

Relieving Spinal Disc Pain

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**Thank you.
Be Healthy. Be Safe.**



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Who Am I?



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Medical Training

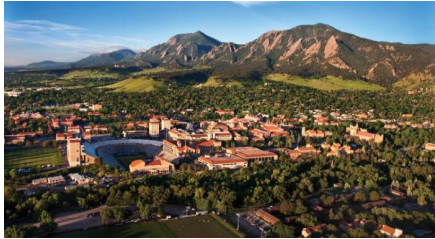
- Medical School: UW-Madison (4 years)
- Neurosurgery Residency (7 years)
- Cleveland Clinic Spine Fellowship (1 yr)
 - Combined training
 - Orthopedic Spine
 - Neurosurgery Spine



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My Practice

Boulder Neurosurgical and Spine Associates
Partner: 2010-current



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My Office



- 10 Years:
 - > 3600 surgeries
- 18 years:
 - > 9000 surgeries

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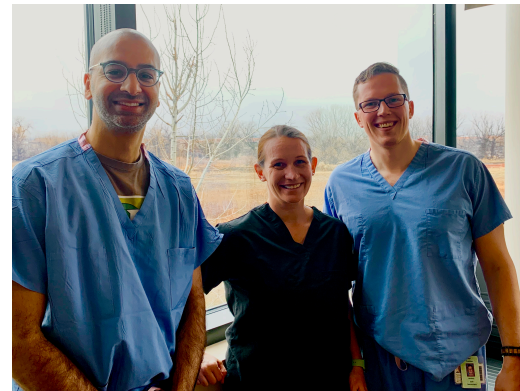
Teaching / Education



- >100 presentations
- > 35 journal publications
- > 10 book chapters
- > 40 educational courses
 - > 750 medical professionals
 - nursing & hospital staff
 - >1600 spine surgeons (25+ countries)

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My Team



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Why Are We “Here”?

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Back Pain

- > 65 million Americans suffer from back pain each year
- Up to 80% of adults experience low back pain at some point during their lives
 - most episodes resolve spontaneously
- Second most common reason for doctor visits



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Relieving Spinal Disc Pain: The Treatment of Common Spinal Conditions



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Back Pain

- Physical loading due to occupation/sports plays a limited role
- **Heredity** plays a major role
 - high degree of similarity in twins
- The only chemical exposure associated with disc degeneration: **tobacco use**



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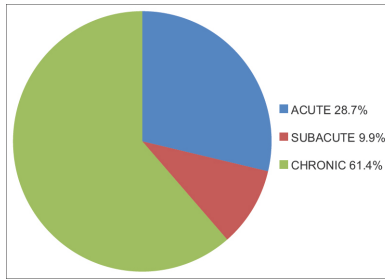
Back Pain: Types

Acute Back Pain

- sudden, intense
- usually resolves within a few days or weeks

Chronic Back Pain

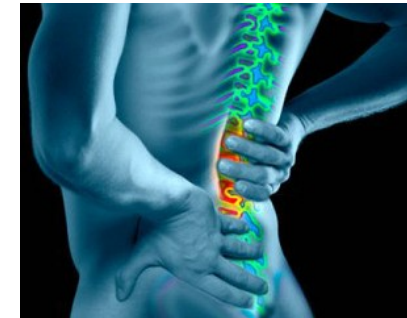
- deep, dull or aching
- usually lasts > 3 months



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Back Pain: Causes

- Degeneration
- Deformity
- Trauma
- Infection
- Tumor
- Inflammation



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Spine Anatomy

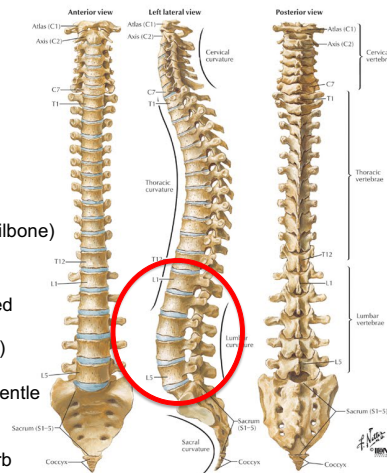
33 Individual Bones:

- Cervical : 7 vertebrae (C1-C7)
- Thoracic: 12 vertebrae (T1-T12)
- Lumbar: 5 vertebrae (L1-L5)
- Sacrum: 5 (fused) vertebrae (S1-S5)
- Coccyx: 4 (3-5) (fused) vertebrae (Tailbone)

Curves:

- The adult spine has a natural S-shaped curve.
- Neck (cervical) and low back (lumbar) regions have a slight concave curve.
- Thoracic and sacral regions have a gentle convex curve.

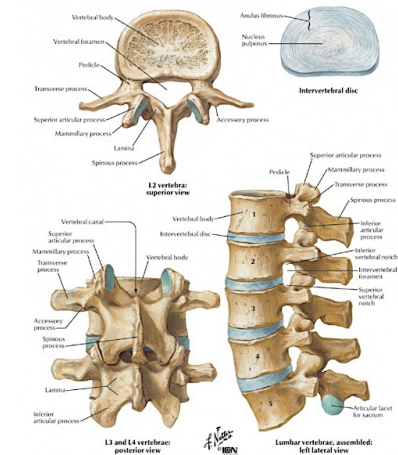
The curves work like a spring to absorb shock, maintain balance, and allow range of motion throughout the spinal column.



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Spine Anatomy

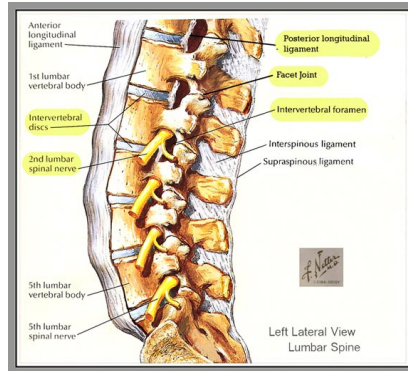
- Vertebra
- Intervertebral discs
- Facet joints



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Spine Anatomy

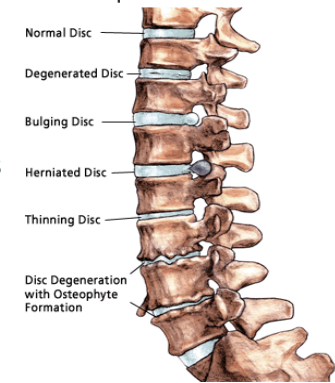
- Vertebra
- Intervertebral discs
- Facet joints
- Spinal nerve
- Epidural space



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Most Common Degenerative Spinal Conditions

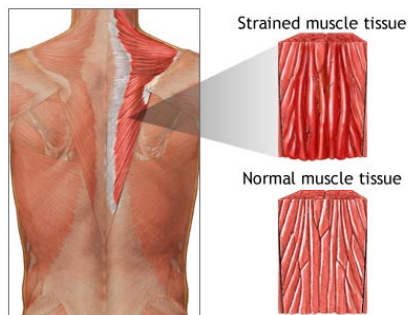
- Disc herniation
- Degenerative disc disease
 - Facet joint osteoarthritis
- Spinal stenosis
- Spondylolisthesis



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Muscle Strains (“pulled muscle”)

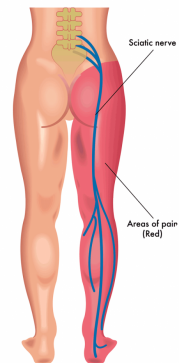
- The **majority** of back pain is caused by muscle strains
- Usually **heals** with non-operative treatments and time



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“Sciatica”: Symptoms

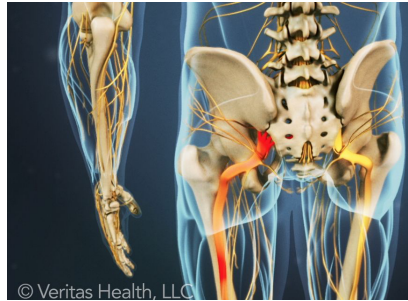
- **Pain**
 - Burning or shooting pain starting in the low back or buttock and radiating down the front or back of the thigh and leg and/or feet
- **Numbness**
 - Sometimes associated with tingling and/or weakness
- **Unilateral symptoms**
 - Typically affects one leg
 - Rarely, both legs may be affected



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“Sciatica”: Etiologies

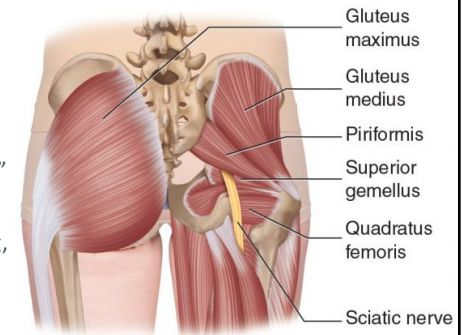
- Piriformis syndrome
- Spinal Stenosis
- Herniated disc
- Spondylolisthesis
- Tumor (Neoplasm)
- Infection



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Piriformis Syndrome

- Muscle that runs above the sciatic nerve
- When the muscle becomes tight: “sciatica” type pain down the leg
- Due to prolonged sitting, car accidents, falls



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Spinal Stenosis

- Normal progression of aging
- Most people do **not** develop symptoms
- Most people do **not** require surgery
- Physical exam is often **normal**
- Weakness and numbness are **not** typical



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Spinal Stenosis: Classic Presentation

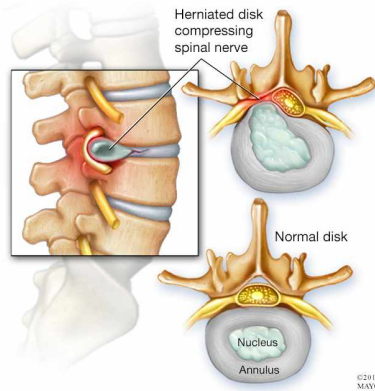
- Buttock and leg pain when walking or standing
- Relieved by sitting or bending over
aka: “grocery cart sign”



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Disc Herniation

- Disc degenerates due to loss of elasticity and/or injury over time
- The disc can bulge/herniate into the spinal canal and compress the spinal nerve roots
- Severe compression may lead to permanent nerve damage



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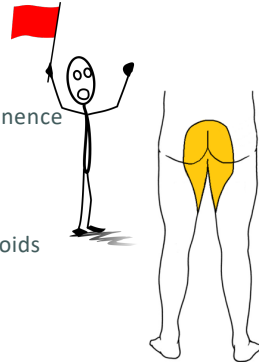
Disc Herniation: MRI



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Back Pain: Red Flags

- Symptoms:
 - saddle anesthesia
 - bladder or bowel retention/incontinence
 - unexplained weight loss
- History of:
 - cancer, IV drug use, prolonged steroids use, diabetes, HIV
- Recent/ongoing fever/infection:
 - UTI, respiratory, etc.



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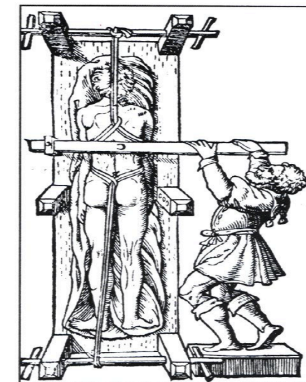
Treatment Options

Non-Operative Treatments

- Physical therapy (PT)
- Medications
- Injections

Operative Treatments

- "Open" traditional surgery
- Minimally invasive surgery (MIS)



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Non-Operative Treatment

Self-Care / Lifestyle Modification

- Maintain activity as tolerated
- If bedrest is necessary, return to normal activities ASAP

Bed mattress choice

- A medium-firm may be preferred choice
- randomized trial: 82% experienced improvement in pain-related disability at 90 days vs. 62% assigned to firm mattress

Spinal support / bracing

- Routine use *not* recommended

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Don't Waste Your Money



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Non-Operative Treatment - Medications

Medications for chronic or subacute low back pain

| Drug | Net benefit* | Graded recommendations | Comments |
|---|--------------------|--|--|
| Acetaminophen | Small | Suggested as first-line therapy* (2B) | Asymptomatic elevations of liver function tests at therapeutic doses. |
| Antidepressants | Small | Suggested as adjunctive therapy (2B) | Only tricyclic antidepressants have been shown effective for low back pain. No evidence on duloxetine or venlafaxine. |
| Antiepileptic drugs | Unable to estimate | Suggest not using (2B) | Gabapentin and topiramate evaluated in short-term trials, primarily in patients with radiculopathy. |
| Non-steroidal anti-inflammatory drugs | Moderate | Suggested as first-line therapy (2B) | May cause serious gastrointestinal and cardiovascular adverse events. Insufficient evidence to judge benefits and harms of aspirin or celecoxib for low back pain. |
| Opioids | Unable to estimate | Suggest not using as first-line therapy (2B) | No reliable data on risks of abuse or addiction |
| Skeletal muscle relaxants and benzodiazepines | Unable to estimate | Suggest not using (2C) | The two higher-quality trials evaluated skeletal muscle relaxants not available in the US. |

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Non-Operative Treatment - Opioids

- Opioid medications compared with placebo or non-opioid analgesics do **not** significantly reduce pain *
- Suggested for chronic back pain **only** and for **short-term** use
- **Rarely**, for severely disabled who do not respond to other measures

*Martell et al, Ann Intern Med 2007

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Non-Operative Treatment - Physical Therapy



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Non-Operative Treatment - Physical Therapy

Non-pharmacologic therapies for chronic or subacute low back pain

| Intervention | Net benefit* | Graded recommendations | Comments |
|--|---|---|--|
| Acupuncture | Moderate | Suggested (2B) | Efficacy of acupuncture versus sham acupuncture inconsistent. |
| Exercise therapy | Moderate | Suggested (2B) | |
| Functional restoration | Moderate | Suggested (2B) | |
| Interdisciplinary rehabilitation | Moderate | Suggested (2B) | More intensive interdisciplinary rehabilitation more effective than less intensive interdisciplinary rehabilitation. |
| Interferential therapy | Unable to estimate | Suggest not using (2B) | |
| Low-level laser therapy | Unable to estimate | Suggest not using (2B) | Trials evaluated different types and intensity of laser, with inconsistent findings. |
| Lumbar supports | Unable to estimate | Suggest not using (2C) | |
| Massage therapy | Moderate | Suggested (2B) | Some trials evaluated minimal or light massage techniques. |
| Percutaneous electrical nerve stimulation | Unable to estimate | Suggest not using (2B) | |
| Psychological therapies | Moderate (cognitive-behavioral treatment) | Suggest cognitive-behavioral treatment (2B) | |
| Short-wave diathermy | Not effective | Suggest not using (2B) | |
| Spinal manipulation | Moderate | Suggested (2B) | |
| Traction | Not effective (for continuous traction) | Suggest not using (2B) | |
| Transcutaneous electrical nerve stimulation (TENS) | Unable to estimate | Suggest not using (2B) | |
| Ultrasound | Unable to estimate | Suggest not using (2B) | |
| Yoga | Moderate (for Vinyasa) | Suggested (2B) | Inconsistent evidence to judge non-Vinyasa techniques. |

Exercise Therapy

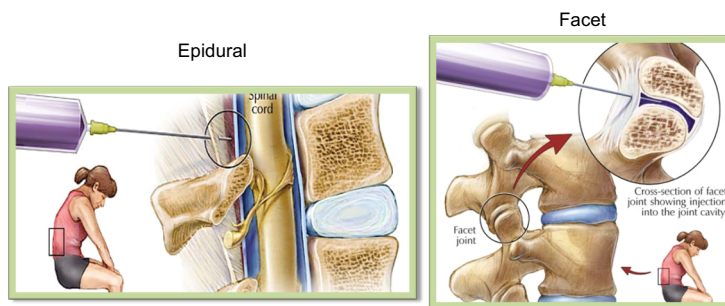
- Core strengthening
- Flexion/extension movements
- General physical fitness

Spinal Manipulation

- The risk of serious adverse events (disc herniation) is less than one per one million visits
- Avoid with progressive/ severe neurologic deficits

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Non-Operative Treatment – Steroid Injections



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Non-Operative Treatment – Steroid Injections

Benefits

- Reduce inflammation, which in turn should reduce pain
- Decrease pain should increase function
- Local injections generally well-tolerated
- Less likely to produce serious side effects than other forms of steroid medications
- May help avoid the need for oral steroids, which could have greater side effects
- Don't generally treat the underlying cause of the condition, but they can treat the **symptoms**

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Non-Operative Treatment – Steroid Injections

Risks

- In rare instances, the following side effects might occur:
 - Infection
 - Allergic reactions
 - Local bleeding
 - Worsening or prolonged pain

- Excessively frequent, repeated injections can cause the bone, ligaments and tendons to weaken

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Surgery - Timing

- Optimal timing is not clear
- No consensus on how long non-operative treatments should be tried
- “Sciatica” usually improves within 3 months in about 75% of patients with non-operative treatment
- Study comparing surgery vs. prolonged non-operative treatment for sciatica (Peul et al, NEMJ 2007)
 - Advantage of early surgery is faster relief of pain and faster perceived recovery time

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Surgery - Indications

Absolute

- “Cauda equina” syndrome
- Progressive or severe motor deficit

Relative

- Failure of adequate response to non-operative treatments
- Severe, intractable pain

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Surgical Options

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Surgical (R)evolution: Remote Past

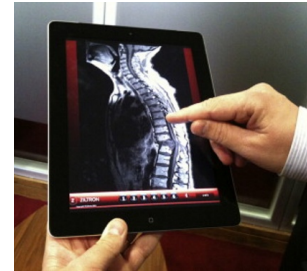
Cut → See



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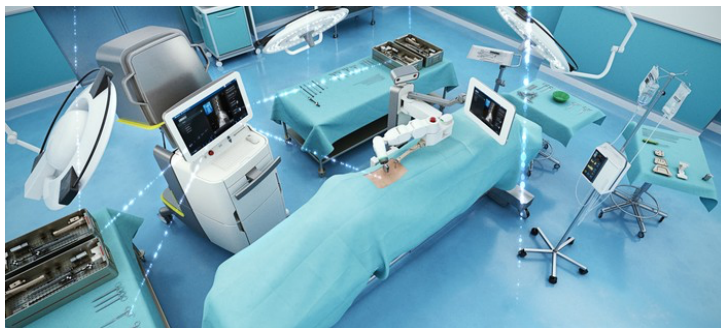
Surgical (R)evolution: Recent Past

See → Cut



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Surgical (R)evolution: Present

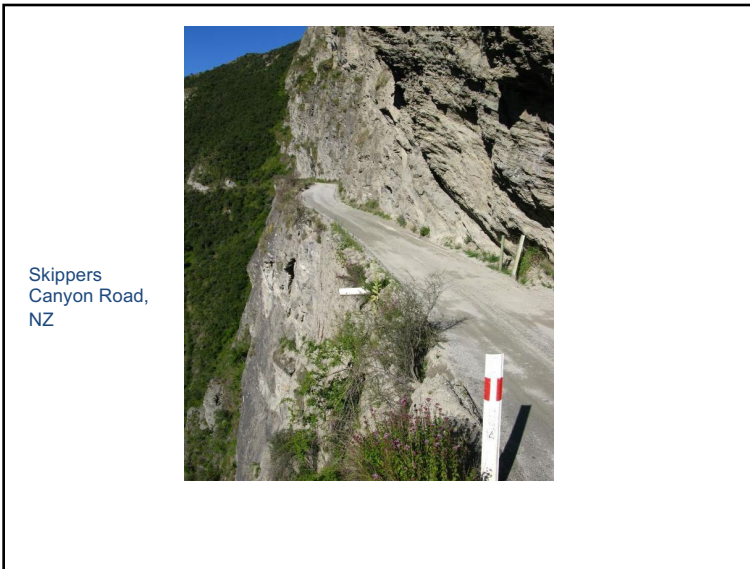


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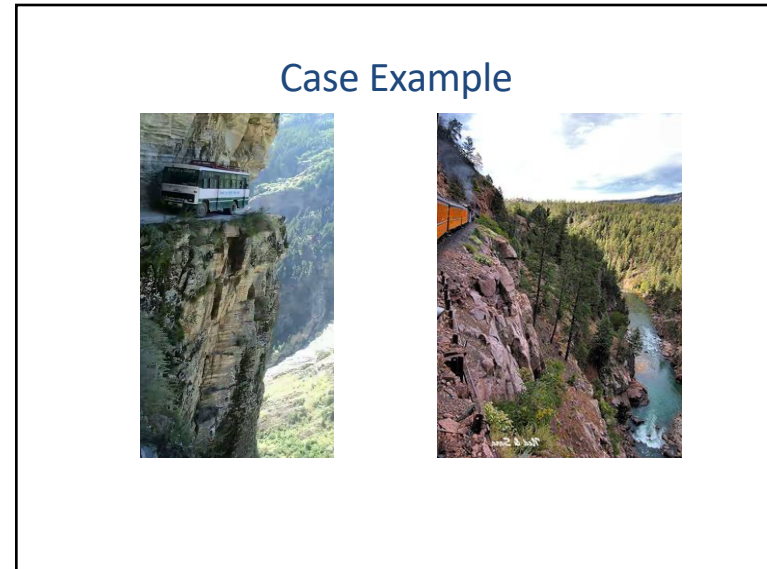
Intraoperative Image Guidance and Robotic Surgery



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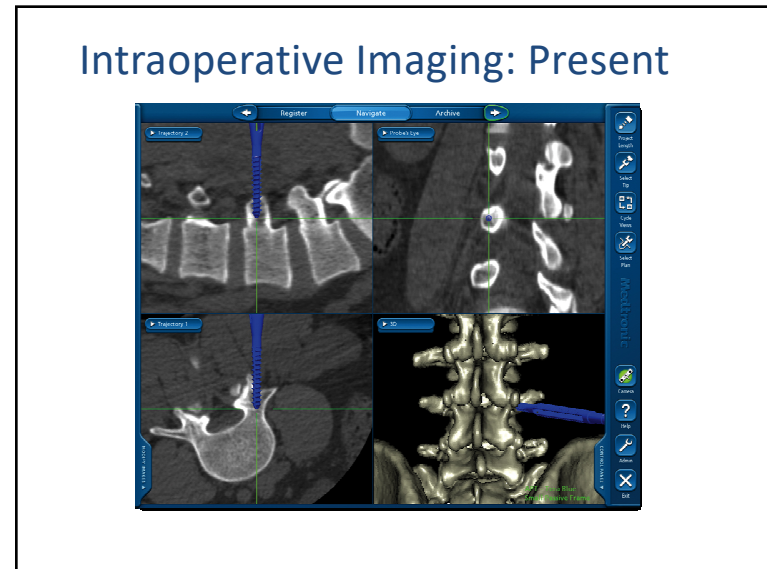
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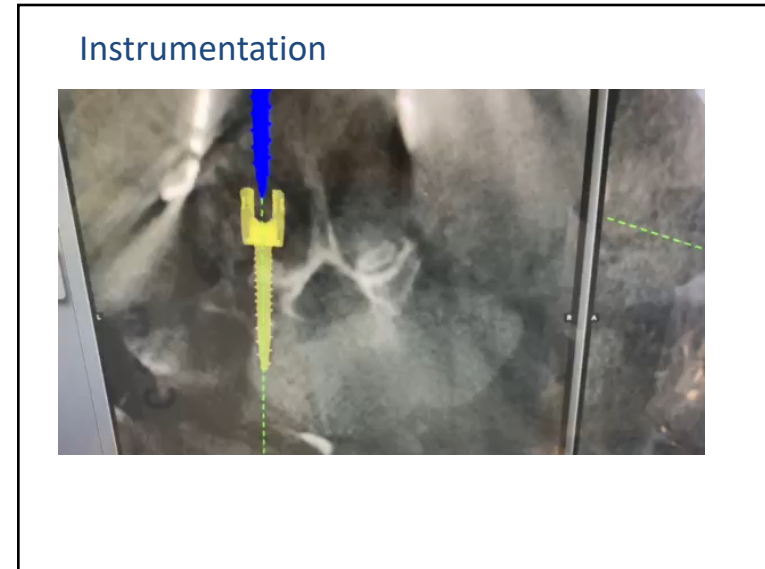
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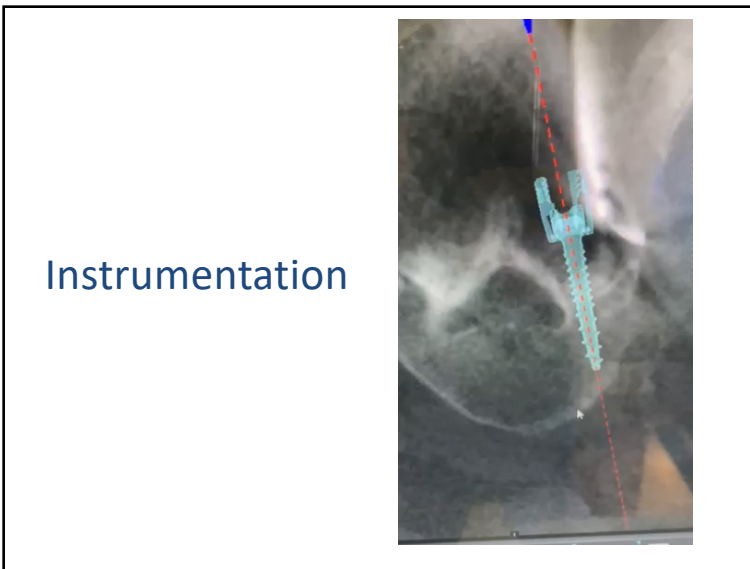
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Computer (& Robot) Assisted Surgery

Allows

- 3-D visualization and reconstruction
- Real time anatomy and feedback / integration
- Preoperative planning with intraoperative execution
- Predictability
- Greater surgical accuracy
- Minimally Invasive Surgery (MIS)
 - smaller incision
 - muscle splitting instead of muscle cutting

Boulder Community Health

BOULDER
NEUROSURGICAL & SPINE
ASSOCIATES

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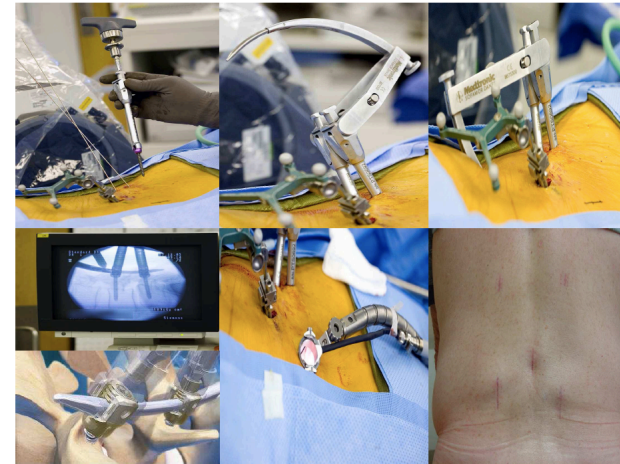
Computer (& Robot) Assisted Surgery

MIS Compared to Open Procedures

- Decreased length of stay in the hospital
 - Decreased risk of infection
- Decreased blood loss
- Less tissue damage
 - Faster return to work and activities
- Decreased pain



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What Surgery is Right for You?

Dependent on numerous factors:

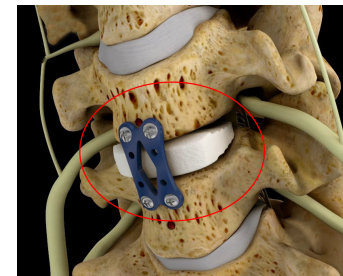
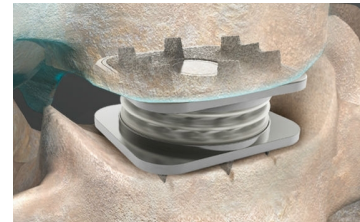
- Cause of symptoms
 - fracture, scoliosis, disc herniation, tumor, infection
- Presenting symptoms
 - any neurologic deficits present?
- Age / Overall Health
 - Osteoporosis, heart and lung conditions

Treatment Goal

- Mutual decision between your doctor and you

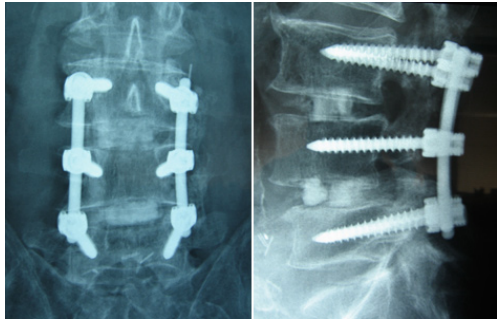
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Types of Surgeries



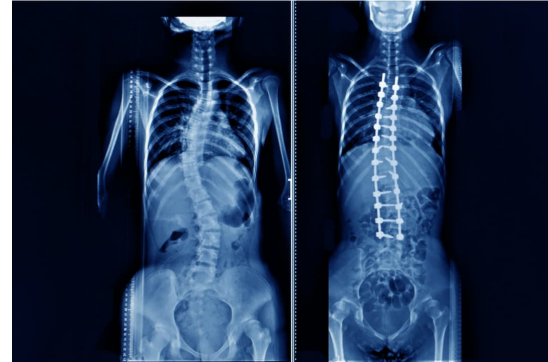
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Types of Surgeries



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Types of Surgeries



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Our (My) Role

- **Navigate** the patient (you) through the process
- **Help** you make the **right** treatment decision
- **Improve** your pain and condition

Get Your Life Back!

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Thank You!

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