

# Cox Technique

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## **Herniated disc**

- You always want to work above the problem area. For example, if L5 is the problem you must work on L3. The same technique is used in the cervical region. As you decompress the segments above, they will lower the disc pressure of the segments below.
- Anytime when you are performing flexion distraction on the cervical spine, you do not contact the T1 vertebral body because it will increase the disc pressure at C6-C7.
- When performing flexion distraction, you bring the patient's back to the area of tolerance of tension not all the way back.
- 76% of patients have a disc problem with no symptoms at that segment

## **Cast of Tolerance**

- The means that, as the patient improves their level of stretch should increase.
- You want to reach their tolerance level, go past that level one or two times, and then bring it back to their tolerance level.
- Each time the patient is seen, their level of tolerance should improve.
- Mr. Cox states that patients should be 50% improved within the first four weeks. If this is not the case, then other actions should be taken (MRI, CT scans).
- If the patient is 50% improved within that four week time period, then the treatment should be cut in half.
- Every time a patient improves 50%, their treatment should be cut in half.
- Initially, patients should be treated four to five times a week.

## **Lumbar-hyper-lordosis**

- Flexion distraction on the y-axis with circumduction.
- Y-axis distraction should be utilized first.
- After the patient is 50% improved you can start working in the lateral rotation (five four second stretches three times). Circumduction can be added afterwards.
- When performing circumduction, the patient is moved in a circular motion at the same time as the patient is distracted.

## **Side-line Flexion Distraction with a Pregnant Patient**

- We would use lateral flexion at three sets of five, strokes of four seconds each (lasts approximately 20 seconds).
- Patient is lying in the side posture position.
- With your left hand, you grab the lumbar segment in question. The right hand holds the L5 sacrum.
- You pull the patient back and forth, towards and away from you (in a lateral movement with you left arm) the patient can wrap their arm around your left arm. This gives you a greater stretch and allows them to hold onto you for support.

## **Right Scoliosis Lumbar Spine**

- You can put a lift of approximately 3mm. in the right foot.

- The exercises the patient should perform are to lift the right leg in a prone position, tightening the gluteals and lumbar as someone distracts the leg in a downward movement.
- This helps to tighten the lumbar region to straighten the curvature.

## **Spurs**

- You will perform ten one second reps on the y-axis.
- When the patient is 50% improved, you will start to perform left \_\_\_ movement for ten one second reps.
- After the patient is 50% improved from that technique, you will perform y distraction of the long axis with lateral movement and circumduction.
- When performing the lateral movement, you can lock the table in slight flexion of open the facets and disc spaces.
- When looking at x-rays of the cervical lumbar spine, you want to look at the lateral film for slight retrolisthesis of a segment as the problem area.

## **Disc Fragments (Free Fragments)**

- You can test these patients by flexing them forward when sitting.
- They should have pains in the buttock, lower leg, or lateral foot
- Normal SLR
- Low back pains may be minimal, but will have leg pains
- Perform a y-axis decompression or distraction at L5 (it was an S1 case). You will use 5, 4 second reps which will last 20 seconds. The dip should be approximately 1 to 2 inches.
- You will use pressure point movements at the right piriformis, hamstring, and posterior popliteal fosse/lateral condyle of the knee
- Then, you perform the same technique again (distract the patient for 5, 4 second reps). Perform the pressure point movements again, and then perform the two steps a third time.
- Three sets of decompressions along with trigger point work in between

## **Spondylolisthesis**

- Looking at spinal stenosis at T1 imagining MRI image
- This condition is often times more commonly found in females
- You will be using y long axis distraction
- You want to contact the area above the spondylolisthesis
- Check the patient's tolerance, and then perform five four second reps for three sets along with right piriformis hamstring and lateral condyle trigger point work between steps.
- In an L4 condition, the patient may have pains in the lateral side of the calf. There could be decompression of the common peroneal nerve. You will perform trigger point work on the calf all the way down to the ankle to treat this.

## **Lumbago**

- Patient has antalgic standing position
- You want to use lateral movements for this patient as the disc is opened at the left antalgic position you want to use the movements towards the right to open the disc space on that side.

- You will use three sets of five four second reps

### **Post Surgical Patients**

- When there is disc herniation or postsurgical rods/bolts/fusions you want to work above the segment
- You will use y long axis decompression above the fused area
- When the patient is 50% improved you can start to use the lateral movements

### **Back Surgeries Failure**

- When a person raises their right leg, their left leg and ankle have increased pain. 98% of cases this is a medial disc herniation.
- People with gluteal weaknesses on the left side suffer from atrophy. This can be proven by raising the right leg and checking gluteals for a contraction. If you turn the foot out, the muscle can no longer contract because of disc herniation.
- You must use rehabilitative muscle exercises for these patients along with muscle stimulation two times a week for approximately one month.
- There is research which indicates that when you have discs that have been removed and surgical structure has been put in its place, sometimes there is metaplastic hyperplasia of tissue which starts to grow to give the same presentation as the disc itself.
- Sensory nerves heal poorly after surgery
- Battered nerve root syndrome always causes pain. Our job is to minimize their pain and to allow the patient realize that their situation will never totally remiss
- Cervical fusions: Occiput distraction one or two segments above the area of hardware. Along with lateral flexions from left to right
- Patients with cervical fusions can also have pains that radiate into the rhomboid region on either one or both sides.
- It is important that as you decompress the neck that you adjust the thoracic area
- You also perform trigger point work to reduce contractions
- Research shows that after back surgery, the adjacent segment becomes the problem because of increase stress loads
- Disc surgeries in which doctors insert a disc were very popular procedures 10 years ago. Today, these surgeries are rarely performed, because the success rate was only 35%
- The fibrosis/scar tissue grows due to the prosthesis put inside the body
- Only 14% of fusion patients, and only 5% of all lumbar surgery patients, would be TDR candidates

### **Scleroderma**

- Calcification at distal digits
- Metacarpal degeneration
- Straight cervical
- Skin tightening around the mouth
- Raynauds at a young age

### **Disc Information**

- The lumbar discs are the most common reason for low-back pain for adults in America

- The total number of U.S. adults who visited a chiropractor increased 57% last year
- Research indicates that the amount of money spent on chiropractic was 40% less than money spent in the medical profession
- The average cost of treatment, hospitalization, lost work days, cost of care, and compensation programs was higher for patients of the medical profession than of chiropractic care
- Manipulation works better than acupuncture and NSAIDS by far
- Studies show that 37% patients of the medical profession still had pain and 10% were worse after 60 days
- After back surgery, 71% of patients did not return to work 4 years later and after multiple back surgeries 95% of patients did not return to work 4 years later
- Research proves that spinal manipulation is safe and recommended by physicians for low back pain
- Chiropractic always gives the best results
- Higher motion changes in the normal C6-C7 segment immediately inferior to a degenerated C5-C6 segment
- Degraded nucleus pulpous and glycosaminoglycan loss leads to disc degeneration

### **Spinal Fusions**

- Spinal fusions have increased by approximately 58%
- Any time screws or bolts are used in a surgery it triples the cost of the surgery
- Two years after a spinal fusion:
  - o 64% are disabled
  - o 22% have had more operations
  - o 12% have other complications
- A back fusion surgery usually costs approximately \$40,000
- 22% growth in implants and devices
- Fusions have increased 500% for patients with Medicare
- Fusion cage rates increased from 3.6% to 58% in 1996 to 2001

### **Injections**

- Facet block injections have been proven to be of no benefit
- The injection was barely more beneficial than the placebo used for relieving discogenic chronic low back pain
- 35% success rate

### **Sciatica Treatment**

- Decrease in reflexes
- Decrease in neurological function
- These patients must be constantly monitored
- Patients do not receive much relief most of the time
- 90% of patients with 4 months of sciatica respond to non-surgical, energetic, non-operative care with better results

### **Cost of Back Pain Care**

- 25% of patients with low back pain and sciatica are 95% of the cost

- \$100 billion a year is spent on 5% of the patients
- 10% of Worker's Compensation Claims are 86% of the cost
- In 1996 the cost of low back pain was \$200-300 billion in the U.S.

### Evidence-Based History of Cox Technique

- Old McManis table found at the National College of Chiropractic in DO widow's basement
- 1973 Chiro-Manis table was made for chiropractors
- "flexion distraction" term was coined by Cos and the technique was born

### Biomechanics: Lumbar Spine

- The disc has a dual nerve innervation which is why it often causes so much pain
- Diabetics tend to have more disc degeneration due to their low circulation and insufficient nutrient supplies
- Anterior spinal arteries supply 75% of spinal cord arterial blood
- Intervertebral disc is most common pain generator in low back pain with facet joints which is responsible for 15-40%
- During straight leg raise there is a marked decreased blood supply to the nerve root with disc herniation

### Nerve Root Pressure

- 27 surgical disc herniations showed nerve root pressure to be:
  - o 20mm.—paresthesia, no neurological deficits
  - o 60mm.—neurological deficits
  - o 100mm.—severe deficits and trunk list

Level	Size	Location
<b>L1</b>	3.7 by 4.3mm	92% in IVF
<b>L2</b>	3.6 by 5.7mm	98% in IVF
<b>L3</b>	5.7 by 7.1mm	100% in IVF
<b>L4</b>	6.2 by 8.4mm	100% in IVF
<b>L5</b>	5.9 by 9.4mm	95% in IVF
<b>S1</b>	6.2 by 11.2mm	79% in IVF

- L5 has the largest nerve root size because it takes up 95% of the IVF (intervertebral foramina). This causes the many problems at L5

### Carpal Tunnel

- Sciatic nerve compression of 30.5 mm causes ischemia in rabbits
- Chronic dorsal root ganglion compression results in thermal Hyperalgesia
- First sign of nerve root compression is the thickening of the dura and arachnoids
- At 6 months the epidural fibrosis and Wallerian degeneration set in

### Disc Protrusion

- 52.3% occur at L5-S1
- 42.6% occur at L4-L5
- 26.7% occur at L3-L4

- Degeneration of the intervertebral disc is the most common cause of low back pain
- Chemical inflammation of the low lumbar discs causes sympathetic L2 nerve afferent stimulation but not with mechanical stimulation alone
- Nucleus pulposus placed on the dorsal root ganglion causes selective cell death called apoptosis within the DRG. Tumor necrosis factor applied to the DRG showed typical apoptotic changes of the cell nuclei in 24 hours. The presence of single-stranded DNA, Caspase 3, and TNF further confirmed the occurrence of DRG cell apoptosis.
- Disc inflammation promotes dorsal root ganglion nerve supply to the disc
- Omega 3 decreases interleukin inflammatory process
- Macrophages acting on disc tissue causes interleukin-6 which triggers neurological symptoms
- Greater than 3mm slip of a segmental motion segment had the strongest effect on symptoms followed by >3mm translation and then > 10° angulations

### **Lower Intradiscal Pressure**

- Intradiscal pressure greater than capillary pressure impedes diffusion and healing
- Reducing intradiscal pressure creates a diffusion gradient into the disc allowing nourishment of the nucleus and reduces lactate waste levels
- IVF dimensions can increase during flexion distraction by as much as
  - o 28% in area
  - o 17% in height
  - o 7% in width
- Axial distraction is shown to decrease
  - o Annulus and nucleus stresses
  - o Fiber stresses
  - o Annulus radial bulging
  - o Nucleus radial displacement

### **Cox Technic Protocols**

- Protocol I Patient
  - o Has radiculopathy: Use only three 20 second distraction sets (five four second pumps applied with long y-axis or F/D) until 50% relief of pain
- Protocol II Patient
  - o No Radiculopathy: Mobilize facet joints in all ranges of motion beginning with long y-axis distraction
- 50% Rule—Expectation
  - o 50% relief of pain is expected in 30 days of care
  - o If 50% is not attained, a surgical (neurosurgical) consultation is arranged
- *Tolerance Testing*
  - release lock
  - central distraction testing
    - o spinous process contact
    - o downward table movement till occiput extends or 2"
    - o hold for 4 seconds
    - o test L5-S1 first, move cephalward

- if this causes pain (lateralization), then only use ice, electric stimulation, trigger point work, acupuncture, hold/cold, massage, etc. until local irritation reduces to allow distraction without discomfort
- Distraction reverses disc degeneration
- 28 days of distraction work and decompression causes regeneration of the disc
- Flexion distraction and chiropractic is more beneficial than physical therapy
- Physical therapy patients needed much more treatment throughout the year than the chiropractic patients
- New cervical studies are being performed

## **Stenosis**

- Loading of the lumbar spine finds the ligamentum flavum bulging to be 50-85% of the cause of spinal stenosis—the disc is not the principle cause of stenosis—it is the ligamentum flavum
- Stenosis pain may only extend to thigh or buttock
- Pain relief when sitting is a classic sign
- Flexion opens the vertebral canal and relieves the pain, extension is worse
- Side base gait
- Romberg positive
- Numbness, decreased ankle jerk, EHL weakness, sensory deficit, extension pain
- Radiographic Stenosis Diagnosis: Lateral C/S x-ray, measure from mid-point of posterior body to nearest point of spinal laminar line
  - Boijesen: C4-C6 = 18.5mm (14.2-23mm)
  - Hinck: C3-C5 = 17mm (13.9-20.3mm)
  - Moiel-Payne-Spillane = 17+/-5mm
  - Wilkinson: C3-C5 = 16.6mm
  - Epstein: stenosis = less than 13mm
  - Countee: stenosis = less than 14mm
  - 1:1 ratio of canal to body is normal
  - .82 or less = stenosis
- 40 of 49 stenosis patients treated non-surgically
  - 23 improved
  - 12 no change
  - 5 worse
- Traction relieves 75% of patients with radiculopathy
- Myelopathy is due to post and lateral column compression, ischemia and neuron loss in gray matter
- Surgery is not proven better than conservative care
- Surgeons will now allow their patients to see care outside of their clinic
- Cervical Spondylotic Myelopathy is not greatly relieved by surgery
- Research of 62 patients showed no surgery benefits; surgery was not any better than non-surgical care

## **Disc Nutrition Essentials**

- Keys
  - Glucosamine Sulfate

- Chondroitin Sulfate
- Other Nutrients as they are found in the disc
  - Calcium
  - Magnesium
  - Zinc
  - Manganese
  - Potassium
- The osmotic pressure in the central nucleus decreases approximately 75% with degeneration
- Chondroitin sulfate (Perna canaliculus)
  - Repairs degraded bone
  - Increases absorption and replacement of calcium
  - Rebuilds damaged bone, cartilage, tendon, ligament, and disc
- Vitamin D is essential for the absorption of calcium
- Osteoporosis is one of the diseases which are influenced by nutrition and life style. It is preventable by means of adequate nutrition and sufficient physical activity
- Calcium intake is critical in teen years
- Low calcium intake in teens equates to osteoporosis later in life
- Teen girls absorb 326mg. and adult women 73mg. of 1332mg. of calcium taken daily

## **Vertigo**

- Manual physical therapy to mechanical neck pain showed no difference in clinical outcome with or without thrust adjustment being given over non thrust manipulation

## **Fibromyalgia**

- Fibromyalgia may be due to cervical cord compression
- Specialized neuroanatomical and adjustment approach to treating radicular and non radicular pain

## **Cervicogenic Headaches**

- C7 ventral ramus is the largest, next is C7, then C8, then C6 and C5 is the smallest
- The mean cross sectional area and reference ranges for the C5, C6, C7 and C8 ventral rami were 7.1+/-4.1mm(2), 10.6+/-4.3mm(2), 12.1+/-mm(2), and 10.7+/-4.8mm(2)
- Cervicogenic headache is caused by degenerative disc diseases mainly from the dorsal part of the cervical motion segments
- Misalignment of the vertebral joints and osteophytes lead to neurological irritations and compression of the vertebral artery.
- Clinical symptoms are characterized by position dependent headaches which become more by extension and rotation of the cervical spine
- No compelling evidence to show that manipulation achieved better clinical outcomes compared with mobilization
- Non-thrust mobilization techniques should be considered as an alternative to MCS for all practitioners of manual therapy
- Headaches are caused by neck pain generators in the facet joints
- Cervical facet arthropathy and occipital neuralgia cause cervicogenic headaches
- Chronic neck pain patients have a predisposition towards respiratory dysfunction



- Patient assessment, rehabilitation, maximal expiratory pressure, spirometry, neck pain, drug consumption need be considered
- Evidence suggests chiropractic care improves cervical range of motion and pain in the management of whiplash associated disorders

### **Klippel—Feil Syndrome**

- Short neck, limited ROM
- Signs
  - o 30% have Sprengle's deformity
  - o Omovertebral bone
  - o Ptosis
  - o Facial nerve palsy
  - o Cleft palate
  - o Upper extremity anomalies, syndactaly, supernumerary digits, hypoplastic arm and thumb
  - o Scoliosis in 60%
  - o Urinary tract anomalies (absence, horseshoe, obstruction)
  - o Congenital heart disease (septal defect, PDA)
  - o Hearing loss in 30%
  - o A fusion of C2-C3 is common