The Scoliosis Center

BACK TO THE FUTURE
SCOLIOSIS
PAIN SYNDROMES
AND BEYOND

MARK A. RIEGER, MD
Advocate The Orthopedic Center

OBJECTIVES
• Define Scoliosis
• Identify Scoliosis
• Identify other Spinal Deformities
• Learn Treatment Options
• Learn When to and to Whom to Refer

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IDIOPATHIC SCOLIOSIS
“More than 10 degrees of lateral deviation of the spine as observed in a frontal plane roentgenogram without an identifiable cause or associate syndrome.”
SRS

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IDIOPATHIC SCOLIOSIS
• INFANTILE (0-3)
• JUVENILE (4-10)
• ADOLESCENT (>10)

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ADOLESCENT SCOLIOSIS
• AGE > 10
• FEMALE > MALE (7:1)
• FAMILY HISTORY
• PAINLESS
• MATERNAL AGE
• NON OPERATIVE TREATMENT VERY SUCCESSFUL

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JUVENILE SCOLIOSIS
• AGE 4 - 10
• FEMALE >>> MALE
• NO FAMILY HISTORY
• PAINLESS
• BRACING FOLLOWED BY SURGERY MOST COMMON TREATMENT
INFANTILE SCOLIOSIS
- AGE 0 - 3
- MALE >>>
- FEMALES
- NO FAMILY HISTORY
- PAINLESS
- NON OPERATIVE TREATMENT VERY SUCCESSFUL

ETIOLOGY
- Collagen
- Muscle
- Growth hormone
- Testosterone
- Somatomedin A
- Equilibrium dysfunction
- Melatonin deficiency

PRESENTATION
- PAINLESS
- Shoulder asymmetry
- Breast asymmetry
- Chest asymmetry
- Limb length asymmetry
- Waist asymmetry
- Truncal asymmetry
- ASSYMETRY

SCOLIOSIS EXAM
- ELEVATED SCAPULA
- CHEST ASSYMETRY
- BREAST ASYMMETRY
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**SCOLIOSIS EXAM**

**LIMB LENGTH ASYMMETRY**

Apparent Scoliosis from limb length inequality

**WAIST ASYMMETRY**

**TRUNKAL ASYMMETRY**

**FUNCTIONAL**

- Limb lengths
- Muscle spasm
- Posturing

**INSPECT SKIN**

- NEVUS - NF
- HYPOPIGMENTATION - TS
- HAIRY PATCH- TETHER

**SCOLIOSIS DIAGNOSIS**

ALLIS TEST
SCOLIOMETER
XRAY
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Allis Test

THREE REGIONS

4 CURVE TYPES

THORACIC
THORACOLUMBAR
LUMBAR
DOUBLE

When You Need an MRI

• HIGH LEFT THORACIC
• HAIRY PATCH
• AGE LESS THAN 10 YO

WITH AND WITHOUT CONTRAST

NEUROGENIC

HIGH LEFT THORACIC CURVES

HAIRY PATCH

DIASTOMATOMYELIA

SYRINGOMYELIA

MRI FINDINGS

SYRINGOMYELIA
CHAIRI MALFORMATION
TETHERED CORD
FATTY FILUM
DIASTOMATOMYELIA

50 % REMAIN STATIC OR IMPROVE AFTER SURGERY
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**SCOLIOMETER**

Bunnell 1984

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Worst Curve of 32 Degrees

Mean Curve of 11 Degrees

Worst Curve at 48 Degrees

Mean Curve 20 Degrees
**SCOLIOMETER < 5°**
- Curve < 20°
- 0.1% error
- No Xray
- No referral

**ASSESS MATURITY**
- Risser Sign
  - 0 – 1 High Risk
  - 4 – 5 Low Risk

**PEAK HEIGHT VELOCITY**

**Cobb Angle Measurement**

**SCOLIOSIS TREATMENT**
- Cobb angle 30
- Risser 2
- 11 Years old
- 90% Chance of Surgery

**INFANTILE TREATMENT**
- MEHTA CAST
- VEPTR
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Milwaukee Brace

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BRACING

- **NIGHTTIME**
  - CHARLESTON
  - PROVIDENCE

- **TLSO (THORACO-LUMBO-SACRAL ORTHOSIS)**
  - BOSTON
  - WILMINGTON

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Night Time Bracing

**INDICATIONS**

- 25 – 35 Degrees
- Lumbar Curve
- +/- Thoracic

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TLSO BRACE

**INDICATIONS**

- 25 – 40 Degrees
- All curves
- Worn 18 Hours/Day

BRAIST STUDY

- **NEJM: WEINSTEIN**
- **TLSO BRACE**
  - TWICE AS EFFECTIVE THAN NO BRACE
  - MAXIMUM EFFECT AT 18 HRS

**THIS IS A BIG DEAL**

INEFFECTIVE TREATMENT

- Exercise
- Electrical Stim
- Chiropractor

WWW.SRS.ORG
No Longer Used
FLATBACK

INSTRUMENTATION

• No Brace
• Quick Mobilization
• Better Correction

INSTRUMENTATION

INSTRUMENTATION

INSTRUMENTATION
Spinal Monitoring and Cell Saver

POSTERIOR INSTRUMENTATION
- SSEPS
- MEPS
- WAKE UP TEST

POSTERIOR INSTRUMENTATION

SPINAL STAPLING
- SMALL CURVES
- HIGH RISK OF PROGRESSION
- POOR BRACE COMPLIANCE

Scheuerman's Thoracic / Lumbar
- MALES > FEMALES
- 12 – 15 Y.O.
- + FAMILY HISTORY
- PAINLESS / PAINFUL

Thoracic Scheuermans
- PIKE
**TREATMENT**

- **<70**
- **>70**

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**LUMBAR SCHEUERMAN’S TREATMENT**

- Brace if painful

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**PAINFUL**

- Spondylolysis
- Spondylolisthesis
- Infection
- Neoplasm
- Mechanical
- Referred
- Trauma

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**SPONDYLOLYSIS VS LISTHESIS**

- % Slippage

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**SPONDYLO**

**HISTORY**

- Any age
- Back pain with extension
- Pain with exercise
- Hip and thigh
- Gymnastics / football

**Exam** - Tight hamstrings

**Xray** - Stress fracture

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**SPONDYLO**

- Lumbar flexion
- Popliteal angle

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**45 deg**
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SPONDYLO

XRAY  BONE SCAN

SPONDYLOLYSIS TREATMENT

• BRACE
• STRETCH HAMSTRINGS
• FUSE

50%

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INFECTION

• DISCITIS
• OSTEOMYELITIS
• SI SEPSIS

INFECTION DIAGNOSIS

HISTORY
• URI
• DENTAL WORK
• FEVER
• INCREASING PAIN

EXAM
• MENINGEAL SIGNS
• FABER TEST
• HOP TEST
XRAY
• PLAIN FILMS
• BONE SCAN
• MRI
INFECTION

CT

MRI

NEOPLASM

BENIGN

- OSTEOID OSTEOMA
- OSTEOBLASTOMA
- ANEURYSMAL BONE CYST
- EOSINOPHILIC GRANULOMA
- SPINAL CORD TUMOR

NEOPLASM

OSTEOID OSTEOMA

- PAINFUL SCOLIOSIS
- NSAID RELIEVES PAIN

EOSINOPHILIC GRANULOMA

ANEURYSMAL BONE CYST

SPINAL CORD TUMORS

PATIENT WITH ASTROCYTOMA

MECHANICAL

HERNIATED DISC
**DISC HERNIATION DIAGNOSIS**

**HISTORY**
- Twisting
- Lifting
- Pain

**EXAM**
- Sensation
- Motor
- SLR
- Xray
- MRI

**MECHANICAL HERNIATED DISC**

**MECHANICAL HERNIATED DISC**

**TRAUMA**

**REFERRED PAIN**
- GYN
- GU
- GI
NONIDIOPATHIC SCOLIOSIS

- MESENCHYMAL
- EHLER-DANLOS
- HOMOCYSTINE
- MARFANS
- METABOLIC
- OSTEOGENESIS IMPERFECTA
- RICKETS
- NEUROFIBROMATOSIS

NEUROGENIC

- CEREBRAL PALSY
  - CARDIOVASCULAR
  - SEATING
- UNIT ROD

CEREBRAL PALSY

POST-OP

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THANK YOU