REPEAT AFTER ME

ANATOMY WILL NEITHER MAKE SENSE NOR BE RETAINED UNTIL IT ‘HOOKS UP’ WITH MORE PRAGMATIC KNOWLEDGE.

DIAGNOSTIC IMAGING LEADS THE TRANSITION FROM PAGE TO PATIENT.

REPETITION IS THE KEY TO RETRIEVABLE LEARNING.
GROSS ANATOMY:
LEARNING THE INDIVIDUAL NOTES AND INSTRUMENTS WITHOUT HEARING THE ORCHESTRA

RADIOLOGY:
DECONSTRUCTING THE ORCHESTRA TO UNDERSTAND THE INDIVIDUAL COMPONENTS
THE BONY PELVIS:

ANATOMY: MORE THAN YOU EVER WANTED TO KNOW OR MEMORIZE.

RADIOLOGY: WHY IT’S GREAT TO KNOW THIS STUFF.

(“The femoral head is the seat of the soul...”)

("The femoral head is the seat of the soul...")
WHAT HAS IT DONE FOR ME LATELY??

SUPPORT  STAND, SIT; MOVE; GRAVITY

WEIGHT TRANSFER  SPINE → LEGS

BALANCE AND GAIT:  FLEXIBLE YET STABLE;
EXPANDED SURFACE AREAS FOR HUGE MUSCLES

PROTECTION OF MANY ORGAN SYSTEMS
AND TISSUES  GI, GU, NEUROVASCULAR...

FETAL SUPPORT/PROTECTION
AND AUTO-MODIFYING FOR DELIVERY

MARROW PRODUCTION
NORMAL: 11yo vs. 18yo
BONES TALK (WOLFFE’S LAW)

→ DATING ONSET OF ABNORMALITIES

- CONGENITAL
- IN CHILDHOOD
- NOT UNTIL ADULT
WEIGHT BEARING: ARCH

STRUCTURALLY SOUND CURVES AND ARCHES ARE INHERENTLY STRONG AND STABLE (pelvis, skull, ribs, foot…)
(CAN BEAR, TRANSFER MORE WEIGHT)
SI (sacroiliac) JOINT STABILITY

MINIMAL INHERENT BONY INTERLOCK;
STRONGEST LIGAMENTS IN BODY BIND SI JOINTS, RING TOGETHER

TRAUMA: PELVIC INSTABILITY (BY PHYSICAL EXAM OR IMAGING) IMPLIES MASSIVE INJURIES
BIOMECHANICS AND LOAD

BODY WEIGHT TRANSFER:

TINY ACETABULAR ROOF ➔ SUPERIOR POLE FEMORAL HEAD (ditto) ➔ FEMUR

100 lb LOAD FEM. HEAD BECOMES +800 lb RACING DOWN STEPS

FOCAL COMPRESSIVE LOAD MAY REACH *1200* lb AT MEDIAL SUBTROCHANTERIC FEMUR!!
“BONES TALK”: WOLFFE’ S LAW

BONE (OSTEOCYTES- ’ blasts, ’ clasts)

CONSTANT WORK-IN-PROGRESS

- PRODUCE and REPAIR
- DESTROY or REMODEL
- GRAVITY, MOTION, etc. MODIFY

PREDETERMINED GENETIC BLUEPRINT (‘NATURE vs NURTURE’
THE PELVIC RING

RINGS: ‘FX. IN TWO PLACES AT ONCE’

THINK ‘STALE BAGEL’, NOT ‘PRETZEL’

(MAY GIVE WAY, DEFORM, A BIT WITHOUT BREAKING; RIGID BUT NOT BRITTLE)
PELVIC RING: ‘OPENS IN 2 PLACES’
(BUT NOT ALWAYS...)
BONY PELVIS: TRAUMA
PELVIC RING FRACTURES

SMALL % OF ALL FXS.

BUT

3RD CAUSE OF DEATH IN POLYTRAUMA

GI (GASTROINTESTINAL)

GU (GENITOURINARY)

NEUROVASCULAR

SHOCK HEMORRHAGE

ROGERS L. RADIOLOGY OF TRAUMA
PELVIC RING DISRUPTION

- Enormous force, esp younger, to disrupt
- Therefore multiple associated injuries
- Intensely vascularized $\rightarrow$ exsanguinate
  Average transfusions = 6 Units blood
  Anterior-Posterior (‘open book’) can = 15 U
  2% $\rightarrow$ embolization (Rads: transart. rescue)
  Retroperitoneum holds 4 L ‘til tamponades
- Rectosigmoid, urethra, bladder, major vessels/nvs, kidneys, hemidiaphragm, L-S
PELVIC RING FRACTURES

- > half = in elderly; usually = fall from stance, less force → 95% are minor
- Greatest morbidity/mortality involve high forces (MVC, ped-x, fall from height)
- 3-20% mortality: hemorrhage, multi-organ, PE
- PE: hemorrhage, marrow, pain, immobility
- Long-term: GI, GU, Gyn, infections, pain
- Ob: infertility, abortion, obligatory C-Section

Sexual dysfunction, chronic pain

CC Mechem, U.Penn, WebMD 2010
‘HIP’ FRACTURES AKA PROXIMAL FEMUR FRACTURES

UBIQUITOUS MISUSE

‘HIP’ = S PROX. FEMUR + ACETABULUM

‘HIP FX’ = S PROXIMAL FEMORAL NECK FRACTURES

PROX. FEMUR: 14% ALL FXS

BUT

>50% ALL FX COSTS

USA
FEMORAL NECK FRACTURES

- 250,000/yr in US → $10 billion
- Most relate to falls esp. elderly
- Assoc’d with osteoporosis (WF), anything increasing risk of fall: afib, hypoglycemia, seizures, neurologic deficit, diabetic neuropathy, slowed response time, decreased balance, deconditioning, diminished vision, …
PROXIMAL FEMUR FXS (‘HIP’)

By 80 YO: 10% Female, 5% Male
By 90 YO: 1/3 F, 1/6 M

MORTALITY (DEATH):
- up to 20% FIRST YEAR
- 33% BY YEAR 2
- 50% BY YEAR 3

HIGHEST RISK: VERY OLDEST, IMMOBILE, INSTITUTIONALIZED, OTHER PROBLEMS (SEIZURE, ARRYRHYTHMIA), DEMENTIA
WEIGHT-BEARING TRABECULAE

Greenspan, A. Orthopedic Imaging, 3rd Ed.
BIOMECHANICS IS DESTINY

“PEANUT SHAPED’ bones fracture through the waist when flexed

FEMORAL NECK is biconcave or ‘peanut shaped’

DOUBLE WHAMMY: retrograde blood supply
DIAGNOSIS AND TREATMENT-

IF YOU KNOW ANATOMY!

Greenspan, A. Orthopedic Imaging
3rd Ed.
PROGNOSIS and TREATMENT
BLOOD SUPPLY → SURGERY
VASCULARITY DICTATES HEALING POTENTIAL
VASCULARITY IS DESTINY
FX. HEALING: NON-WEIGHT-BEARING → PARTIAL WBg → (GRADUAL) FULL USE

- **IMMOBILIZED PT** *(STROKE, POLYTRAUMA)*: PHYSICAL THERAPY SIMULATES NORMAL USE: ‘REMINDED’ MUSCLE, BONE OF END-GOAL; GUIDE NEW BONE FORMATION, HEALING, REMODELLING

- **DISUSE, NON WBg** LEAD TO BONE LOSS (REVERSES W’S LAW)
RADIOLOGY is the SUN!!

www.TeamRads.com from Google, Firefox, Armstrong ...
keep comments coming!!
THANK YOU!
COMING SOON TO AN ANATOMY CLASS NEAR YOU:

Urogenital (UG) Thurs. 9/8
Lower Extremity (LE) Tues. 9/13
CASES

- What was mechanism of injury? Where was pt. sitting? What are vectors of disruption?

- What other organs were in path of destruction?

- What are the emergent, urgent, and eventual considerations/risks?
WHICH MAY HEAL FASTER?