How to heal the masses: Low back pain in the 21st Century.

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Goals

1. Backs hurt and we don’t know why.
2. We need to find the few that need fixing.
3. We can’t do much to fix backs.
4. Change the discussion.

Goal #1

Backs hurt and we don’t know why.

Back pain is everywhere

- 4 in 5 (**80%**) will have an episode of “major” back pain in their lifetime.
- 5% of people affected each year

2nd most common PCP visit

4th most common ED visits

At any given time:

1% of the U.S. population is on long-term disability due to chronic back pain

1% is on temporary disability for back pain.

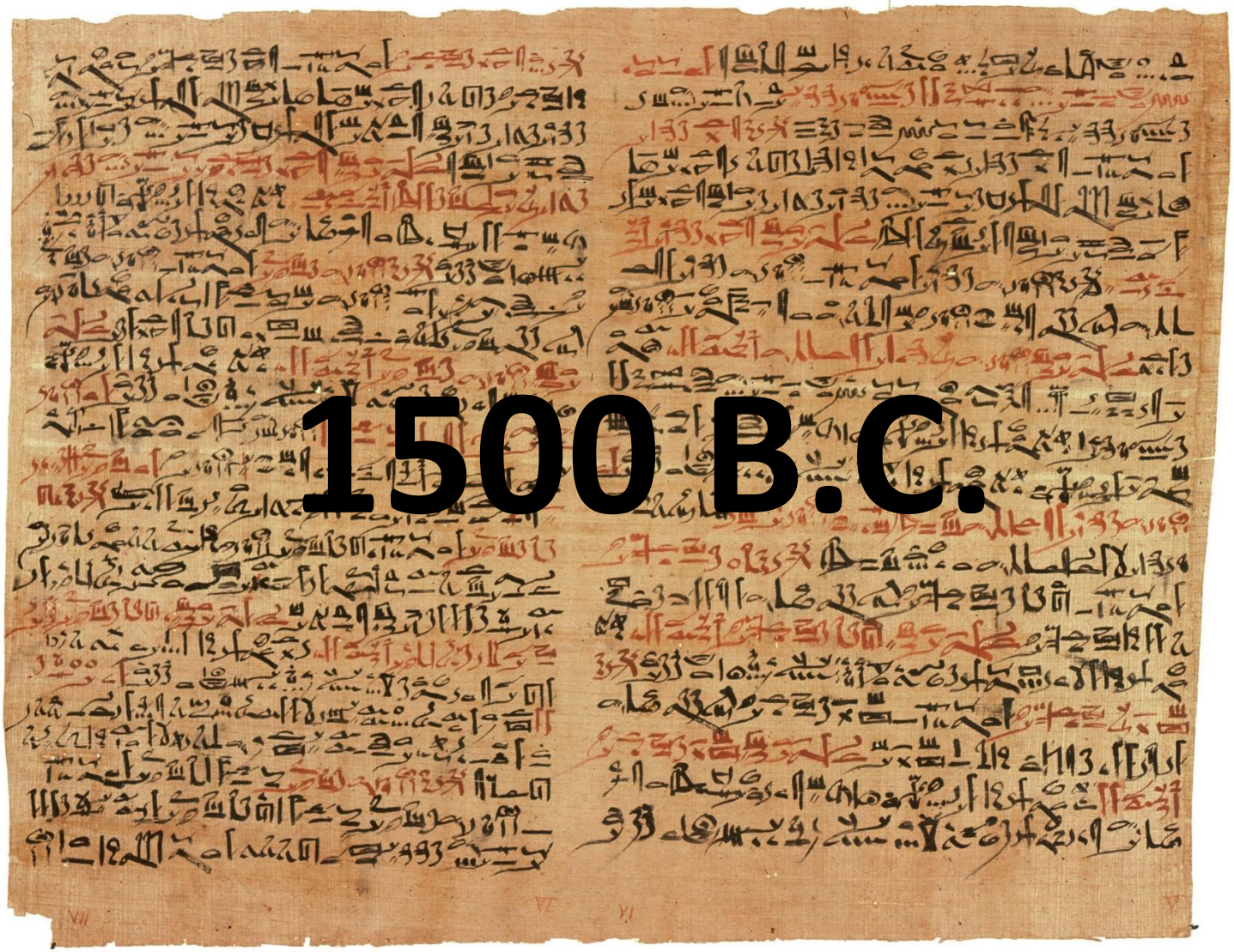
Low Back Pain

- **1-5 in 100** will have a specific diagnosis
- **1 in 200** will need surgery

At **4** weeks: **74%** will be symptom free

At **3** months: **93%** of patients will symptom free

Back Pain through the ages



3500 years later…

Examination: *If thou examinest a man having a sprain of the vertebra of his spinal column, thou shouldst say to him: extend now your legs and contract them both. He contracts them both immediately because of the pain he causes in the vertebra of the spinal column in which he suffers.*

Diagnosis: *Thou shouldst say to him: one having a sprain in the vertebra of his spinal column an ailment I shall treat.*

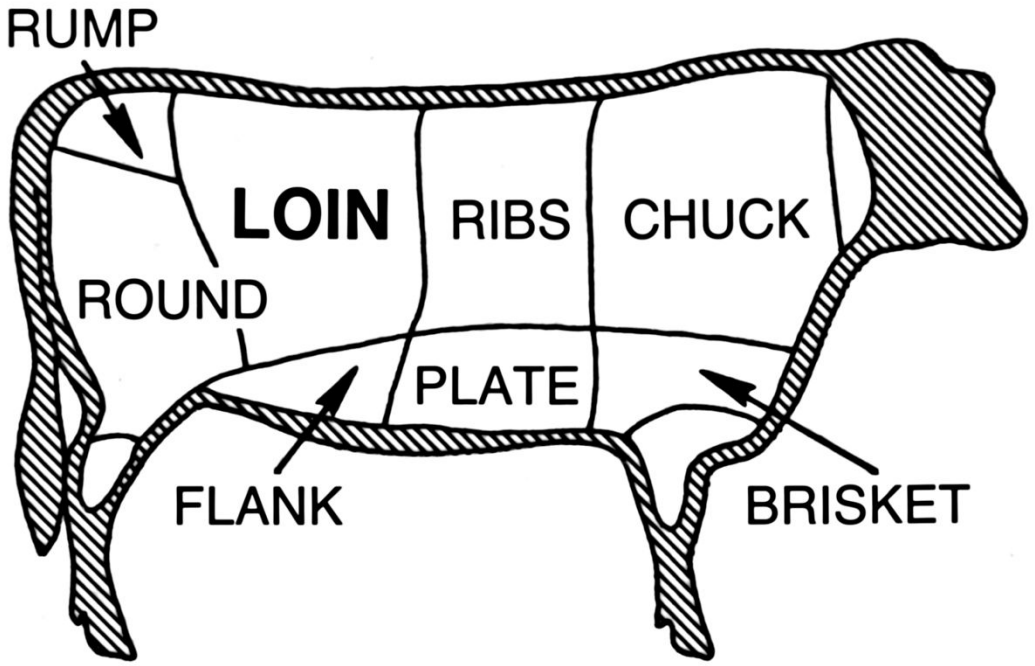
Treatment: *Thou shouldst place him prostrate on his back…*

Don't get sick pre 1500

- Two important concepts emerge:
  - 1500's: **Vesalius**
    - Circulation
  - 1600's: **Sydenham**
    - Illness vs. Underlying Disease
    - Disease has specific signs and symptoms

“Lumbago “

1642: Guillame de Bailou



Classified as Rheumatism

rheuma:

"...a watery discharge or evil humour which flowed from the brain to cause pain in the joints or other parts of the body."

1700-1800's

"***Ma'am you have rheumatism***."

- Buildup of rheumatic phlegm in muscles
- "Cold and damp"
- Rx:
  - Counter irritants
  - Laxatives
  - Cupping

1866- Railway Spine

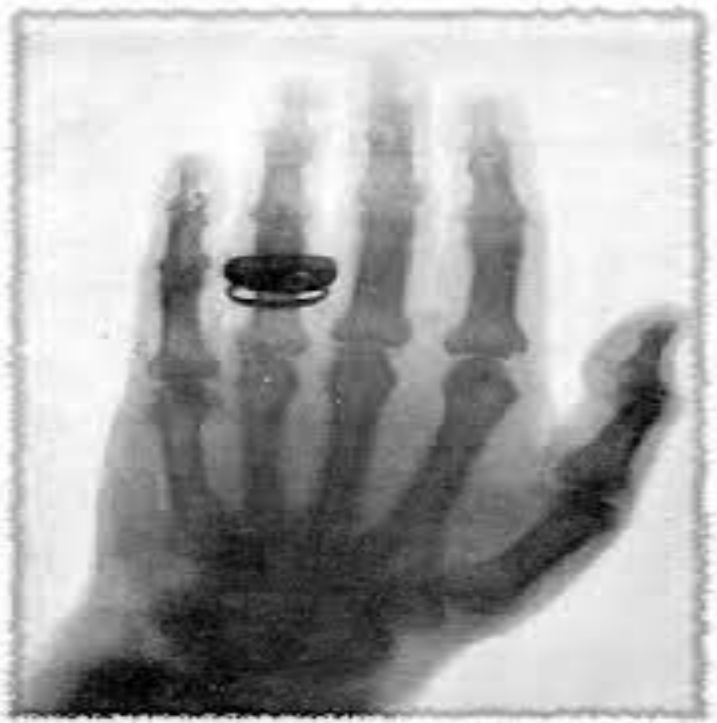
On Railway and Other Injuries of the Nervous System.

-Erichsen

- Trauma = pain
- **First report of disability**
  - Money is tied to pain
- Trauma vs. Hysteria
- Early Whiplash

1890's: XRAY

- Lumbosacral anomalies
- Facet joint disease
- Sacroiliac disease



They start removing and fusing things

Patients do not improve

1900's
"Just take it easy."

1900:

"six weeks bed rest for acute lumbosacral pain."

-Bradford and Lovett

1926:

"chronic pain caused by not enough bed rest."

-Painter

20th Century
The growth of disability

Average time to return to duty:

World War I:

Two weeks

World War II:

Two Months

1950-60’s

- No real advances
- Biopsychosocial model of illness

The 80's and 90's
CT and MRI Driven

- Model of degenerative disc disease
  - Good images
  - Disc = pain?

- 1980-1990
  - Rates of surgery increase 55%

"In the past, much back pain management has been a series of fads and fashions. Many treatments eventually have been discredited, but not until they were provided to many patients at high cost, with occasional morbidity…**at least today, we are better aware that we 'know that we don't know'"**

Violinn N, et al: Theories of back pain.Neurosurg Clin North Am 1991

Goals:

- **#2: Find the few that need fixing.**
  - Exams
  - Tests
  - Labs
- **#3 We can't do much to fix backs.**
  - What works
  - What doesn't work

Goal # 2
Find the ones that need fixing

- You have a ton of patients.
  - Most are not sick
- You can order a ton of tests
- You have a few beds.
- You need to identify serious disease quickly with limited resource utilization.

*Find the ones that need fi*xing

- History
  - Look for red flags
- Exam
  - Look for evidence of badness

History: Red Flag Features

Baseline chance of finding something **doubles** with just one “red flag.”

Red Flags: Two questions

1. Are you likely to have something pushing on your spine?

- **Infection**
- **Tumor**
- **Bone/Disc**

2. Is your pain weird?

Infection: red flag features

- **Do you sound infected**?
  - Fever/Chills/Night Sweats
- **Do you have a good immune system**?
  - Immunosuppression
- **Do you do high risk things**?
  - IVDA (IV Drug Abuse)
    - Vertebral Osteo
    - Epidural Abscess
  - Spinal procedures

Cancer: red flag features

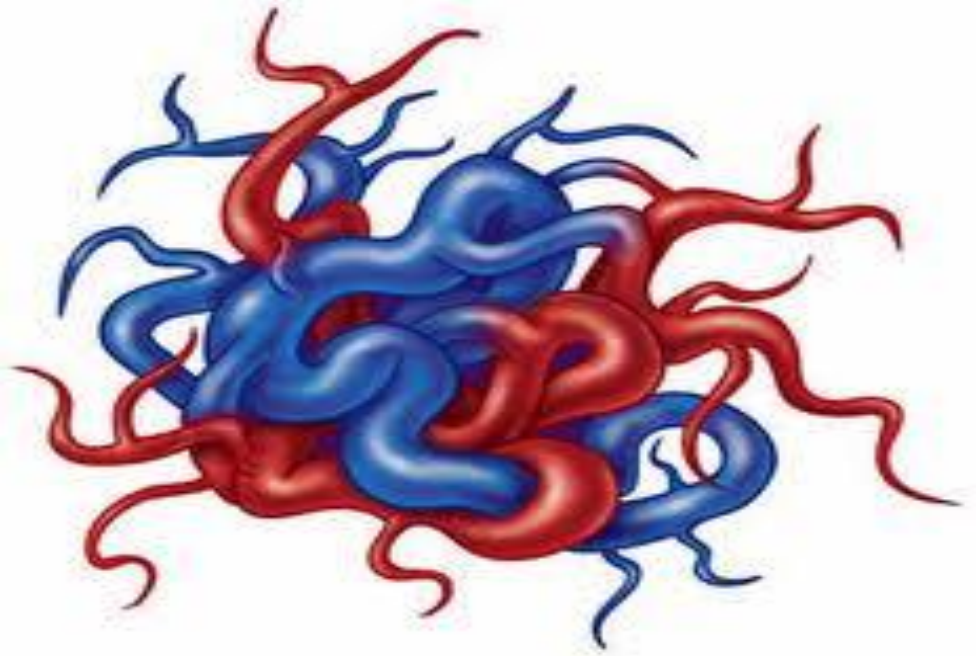
- **Could you have cancer?**
  - Unexplained Weight Loss
    - > 10 Lbs over 3 months w/o trying
- **Do you have cancer?**
  - Primary Cancers:
    - Myeloma
    - Lymphoma
    - Sarcoma
  - Metastatic Cancers:
    - Breast, Lung, Thyroid, Kidney, Prostate

Weird Pain: red flag features

- **Are you old or young?**
  - 18-50 = Normal
- **Has this hurt for a long time?**
  - Pain duration
    - Pain > 4-6 weeks more concerning
- **Does this hurt at night?**
  - Night time pain/Pain wakes patient

AVM: the forgotten flag

- 20-60 years old
- Progressive or sudden onset of symptoms
- Can look like *cauda equina*



Other “back stuff”

- AAA
- Pyelonephritis
- Renal Colic
- Pancreatitis
- Pneumonia
- Ulcers
- Tumor
- Cholecystitis
- Diverticular disease
- Prostatitis
- Pulmonary Embolism
- Herpes Zoster
- Pericarditis

Just take a legit history and you should be fine

History: red flag features

- You don't have to ask all of these

- Macro:

"Patient has no history of IVDA, spinal procedures, immuno-compromise, or malignancy, and has no family history of AVM. "

Trust your history

Fewer than 1% of patients in a primary care population with low back pain have spinal infection, metastatic cancer or cauda equina…and **nearly all** of these patients have **easily identifiable risk factors.**

– Clinical Guidelines Committee, American College of Physicians, 2011

Physical Exam

- You don’t have to make a diagnosis
- Look for trouble.

Physical Exam

- Vital Signs
  - Fever can be helpful…
  - Sensitivity of fever varies with disease process
    - TB = 27%
    - Osteo = 50%
    - SEA = 83%

BUT…

~10% of patients ultimately diagnosed with mechanical LBP will have fever on presentation from unrelated illness.

Physical Exam

Visualize and touch the entire spine

- Look for trauma
- Push on the Spine
  - We don’t know what this tells us.
  - No good studies
    - You don’t push like me.
  - It feels medical.

Do you feel spasm?

- We can't figure this out
  - Yes or No?
  - Right or left?

- Say what you want just don't make big decisions based on this.

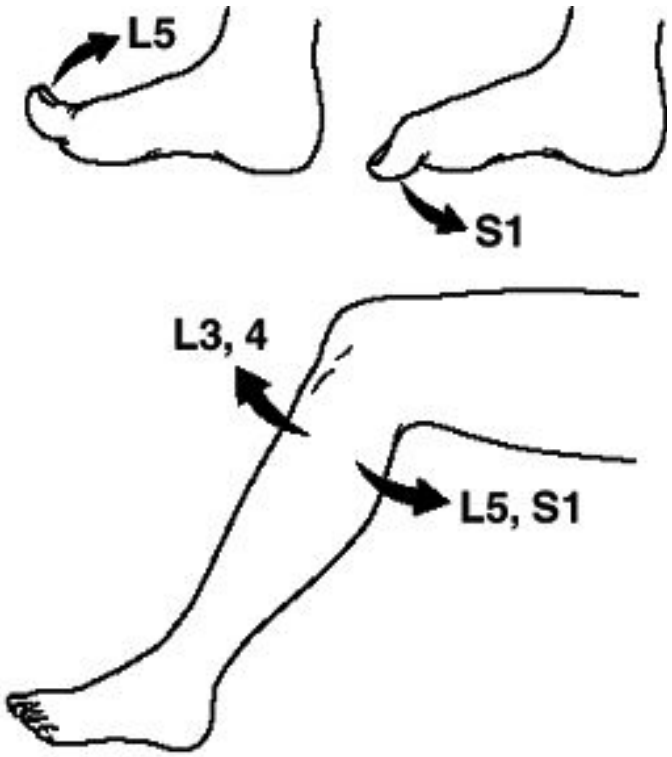
Johnson et al. 1989.

Neurologic Exam
Is something pushing on this spine?

- Strength, Sensation, Reflexes on all patients.
- Ask about bowel/bladder on all.
  - Check on some
- Don’t talk about cranial nerves
- Walk your patients.
- Document like a normal person

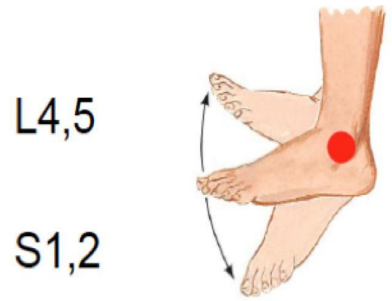
Motor Exam

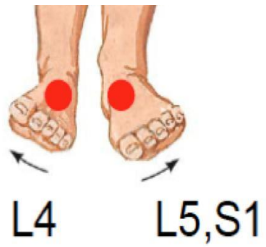
- **Can you walk**?
  - Heel Walk
    - L4/L5
  - Toe Walk
    - S1
  - Squat/Rise
    - L3-L5



"My back hurts too much for me to walk."

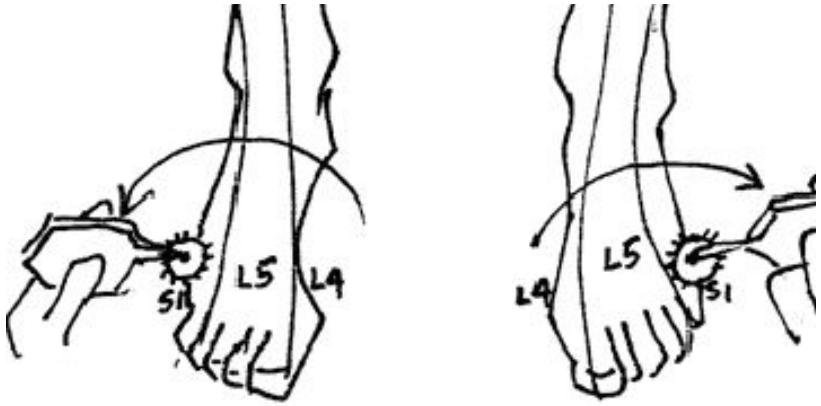
- **L4 - Tib Anterior**
  - Foot inversion/dorsiflexion
- **L5 – Ext.DL/EHL**
  - Great Toe dorsiflexion
- **S1 - Per. Longus/Brevis**
  - Foot eversion/Plantar flexion





Sensory Exam

- **L4** - Medial Knee/foot
- **L5** - Mid foot
- **S1** - Lateral foot
- **S2-4** – Perineum



www.aan.com

Reflexes

- **L4** - Knee jerk
- **L5** - None
- **S1** - Achilles
- **S2-4** - Anal Wink

Bowel and bladder

- Bowel:
  - Check rectal tone
  - Check perineal sensation

- Bladder:
  - What are they actually talking about?
  - Look for **overflow incontinence**

Yes: My back hurts and I just wet my pants without warning.

No: My back hurts so bad I peed on myself.

Bladder symptoms

- Check a post-void residual.
  - Have them pee.
  - Check their bladder.
    - Catheter
    - Ultrasound
      - Look for <100cc
      - Use your own formula:

        L x W x 6

Be careful with Bowel/Bladder stuff.

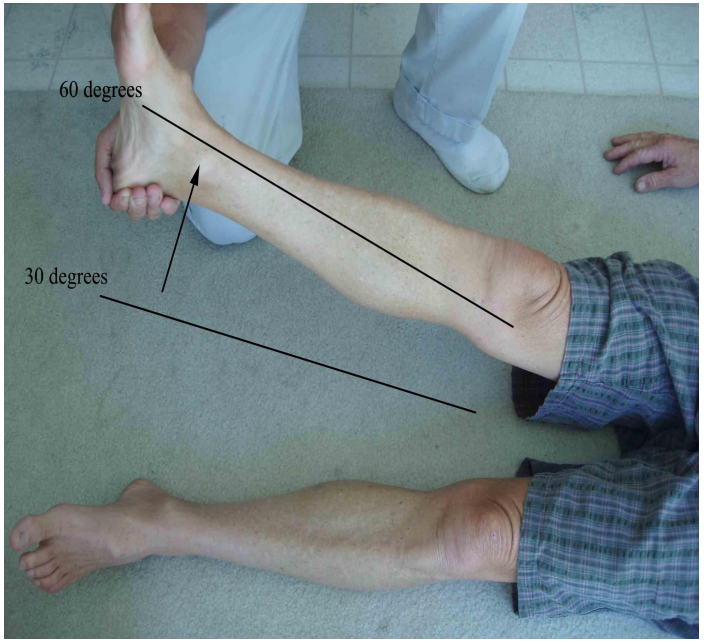
Bonus exam: Straight Leg Raise

- Shows tension on Sciatic nerve
- Shows nerve root irritation
  - 80% sensitive
  - 40% specific
    - Lots of false positives

Straight Leg Raise

Positive:

- Pain between 30-60 deg.
- Pain down leg
- Worse with flexing foot
- Better with flexing knee
- Not just pain with movement



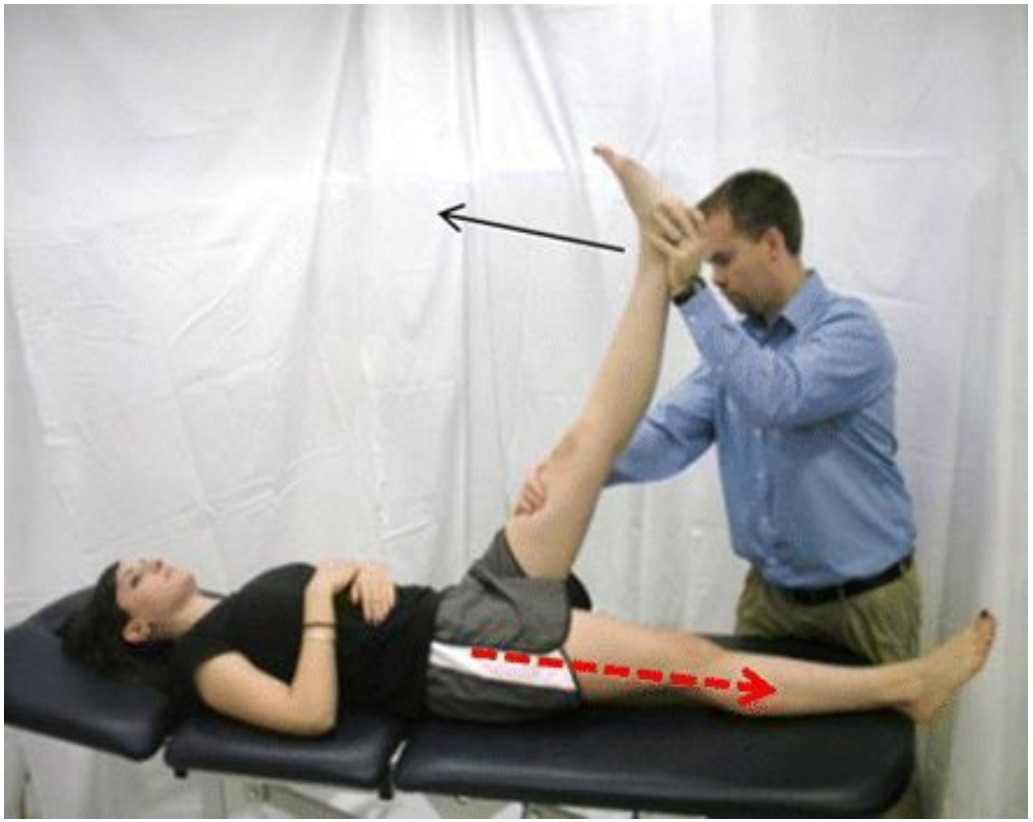
Crossed SLR Test

- + on one side.
- Raise the other leg

90% specific for herniated nucleus pulposus (HNP)

Low sensitivity

+ test is helpful.



History and Exam

- Get credit for what you asked.
- Tell folks exactly what you did.
- Don’t play around with a tricky exam.

Testing

X-rays?

In the **absence of Red Flags**, plain radiographs are **NOT indicated** in the **1st 4-6 weeks** of low back pain, because the VAST majority will be asymptomatic by this time.

AHRQ (Agency for Healthcare Research & Quality) 2002

X-Rays?

- Low back pain
- **No** red flags
- Rate of Positive X-ray:

1 in 2500

-Liang Arch Int Med 1982

X-Ray Basics

Who needs them?

- **Red Flags**
  - Young and Old (<18 or >50)

What should I order?

- AP and Lateral will identify **92-96%** of pathology in LS spine.
- Be sure you can read these,

CT Scans

- Who needs a CT?
  - Good for trauma
  - Good for fractures
  - You don’t have to read your own CTs
  - MRI contraindicated
  - Recent spinal surgery

MRI in the Emergency Dept.

"Could this patient have something pushing on their spinal cord?"

- Study of choice for:
  - Cauda equina
  - Big bad discs
  - Possible abscess
  - Metastases
  - AVM's

Everyone else does not need an MRI

“I need an MRI.”

Why not just get the test?

- Unreliable information
- It does not help patients

Why not just get the MRI?

We don't know what to do with this information

Asymptomatic patients:

- 50-80% with disc bulge (symmetric)
- 27% with disc protrusion (asymmetric)
- 5% - 30% with HNP.
- Incidence increases with age.
- Your back is likely "abnormal" right now.

MRI in Symptomatic patients
What predicts an abnormal MRI?

"My leg hurts"

WEAK association

"My back hurts"

NO association

MRI in Symptomatic patients

- At best there is a **very weak association** between **degenerative discs** and patient symptoms.
  - Lot of folks have bad discs
  - Lots of folks have back pain

We can't match up these two groups.

MRI abuse

- **1000** MRI's ordered
- Only **443** of 1000 requests were considered appropriate.
- The remainder were split between:
  - Inappropriate (**285** of 1000)
  - Uncertain value (**272** of 1000)

Emery et al. JAMA 2013

MRI abuse

Past decade:

307% rise in Lumbar MRI

- More information = more intervention

220% rise in spinal fusion

- **No improvement** in patient outcomes
- **No reduction** in rate of disability

Deyo et al.

“I just want an answer.”

- **The power of the visible: the meaning of diagnostic tests in chronic back pain.**

  94% of patients “*wanted an answer*.”

“When physicians cannot locate the problem or express doubt about the possibility of a solution, patients feel that their pain is disconfirmed.”

Rhodes et al.

MRI

- A few patients **NEED** this test.

- This test can hurt the rest of our patients.
  - No proven benefit
  - We find lots of stuff
  - We don’t know what to do with this stuff.
  - Other people think they know what to do.

Does this patient need imaging?

Immediate imaging vs. standard care for LBP w/o red flags
-includes immediate imaging with (CT / MRI)

- **No difference** in primary outcomes:

  Pain & Function
  - short term (0-3 months)
  - long term (6-12 months).

- **No difference** in secondary outcomes
  - mental health
  - quality of life
  - patient satisfaction

No serious diagnoses missed in those not imaged

The patients **without red-flags** (beware the soft flag).

Chou et al. 2009 Lancet

Do I need Labs?

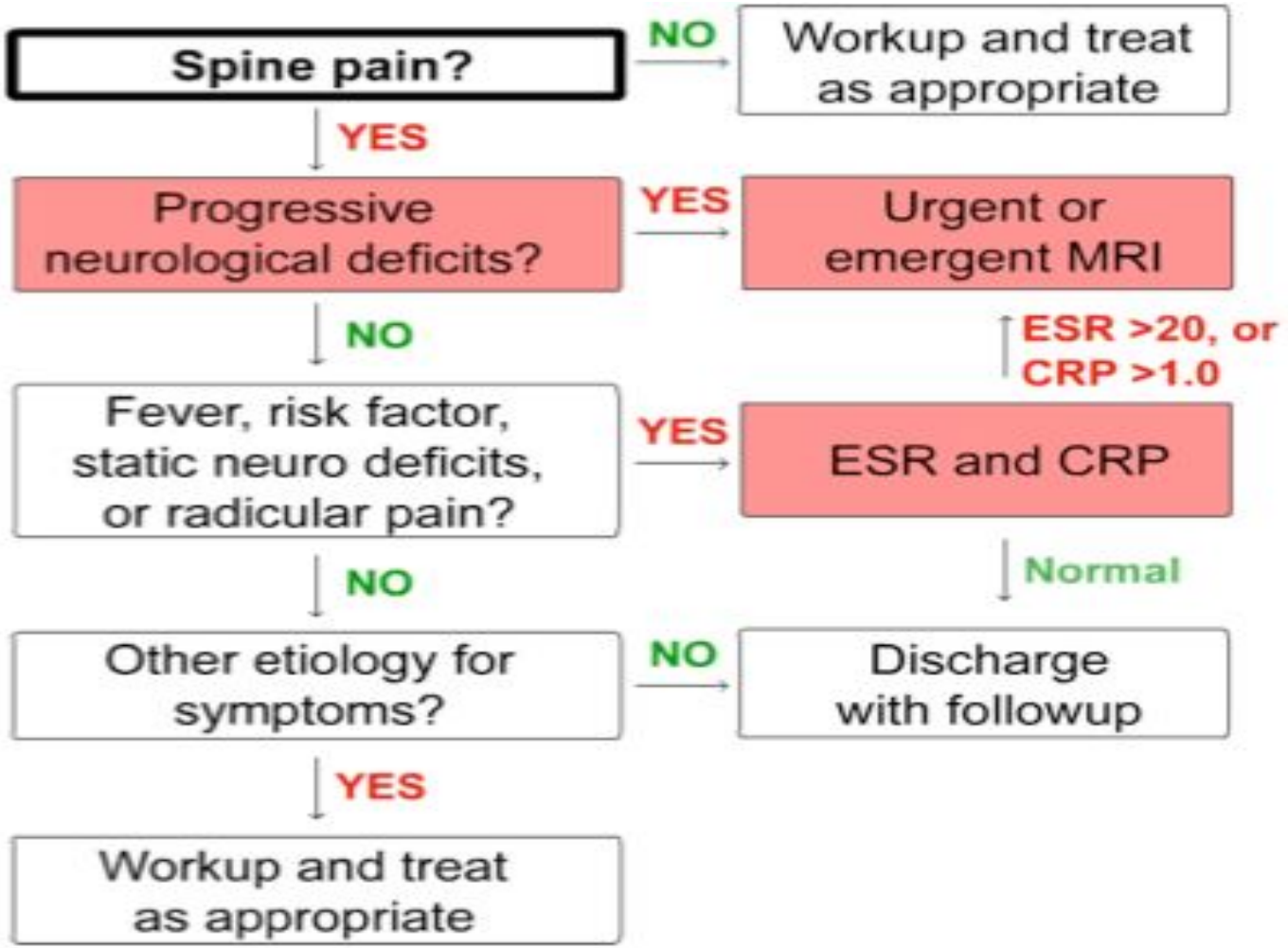
Elevated WBC =

- 7x increase in odds of spinal infection
- 40% sensitive
- 10% of non-infected patients have elevated WBC

- OK if you suspect infection
- Never trust a negative test

Labs: ESR

- Can be sensitive
  - + ESR in cancer patients = increased risk of mets.
- ESR extremely non-specific.
- Not a good test in the ED.


Spine pain?
NO
Workup and treat as appropriate
YES
Progressive neurological deficits?
YES
Urgent or emergent MRI
NO
ESR >20, or CRP >1.0
Fever, risk factor, static neuro deficits, or radicular pain?
YES
ESR and CRP
NO
Normal
Other etiology for symptoms?
NO
Discharge with followup
YES
Workup and treat as appropriate

- + in 100% of SEA
- + in 33% of control group

Goal #3: We can't do much to fix backs

- When managing LBP:

  Orthopedists vs. Neurosurgeons vs. PCPs vs. chiropractors

  NO difference
  - duration of symptoms
  - functional outcomes
  - chances of developing "chronic back pain"

Treatment:

NSAIDS?
Opioids?
Steroids?
Bed Rest?
Injections?
Surgery?
Mattress selection?
Chiropractor?
Accupuncture?

NSAIDS: Yes

Poorly studied and poorly understood

- NSAIDs better than placebo, and:

  "**probably effective for short-term relief**"

- Not clearly better than acetaminophen.

  Cochrane 2011

NSAIDS: The downside

- 3-23% report a “side-effect”
- Complications:

  7,500 deaths **75,000 hospitalizations**

- They all work equally well:
  Relative risk of gastrointestinal upset relative to ibuprofen:
  - Ibuprofen 1.0
  - Aspirin1.6
  - Naproxen 2.2
  - Indomethacin 2.4

Opioids

- We use these all the time:
  - 108% increase in Rx 1997-2004
  - 423% increase in expenditures
    - Lots of people are getting rich off these drugs.

Opioids: Yes

Short Term for Acute Back Pain

- Better than Placebo
- Better than NSAIDS
- Better than Tramadol (also safer)
- **Not clearly better than acetaminophen**
  - Straw man studies

Opioids: The downside

- “Significant” risk of addiction
  - ~25% show aberrant behavior

  Overdose deaths from Opioid analgesics
- 1999: 4030
- 2010: 16,651
- 2017: 47,00

"I just gave them 20 Lortabs."

- Tolerance can start early
  - Need more drug for same effect
  - Within **1 week** of regular dosing

- Their pain is likely going to last longer than their prescription.
  - Have this discussion in the ER.

Houde et al.

Opioids after 14 days

- We don't know if these work.

  Person Hours of data

  - NSAIDS: 100,000
  - Opioids: 1,500

- Risk of hyperalgesia
- Increased rates of disability/surgery

Opioids for Acute pain: Maybe?

Dolobid (NSAID)

vs.

Acetaminophen with Codeine

- Equal pain over 15 days
- Opioids were harder to tolerate.

Brown et al.

Muscle Relaxants: maybe?

- Slightly better than placebo
- Choice of med does not matter.
  - Cochrane 2005/2021

- NSAIDs + muscle relaxants not significantly different than NSAIDs alone.
  - Turturro MA: Ann Emerg Med 2003

- **Significant side effects**
  - 7-15% will stop taking the drug on their own.

Hot or Cold?

- Commonly used / recommended.
  - Impossible to blind the study
- **Heat**
  - one positive study,
  - one negative study,
  - one un-interpretable study.
- **Cold** – Can draw no conclusions.

French et al. 2021

Steroids

- No data to support oral steroids
  - With or without sciatica
- People may get “pumped up.”
- Surgeons love this stuff

- 2008 study (82 pts) showed ***trend*** towards improvement:
  - Low back pain with positive SLR test
  - IM methylprednisolone acetate (160 mg)

Epidural Injections

- No role emergently
- Long term:
  - No relief without sciatica
  - May help sciatica short term
    - No relief at 1 year
    - Do not reduce surgery rates

Mattress Choice

- 313 adults with chronic LBP, randomized:

  Firm (ECS* = 2.3) vs. **Medium** (ECS = 5.6) mattress.

  90 days later:

  Medium bed had an OR of 2.6 for improvement

Kovacs: Effect of firmness of mattress on chronic LBP. Lancet 2003

Bedrest

- Long thought to be problematic

"for keeping bed constantly promotes and augments the disease".

-Sydenham (1743)

Bedrest

- **LBP w/o sciatica**:
  - *No question that maintaining activity leads to **improved** functional status and decreased pain at 3 weeks and 12 weeks*."
- **LBP w/sciatica**:
  - No difference with rest vs. none
  - If you rest, 2 days is better than 7.

Exercise

- No good data for acute pain
  - Probably doesn't matter
- Chronic pain
  - Exercise is good for you
  - Physical Therapy vs. Home
    - Same improvement
    - More bounce back disability with PT

Accupuncture

- Poorly studied
- Beats doing nothing.
- Not better than traditional treatment

Massage

- No help with acute pain.
- May help with chronic pain
- Beats out accupuncture at 1 year.

Chiropractic manipulation

- Mechanism is very theoretical
- Hard to run a RCT

  - **Acute LBP w/o sciatica:**

    Slightly better than standard therapy
  - **Acute LBP w/ sciatica**

    No better than standard therapy
  - **Chronic LBP:**

    No better than standard therapy

Surgery

- Discectomy for HNP
- Compared to traditional therapy
  - May help at 1 year
  - No improvement at 4, 10 years
- Newer data is somewhat unclear
  - Trend towards doing better

Elective Surgery for HNP

- Definite HNP on imaging study
- Corresponding pain syndrome
- Corresponding neurologic deficit
- No response to 4-6 weeks of conservative therapy.

Emergent Surgery for HNP

- Cauda Equina
- Progressive Motor Deficit
- E.g. Foot drop / bowel / bladder
- **“Intractable pain”**
  - Degree of pain does not correlate with presence of surgical lesion.
- DTR/Sensory deficits **NOT** indications for emergent surgery.
- Fixed motor deficit **NOT** indication for emergent surgery

Patient Expectations as Predictors of Outcome In Patients with Acute Low Back Pain

Harvard University, 442 adults

Expectations of recovery vs. Actual recovery

- Found a ***near linear relationship*** between expectation of recovery and recovery at 5 weeks.

Myers J Gen Int Med 2008

Low Back Pain

- You see tons of this
- Do and Document a good history and physical
- Find the **red flags**
  - These people need more testing

Low back pain

- The majority of the patients will be fine.
  - Don’t need anything else done
  - Aggressive approach can hurt your patients
- Use your meds wisely
  - Be careful with all your drugs
- Educate our patients
  - Your back hurts, it is probably going to get better no matter what you do.