

COURSE OUTLINE-IB 128: SPORTS MEDICINE

INTRODUCTION

Definition of sports medicine

Pre-participation physical exam

Epidemiology of sports injuries

- injury rates for various sports
- sports risks relative to other public health problems

Mechanism of injury

- trauma
- overuse
- environmental

EXERCISE AND HEALTH

BIOENERGETICS

- energy sources for power, speed, endurance

- oxidative energy sources

- supplying O₂ to muscles

lung factors

blood factors

cardiovascular factors

tissue factors

- adaptation to exercise

cellular level

organ level

Exercise and health

trends of heart disease in USA

medical studies supporting merits of exercise

animal studies of exercise and cardiovascular health

risks of exercise

- sudden death in young athletes
- cardiac arrhythmias during exercise

recommendations for safe exercise

- pre-exercise evaluation and counseling
- target heart rates
- choice of appropriate activities

FITNESS TESTING

body fat measurement

pulmonary function evaluation

cardiovascular function

- cardiac output
- VO₂ max
- CV response to exercise
- target heart rate

categories of fitness by age, gender

treadmill testing:

- sensitivity
- specificity
- predictive value

Introduction to Injuries

symptoms and signs of injury

initial treatment of injury-R.I.C.E.

definitions:

- fracture
- sprain
- strain
- dislocation
- joint
- cartilage
- synovium
- bursitis
- tendinitis

SHOULDER AND ARM INJURIES

anatomy

biomechanics

- muscles and function
- defining mobility

injury considerations

- mechanism of injury
- symptoms/signs
- diagnosis
- treatment
- rehabilitation
- prevention

specific injuries:

- shoulder

clavicle fracture

A-C joint injury

rotator cuff

tendinitis

bursitis

dislocation

- upper arm and elbow

contusion

bursitis

muscle strain

epicondylitis

elbow sprain, dislocation

- forearm

fractures

contusions

tenosynovitis of wrist
nerve compression syndromes
• hand and wrist
fingertip: contusion, hematoma, nail avulsion,
paronychia, felon, mallet finger
proximal finger: hyperextension,
dislocation, collateral ligament tears, boutonniere
deformity
thumb: ulnar collateral ligament tear
palm and dorsal hand contusion
wrist: navicular fracture
skin wounds

INJURIES TO PELVIS, HIP, THIGH

Pelvic Injuries: fracture, stress fracture

Hip: anatomy and function

- overuse injuries
- "groin strain"

Thigh: anatomy and function

- soft tissue injury: contusion
- myositis ossificans
- muscle strain, esp. hamstrings
- fractures

HEAD, NECK, SPINE INJURY

Head Injury

Survey of football injuries

- injury rates
- risk factors
- rule changes
- helmet technology

Brain injury: pathophysiology of injury

- concussion
- cerebral contusion
- epidural hematoma
- subdural hematoma

Evaluation of person after head injury

- mental state
- symptoms of increased intracranial pressure

Neck Injury

- strain
- "stinger"
- criteria for return to activity after injury
- Cervical spine fracture

mechanism of injury

transport of injured athlete

Upper back, thoracic spine

- contusion, rib fracture

Lumbar Spine

- lumbar disc disease
- spondylolisthesis
- spondylolysis
- prevention and treatment of low back pain
- physical exam of back
- consideration of chiropractic

KNEE INJURY

Perspective on knee injuries

Anatomy

Evaluation of injury

Knee ligament injury

- stabilizing structures
- mechanism of injury
- classification of knee sprain
- treatment
- symptoms of chronic knee disability
- role of knee braces

Meniscus Disorders

anatomy and function

meniscus tears

- mechanism of injury
- diagnosis
- treatment
- arthroscopy

Anterior Cruciate Ligament

- injury diagnosis/treatment options

Patellofemoral disorders

anatomy

- iliotibial band friction syndrome
- Osgood-Schlatter's disease

biomechanical factors

clinical problems

- patellofemoral syndrome
- tendinitis
- patellar subluxation/dislocation
- treatment

Bursitis

Other conditions

- iliotibial band friction syndrome
- Osgood-Schlatter's disease

Rehabilitation after Injury

LOWER LEG, ANKLE, FOOT INJURIES

Lower leg

- anatomy and function

- overuse syndromes

training errors

biomechanical factors

- clinical problems

muscle cramps

anterior compartment syndrome

posterior tibial syndrome ("shin splints")

Achilles tendinitis

Achilles tendon rupture

muscle strains

gastrocnemius/plantar

stress fractures

Ankle

anatomy and function

mechanism of injury

ankle sprain

- history

- clinical evaluation

- normal course of healing

- rehabilitation

Foot

anatomy and function

biomechanics of gait and running

anatomic variants

- cavus foot (high arch)

- pes planus (low arch)

clinical problems

- callous/blisters

- plantar fasciitis

REHABILITATION FROM INJURY

presentation by physical therapists and athletic trainers

- career possibilities in sportsmedicine

- education requirements

- certification and licensing

- career description

- modalities of treatment

WOMEN'S ISSUES IN SPORTS MEDICINE

growth and maturation

- role of androgens/estrogens

physiologic differences by gender

- body composition

- leg length
 - shoulders, pelvis, Q angle
 - heart and lung capacity
 - O₂ transport: VO₂, hemoglobin
- physical performance
- speed/strength/endurance
- effects of exercise on female estrous cycle
- menarche
 - amenorrhea/oligomenorrhea
 - pregnancy outcome
 - effect of menses on athletic performance
- orthopedic problems common in female athletes
- osteoporosis
- clinical problem
- physiology of calcium regulation
- effect of estrogen
- loss of bone mineral content
- stress fractures
- dietary calcium recommendations
- eating disorders
- anorexia and bulimia
- definition
- health consequences
- athletes at risk

NUTRITION

- recommendations for a healthy diet
- carbohydrates/protein/fat
 - basic food groups: portions, examples
- bread/cereal
- dairy
- fruits/vegetables
- protein
- fats: saturated, unsaturated, monounsaturated
- additional considerations for athletes
- water needs
- baseline metabolism
 - dehydration
 - clinical effects of 1%, 3%, 5%, 10% dehydration
 - thirst mechanism
- electrolyte loss and replacement
- sugar: simple vs. complex
- effects on endurance sports
- sports drinks
- vitamins and minerals
- caffeine

alcohol
pre-event meal
carbohydrate loading

DRUG USE IN ATHLETICS

banned substances: stimulants/narcotics/sympathomimetic
amines/anabolic steroids
health hazards: Cocaine
blood doping
drug testing at athletic events

- ethics of drug testing
- technology

ENVIRONMENTAL PROBLEMS

Heat disorders

- physiology of heat production and loss
- clinical disorders: heat cramps, heat exhaustion, heat stroke
- prevention

Altitude illness

- physiologic adaptation to altitude
- clinical problems

acute mountain sickness
high altitude pulmonary edema
high altitude cerebral edema
mountaineering accidents