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
- VO@ 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/plantaris
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
breads/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