- High altitude training
- Interval training with short rest period

(Luke et al, 2011)

Musculoskeletal screening for injury prevention

- Questionnaires:
- Red flag: Individual rehab with a time frame
- Yellow flag: Load management with time frame
- Green flag: Prevention program

Injury Prevention Program

- Warm-up
- Structured, sport specific
- Focussed towards improving joint movements and joint control in various movements
- Resistance training
- Focussed towards improving muscular strength, power, speed, endurance and general motor performance
- Resistant towards sports-related injuries

Injury Prevention Program

- Boxing is an explosive sport
- Slow is not always good
- Strength training must be ballistic : plyometrics, medicine ball drills, explosive training with weights or jumps
- Machine, free weights, core, functional training
- Functional training exercises (e.g. exercises with trunk rotations in boxing stance position), functional cable machines

Injury Prevention Program

- Neuromuscular training:
- An integrated NMT enhances physical fitness and motor competence
- Prevents aggregation of neuro-muscular deficits
- Cool-down (active):
- Blood-lactate recovery (peripheral)
- Reduces neuro-muscular fatigue (central)

EQUIPMENT

- Head-gear/chest and groin protectors
- Gloves
- Bandaging
- Mouth-guard
- Footwear

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EQUIPMENT

Preventing common boxing injuries

- Head:

- Concussion (90%)
- Whiplash (higher the weight, higher is the punch force)
- Head gear
- ASBC suggestion to bring back head-gears in men
- Neck strengthening exercises

Preventing common boxing injuries

- Dental:
- Tooth/jaw fracture, TMJ injury
- Mouth guard (shock absorption and other properties, teeth clench, mouth closed)
- First used in boxing in 1920s followed by other sports
- Facial muscle exercises

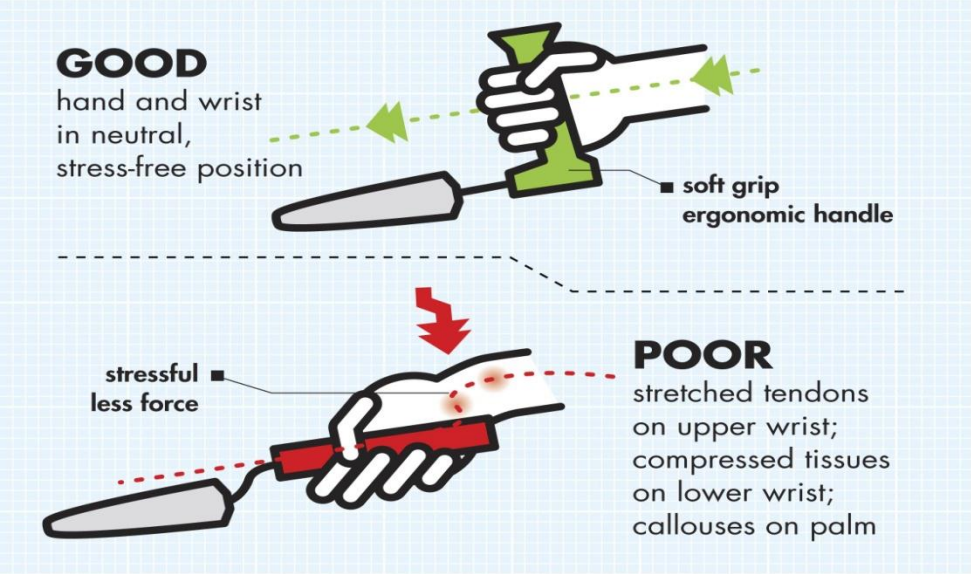
Preventing common boxing injuries

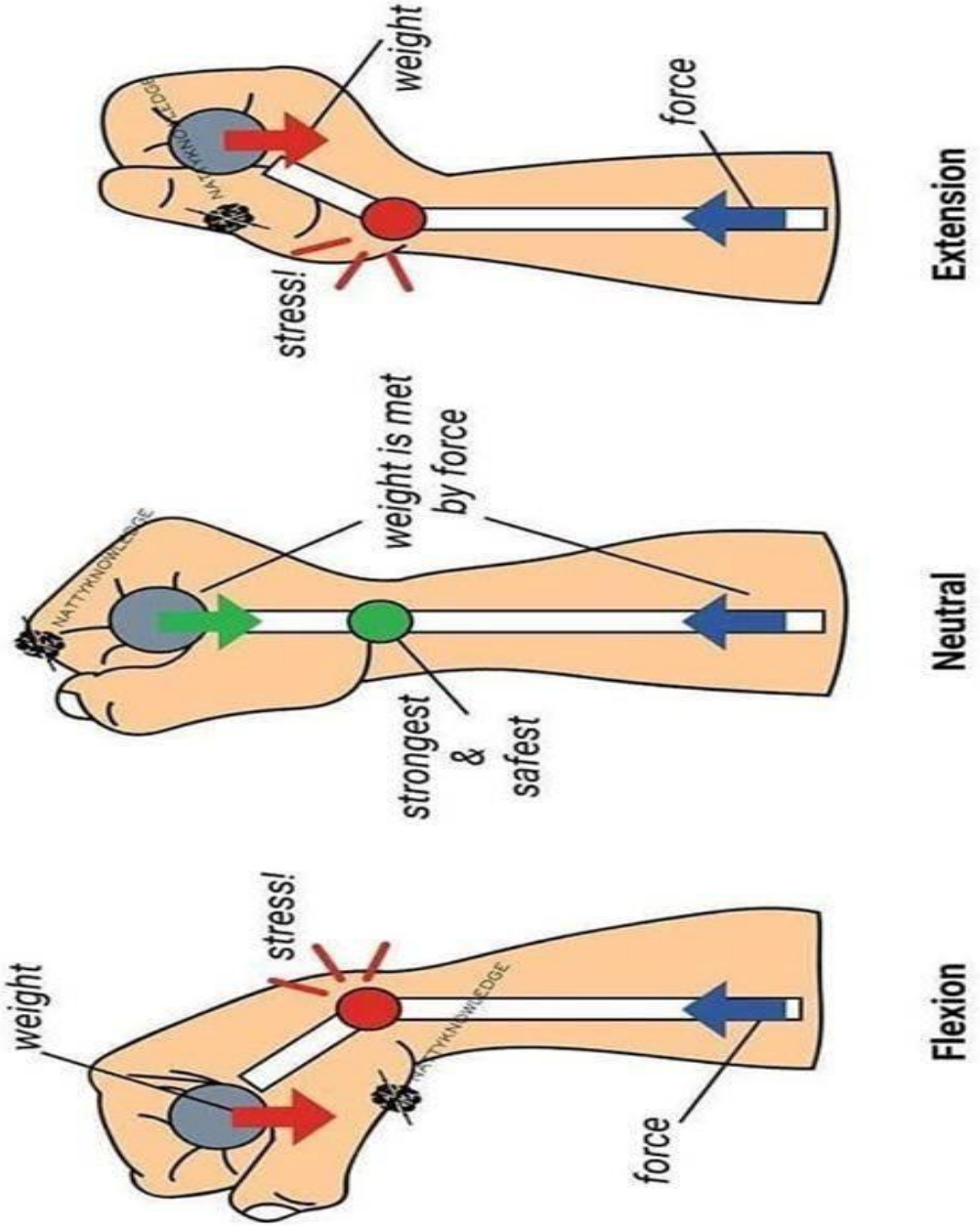
- Hand and wrist:

- Carpal bossing (straight punch with wrist in flexion)
- Boxer's knuckle (faulty hook technique)
- Punching mechanics/wrist position/foam pads or thick bandage over knuckle during training/proper bandaging and wrapping
- Absorb/diffuse detrimental forces

Preventing common boxing injuries

- Hand and wrist:





Preventing common boxing injuries

- Constant monitoring of pain, tenderness, disability
- Grip strength/Intrinsic muscle exercises/forearm exercises
- Push ups with wrapped fists
- Small muscles

Preventing common boxing injuries

- Winners have stronger grip strength (58.2 kg) than non-winners

Preventing common boxing injuries

- Abdominal:
- Contusion, vital organs
- Body punches
- Abdominal strengthening exercises
- Entire core
- Protects internal organs, prevents muscle strain and contusions
- Reduce chances of Knock outs through
- these punches

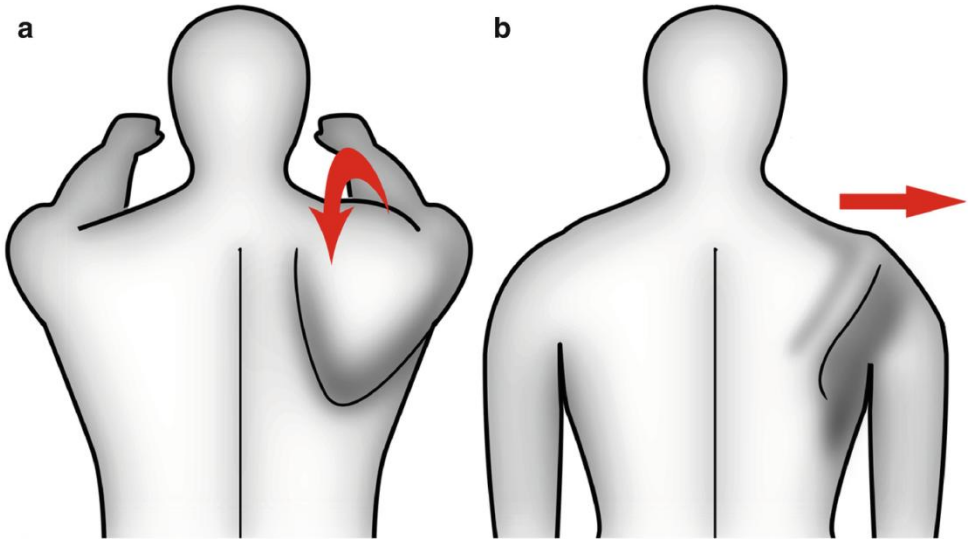
Preventing common boxing injuries

- Chest Protectors:

Preventing common boxing injuries

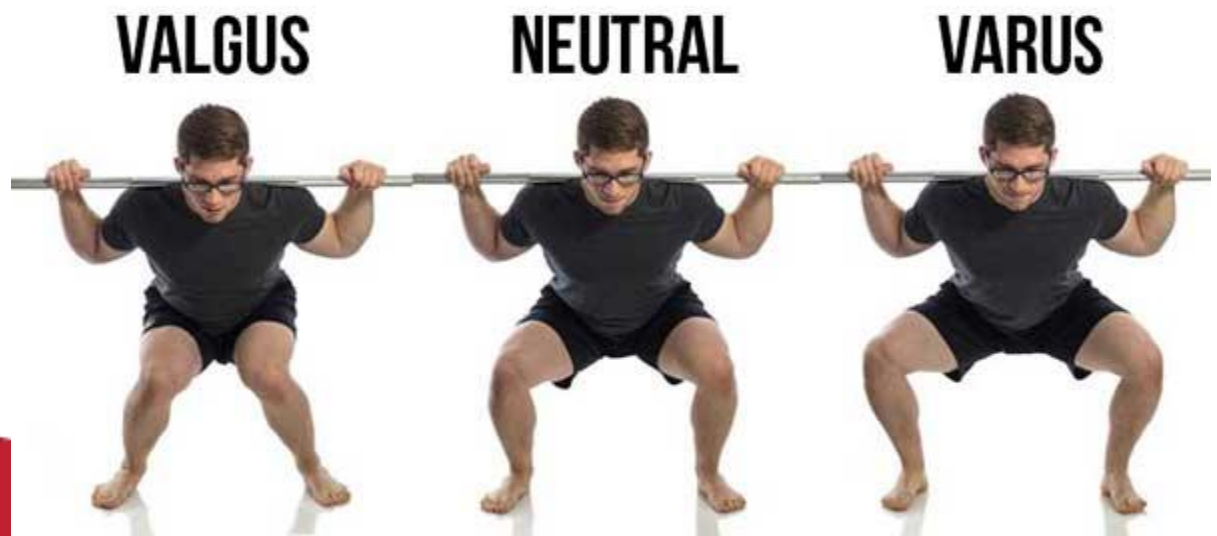
- Shoulder:

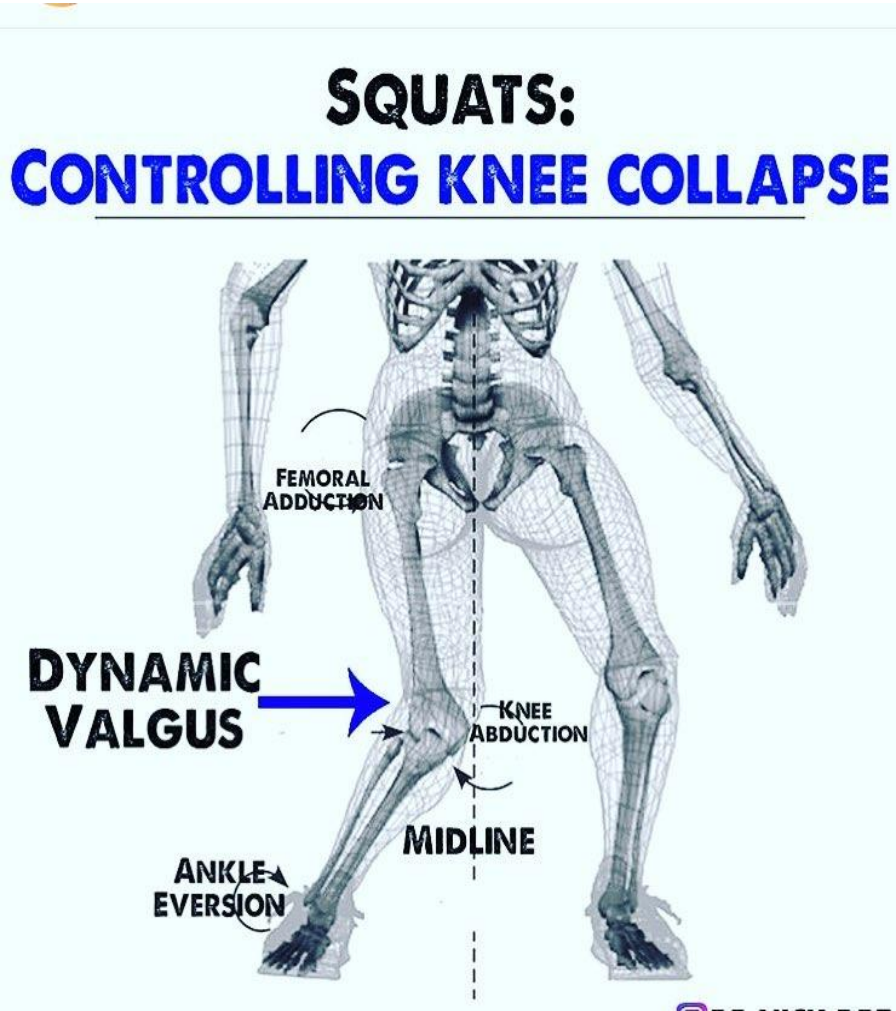
- Repetitive acceleration and deceleration during training due to repetitive punching (bag)
- Prehab for rotator cuff and scapular stabilizers



Preventing common boxing injuries

- Lower limb:
- Knee/Ankle
- ACL/Meniscus/Ankle sprain
- Knee Valgus correction





Preventing common boxing injuries

- FIFA 11+
- Footwear, duration of use, optimally tight shoe lace
- Barefoot training
- Balance exercises (NMT)

Preventing lower limb injuries

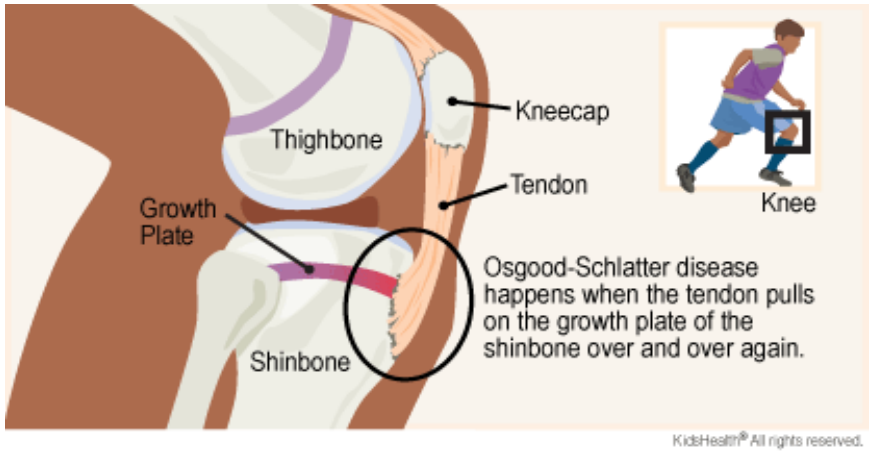
Injury prevention in Female Boxers

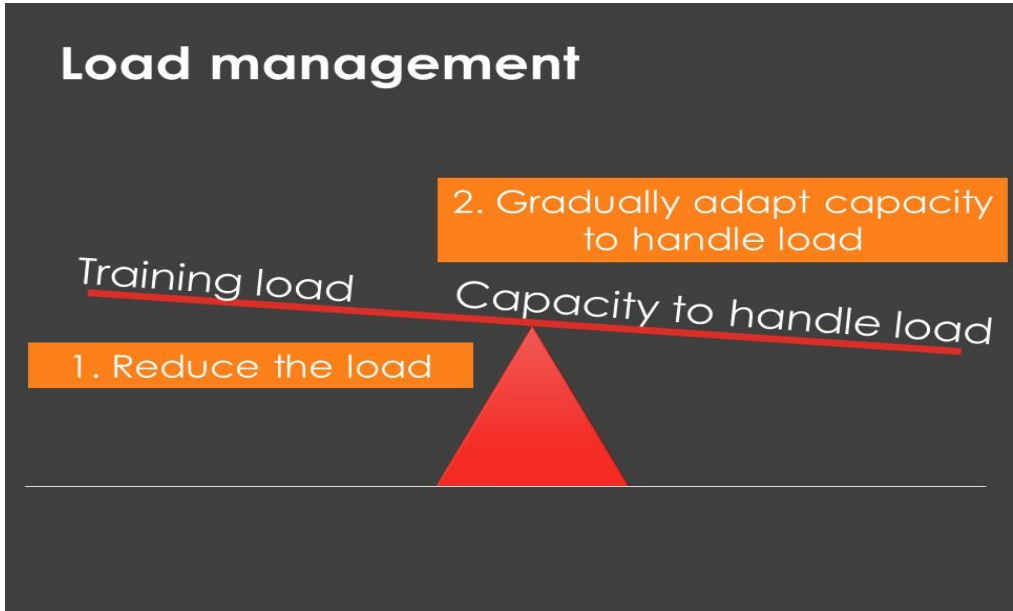
- Female athletic triad:
  - Low energy availability/Menstrual dysfunction/Low bone density
- Post pregnancy
  - Ligaments laxity
- Early diagnosis by close monitoring
- Mammary glands
- Chest-protector

(Rauh et al, 2014, Int. Jl. of Sports PT)

Injury prevention in Adolescents

- Growth spurts
- **'too much, too soon' or 'too little, too late'**
- Load management
- Role of parents
- Recognize the injury risks
- Trust the coach
- Injury management





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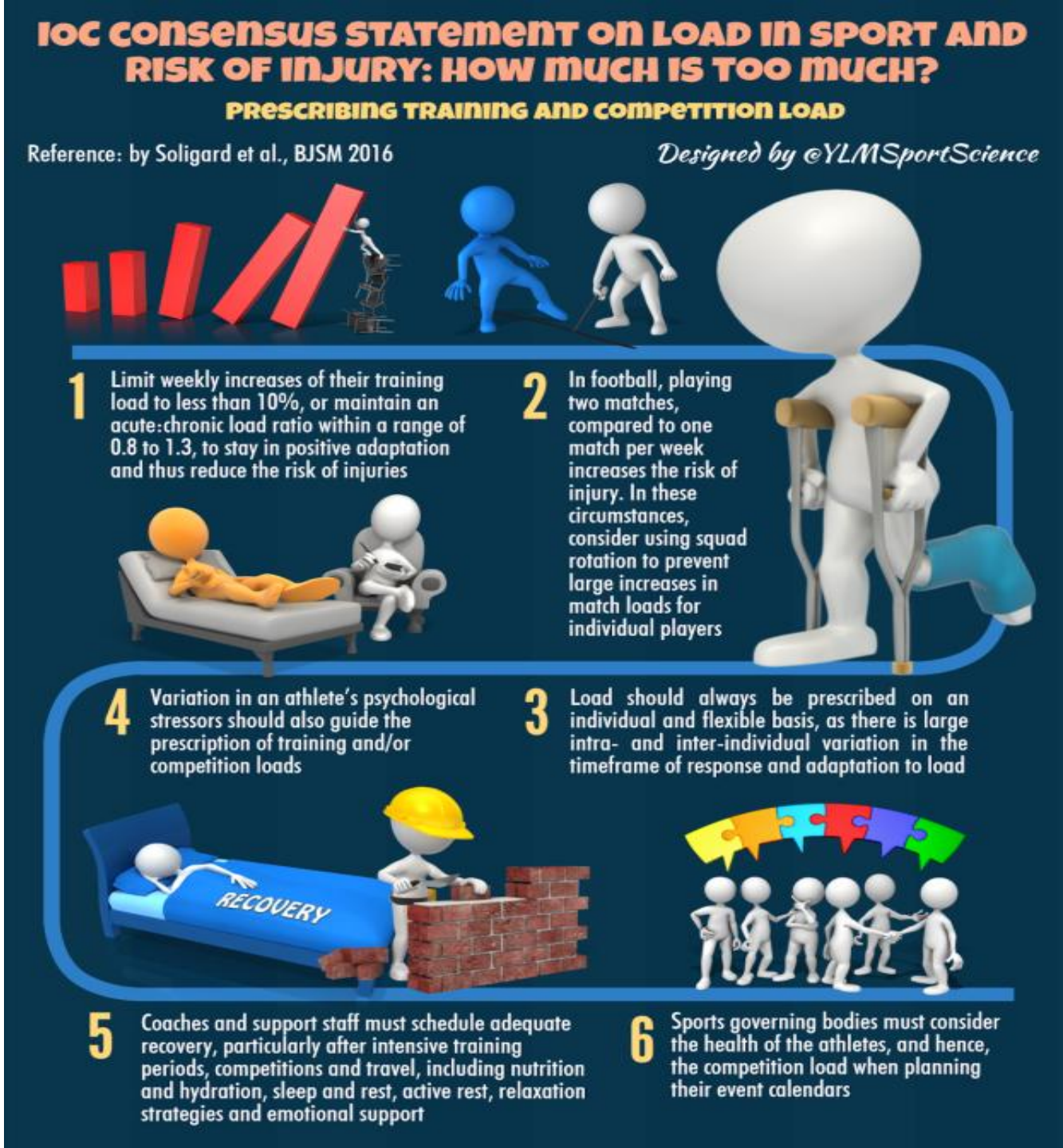
Injury prevention in Adolescents



Injury prevention in Boxing Coaches

- Warm-up (sparring partners/punching pad training)
- Stretching of smaller muscles
- Head gear

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1. Prone neck strength

3 x 8-16 repetitions

- Purpose: To strengthen the neck
- Lie on a bench with your head over the edge
- Slowly lower and raise your head
- 4 seconds per repetition
- 3 x 8-16 repetitions

2. Supine neck strength

3 x 8-16 repetitions

- Purpose: To strengthen the neck
- Lie on a bench with your head hanging over the edge
- Slowly raise and lower your head
- 4 seconds per repetition
- 3 x 8-16 repetitions

3. Shoulder stability

3 x 60 seconds

- Purpose: To increase shoulder strength and stability
- Kneel on all fours
- Keep your back straight
- Lift one arm up at a time, stretching out overhead
- Stabilise the shoulder on the weightbearing arm
- 3 x 60 seconds

4. Forearm strength 2

3 x 8-16 repetitions

- Purpose: To strengthen the forearm muscles
- Start with palm of your hands facing upwards
- Flex your wrist upwards and return slowly down
- Partner provides resistance
- 3 x 8-16 repetitions

5. Forearm strength 1

3 x 8-16 repetitions

- Purpose: To strengthen the forearm muscles
- Start with palm of your hands downwards
- Flex your wrist upwards and return slowly down
- Partner provides resistance
- 3 x 8-16 repetitions

6. Diagonal arm pull

3 x 30 sec

- Purpose: To improve shoulder stability
- Keep your feet stable
- Pull your partners arms diagonally and rotate trunk
- Provide resistance to your partner ' s pulls
- Your partner pushes you forwards and pulls you backwards
- 3 x 30 sec

7. Core stability

3 x 8-10 repetitions

- Purpose: to increase core stability
- Hold on to partners legs
- Elevate legs, partner gives pushes in different directions
- Resist the movement and go back to start position
- 3 x 8-10 repetitions

8. Neck strength against wall

3 x 30 seconds

- Purpose: To strengthen the neck
- Stand 1 m from a wall, leaning on your forehead
- Flex and extend your neck by going up and down on your toes
- Progression: Increase distance from wall, or perform exercise facing the other way
- Remember to use non-slip shoes
- 3 x 30 seconds

Multi-disciplinary approach

- Due to the complex systems involved in the nature of injuries, the responsibility for injury risk prevention and/or management cannot lie solely within a single domain of professional practice.
- Interdisciplinary collaboration between technical/tactical coaches, strength and conditioning coaches, team doctors, physical therapists and sport scientists is likely to have a meaningful impact on injury risk.

Multi-disciplinary approach of injury prevention

Intellectuals solve problems, Geniuses prevent them…

(Albert Einstein)

THANK YOU ☺