Advances In Spine Care

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Introduction

- The Spine - A common source of problems
  - Back pain is the #2 presenting complaint to primary care provider
    - 19 million visits
  - Prevalence increases with age
  - High acuity and disability
  - High cost of acute and chronic care
    - $89.5 B annual US direct cost
      - JAMA - 2005
    - $10-20 B lost productivity cost

- Science News
  Patient Spending for Spinal Care in U.S. Has Nearly Doubled Over Past Decade
  ScienceDaily (Sep. 5, 2012)
Introduction

- Complex Issues
  - Structural
  - Neurologic
  - Psychologic
  - Functional
- Treatments also complicated
  - Aging patients
  - Medical co-morbidities
  - Return to function
    - Higher demands
    - Longer life expectancy
Anatomy

- Anatomical differences in spinal regions create different challenges
  - Cervical
    - Spinal cord immobile
    - High segmental mobility
  - Thoracic
    - Relative immobility of segments
    - Cord issues
  - Lumbar
    - Root levels
    - Moderate mobility
    - High stress on segments
    - Junction to the immobile pelvis
Pathology

- **Disease Conditions**
  - Degenerative
    - Age-related changes of disc and articular cartilage structure
  - Deformity
  - Traumatic
  - Systemic
    - Osteoporosis
    - Tumor
    - Infection
  - The failure of the spinal motion segment or structure to maintain shape, stability, or neurologic protection, generating pain or dysfunction

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- [Image of MRI scan of the spine]
Treatments

Non-Surgical Care
- Rest/Time
- Exercise/Strengthening
  - PT is largest $ cost for spine care
- Antiinflammatories
  - NSAID’s
  - Corticosteroids
- Narcotics
  - >100% increase in opioid use for spine pain from 1997 to 2004
- Injections
  - Epidurals
  - Pain target blocks
- Systemic treatments
  - Osteoclast inhibitors
    - Fosamax
    - Actonel

Advancements
- PTH analog
  - Forteo
- Flouroscopy for injections
  - Allows specificity and improved efficacy
- Long-acting opioids
Surgical Treatment

- **Surgical Care**
  - **Principles**
    - Neurologic decompression
    - Structural stabilization
    - Deformity correction
    - Motion/function preservation
    - Minimize iatrogenic injury
    - Allow for long term spinal function
Surgical Treatment

- Traditional approaches
  - Allow for visualization of spine to achieve treatment
    - Posterior
      - Laminectomy
      - Fusion
        - +/- instrumentation
    - Anterior
      - Corpectomy/discectomy
      - Fusion
        - +/- instrumentation
  - Approach related morbidity
    - Wide exposures
    - Blood loss
    - Prolonged recovery
Minimally Invasive Spine Surgery

- The Hype
  - Little or no incisions
  - No blood loss
  - Rapid recovery
  - The laser cures all!

Just two weeks ago I had back surgery. Thank you Laser Spine Institute.

If you’ve been putting off neck or back surgery, come learn about a proven technique that can help you avoid it. This fall, our doctors will be doing a free seminar at the Las Vegas Hilton. Come meet our doctors and nurses, answer your questions, and explore treatment for your specific condition.

Now offering a limited number of FREE INITIAL MEDICAL CONSULTATIONs
September 20 and 21 in Las Vegas, CA.

The advantages of endoscope surgery at Laser Spine Institute:
- No lengthy recovery
- No open back procedures
- Less than 1-inch incision
- Quick and painless recovery
- 95% of patients return to work in 48 hours

We are experts in treating conditions such as:
- Degenerative disc disease
- Herniated disc
- Degenerative disc disease
- Spine tumors
- Other chronic conditions

Call to schedule your free initial medical consultation: 1-855-352-3052 or visit LaseSpineConsult.com

*No such patient will be charged or will receive any medical care. Medical care currently not accepted.
Minimally Invasive Spine Surgery

- The Reality
  - Incisions are smaller
  - Blood loss is less
  - Recovery is quicker
  - The laser can be utilized as a tool for treatment

- However.....
  - Technology must be used appropriately
    - Maintain efficacy of traditional surgery
    - Cannot create new complications
    - Equal or improved costs of procedures
Techniques of MISS can be applied to almost all spinal pathologies

- Disc herniations / neurologic impingement
- Instability
- Deformity
- Trauma
- Systemic disease
  - Osteoporosis related fragility fractures
MI Decompression

- **Endoscopic**
  - Uses a camera to visualize pathology
    - Smaller incisions
    - Potentially more rapid recovery
    - Outpatient settings
  - Limited application due to anatomic restraints
    - Potential for limitation of efficacy
      - Indirect access to pathology
    - Unique complications
MI Decompression

- Tubular based systems
  - Benefits of MI plus visualization of traditional surgery
    - Same benefits as endoscopic
    - Same efficacy as open procedures
      - Easily converted to standard open operation if needed
      - Similar complications to standard procedures
  - Gold standard for most decompressive surgery in US
MI Stabilization

- Operations for fusion
  - Alphabet soup!!
    - TLIF
    - XLIF
    - DLIF
    - ALIF
    - AxialLIF
    - MIDLIF

- The common theme
  - MI techniques that allow appropriate access to pathology to allow for placement of instrumentation and grafting implements
  - An expansion of decompression techniques
MI Stabilization

- Advancements in care
  - Access systems
    - Retractors
    - Neuromonitoring tools
    - Instrument systems
  - Implants
    - Specific shapes
    - Features that allow access regardless of anatomic restraints
      - Expandable
      - Rotating
MI Stabilization

- Advancements in care
  - Fixation systems
    - Fluoroscopically placed
    - Guidewires to improve accuracy
  - Connection systems that allow for percutaneous placement of screws and still allow connectivity and deformity correction
- Intraoperative imaging
  - CT
  - Improved fluoroscopy
  - Image guidance
MI Surgical Case

- 61 yo female
  - Historically very active
    - Running
    - Skiing
  - 1 year history of progressively worsening back pain and left leg and thigh pain
    - Significant disability
    - Failed all conservative treatments
    - Postural change over time
MI Surgical Case

- **Diagnosis**
  - Progressive DDD leading to worsening degenerative scoliosis
    - Severe neuroforaminal stenosis on concave (left) side of curve causing leg pain
MI Surgical Case

- **Treatment Planning**
  - **Issues**
    - Neurologic impingement
      - Decompression
    - Degenerative progression
      - Pain increase over time
    - Deformity progression
      - Indicates lack of stability
        - Due to progression of the degeneration

- **Options**
  - Decompression alone
    - Will fail due to instability
  - Standard open anterior and/or posterior instrumentation and fusion
    - Difficult to address neuroforaminal disease posteriorly
    - High morbidity
  - MI anterior interbody fusion
    - Indirect neural decompression
    - Deformity correction
    - Stabilization
      - +/- percutaneous screw fixation
MI Surgical Case

- **Treatment**
  - MI anterior interbody fusion
    - Operative technique
      - Lateral approach to allow anterior spinal exposure
        - Transpsoas
      - Graft placements correct deformity, provide stability, indirectly decompress the neurologic compression via foraminal height restoration
MI Surgical Case
MI Surgical Case

- **Outcome**
  - Complete relief of preop symptoms
  - Fusion solid at one year
  - Has returned to activities without restriction
MI Fracture Care

- Percutaneous fracture stabilization
  - Vertebroplasty
  - Kyphoplasty
- For more complex fractures
  - Implants and retractors designed specifically for these applications
  - Variations from MI stabilization systems and techniques
Future Directions

- Robotics/Image guidance improvements
  - More precision
  - Less patient and surgeon radiation
    - Smaller incisions
    - Less surgical morbidity
- Implant designs
  - Anatomic shapes
  - Ease of placement
  - Ease of fixation
  - Improved materials
    - Biocompatibility
  - Motion preservation
Future Directions

- Systemic treatments to prevent disease
  - Osteoporosis treatments
  - Disc disease modification agents
- Biomaterials
  - Bone graft substitutes
  - Bone graft extenders
  - Artificial discs
  - Biocompatible implants
    - No hardware long term

News Release

Spinal Restoration, Inc. Completes Enrollment of the Phase III Study of the Biostat System

*Placebo Controlled Trial Assesses the Biostat System for the Treatment of Discogenic Low Back Pain*
Future Directions

- Health Care system issues
  - Demographics
    - Aging population
    - Increased demand and complexity of problems
  - Insurance/payment systems
    - Finite resources for all care
    - Trend towards cost reductions
      - Care limits?
  - Accountable Care Organizations
    - Disease prevention
    - Comprehensive disease management
      - Specialized centers?
    - Bundled payments
      - Will this model work?

Smith MJ.

Source
East Greenwich Spine & Sport Inc., East Greenwich, RI 02818, USA. smith@egss.us
Future Directions

- Health Care System Issues
  - Outcomes research
    - Will determine:
      - Who gets paid
      - What gets paid for
      - How much gets paid
      - What gets excluded
      - New technology development and adoption
    - We need to validate the results of what we are doing to justify its cost
Summary

- Spine care, like all of medicine, is changing
  - Minimally invasive procedures, offering less morbidity and equal or better efficacy, will become the norm
  - MI techniques will improve and applications will broaden

- Cost is an issue, and will be heavily scrutinized

- Outcomes research will determine future care and technology incorporation

- The disease conditions themselves, due to their acuity and disability, will drive patient demand for care

- The aging patient will increase the complexity of care
Thank You