FDA cleared indications

- Pain relief related to
  - Protruding and herniating discs
  - Degenerative disc disease (DDD)
  - Facet joint disorders
  - Spinal root impingement
  - Degenerative joint disease (DJD)
  - Hypomobility
  - Compression fractures
Back and Neck Pain – Causes

• Back and neck pain is related to different causes
  – Active support system failure (muscle strain/injury)
  – Structural support system failure (Ligament, disc injury)
  – Chronic conditions usually have failure of both systems: structural damage and muscle imbalance
Sources of Back and Neck Pain

Facet Joint Arthritis

Facet Joint

nerve root

muscle
Goals of Mechanical Traction

• Mechanical effects
  – Stretch ligaments, muscles
  – Relax musculature
  – Decrease intradiscal pressure
  – Widen intervertebral foramen

• Physiological effects
  – Relief nerve root compression
  – Possible disc retraction
  – Mobilize joint and muscle
  – Improve blood flow
  – Decrease pain
Traction Parameter Adjustments

- Traction parameter set depends on
  - Type of injured tissue
  - What is Goal of treatment
    - pain relief,
    - decompression,
    - stretch
    - increase circulation
    - reduce inflammation
  - Acuity of lesion
  - Phase of Healing cycle
Traction Therapy Goals

**Decompression**
- Relieve pressure on nerve
- Decrease disc bulging
- Open up foramen

**Mobilization**
- Stretch ligaments
- Stretch capsule

**Increase Circulation**
- Stretch and relax
- Tension tissues
- Oscillate joint

**Anti-inflammatory**
- Decrease muscle tone
- Decrease inflammation
Patient Selection

• Radiating pain in dermatomal distribution
  – With or without sensory loss
  – With or without decreased strength in key muscles

• Decreased ROM in capsular pattern of restrictions
  – With or without radiculopathy
  – No exacerbation of pain after “trial” of manual traction
  – With or without degenerative spondylotic changes

• Centralization of the pain after “trial” of manual traction is indicator of favorable outcomes of mechanical traction
Expected Outcomes of Traction

• Symptomatic relief
  – Decreased back pain
  – Increased ROM
  – Decreased muscle tone

• Functional improvement
  – Increased participation in exercise
  – Increased work tolerance
  – Increased participation in ADLs

• Red flags
  – Pain increases or starts referring
  – Muscle guarding increases
The Four Phases of DTS Therapy

- Pretension
- Progression
- Traction
- Regression
# Lumbar Traction Progression

<table>
<thead>
<tr>
<th></th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Progression Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms Lumbar Spine</strong></td>
<td>+++ pain Mm spasm</td>
<td>++ pain Mm guarding</td>
<td>+ pain Stiffness, Dec.</td>
<td>Min. pain ↑ ROM</td>
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<tr>
<td><strong>Pretension</strong></td>
<td>25 lbs, 60 sec</td>
<td>25 lbs, 30 sec</td>
<td>30 lbs, 30 sec</td>
<td>30 lbs, 20 sec</td>
<td>↑ lbs, ↓ time</td>
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<tr>
<td><strong>Rope speed</strong></td>
<td>30%</td>
<td>30%</td>
<td>50%</td>
<td>100%</td>
<td>↑ speed</td>
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<tr>
<td><strong>Progression</strong></td>
<td>Static steps</td>
<td>Static steps</td>
<td>Static steps</td>
<td>Int. or stat steps</td>
<td>↑ movement</td>
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<td>6-8</td>
<td>4-6</td>
<td>3-5</td>
<td>↓ steps</td>
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<tr>
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<td>12-15 sec</td>
<td>12-15 sec</td>
<td>12-15 sec</td>
<td>12-15 sec</td>
<td>= hold time</td>
</tr>
<tr>
<td><strong>Traction</strong></td>
<td>Static</td>
<td>Intermittent</td>
<td>Intermittent</td>
<td>Intermittent</td>
<td>↑ movement</td>
</tr>
<tr>
<td>- time</td>
<td>5-8 min</td>
<td>8-10 min</td>
<td>10-12 min</td>
<td>12-15 min</td>
<td>↑ time</td>
</tr>
<tr>
<td>- lbs. max</td>
<td>30-40 lbs</td>
<td>40-50 lbs</td>
<td>50-85 lbs</td>
<td>60-85 lbs</td>
<td>↑ lbs</td>
</tr>
<tr>
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<td>45-60 sec</td>
<td>45-60 sec</td>
<td>0-5 sec</td>
<td>↓ hold time</td>
</tr>
<tr>
<td>- lbs. min</td>
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<td>20-30 lbs</td>
<td>30-40 lbs</td>
<td>45-65 lbs</td>
<td>↑ lbs</td>
</tr>
<tr>
<td>- rest hold time</td>
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<td>30-45 sec</td>
<td>15-30 sec</td>
<td>0-5 sec</td>
<td>↓ hold time</td>
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<tr>
<td><strong>Regression</strong></td>
<td>Static steps</td>
<td>Static steps</td>
<td>Static steps</td>
<td>Static steps</td>
<td>↑ movement</td>
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<tr>
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<td>30-45 sec</td>
<td>30-45 sec</td>
<td>= hold time</td>
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# Cervical Traction Progression

<table>
<thead>
<tr>
<th>Symptoms Cervical Spine</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Progression Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>+++++ pain Mm spasm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>= lbs, ↓ time</td>
</tr>
<tr>
<td>++ pain Mm guarding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>↑ speed</td>
</tr>
<tr>
<td>+ pain Stiffness, Dec.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>↑ movement</td>
</tr>
<tr>
<td>Min. pain ↑ ROM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>↓ steps</td>
</tr>
<tr>
<td>Pretension</td>
<td>10 lbs, 20 sec</td>
<td>10 lbs, 20 sec</td>
<td>10 lbs, 15 sec</td>
<td>10 lbs, 15 sec</td>
<td>= hold time</td>
</tr>
<tr>
<td>Rope speed</td>
<td>30%</td>
<td>30%</td>
<td>50%</td>
<td>100%</td>
<td>↑ movement</td>
</tr>
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<td>Progression</td>
<td>Static steps</td>
<td>Static steps</td>
<td>Static steps</td>
<td>Int. or stat steps</td>
<td>↑ movement</td>
</tr>
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<td>↓ steps</td>
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<td>12-15 sec</td>
<td>12-15 sec</td>
<td>12-15 sec</td>
<td>12-15 sec</td>
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<tr>
<td>Traction</td>
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<td>Intermittent</td>
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</tr>
<tr>
<td>- time</td>
<td>5-8 min</td>
<td>8-10 min</td>
<td>10-12 min</td>
<td>12-15 min</td>
<td>↑ time</td>
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<td>15-25 lbs</td>
<td>15-30 lbs</td>
<td>15-30 lbs</td>
<td>↑ lbs</td>
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<tr>
<td>- max hold time</td>
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<td>45 sec</td>
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<td>3</td>
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</tr>
<tr>
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DTS Pull Patterns

• 5 unique preprogrammed pull patterns
• Automatic speed adjustment (with each cycle)
  – From 0 lbs to pretension lbs at 100%
  – From pretension lbs to target max lbs at 50%
  – Continually slows till reaches max lbs
  – From max lbs to min lbs at 50%
  – Repeats slowing progression each cycle of Intermittent traction
  – End of treatment 30% until all force is released
Simple Intermittent traction pattern from max to min lbs

Intermittent traction cycle continues during entire treatment time, using speed slowing progression with each cycle.

Maximum and minimum traction levels are held according to Hold and Rest times.
Simple intermittent traction pattern from max to min lbs

Case study
- Moderate back pain
- Referred pain in buttocks
- Radiology: small disc protrusion
- Minimal protective muscle tone

Rest period is necessary to facilitate disc nourishment
Intermittent traction with an extra force gradient added at the end of the hold time

Extra force gradient lbs and hold time
Intermittent traction with an extra force gradient added at the end of the hold time

Extra pull is possible because of absence of muscle spasm

Case study
- Minimal to moderate back pain
- Referred pain in buttocks and/or LE
- Radiology: small to moderate disc protrusion
- No protective muscle tone
- Decreased lumbar ROM
Intermittent traction with a declining force gradient added at the end of the hold time
Intermittent traction with a declining force gradient added at the end of the hold time

Case study
- Moderate to significant back pain
- Moderate protective muscle tone/spasm
- Radiology: moderate disc protrusion / herniation

Decreasing traction force is necessary to accommodate muscle tone
Intermittent traction increasing in phases to max lbs, similar to PROM, (progressive range of motion), PNF patterns
Intermittent traction increasing in phases to max lbs, similar to PROM, (progressive range of motion), PNF patterns

Case study
• Moderate to significant back pain
• Minimal protective muscle tone/spasm
• Moderate ROM decrease in lumbar joints and soft tissue
• Poor posture
Intermittent traction cycle without any hold or rest time, very slow Oscillation.

Traction force changes smoothly from max to min lbs (automatically adjusting motor speed).
Intermittent traction cycle without any hold or rest time

Case study
- Moderate back pain
- No or minimal protective muscle tone/spasm
- Significant ROM decrease in lumbar joints and soft tissue
- Decreased circulation

Cyclic pattern facilitates stretch of soft tissue and maximizes circulation