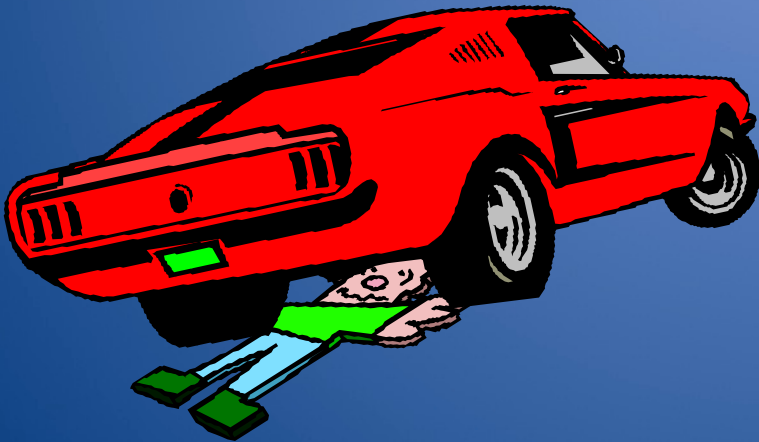
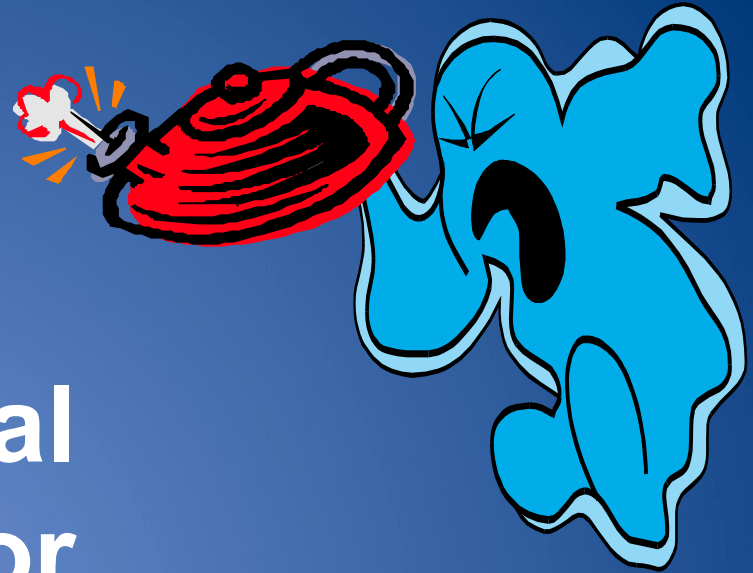


# The chameleon of neuropathic pain: how to recognize it and what to do about it.

**Giancarlo Barolat MD**

Presbyterian / St Lukes Medical Center

**Most of the time**  
**PAIN**  
**is the body's natural**  
**response to harm or**  
**possible damage.**



# Pain

## Two Types

# Two Types of Pain

Nociceptive

Neuropathic

**They Almost Have Nothing To Do  
With Each Other  
(Other than the fact that they  
HURT)**



# Nociceptive Pain

- ❖ It is the “Normal” Pain
- ❖ It is a Warning Signal that Something is Wrong with a Body Part
- ❖ It is a “Good” , “Meaningful” Pain
- ❖ It Goes Away When the Body Part has Healed

# Examples of Nociceptive Pain

- Abdominal pain from appendicitis
- Pain from a fractured bone
- Someone stepping on your foot

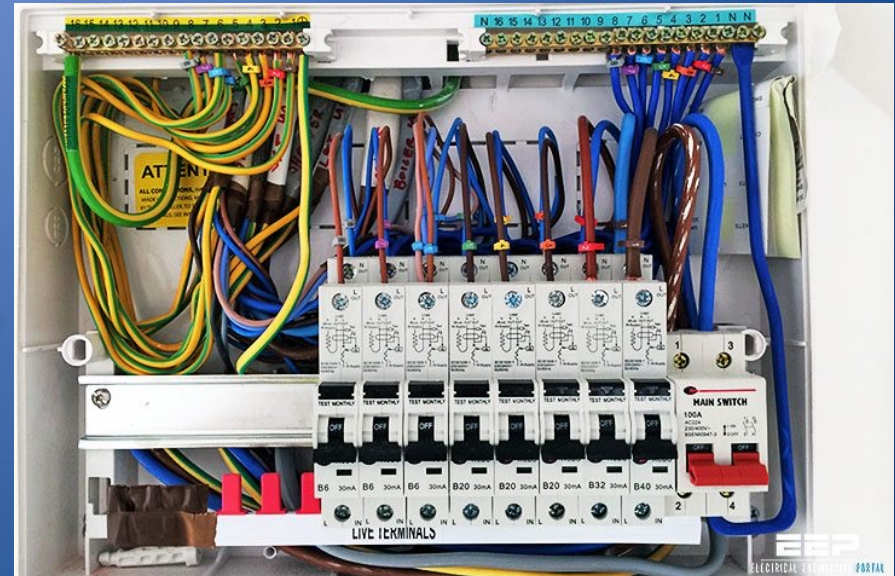
*Etc.*

*The list is very very long*

# Neuropathic

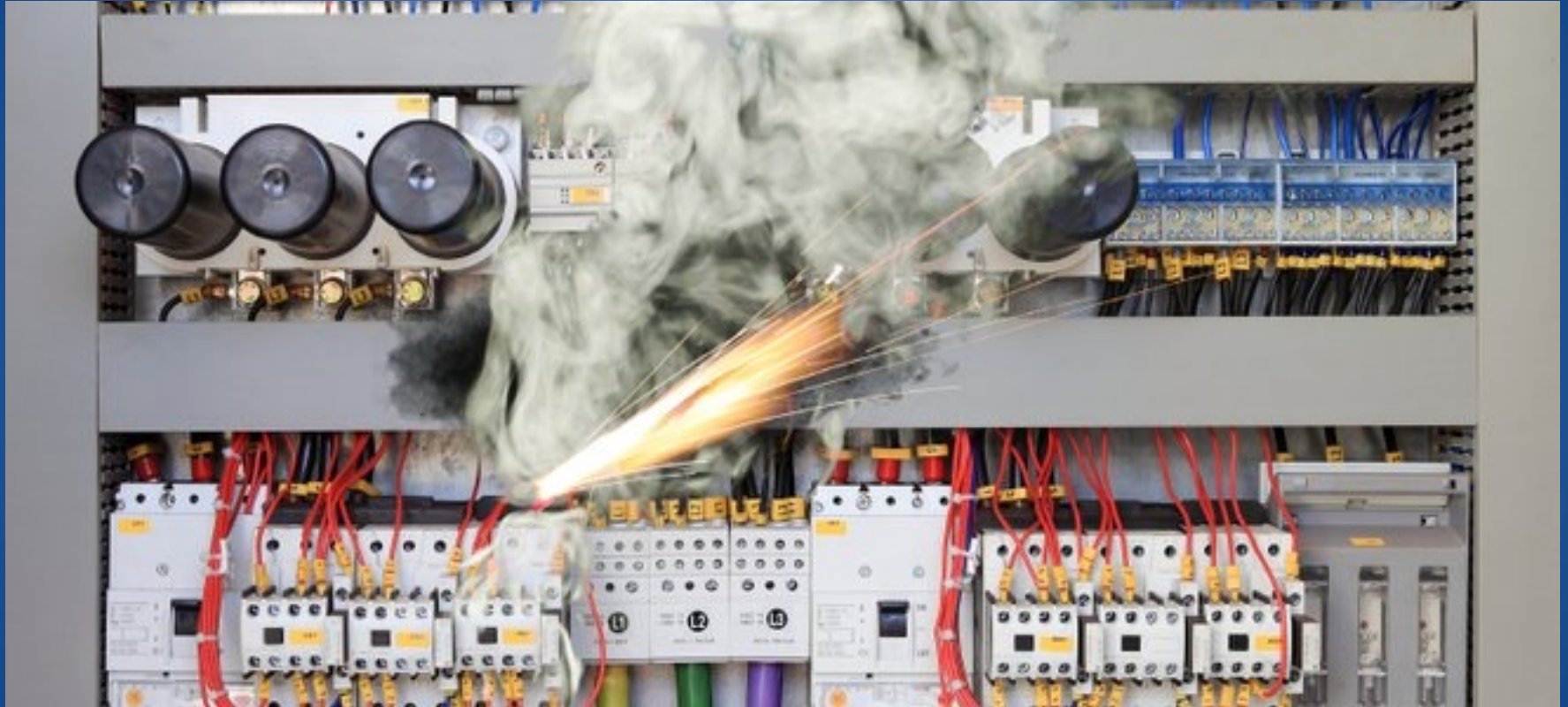
# Pain

- ❖ Pain due to damage to the sensory nervous system
- ❖ It has no warning signal meaning
- ❖ The problem is in the electrical circuitry





# It Is Like a “Short” In The Nervous System Circuitry



Unfortunately, Many Times, The Damage To The Circuitry Is **Permanent**

**With Nociceptive Pain**  
**The Underlying Condition**  
**Is The Problem**

---

**With Neuropathic Pain**  
**The Pain Condition Itself**  
**Is The Problem**

# Nociceptive

❖ **Mostly Sharp and Shooting**

# Neuropathic

- ❖ **Mostly Burning, Aching**
- ❖ **Sometimes Accompanied by Autonomic Dysfunction (Swelling, Discoloration)**

**Burning Pain  
Is Almost  
Always Associated  
With  
Neuropathic Pain**



# Pain

Nociceptive/  
Mechanical

Neuropathic

Both



# Pain

Nociceptive/  
Mechanical

Neuropathic

Both



A Venn diagram with two overlapping circles. The left circle is yellow and labeled 'Nociceptive/Mechanical'. The right circle is maroon and labeled 'Neuropathic'. The overlapping area is orange. A white arrow points from the word 'Both' (in a blue-outlined box) up to the orange intersection area.

# Pain

Nociceptive/  
Mechanical

Can become

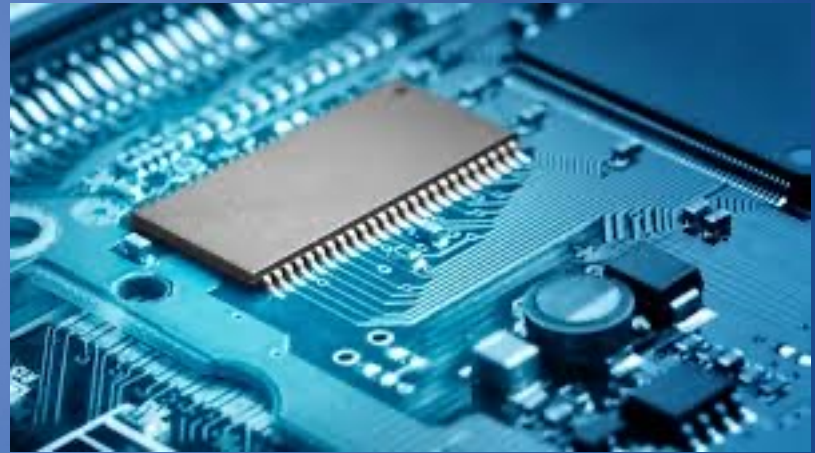
Neuropathic

# IS IT

A Mechanical



An Electrical Problem



OR

OR

A Combination Of Both?

## Mechanical Problem



FIX IT

## Electrical Problem



- Pain Management
- Neuromodulation

# Neuropathic Pain

## Two Simple Questions

Do you have pain at night ?

Do you have burning pain ?

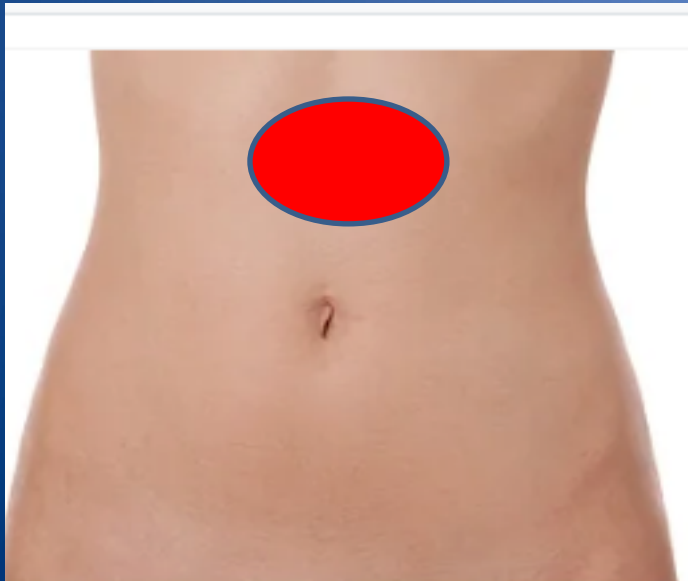


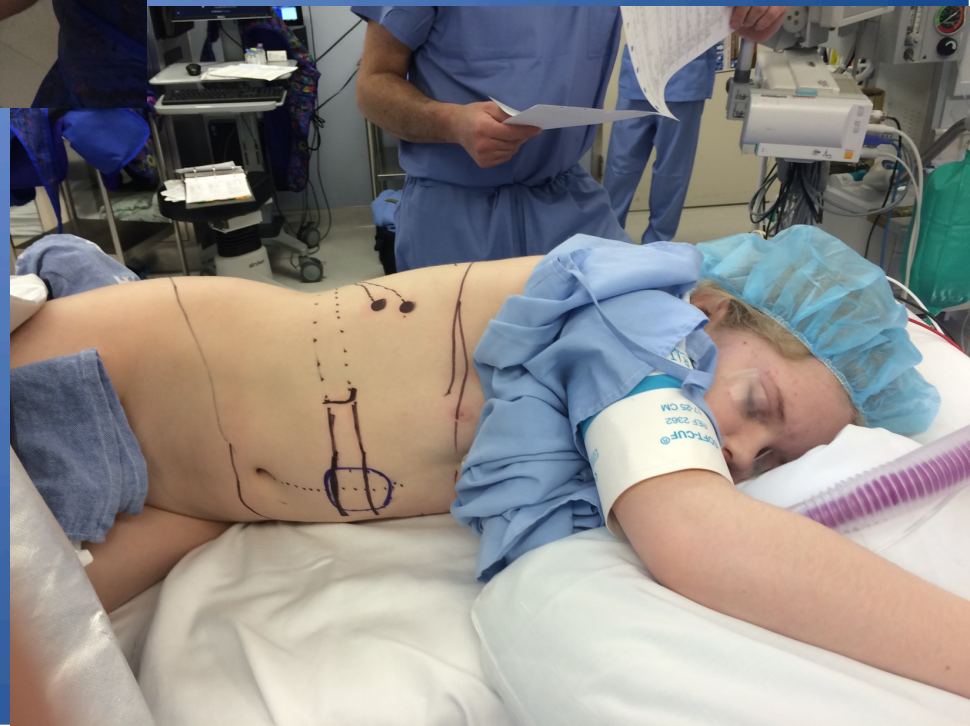
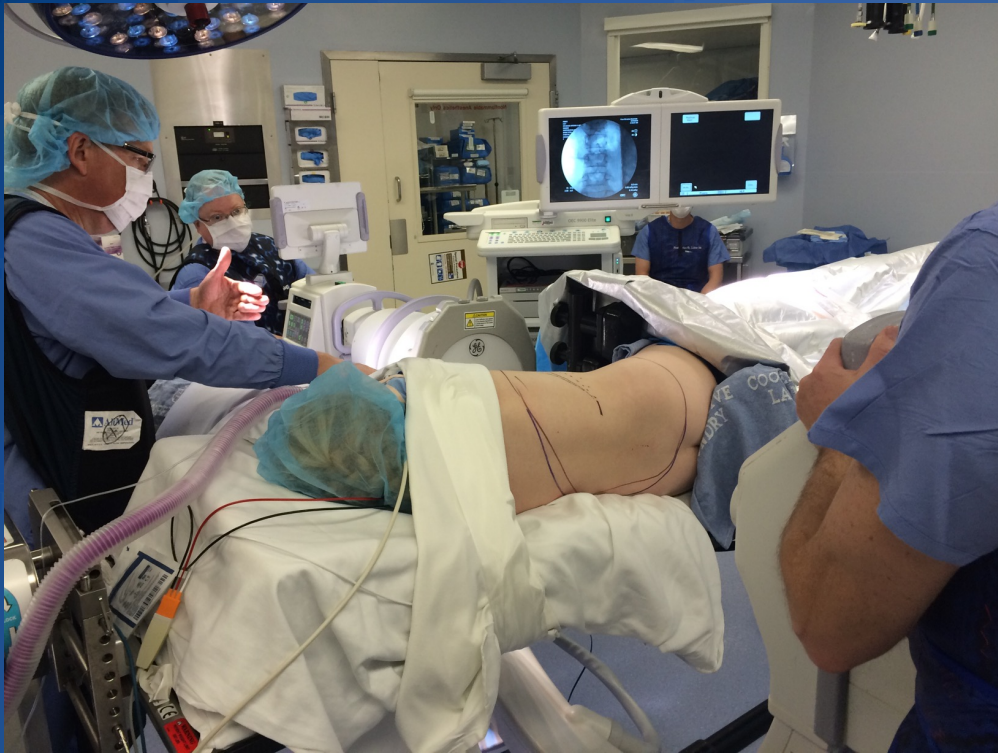
# Pain Nomenclature

<b>Pain</b>	A Normal Reaction to a Threatening Stimulus
<b>Hypersensitivity</b>	An Annoying Sensation to a Non-Annoying Stimulus
<b>Hyperalgesia</b>	A Painful Reaction Out of Proportion to a Painful Stimulus
<b>Allodynia</b>	A Painful Reaction to a Non Painful Stimulus



- Lily
- 12 y/o girl
- Hx of Pancreatitis and Crohn's Disease
- Severe epigastric pain
- On narcotics









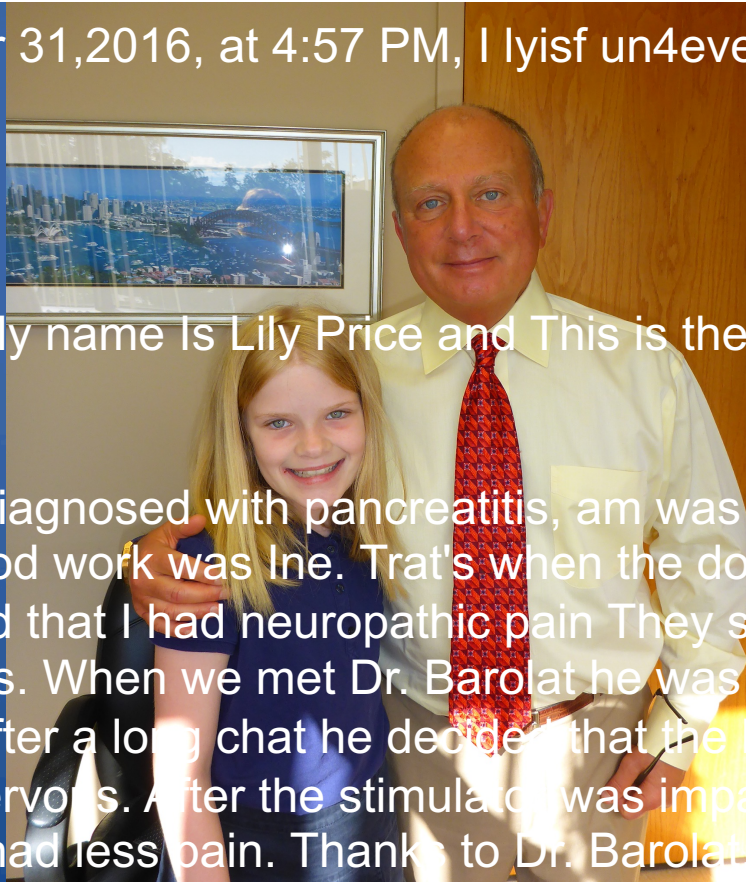
On Mar 31, 2016, at 4:57 PM, lilyisfun4ever animal jam <lilyisfun4ever@gmail.com> wrote:

Hello My name Is Lily Price and This is the story about how Dr . Giancarlo Barolat fixed me .

I was diagnosed with pancreatitis , and was Admitted to Rocky Mountain Hospital For Children for over a month . After I had healed , I still had pain and even though my blood work was fine . That's when the doctors realized that I had neuropathic pain . They sent me to go see a doctor named , Giancarlo Barolat to figure out the pain . When I arrived at my first appointment , I was nervous . When we met Dr. Barolat he was very nice . After a long chat he decided that the best option was to implant a neuro stimulator . When the day of the surgery finally came I was both excited and very very nervous . After the stimulator was implanted , I finally had less pain . Thanks to Dr. Barolat , and the stimulator , I have less pain and I am almost at the point where I have no pain at all . I believe that the stimulator will help and my only pain will be my Crohn's pain . I still cannot Thank Dr. Barolat for helping me, he is so nice and amazing .

Thanks for reading,  
Lily Price

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I still cannot Thank Dr. Barolat for helping me, he is so nice and amazing.



- 18 y/o boy from Mexico City
- Intractable left inguinal/low back pain

When did the present problem start? Oct 2018

Describe the onset and cause of the problem While playing basket ball I  
felt pain in the lower back and in the left groin area.  
As days past by, the pain was increased to the  
point where I was dragging my left leg as I was  
walking.

Describe the  
problem: After 3 years and 3 left hip surgeries I still  
have pain (6/10) in the groin area and sometimes on my  
lower back. I am unable to flex my left leg without pain  
and can't do my daily activities as walking more than a block  
without pain. I've been in physical therapy for 3 years  
with light changes in strength in my left leg but without  
changes in the intensity of the pain.

What tests have you had related to the problem (circle the appropriate)

☒ MRI

☒ CAT Scan

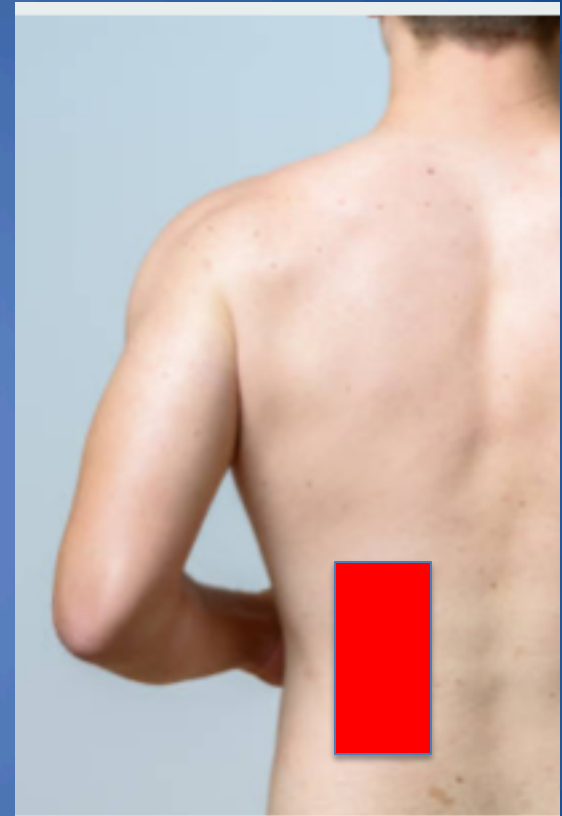
☐ Myelogram

☒ EMG

☒ Nerve blocks

☐ Other





# Barolat

## Pain Evaluation Questionnaire: Functional Assessment

Name Santiago

<b>What impact does the pain have on your life?</b> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>Minimal</span> <span>Moderate</span> <span><b>Major</b></span> </div>	
<b>What was your activity level prior to the onset of the pain problem?</b> <input type="checkbox"/> Sedentary <input type="checkbox"/> Moderately active <input checked="" type="checkbox"/> Very active	<b>What is your activity level now?</b> <input checked="" type="checkbox"/> Sedentary <input type="checkbox"/> Moderately active <input type="checkbox"/> Very active
<b>Were you actively involved with sports prior to the pain problem?</b> <input checked="" type="checkbox"/> Yes, Very Much <input type="checkbox"/> Yes, Moderately <input type="checkbox"/> Yes, Minimally <input type="checkbox"/> No	<b>Are you involved with sports now?</b> <input type="checkbox"/> Yes, Very Much <input type="checkbox"/> Yes, Moderately <input type="checkbox"/> Yes, Minimally <input checked="" type="checkbox"/> No
<b>How do you spend most of your day?</b> <input type="checkbox"/> At home in bed <input checked="" type="checkbox"/> At home on the couch <input type="checkbox"/> At home actively performing chores <input type="checkbox"/> I go out a few hours and then at home <input type="checkbox"/> I am out at least 8 hours per day	

## Average Pain

Back Lumbar	0	1	2	3	4	5	6	7	8	9	10
Abdomen	0	1	2	3	4	5	6	7	8	9	10
Private Parts	0	1	2	3	4	5	6	7	8	9	10
Arm(s)	0	1	2	3	4	5	6	7	8	9	10
Leg(s)	0	1	2	3	4	5	6	7	8	9	10
Other (groin)	<del>0</del>	1	2	3	4	5	6	7	8	9	10

## Worst Pain

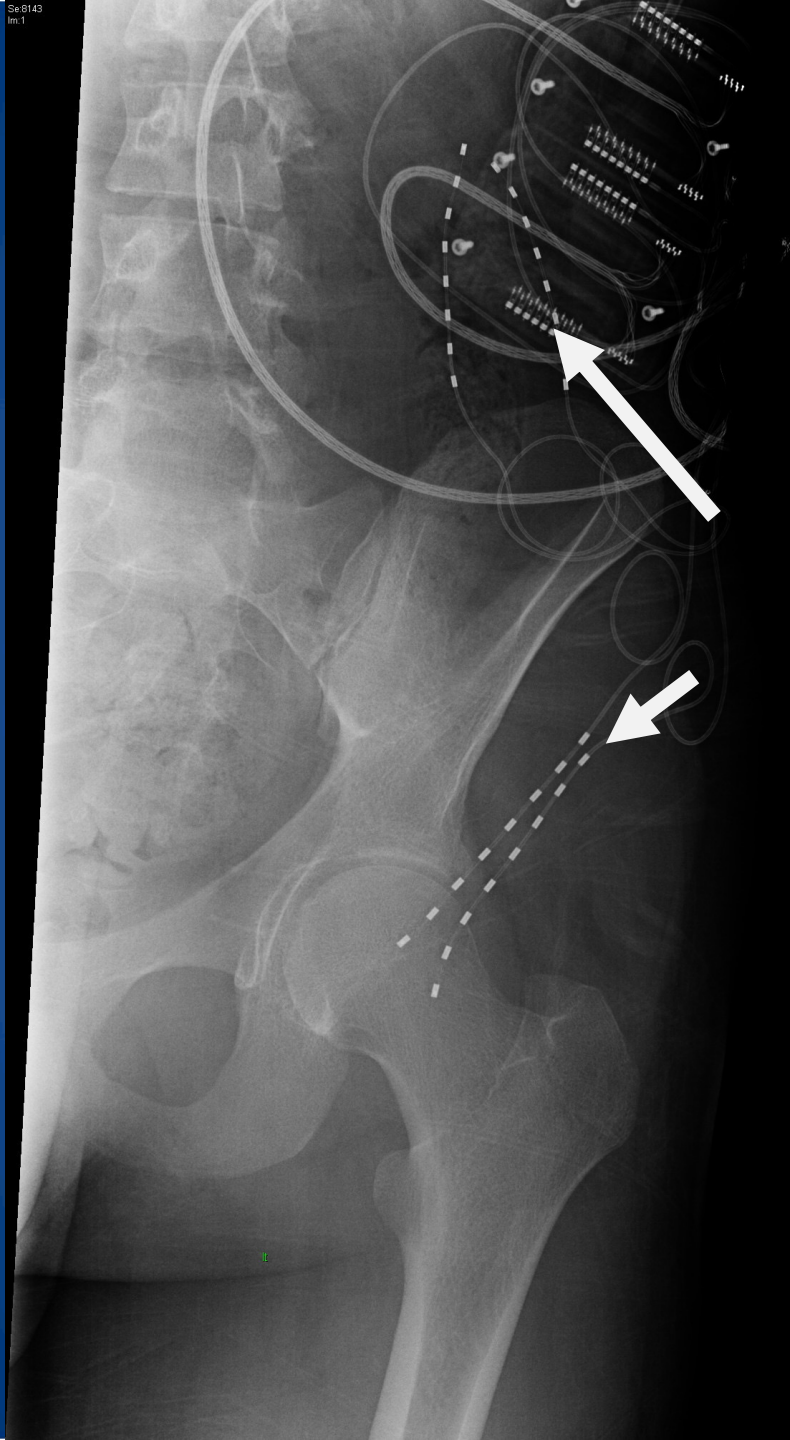
Back Lumbar	0	1	2	3	4	5	6	7	8	9	10
Abdomen	0	1	2	3	4	5	6	7	8	9	10
Private Parts	0	1	2	3	4	5	6	7	8	9	10
Arm(s)	0	1	2	3	4	5	6	7	8	9	10
Leg(s)	0	1	2	3	4	5	6	7	8	9	10
Other (groin)	<del>0</del>	1	2	3	4	5	6	7	8	9	10

Any surgical procedures related to the problem? ☒ Yes ☐ No  
List:

Date Procedure

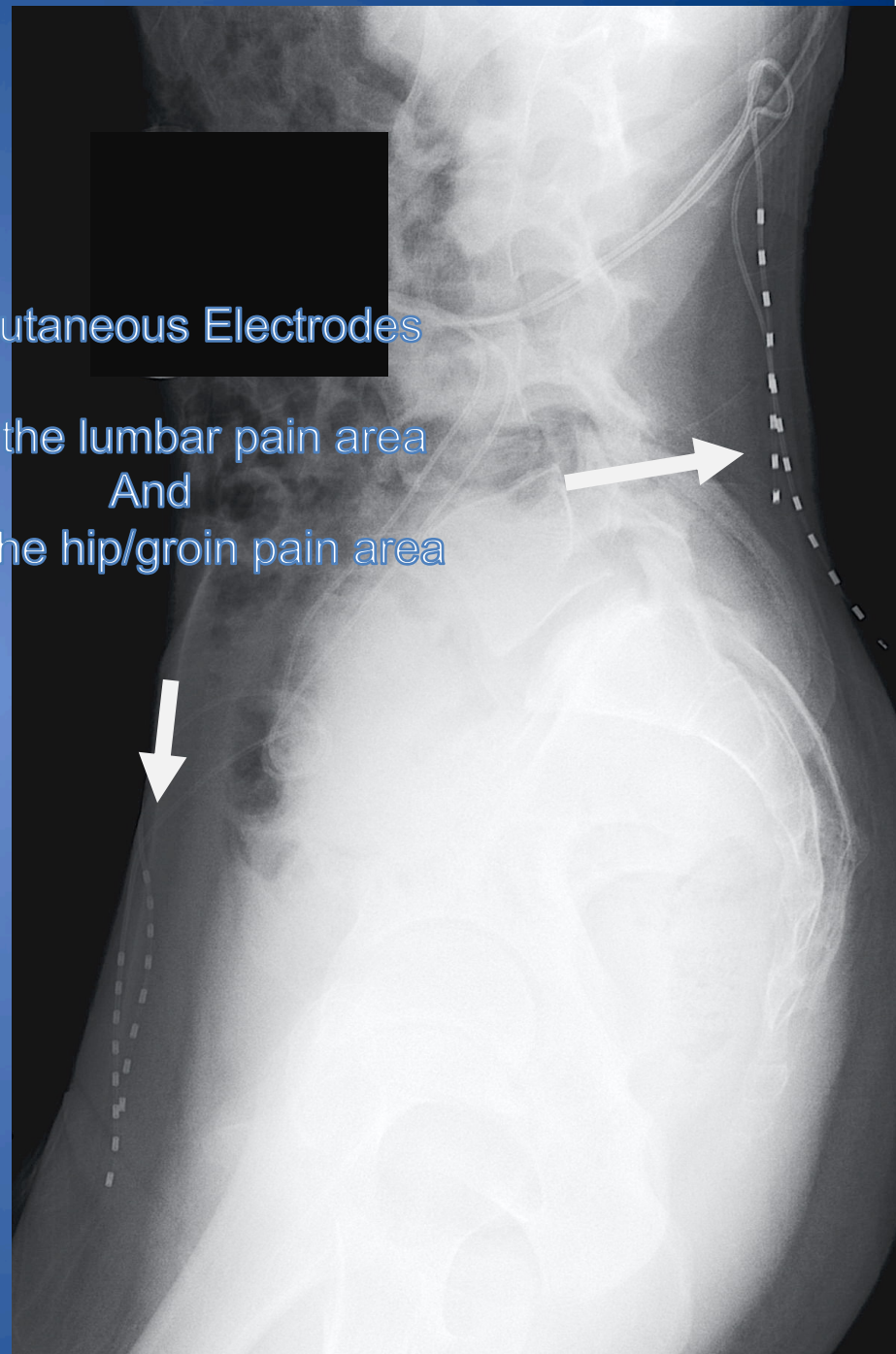
1. Jan 23<sup>th</sup> 2019 Left hip labral repair
2. Aug 1<sup>st</sup> 2019 Left hip labral reconstruction and hip capsuloplasty
3. Oct 2019, Nov 2019 Hip intraarticular infiltration with steroids.
4. Jul 14<sup>th</sup> 2020 Lyssix of adhesions, left hip
5. Oct 2020 Hip flexors infiltration (psoas, rectus femoris, sartorius)
6. Oct 2020 Selective Nerve Block L1, L2, L3
7. Nov 25<sup>th</sup> 2020 Selective Nerve Block L2-L3, psoas plexus blockade.

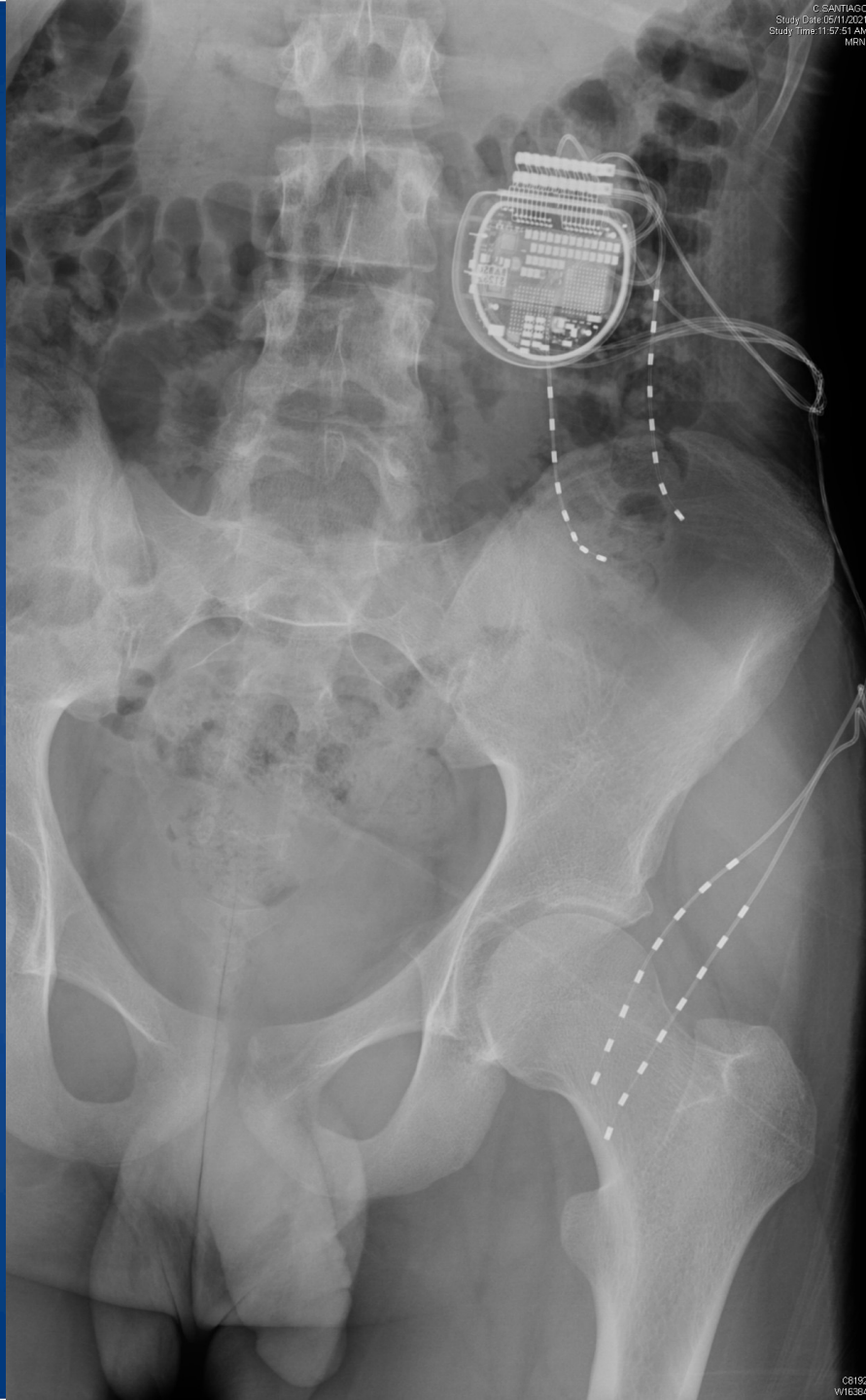




Subcutaneous Electrodes

Over the lumbar pain area  
And  
Over the hip/groin pain area





## BAROLAT NEUROSCIENCE

Follow Up Form

Hola Dr.Barolat:

We arrived yesterday to Mexico safely.

Santiago was without pain during the whole trip so he was very happy.

Thank you again for treating Santiago, it has changed his life been able to do things he thought he would never do again because of the pain.

What has your **worst** pain been with the stimulator (only the pain the stimulator is meant to help)

0 1 **(2)** 3 4 5 6 7 8 9 10 (circle one)

*Do you think the stimulation is helping you:*

☒ A lot ☐ Moderately ☐ Minimally ☐ Not at all

*Would you do it again?*

☒ Definitely yes ☐ Maybe yes ☐ Maybe no ☐ Definitely no

*Have your activities Improved?*

☒ A lot ☐ Moderately ☐ Minimally ☐ Not at all

*Have you decreased your pain medications?*

☒ A lot ☐ Moderately ☐ Minimally ☐ Not at all



# **Neuropathic Pain Conditions Encountered in Spine Patients**

- ❖ **Arachnoiditis**
- ❖ **Radiculitis**
- ❖ **Epidural Fibrosis (?)**
- ❖ **Back pain in the presence of a  
well healed fusion (?)**

# Leg / Arm Pain

---

- ◆ **Structural :**  
***Mechanical Compression/Irritation***
  - Sharp, shooting
  - Activity related
  - Along specific root distribution
- ◆ ***Neuropathic***
  - Dull, Burning
  - Constant
  - Usually widespread  
(exception: radiculitis)

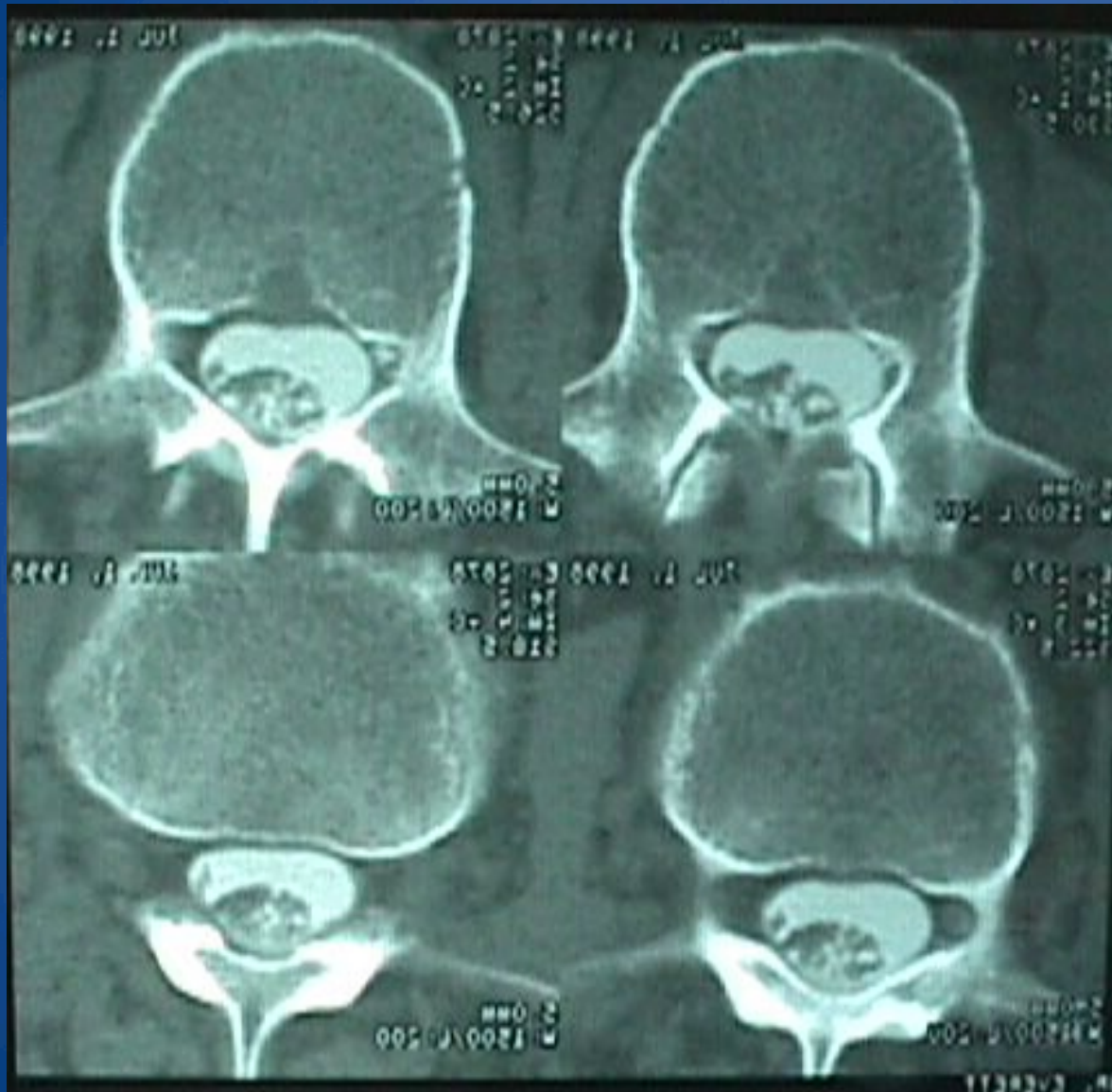
# Arachnoiditis

- ◆ Scar tissue around the nerve roots in the intrathecal space
- ◆ Nerve roots clumping



Arachnoiditis





Arachnoiditis

# Arachnoiditis

- ⚙ Diffuse Aching/Burning Pain
- ⚙ Legs Give Out : Falls
- ⚙ Bladder Dysfunction

Unfortunately  
The Majority Of Patients  
Presenting With This Clinical  
Syndrome

DO NOT Have  
Clumping Of The Nerve Roots On  
Imaging Studies



# Radiculitis



Persistent Pain in a  
Radicular Distribution  
That Does Not Respond  
To Conventional Treatment



# Leg Pain

Neuropathic Radicular Pain  
May Mimic  
Mechanical Compression Pain



# Leg Pain

Radicular and  
Neuropathic Pain  
Can Both  
Be Present Simultaneously

# **Radicular Pain. Referred for Stimulator**

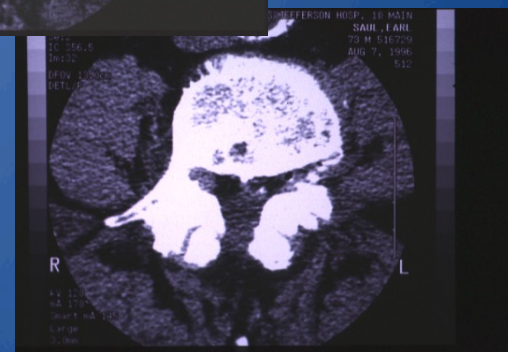
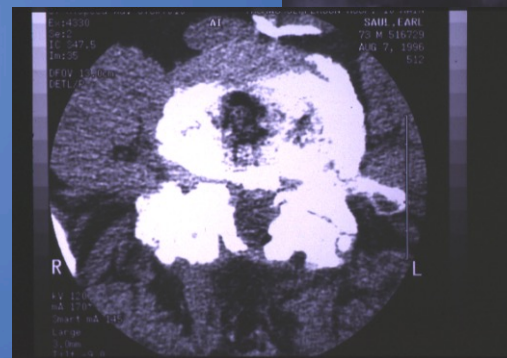
- 70 y/o man with severe sharp shooting pain in the dorsum of the foot and big toe
- Previous lumbar laminectomy several years before
- Pain absent at rest, present with activity
- CT scan: persistent severe recess stenosis at all levels





# Radicular Pain. Referred for Stimulator

- L5 Foraminotomy
- Home The Next Day Cured

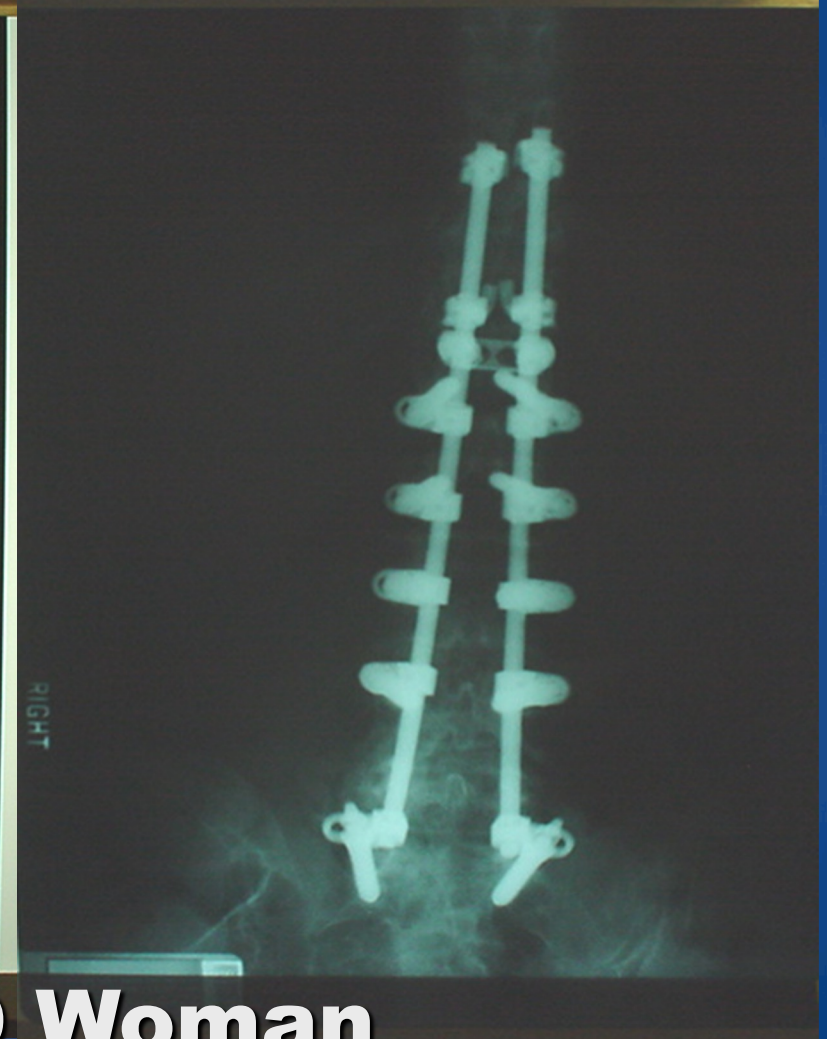


- 70 Y/O Woman
- Lumbar Radiculopathy
- L3,4,5 Laminectomy
- Wakes Up From Operation With Burning Pain In The Front Of The Thigh (Most Likely Damage To L3 Nerve Root)

**Goes Back To The Surgeon One Month Later  
Complaining Of Burning Pain In The Thigh**

**What Does She Get ?**

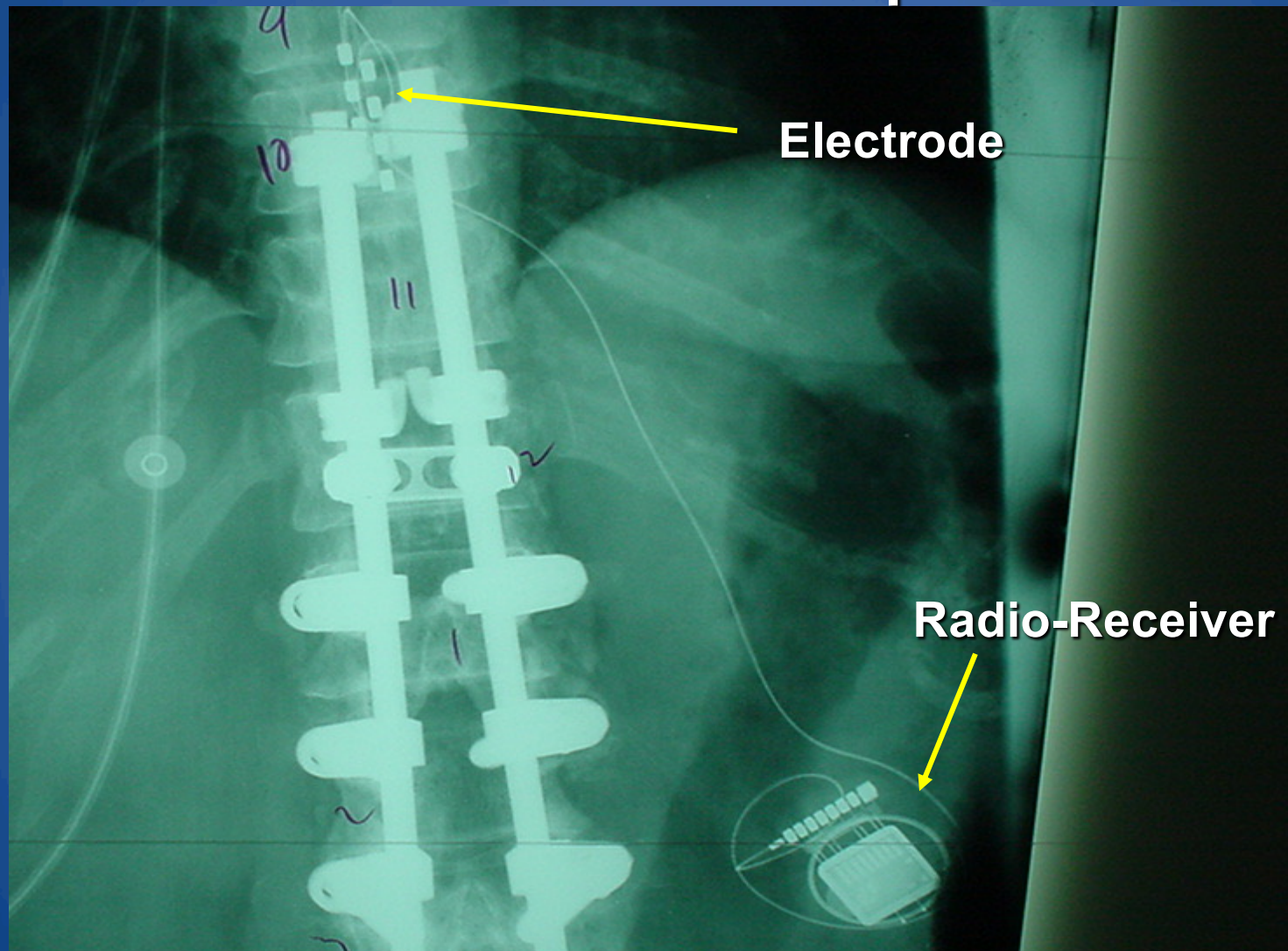
# **T10-S1 Fusion for L3 Neuropathic Pain !!!!!**



**In a 70 Y/O Woman**



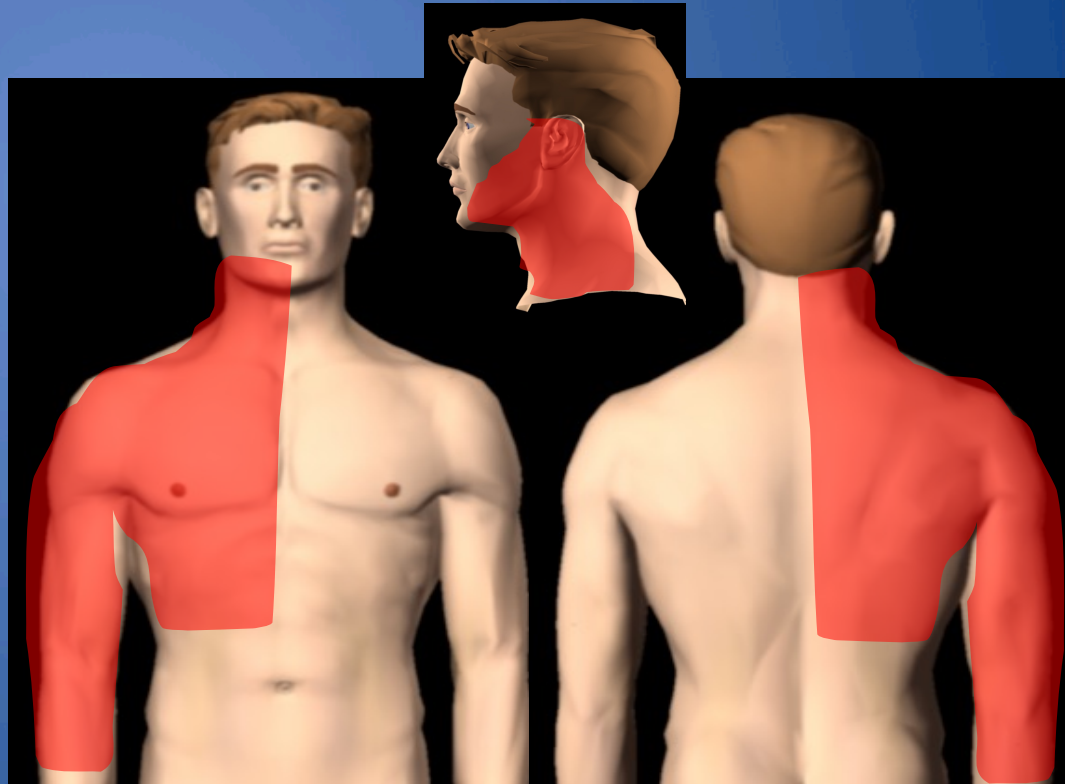
# T10-S1 Fusion for L3 Neuropathic Pain





# Neurogenic Thoracic Outlet Syndrome

- ❖ Usually stretch injury to brachial plexus
- ❖ Pain + Sometimes Neurological Deficit
- ❖ *Frequently misdiagnosed as cervical radiculopathy or miofascial syndrome*



# Save This Poor Patient

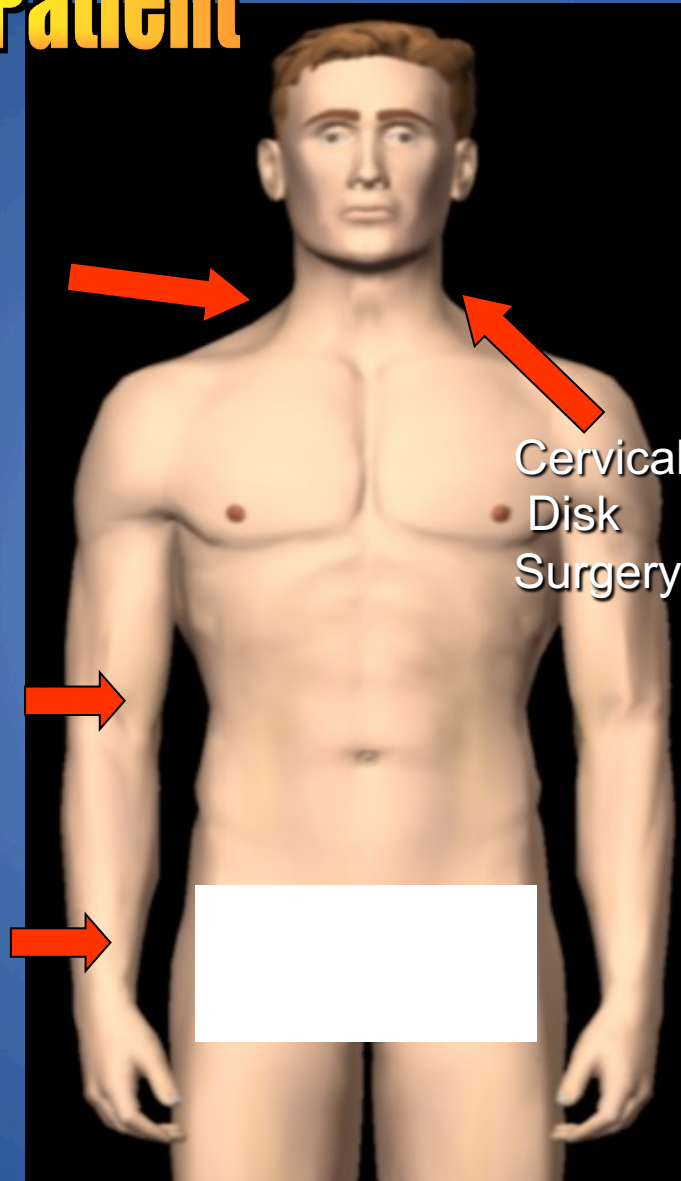
First Rib  
Resection



Ulnar  
Nerve  
Surgery



Median  
Nerve  
Surgery



Cervical  
Disk  
Surgery





Often Concomitant Cervical Disk  
Herniations



Sometimes Surgery On The Disks  
Herniations Is Definitely Not  
Indicated (But Often Performed)



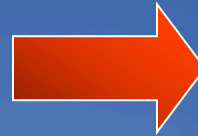
Sometimes The Patient Requires  
BOTH Disk Surgery And A  
Neuromodulation Procedure

# Cervical Spine Problem

- Patient involved in car accident
- Persistent neck pain
- Persistent shoulder pain
- Persistent arm pain in ulnar distribution
- Frequent chest pain (a few visits to the emergency room to rule out heart attack)
- Previous shoulder surgery for “rotator cuff tear” (did not help)
- Small herniated disk at C4-5 on MRI



Previous shoulder surgery for  
“rotator cuff tear” (did not help)



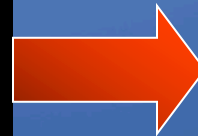
A diagnostic mistake  
(misdiagnosed C5  
radiculopathy)

→ Persistent neck pain  
→ Persistent shoulder  
pain



Herniated disk  
C4-5

→ Persistent arm pain in  
ulnar distribution  
→ Frequent chest pain (a few  
visits to emergency room  
to r/o heart attack)



Neurogenic Thoracic Outlet  
Syndrome

Scenario 1



# ***What To Do***

Previous shoulder surgery for  
“rotator cuff tear” (did not  
help)

A diagnostic  
error

Keep it  
quiet

→ Persistent neck pain  
→ Persistent shoulder  
pain

Herniated  
disk C4-5

Fusion

→ Persistent arm pain in  
ulnar distribution  
→ Frequent chest pain

Neurogenic  
Thoracic  
Outlet  
Syndrome

Pain  
Management +  
Possible  
Stimulator

# Cervical Spine Problem

- Patient involved in a lifting accident
- Persistent neck pain
- Persistent pain and numbness in the whole arm
- Tenderness to pressure over brachial plexus
- Previous fusion at C5-6 for small disk herniation (did not help at all)
- Referred for possible more surgery on degenerated C6-7 disk  
( the surgeon does not understand why the surgery did not work. The fusion took perfectly !!!!)

Patient involved in a  
lifting accident

Persistent pain and numbness in  
the whole arm  
Tenderness to pressure over the  
infraclavicular area

Persistent neck pain

Previous fusion at C5-6 for  
small disk herniation

The surgeon does not understand  
why the surgery did not work

Referred for possible more surgery  
on degenerated C6-7 disk

Should be more careful

Neurogenic  
Thoracic Outlet  
Syndrome

Stuck with it

Wrong indication

Should be at this lecture

No Way !!!!!!!

Scenario 2



# Cervical Spine Problem

- Patient had large disk herniation at C5-6
- Woke up from surgery with horrible pain in the arm (worse than before)
- Underwent pain management. Minimal help
- A few months later MRI repeated. Small disk herniation at C4-5
- Finally found the problem!!!!!! Easy
- New cervical fusion at C4-5
- Accomplishes nothing. Surgeon is appalled

Large herniated disk

Surgery indicated

Woke up with horrible arm pain

Sorry !!! Damaged the nerve root.  
Neuropathic pain par excellence

Second surgery at C4-5

No Comment !!!!

*What To Do* 

Neuropathic Pain  
Protocol +  
Possible  
Stimulator

# THANK YOU

[gbarolat@gmail.com](mailto:gbarolat@gmail.com)