Lumbar Radiculitis & Radiculopathy

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Disclosure I have:

- **No** Commercial Interest or support
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- **No** Conflict of Interest
Objective

- Describe the pathophysiology of lumbar radiculitis & radiculopathy
- Describe role of multiple modalities in treatment of lumbar radiculitis & radiculopathy
- Determine how to assess risks factors and benefits, as well as alternatives of lumbar spine surgery
Cultural Barriers

- Language Barrier could lead to delay
  - availability of translators crucial
- Personal Beliefs creating treatment issues
  - concern regarding PT, medications
  - necessitates detailed explanations
- Ethno cultural Beliefs that delay treatment
  - concern regarding procedures at certain ages
Case

- 45 y/o RH Caucasian male c/o LBP with post axial radiation into top of right foot, with paresthesia in similar distribution and subjective paresis of EHL, no change reflexes. Pain increased with coughing and sitting, relieved with lying down.
Epidemiology – Back Pain

- Second leading cause of disability and work-related injury
- Affects 50 million Americans annually
- Most common health problem in 20-50 y/o
- 13 million US doctor visits annually
- Most lost productivity
- 175.8 million restricted days
- Annual prevalence 15-20%
- 70-80% world experience LBP
## Prevalence of Joint Pain

**Most common health problem 20-50 y/o**

<table>
<thead>
<tr>
<th></th>
<th>Joint Pain</th>
<th>Back Pain</th>
<th>Neck Pain</th>
<th>Other Joint Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B,N,O</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>25-74 yrs</td>
<td>21.0</td>
<td>16.0</td>
<td>8.2</td>
<td>19.0</td>
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<tr>
<td>Male</td>
<td>19.6</td>
<td>16.0</td>
<td>7.0</td>
<td>16.6</td>
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<tr>
<td>Female</td>
<td>22.4</td>
<td>16.0</td>
<td>9.4</td>
<td>21.3</td>
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<tr>
<td>25—44 yrs</td>
<td>15.8</td>
<td>12.3</td>
<td>6.6</td>
<td>12.3</td>
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<tr>
<td><strong>45—64 yrs</strong></td>
<td><strong>38.4</strong></td>
<td><strong>20.3</strong></td>
<td><strong>10.1</strong></td>
<td><strong>25.1</strong></td>
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<tr>
<td>65—74 yrs</td>
<td>40.1</td>
<td>18.2</td>
<td>9.3</td>
<td>28.1</td>
</tr>
<tr>
<td>White</td>
<td>21.9</td>
<td>16.5</td>
<td>8.6</td>
<td>19.4</td>
</tr>
<tr>
<td>Black</td>
<td>15.5</td>
<td>13.2</td>
<td>5.6</td>
<td>16.8</td>
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<tr>
<td><strong>Other</strong></td>
<td>13.7</td>
<td>11.3</td>
<td>7.2</td>
<td>12.5</td>
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</table>
Anatomy- Where’s the pain?
The Spine - Disk Strength

- 1,000 Kg force slowly applied to the vertebral end plates would cause them to fracture far sooner than it would cause a disc to herniate.
- The load on a disc may be as little as 25 Kg in the supine position to 250 Kg in the seated flexed position.
- Plunges water in & out of NP.
Risk Factors
Most avascular tissue in human body

- Microtrauma, disuse, immobilization, obesity
- Sitting, postural stress, vibration, chemicals
- Driving, heavy lifting
  - Heavy work before 20 y/o for > 3 years
  - Exercise < 1 yr or > 15 yrs
- Less in moderate occupations

Axial Loading model
Causes of LBP & RR

- Bones
- Muscles, soft tissue
- Joints
- Disk
- Nerve compression
- Nerve irritation
- Spinal cord compression
- Stenosis
  - Central, lateral, NF
Soft Tissue

- Muscles, tendons and ligaments
  - Help to support and move the bones
- Painful
  - with over use but also with under use.
- Stretched with weight gain
- Irritated from vascular diseases caused by smoking and other abusive behavior
- Crushed or torn from injury or atrophied from sitting on the couch watching TV and eating chips
Facets

True synovial joints
  - allow flexion and extension and tend to resist axial loads, side-bending and rotation

When the loads exceed the capacity of the joints the body will try to compensate
  - facets they will thicken over time
  - bony spurs will be added by the body to take up the additional strain
Facets

- Body aids facets-Hypertrophy; narrowing central canal & foramen compresses nerves
- Erosion of the synovial surface
  - Back pain with movement esp. extension
  - Decreased blood & nutrient supply
  - Causing ischemia- felt as neurogenic claudication or radiculopathy
Disk

- Vesalius first described the intervertebral disc in 1555.
- Its association to postaxial pain was described by Lasegue in 1870.
- First monograph being published in 1933 by Mixter and Barr.
- Very good nerve supply and a poor blood supply.
Pathophysiology
Disk

- “Herniated disc” or nucleus pulposus
  - Compress a nerve directly causing pain
  - Chemical irritant leading to an inflammatory reaction
  - Referred irritation: irritate the nerves to the disc, joints, muscles and skin
Cartilage

Once destroyed, is not repaired

Hunter 1743
Herniated Disk

- May not leave the confines of the annulus
- Annulus may be torn, stretched or just chemically irritated from a nucleus pulposus that has degenerated and lost its water content
  - Prostaglandins, leukotrienes, histamines
Pain

Heat Pressure Cold Chemical Complex

Phospholipids
Arachidonic acid
Lipoxygenase
SRSA Leukotriene B2
Slow Reacting Subs Anaphy
Inflammation erythema edema pain loss of function

Lysosomes
Histamine Bradykinin Kinins
Leukotriene B2
Prostaglandins
Thromboxanes

Lysosomes
Histamine Bradykinin Kinins
Leukotriene B2
Prostaglandins
Thromboxanes

Lipoxygenase cyclooxygenase
free rad
Herniated Disk

With time the entire disc is irritated, chemosis spreads

- to the bones, causing Modic changes
- facets causing hypertrophy and loss of synovium
- to the nerve roots causing radiculopathy
- to the innervating nerves causing sprouting, discogenic & other pain
- to the muscles causing spasms and pain
Other Causes of LBP & RR

- Surrounding structures may play a role
- Skin causes pain
- Internal organs can cause pain
- Nerves from skin, muscles, tendons, ligaments, joints and bones travel to the spine before going to our brain to be perceived
- If these structures are inflamed *nerves sprout & pain is felt at lower threshold*
- Nerves can be inflamed without other causes
  - Diabetes
  - *peripheral neuropathy*
SEGMENT ANATOMY

FORAMEN

- Smallest at L5-S1 with largest nerve root, largest at L1-2
- Connective tissue, lig. flavum, arteries, veins, lymphatics, sinuvertebral nerve
- Spinal nerve forms lateral
- Motor root ant. inf. in foramen
  - Nerve, dura, arachnoid occupy 35-45% space
SINUVERTEBRAL NERVE

Major sensory supply to lumbar spine from spinal nerve before splits into ant. & post. divisions (rami)

Joins sympathetics

- enters canal through foramen, around pedicle to mid PLL divides & anastomosis with opposite side and levels

Innervates PLL, superficial annulus, epidural blood vessels, ant. dura mater, NR dural sleeve, post. vertebral periosteum

Posterior disc: sinuvertebral

Lateral disc: ventral & grey rami

Anterior disc: afferent sympathetics
POSTERIOR PRIMARY RAMI

From spinal nerve which splits into ant & post Rami

Posterior Rami (division) splits into medial & lateral branch

- **Medial** supplies two ipsilateral facets
- surface lig. flavum
- dorsal muscles
  - multifidus, intertransversarii mediales, interspinales, fascia, interspinous lig., blood vessels, periosteum
- **Lateral** sacrospinalis muscles, lumbar skin
DIAGNOSIS

Obtaining the history and examining the patient is the most reliable way to determine the site of the pathology.
History

Where is the pain? Back or Leg
Is there any paresthesia? Where?
Is there any weakness? Where?
When did it start?
How did it start?
What makes it worse?
   Activity, inactivity, valsalva, walking, sitting
What makes it better?
Radicular Pain

- Pain + changes in sensation or weakness should be addressed more aggressively
  - not necessarily with surgery

- Amount of s/sx determine ultra-early surgery

- Even bowel and bladder changes are not the sine qua non of surgery - but they should not be taken lightly

- Bladder changes affected by pain, bowel changes caused by pain medication
  - Sig. Bladder distention & incontinence: **Worry**
  - Bowel incontinence & loss of tone: **Worry**
  - Ask when symptoms started, under what circumstances
Radicular Pain

Pain that is improving and less than 3 months or greater than 6 months and stable does not respond best to surgery.
Back or radicular pain related to a workman’s compensation injury responds 90% of the time to any therapy.

Out of work for greater than 6 months only 50% ever return to work.

After 1 year 25%
After 2 years ~0%
Clinical Picture
Pain Pattern

Pain exacerbated with **valsalva** maneuver it may be a **herniated disc**

Pain increased with **walking** is usually **stenosis** leading to **claudication**

Pain increased with **extension** or palpation then it may be the **facets**
- marked reduction in interspinous movement

**Tenderness** to percussion over the midline rule out an **infection** even if there is not antecedent event or **cancer**.
Pain Pattern

Pain upon awakening can be facet disease or a mass.

At the end of the day usually is from the muscles, tendons and ligaments. This is from poor posture, overuse, or stretching poorly conditioned structures.
Physical Exam

Mental status
Cranial nerves
Upper extremities
Tenderness
Bending, Patricks, FABERS
Motor: standing, resistance
Reflexes don’t lie
Sensation pin prick, position
SLR
Physical Exam

Pain, paresthesia and paresis should be confined to a specific myotome and dermatome for a herniated disk with a radiculopathy.
Physical Exam

Normal: central stenosis w/claudication

since this is an intermittent ischemia

Normal: facet disease, discogenic disease
and cancer

Any amount or distribution of pain,
paresthesia or give way weakness when
muscles, tendons or ligaments are involved
solely or partially
Physical Exam L4

DERMATOME
Anterior
Posterior

MYOTOME
Anterior
Posterior

SCLEROTOME
Anterior
Posterior

DERMATOME
Anterior lower leg
Lateral knee
Medial ankle

MYOTOME
Thigh abductors
Thigh flexors
Thigh rotators
Leg extensors
Foot dorsiflexors
Foot supinators
Spine extensors
Spine rotators

SCLEROTOME
Bones
Level vertebra and periosteum
Iliac wing
Femur (medial and lateral)
Tibia (medial plateau and lateral epicondyle)
Talus

Joints
Facet
Hip
Knee
Ankle

Ligaments
Anterior longitudinal
Posterior longitudinal
Ligamentum flavum
Interspinous
Physical Exam L5

DERMATOME
Anterior  Posterior

MYOTOME
Anterior  Posterior

SCLEROTOME
Anterior  Posterior

DERMATOME
Lateral calf
Dorsum of foot
Large toe-plantar surface

MYOTOME
Thigh abductors
Foot dorsiflexors
Large toe extensors
Spine extensors
Spine rotators

SCLEROTOME
Bones
Level vertebra and periosteum
Greater trochanter
Posterior iliac wing
Pubis
Proximal fibula
Distal anterior femur
Talus
Mid-foot
Large toe
Posterior proximal and distal

Joints
Facet
Sacrotubercular
Hip
Knee
Ankle
Toe

Ligaments
Anterior longitudinal
Posterior longitudinal
Ligamentum flavum
Interspinous
Dermatome Overlap
Physical Exam Lumbar

L2,3,4 iliopsoas flex hip
L3, 4 adduct magnus adduct thigh
L3, 4 quads knee ext
L4, 5 tibialis ant dorsiflex ankle
gluteus medius/min abduct thigh
L4, L5, S1 EHL grt toe ext
L5, S1 post tibialis foot inversion
L5, S1 hamstrings (l) knee flex
S1, L5, S2 glut max ext thigh
S1, 2 gastroc plantar flex ankle
S2, 3 flex dig plantar flex toes
S2,3,4 anus, sphincter rectal tone
Autonomic Nervous System

Sympathetic

T3- L2(3)

Parasympathetic

CN III, IX, X

S2-4
Key Sensory Landmarks

C4  top shoulders AC  L3  medial above patella
C5  lateral elbow    L4  medial malleolus
C6  thumb            L5  dorsum MT grt toe & 2nd
C7  middle finger    S1  lateral plantar
C8  little finger    S4-5 peri-anal
T4  nipples
T6  xiphoid
T10 umbilicus
Reflexes don’t lie
Changes in reflexes usually signify that a nerve is being compressed

S1-2 Achilles
L3-4 Patella
C5-6 Bicep
C7-8 Tricep
Reflex Testing in SC Injury

All standard DTRs should be tested
Abdominal Reflex: T8-T12
Cremasteric Reflex: L1,2
Bulbocavernosus Reflex: S2,3,4
Rectal contraction to sensation: S2,3,4
Given that the vast majority of people have problems unrelated to a disc and physical findings that are vague or follow multiple dermatomes other types of diagnostic tests must be entertained.
Radiology
Tests

MRI
CT scan
Myelogram
Xrays F/E
EMG
SSEP
discogram
DIAGNOSTIC TESTS

X-ray - fracture or spondylololithesis
Ligamentous laxity as a cause of back pain can be documented with flexion and extension x-rays.
X-rays - pedicle invasion or replacement, cancer
Tests

A bone scan – metastasis
Positive in infection, fractures or degenerative arthritis.
Tests

A CT-scan is an excellent test to demonstrate bone anatomy such as stenosis in the lateral recess, in the foramen or centrally.

CT myelogram considered by some as the “gold standard” for all types of pathology.

Invasive test requiring a short outpatient stay.

Not show intrinsic cord changes.
Tests

MRI test of choice for diagnosis spinal disease.

Disc pathology

Bone changes of swelling, infection, stenosis and joint changes

Rapid distinction between different soft tissues

stenosis due to disc, facet or ligament

Directed therapy
MRI

HELPFUL
When symptoms are not clear, multi-dermatomal, diffuse

HINDRANCE
When multiple changes appear
MRI

Radiographic studies only show changes in anatomy, they do not necessarily demonstrate pain.
Additional Tests

EMG/NCV of spine & both extremities
  can often help distinguish between specific radicular findings and peripheral neuropathies

SSEP
  Spinal cord abnormality - contusion, demyelination, stenotic compression or intrinsic mass
Provocative Tests

When the symptoms still do not coincide with the clinical findings or imaging studies.

Invasive discogram- is a disk symptomatic?
Discogram

Performed by an experienced physician
Include the nature, extent, distribution of reproduced pain
Ability of the disk to accept the dye
Morphology of the disk on x-ray or CT-scan
Measure pressure
Must show areas of no reproducible pain, unless chemical irritation is widespread.
Neuroscan

- Nerve conduction sensory exam
- 95% sensitive
- Tests pathologic A-delta fibers to exactly localize pain to dermatome
- Test malingerers
Treatment

When to do surgery?
When not to do surgery?
Who gets better?
Surgery for back pain?
Surgery for radicular pain?
Test & Treat

SNRB- xylocaine and steroid

xylocaine acts almost instantly to produce numbness or other paresthesia in the nerve root distribution thereby covering the pain if the correct level has been selected.

two days later, the steroid starts to relieve the inflammation and pain maximum at 2 weeks.

Unlike the ESI, the SNRB is very specific, placing the treating medication exactly at the problem.
ESI

Stenosis or when multiple areas of coverage are needed without multiple injections

Injected ventral to treat painful annular tears

May not reach the intended nerve root and thus fail to help in the management of the symptoms.
Facet Injections

Joints responsible for the back pain and rarely leg or groin pain

Responds even temporarily, and there was no spillage then the patient may benefit from a facet rhizotomy

deadens the ABNORMAL medial branch of posterior primary rami in the joint, not the nerve root responsible for movement or sensation

may only be temporary lasting a little as 6-18 months.
Treatment surgery or not
TREATMENT NON-OPERATIVE

Improving the overall health of the body
Attempt weight loss
Cessation of smoking
Relief of stress
Decreasing the axial load and avoiding twisting and turning
NOT prolonged bed rest
The most important decision in treatment is deciding the cause.
Treatment

The course of action for one melody of the back may exacerbate another.

The anatomical basis of the pain as well as the chemical nature of the pain and associated painful structures must be addressed simultaneously.
Treatment

Symptomatic, angulated or compressing bone fractures are treated with bracing or fusion.
Muscle Treatment

Sole source of back and even radicular pain
Unused muscle shrink or atrophy, become tired toward the end of the day, hurt with normal use and can not support the spine leading to further degeneration of the disk and facet
Spine stabilizing exercises done on a daily basis helps to rid the body of this very common aliment.
Medication

Non-sedating muscle relaxants
  continuously for two weeks no longer
  Longer use makes the muscles dependant and weak
  leading to further loss of tone and pain

Anti-inflammatory
  pain and muscle irritation.

Physical therapy
  ice early on in the first two weeks
  later warm moist heat for 30 minutes at a time 4-5 times
  per day. The use of heat for greater periods of time can
  promote muscle tissue swelling and of course worsen
  the problem
Physical Therapy

Manipulation, massage, ultrasound and muscle stimulation therapy help the spasms associated with muscle disease.

OMT reduces need for adjunctive therapy. Works if normally respond to adjunctive therapy.
Scientific Data

RCT: OMM effective

Cochrane data base:
Cochrane.org/cochrane/revabstr/AB004249.htm

National Guidelines Clearing House
Scientific Data England

April 2006 Journal of Royal Society of Medicine, Ernst and Canter- stated based upon systematic review, the effectiveness of spinal manipulation for any condition, except for back pain, is not an effective intervention. Because of potential side effects, it cannot be recommended for use at all in clinical practice.

There was no systematic assessment of the literature pertaining to the hazards of manipulation, including comparison to other therapies. Hence, their claim that the risks of manipulation outweigh the benefits, was not supported by the data analyzed.

Scientific Data

Literature Review: OMT significantly reduced low back pain (effect size, -0.30; 95% confidence interval, -0.47 - -0.13; P = .001

Osteopathic manipulative treatment for low back pain: a systematic review and meta analysis of randomized controlled trials. Licciardone JC, et al. BMC Musculoskelet Disord. 2005 Aug 4;6:43. Osteopathic Research Center, University of North Texas Health Science Center, Fort Worth, TX 76107, USA

Osteopathic therapy is as good as allopathic therapy and uses less medicine and physical therapy for LBP.

OMT …for Chronic LBP: RCT

- 455 pts: OMT (n=230) v Sham OMT (n=230)
  - And US v sham US
- 6 Rx over 8 wks
- Measure outcomes at 12 weeks
- Conclusion: Pts receiving OMT were more likely than pts receiving sham OMT to achieve moderate (P<.001) and substantial improvements (P=.002) in LBP at 12 weeks


- OMT pts more likely to be very satisfied with low back care throughout study (P<.001)
- OMT Pts used less prescription drugs during 12 weeks (P=.048)
Summary Data

Many published RCTs, reviews, national clinical guidelines but controversy outside OM regarding the evidence for or against efficacy of spinal manipulation for spine pain.

aLBP: SMT > short-term MOB, diathermy, faster recovery than PT

cLBP: SMT = NSAID

SMT > placebo and general practitioner care (NEJM 1999)

SMT > PT & home back exercise in both the short and long term

SMT > sham SMT in the short term

SMT> short and long term when compared with placebo, or McKenzie therapy, medical care, PT management, soft tissue treatment & back school

Sitting

Do not sit in 90°
Sit 135° body-thigh reclining posture with feet on floor
Slouched over desk highest rate of wear and tear
Tested in positional MRI

Bashir A. RSNA 2006 Annual Meeting
Physical Therapy Strategy

Pain Control
  Back First Aid
  Trial of Extension McKenzie Exercises
  Trial of Traction
  Basic Stabilization Exercise Training

Medication
  NSAIDs
  Non-Narcotic Analgesics
  Corticosteroids
  Muscle Relaxants
  Epidural Injection
  Selective Nerve Root Injection
  Facet Injection
Joint Treatments

Lumbar osteoarthritis
facet blocks and rhizotomies
rid the joint of the chemical irritation reaction
NSAID

Aquatic exercises 95 degrees F
relieve gravitational stress on the joint
rebuild the muscles to support the spine
takes pressure off facets
warm water increases blood flow improving outcome
cold water aggravate chronic back spasms
Lumbar OA

If does not improve over time and if the pain becomes disabling then in order to possibly improve the condition maybe only 50%, back fusion may be contemplated. Usually does not relieve the pain can cause other problems and pain.
TREATMENT OPERATIVE osteoarthrits

Non-surgical 15% of the people will have a decrease in symptoms, 70% will have no changes, and 15% will have an increase in their symptoms with no severe deterioration.

Surgery - 50% will have an improved post-operative course, 40% will have slight to no improvement, and 10% will be worse.

Removal of the facet and synovium followed by fusion is the surgical treatment for isolated facet disease.
250 patients- questionnaire at ~ 75 days.
78% 1200 mg and 22% 2400 mg.
59% discontinued prescription NSAID medications for pain.
60% overall pain improved
60% joint pain improved
80% satisfied with improvement
88% would continue to take fish oil
No significant side effects reported
Maroon JC, Bost JW. Surg Neurol. 2006 Apr;65(4):326-31
Disk Disease

Not all people with herniated discs have symptoms
Not all people who have symptoms require surgical intervention
Large herniated discs of the lumbar spine have been demonstrated to decrease, or resolve with conservative therapy
Leg & back, +EMG, SLR, all signs, treated with back school, spine stabilization, strengthening, flexibility, ESI/SNRB 96% good/excellent outcome Saal and Saal, 1989, Spine, 14:431-437
Leg & back pain, weakness, SLR, Extruded HNP, followed 8-77 months, treated as above, all (n=11) without pain and signs Saal,Saal, Herzog, 1990, Spine, 15:683-686
Physical Therapy Changes

- 48 pts: Acute leg pain, not requiring immediate surgery, Any signs or symptoms
- HNP: filling AP diameter of canal 1= <1/4; 2=1/4-1/2; 3=>1/2
- 1-48 months later: With PT, ESI, NSAID
- HNP ↓ in size >75% (GrIII) [67%pts], 50-75% (GrII), <25% (GrI)
- 81% decreased 50% or greater! 89.3% successful treatment. 11% who were not controlled by treatment disks were either unchanged or larger

Intra-Disc-Distraction

- Increase negative pressure to maximum, release to half, then start again
- Pulsating negative pressure
- Draws in fluids, nutrients and oxygen
Psychological Approaches

- Most beneficial if chronic pain to reduce pain-related interference, depression and disability (R Kearns et al 2006 Health Psychology)
HNP Options

OMT/PT McKenzie exercises
Traction
Magnets, mattress
IDET
MSC
Percutaneous Fusion
Disk Regeneration

- Needs blood supply
- Replace cells or rebuild structure
- Stem cells studied in numerous clinical applications from neurodegenerative diseases to cardiac insufficiency.
- Mesenchymal Stem Cells (MSCs) possess capacity to differentiate into nucleus pulposus-like cells capable of synthesizing a physiological, proteoglycan-rich extracellular matrix characteristic of healthy disks
- Change pressure inside disk
Studies of Disk Regeneration


- Disc regeneration can be induced by axial dynamic distraction in the moderately degenerated rabbit intervertebral disc. Unglaub F, Guehring T, Omlor G, Lorenz H, Carstens C, Kroeger MW. Z Orthop Ihre Grenzgeb. 2006 Jan-Feb;144(1):68-73

  The decompressed rabbit intervertebral discs showed signs of tissue recovery at the cellular and histological levels after temporary disc distraction.


- Intradiscal injection of hematopoietic stem cells in an attempt to rejuvenate the intervertebral discs. Haufe SM, Mork AR. Stem Cells Dev. 2006 Feb;15(1):136-7 (Humans showed no improvement in outcome)
Future is Here

- Gel mix reintroduces nucleus cells to disc
- 3 components: protein laminin-111 that has been chemically modified, & 2 polyethylene glycol (PEG) hydrogels that attach to modified laminin
- Gel holds cells in place
- Solution solidifies after 5 min, sets in 20 min

http://www.medicalnewstoday.com/articles/263496.php
The Future

- H&P
- PT, Meds, OMT
- Neural-scan, IDD
- MRI
- Intradiscal injection of patient’s own incubated bone marrow obtained mesenchymal stem cells embedded in collagen gel and injected into disk (Richardson S. U of Manchester Regenerative Medicine)
- Augmented with IDD
Operative Treatment HNP

Best outcome, the history has to correspond to the anatomical and physical findings.

Onset of radicular pain could begin under most circumstances, even without apparent etiology.

Major complaint should be of radicular pain. It may or may not be associated with paresthesias or paresis.
Operative HNP

Radiographic findings should demonstrate disc pathology at the level of the dermatomal or myotomal symptoms. I DO NOT Operate for LBP
HNP Sx

Herniated disc could affect both of the nerve roots.

The herniated discs do not have to be large, but just "large enough" to deform the nerve root or thecal sac.
HNP Sx

All of the treatments for back disease

Disk does not return to the healthy young non diseased state

Comparable to removing a splinter. Not only mass removed, the inflammation is allowed to subside
Microdiscectomy Standard of Care

Surgery is an art.
The anatomy and pathology is interpreted in the surgeons mind prior to the operation and must match what is actually seen.

One level microdiscectomy incision is usually 2 cm. in length (longer in more robust individuals)

Disk continues to degenerate after nucleotomy

Need to RESTORE morphology and function
Prodisc II
Charite
Bryan
Artificial disk attorneys
POST TREATMENT CARE

It is very important to maintain chronic back care after the acute treatment process.

Back care is life long.

Daily exercise routine.

Proper back posture with sitting and lifting.

During the immediate post operative period leg stretching exercises are needed to try to reduce scar tissue. Sometimes at surgery anti-scar medicine is used. However, scar tissue still may form. It’s occurrence and extent cannot be predicted.

Despite post operative care herniations reoccur!