Understanding the 5 Primary Kinetic Chains for Clinical Assessment and Application

By Dr. Alan Smith, DC

Sponsored by Foot Levelers

Education vs Selling:

Elevate your cash practice through certainty by understanding fascial diaphragms and kinetic chains!
In the USA, $3.2 trillion per year is spent on healthcare (2015)

This equates to $9,900 per person per year

17.8% of the US economy is devoted to healthcare spending

Healthcare spending is exorbitant, but quality of life remains poor

Inefficient Healthcare

Among 11 high-income countries evaluated by the Commonwealth Fund, the US healthcare system ranked worst (Newsweek, 2014)

- Study ranked care process, access, administrative efficiency, equity and health care outcomes
- US scored especially poor in equality of coverage
- 44% of low-income Americans have trouble accessing healthcare, compared to 7% in the UK

US Healthcare System
Medical Errors

• 10% of deaths attributed to medical error
• Medical institutions spent an estimated $28 billion due to medical errors (2008)
• More recently, it’s estimated that the true cost of medical errors is $850 billion (2014)

The Opioid Epidemic in the U.S.

In 2015...

12.5 million
People misused prescription opioids

2.1 million
People misuse prescription opioids for the first time

33,091
People died from overdosing on opioids

2 million
People had prescription opioid use disorder

15,281
Deaths attributed to overdosing on commonly prescribed opioids

828,000
People used heroin

9,580
Deaths attributed to overdosing on synthetic opioids

135,000
People used heroin for the first time

12,989
Deaths attributed to overdosing on heroin

$78.5 billion
In economic costs (2013 data)

• People in pain do drastic things to alleviate suffering
• Opiate addiction is on the rise and the effects are devastating
• Addictions are so problematic there is discussion of mitigating hazards (overdose, HIV infection, etc.) by opening “safe injection sites” in which drug users are able to legally inject while being supervised
Diacetylmorphine, commonly known as heroin, was first discovered by a British chemist in 1871 by combining morphine with acetic anhydride. In 1898, the Bayer Company of Elberfeld, Germany began to mass produce and market heroin as a cough suppressant and diarrhea treatment; one possibility for the name heroin was that the drug gave its users a “heroic” feeling and it was thought to be a “heroic” and powerful new drug.

First approved by the American Medical Association in 1906, heroin was administered by injection as a painkiller and was believed to be a non-addictive substitute for morphine. Patent medicine manufacturers included heroin in cure-all tonics, painkillers and cough medicines.

The passage of the 1914 Harrison Act required a physician’s prescription to obtain narcotics, although the law was sporadically enforced until the Narcotics Division of the Treasury Department began a crackdown in 1923. The Federal Bureau of Narcotics, the precursor to the modern Drug Enforcement Administration (DEA), tightened restrictions in 1930, resulting in the eventual criminalization of recreational narcotic use.
Keys to a Successful Cash-Based Practice:

Are You Insurance Dependent Versus Insurance Enhanced?

- Reimbursement problems
- Changing plans

Are Traditional Practice Models Outdated?

- Prepaid plans
- Gym membership mentality
- What will a patient need in 3 months???
- Escrow accounts - legality
What’s Your Patient Visit Average?

- 35 National Average
- 62+ Axiom Wellness

Keys to a Successful Cash-Based Practice:

- You must LOVE your practice to succeed
- Educate your patients
- Keep learning and growing
Why I Have a Cash-Based Practice:

The Golden Rule

DO UNTO OTHERS
AS YOU
WOULD HAVE
THEM
DO UNTO YOU
Why You Should Have a Cash-Based Practice:

• The pie is big enough for everyone to thrive

• Competition is unnecessary

• Subluxation-centered practice versus Subluxation-focused

From Philosophical to Bio-Mechanical
The Five Axioms

1. Chiropractic
2. Exercise
3. Positive Mental Attitude
4. Nutrition
5. Sleep

Everyone is a “Crooked Man”

Orthotics
+ Simple Structure-based Rehab
+ Chiropractic
= TRUE SUCCESS
Maggs’ Law of Tissue Tolerance

When the *loading* of a tissue exceeds the *capacity* of that tissue, compensatory physiological changes occur.

Fascia .... What is it?

• A biological fabric that surrounds every structure in the body and invests most of them
The Elementary View of Fascia

- Superficial - just below the skin
- Deep - surrounds muscles and bones
- Visceral - envelopes organs within their cavities

Fascia: The body suit

The fascia is a single 3 dimensional interdependent structure covering and linking muscles, tendons and visceral organs together throughout the entire body.
The 8 Transverse Diaphragms

- Plantar fascia
- Knee diaphragm
- Pelvic diaphragm
- Respiratory diaphragm
- Thoracic outlet
- Suboccipital triangle
- Tentorium cerebella
- Diaphragm sella

The Transverse Diaphragms of the Spine:

- A membrane or flexible layer that separates one space from another
- Occurs in the four spiral transition zones
**Cranio-cervical Junction (CCJ)**

- Articulation between the occiput, atlas, and axis
- Extensive mobility - head balances on the cervical spine
- Site of the tonic neck reflexes, which influences postural muscular tone throughout the trunk
- Disturbed function creates hypertonus of the postural muscles, disturbances of equilibrium and locomotor deficits

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**Cranio-cervical Junction**

- Suboccipital triangle
- Tentorium cerebella
- Diaphragm sella
Cervicothoracic Junction

• Articulation between cervical and thoracic spine
• Most mobile part of the spinal column is joined to the relatively rigid thoracic spine
• Anatomically, it is referred as the thoracic inlet and clinically, as the thoracic outlet

Thoracic outlet
• Anterior cervical fascia
• Subclavius muscles
• Costocoracoid ligaments
• Costoclavicular ligaments
Thoracolumbar Junction

- Abrupt change in function from rotation to flexion
- Respiratory diaphragm

Lumbosacral Junction

- Forms base of axial skeleton therefore necessity for stabilization
- Movement of legs is directly translates through this junction
- Pelvic Diaphragm/Pelvic Floor
Five Primary Kinetic Chains

• Intrinsic
• Deep Longitudinal
• Lateral
• Posterior Spinal
• Anterior Spinal

Five Primary Kinetic Chains

• Built on the principal actions that apply to all locomotion and movement

• Interdependent relationship that relies on the other to create balanced, efficient, reciprocal movement.

• One side of the body is active in one chain while the other side of the body is active in another
Five Primary Kinetic Chains

• Contralateral Synergists:
  • Posterior Spiral / Deep Longitudinal
  • Lateral / Anterior Spiral

• Functional Opposites:
  • Deep Longitudinal / Lateral
  • Lateral / Lateral
  • Posterior Spiral / Anterior Spiral
Intrinsic

- DIAPHRAGM
- TRANSVERSE ABDOMINIS
- MULTIFIDUS
- PELVIC FLOOR

Intrinsic Kinetic Chain

- Sets foundation for movement and locomotion
- Interdependent with the nervous system
- Principal action = BREATHE
### Deep Longitudinal

**Kinetic Chain**

<table>
<thead>
<tr>
<th>Deep Longitudinal</th>
<th>Action</th>
<th>Prime Mover</th>
<th>Synergist</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE. Liver</td>
<td>toe extension</td>
<td>extensor hallucis longus</td>
<td>extensor digitorum longus, extensor digitorum brevis, lumbricals</td>
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<td>DE. Tuber</td>
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<td>peroneus brevis</td>
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<td>DE. Patella</td>
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<tr>
<td>DE. Patella</td>
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<tr>
<td>DE. Patella</td>
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<td>abductor longus</td>
<td>adductor longus, biceps, pectineus, gracilis, sartorius</td>
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<tr>
<td>DE. Femur</td>
<td>hip abduction</td>
<td>gluteus medius</td>
<td>tensor fascia lata, gluteus minimus</td>
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<tr>
<td>DE. Femur</td>
<td>lateral fascial spring</td>
<td>iliotibial band</td>
<td>gluteus maximus, piriformis</td>
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</tbody>
</table>

### Deep Longitudinal

**Upper Limb**

- abductor pollicis
- extensor carpi radialis longus
- brachialis
- middle deltoid

**Thoracolumbar Fascia**

- pectoralis
- serratus anterior
- upper trapezius
- erector spinae

**Anterior Lower Limb**

- iliotibial band
- gluteus medius
- adductor magnus
- rectus femoris
- biceps femoris
- peroneus longus
- tibialis anterior
- extensor hallucis longus
Posterior Spiral

Posterior Spiral

Lumbricals
extensor carpi ulnaris
triceps
posterior deltoid

SPLENIUS CAPITIS
SACROILIAC JOINT
LATISSIMUS DORSI
GLUTEUS MEDIUS
THORACOLUMBAR
GLUTEUS MAXIMUS
FASCIA

iliotibial band
vastus lateralis
tibialis posterior
peroneus longus
soleus
achilles tendon
plantar aponeurosis
flexor hallucis longus
Master Fascial Spring

- **The Thoracolumbar Fascia**

- **The rotary action of the core cylinder** allows for an efficient coiling and uncoiling of stored elastic energy.

- **The top of the cylinder is capped with thoracic diaphragm; the bottom with the pelvic diaphragm.** This connects the contralateral balance to hip and shoulder with the direct influence of breathe.

### Anterior Spiral

#### Kinetic Chain and Actions

<table>
<thead>
<tr>
<th>Kinetic Chain</th>
<th>Action</th>
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<th>Synergist</th>
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<tr>
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<td>psoas</td>
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<td>trunk stabilization</td>
<td>internal oblique</td>
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<td>rotation (yaw)</td>
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<td>SCM</td>
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<td>dorsal interossei</td>
<td>abductor pollicis longus, abductor pollicis brevis, abductor digitii minimi</td>
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</table>

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3/14/2019
Anterior Spiral

dorsal interossei
extensor carpi radialis longus
brachialis

pectoralis major
serratus anterior

spleunius capitis

SCM

INTERNAL OBLIQUE
RECTUS ABDOMINIS
iliacus
ADUCTOR LONGUS
biceps femoris
peroneus longus
tibialis anterior
extensor hallucis

EXTERNAL OBLIQUE
dorsal interossei
extensor carpi radialis longus
brachialis

PUTTING IT ALL TOGETHER
The Gait Cycle

• The gait cycle starts with the Deep Longitudinal, shock absorption.
• The kinetic wave of energy is absorbed and translated into the axis of the spine.
• The Lateral completes the dynamic platform for the power generating Spirals.
• The Posterior Spiral coils fascial spring tension.
• That energy is then translated through the Anterior Spiral into forward motion and next absorption phase of the Deep Longitudinal.

Deep Longitudinal

• The Deep Longitudinal Kinetic Chain is an energy absorption system. The strike phase of the gait absorbs kinetic energy from gravity and the subsequent swing phase of the Anterior Spiral Kinetic Chain.

• Ground engagement starts with the heel strike. The kinetic energy wave moves up to and through the axis of the spine.

• The energy of group engagement is absorbed through the Deep Longitudinal, and the response of the structure is ground force reaction. The Lateral Kinetic Chain responds to shock absorption with push into the earth.
**Lateral**

- **Lateral Kinetic Chain** takes the kinetic energy of ground engagement and translates it into ground force reaction. The stance phase of the gate is a transition between energy absorption of the Deep Longitudinal and the energy generation of the Posterior Spiral.

- **Dynamic stability is the interdependent relationship between mobility and stability.**

- **Walking is a series of transitioning weight from one leg to the other while making forward progress.** The midline stabilization of the stance phase orients the spiral energy to the axis of the spine. The Lateral Kinetic Chain is paired with the contra-lateral opposite, anterior Spiral. The lateral completes the dynamic platform for forward movement.

- **The feet are rich in pressure receptors that direct ground force reaction.** The integrated activation of the mechanoreceptors in the joints of the feet are vital for kinetic chain sequencing. Walking gait integration starts at the feet and moves upwardly joint by joint.

**Posterior**

- **Utilizes the dynamic platform of the previous three kinetic chains.**

- **The work production of the Posterior Spiral activates the fascial matrix to store elastic energy.**

- **A fascial spring is how energy is stored for location.** Elastic energy is stored in the tissues by two mechanisms. One is the compression occurring as the tissues are coining into a tight spring. The second mode of storing elastic energy is through the lengthening, or stretching of fascia or connective tissue.

- **The Posterior Spiral has four major fascial springs ~ the thoracolumbar fascia, the iliotibial band, the Achilles tendon, and the plantar aponeurosis.** These facial springs work together synergistically to create efficient movement so that the muscles do not have to work as hard.
Anterior

• The Anterior Spiral completes the gait cycle.

• Elastic energy up to this point has been stored in the tissues, and now the body is poised to do something with that energy. The Anterior Spiral redirects the elastic energy of the Posterior Spiral into the swing phase of the gait. This forward motion then becomes the next shock absorption of the Deep Longitudinal, thus completing the gait cycle.

• Anterior Spiral is the release of elastic energy into the complementary movement.

Clinical Gems
Everyone is Crooked Man

Journey and Applications

• Fulford
• Rolf
• Arthro stim/ Impulse IQ
• Vibracussor
• Oscillation/Vibration plates
• Rolfing, IASTM
• Cold Laser
• Nutraceuticals
Journey and Application

• Rollers
• Balls
• Canes
• Sticks

Additional Pre/Post Adjustment Assessments

• Eyes Open/Eyes Closed
• Walking
• Postural Assessment
Here is a simple movement you can do to feel coiling and translation into the complementary opposite.

- Stand in a split stance
- Rotate the torso to the front leg side
- Notice the pelvis rotating to the back-leg side
- Contralateral rotation of shoulders to legs
- Head forward, eyes level to horizon
- Notice cervical spine in opposite rotation to thoracic
- This is coiled and poised to translate stored elastic energy into the complementary opposite
- Release the stored elastic energy to arrive in the opposite split stance
- This simple movement drill demonstrates the spiral counter spiral of the axial skeleton. This is an essential function that coils elastic energy into the connective tissue structures during gait.

**Plantar Fasciitis**

- Direct – plantar aponeurosis
### Plantar Fasciitis

<table>
<thead>
<tr>
<th>Plantar Fasciitis</th>
<th>Lateral</th>
<th>Adductor Magnus</th>
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<tbody>
<tr>
<td>Flexor hallucis longus</td>
<td>flexor hallucis brevis, plantaris</td>
<td>posteriocruralis</td>
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<td>soleus</td>
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<td>iliopsoas</td>
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<td>IT band</td>
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<tr>
<td>vastus medialis</td>
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</table>

### Lateral

- Thoracolumbar fascia
- Quadratus lumborum
- Upper trapezius
- Middle trapezius
- Latissimus dorsi

### Adductor Magnus

- Gluteus medius

### Lumbricals

- Extensor carpi ulnaris
- Triceps

### Thoracolumbar Fascia

- Extensor carpi ulnaris
- Triceps

### Quadratus Lumborum

- Flexor hallucis longus
- Plantaris
- Achilles tendon
Posterior Spiral

Lumbricals extensor carpi ulnaris triceps posterior deltoid

SCM

LATISSIMUS DORSI

THORACOLUMBAR FASCIA

SACROILIAC JOINT
GLUTEUS MEDIUS
GLUTEUS MAXIMUS
iliotibial band vastus lateralis tibialis posterior peroneus longus soleus achilles tendon plantar aponeurosis plantar aponeurosis

Everyone is Crooked Man

Shoulder Drop
Pelvic Imbalance
Internal Knee Rotation
Imbalanced Foundation
Shin Splits

- Direct – Tibialis Anterior
**Deep Longitudinal**

- abductor pollicis
- extensor carpi radialis longus
- brachialis
- middle deltoid
- pectoralis
- serratus anterior
- upper trapezius
- ERECTOR SPINAES

**THORACOLUMBAR FASCIA**

- SACROILIAC JOINT
- SACROTUBEROUS LIGAMENT

- iliobibial band
- gluteus medius
- adductor magnus
- rectus femoris

**BICEPS FEMORIS**

- PERONEUS LONGUS
- TIBIALIS ANTERIOR
- extensor hallucis longus

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**Anterior Spiral**

- dorsal interossei
- extensor carpi radialis longus
- brachialis
- splenius capitis
- pectoralis major
- serratus anterior

**EXTERNAL OBLIQUE**

- SCM

**INTERNAL OBLIQUE**

- RECTUS ABDOMINIS
- iliacus

**ADDUCTOR LONGUS**

- biceps femoris
- peroneus longus
- tibialis anterior
- extensor hallucis
Everyone is Crooked Man

Inversion Sprain

- Direct – Peroneus Longus

Approximately 1 million ankle injuries occur every year in the U.S., and many of them are inversion sprain injuries.

Studies indicate custom-made orthotics are an effective preventative measure against ankle sprains.
Inversion Sprain

Deep Longitudinal

- abductor pollicis
- extensor carpi radialis longus
- brachialis
- middle deltoid

Thoracolumbar Fascia

- serratus anterior
- pectoralis
- upper trapezius
- erector spinae
Anterior Spiral

dorsal interossei  
rectus abdominis  
splenius capitis  
peroneus longus  
serratus anterior  
biceps femoris  
tibialis anterior  
liacus  
iliacus  

INTERNAL OBLIQUE

EXTERNAL OBLIQUE

Everyone is Crooked Man

Shoulder Drop  
Pelvic Imbalance  
Internal Knee Rotation  
Imbalanced Foundation
Eversion Sprain

• Direct – Tibialis Posterior

### Table: Kinetic Chain and Muscle Stabilization

<table>
<thead>
<tr>
<th>Kinetic Chain</th>
<th>Midline Stabilization</th>
<th>Action</th>
<th>Prime Mover</th>
<th>Synergist</th>
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<td>Ipsi-Lateral</td>
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<tr>
<td>Extension</td>
<td>gluteus maximus</td>
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### Table: Ipsi-Lateral

<table>
<thead>
<tr>
<th>Kinetic Chain</th>
<th>Posterior Sprain</th>
<th>Action</th>
<th>Prime Mover</th>
<th>Synergist</th>
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<tbody>
<tr>
<td>Ipsi-Lateral</td>
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<td>Plantar flexion</td>
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<td>Posterior leg flexion</td>
<td>soleus</td>
<td>gastrocnemius</td>
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<td>Ankle flexion (plantar)</td>
<td>tibialis posterior</td>
<td>peroneus longus</td>
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<tr>
<td>Knee extension</td>
<td>gastrocnemius</td>
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<td>Flexion</td>
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<tr>
<td>Lateral flexion</td>
<td>gastrocnemius</td>
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<td>Hip abduction</td>
<td>adductor magnus</td>
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<td>Hip adduction</td>
<td>quadriceps femoris</td>
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<td>Hip flexion</td>
<td>rectus femoris</td>
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<tr>
<td>Hip extension</td>
<td>gluteus maximus</td>
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<td>Lateral rotation</td>
<td>oblique muscles</td>
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<td>Abduction</td>
<td>gluteus medius</td>
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<tr>
<td>Adduction</td>
<td>adductor magnus</td>
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<td>Flexion</td>
<td>flexor digitorum longus</td>
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<tr>
<td>Extension</td>
<td>gluteus maximus</td>
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</table>

### Image: Eversion Sprain

#### Inversion

- Sprained Lateral Ligament

#### Normal

- Ankle Sprains

#### Eversion

- Sprained Medial Ligament

- Eversion Sprain

- Talar inversion

- Tibialis posterior

- Ankle flexion (plantar)

- Knee extension

- Lateral flexion

- Hip abduction

- Hip adduction

- Hip extension

- Lateral rotation

- Abduction

- Adduction

- Flexion

- Extension

- Lateral adduction

- Medial adduction

- Elbow extension

- Finger adduction
Everyone is Crooked Man

Foot Drop

- Direct – Tibialis Anterior
  - Extensor Hallucis Longus
### Foot Drop

#### Active Chain Assessment

<table>
<thead>
<tr>
<th>Kinetic Chain</th>
<th>Anterior Spinal</th>
<th>Action</th>
<th>Prime Mover</th>
<th>Synergist</th>
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</thead>
<tbody>
<tr>
<td>Ipsi-Lateral</td>
<td>toe dorsiflexion</td>
<td>extensor hallucis longus</td>
<td>extensor digitorum longus, extensor digitorum brevis, tibialis anterior</td>
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<tr>
<td>DL, GM, SI</td>
<td>ankle dorsiflexion</td>
<td>tibialis anterior</td>
<td>extensor hallucis longus, extensor digitorum longus, extensor digitorum brevis</td>
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</tr>
<tr>
<td>DL, GM, SI</td>
<td>peroneus longus</td>
<td>peroneus longus</td>
<td>peroneus longus, extensor digitorum longus, extensor digitorum brevis</td>
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<tr>
<td>DL, GM, SI</td>
<td>peroneus brevis</td>
<td>peroneus brevis</td>
<td>peroneus brevis, extensor digitorum longus, extensor digitorum brevis</td>
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<tr>
<td>DL, GM, SI</td>
<td>popliteus, semimembranosus, semitendinosus, sartorius</td>
<td>semitendinosus, sartorius</td>
<td>popliteus, semimembranosus, semitendinosus</td>
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<tr>
<td>DL, GM, SI</td>
<td>rectus femoris</td>
<td>rectus femoris</td>
<td>sartorius, adductor magnus, adductor brevis</td>
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</tr>
<tr>
<td>DL, GM, SI</td>
<td>adductor brevis</td>
<td>adductor brevis</td>
<td>sartorius, adductor magnus</td>
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<tr>
<td>DL, GM, SI</td>
<td>adductor magnus</td>
<td>adductor magnus</td>
<td>sartorius</td>
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<td>DL, GM, SI</td>
<td>iliacus</td>
<td>iliacus</td>
<td>adductor magnus</td>
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<tr>
<td>DL, GM, SI</td>
<td>rectus abdominis</td>
<td>rectus abdominis</td>
<td>internal oblique</td>
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<tr>
<td>DL, GM, SI</td>
<td>internal oblique</td>
<td>internal oblique</td>
<td>transversus abdominis</td>
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<tr>
<td>DL, GM, SI</td>
<td>transversus abdominis</td>
<td>transversus abdominis</td>
<td>quadratus lumborum</td>
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</tbody>
</table>

### Deep Longitudinal

- abductor pollicis
- extensor carpi radialis longus
- brachialis
- middle deltoid
- pectoralis
- serratus anterior
- upper trapezius
- erector spinae

### Thoracolumbar Fascia

**Sacrotuberous Ligament**

- iliotibial band
- gluteus medius
- adductor magnus
- rectus femoris
- biceps femoris
- peroneus longus
- tibialis anterior
- extensor hallucis longus
Anterior Spiral

dorsal interossei
extensor carpi radialis longus
brachialis

pectoralis major
serratus anterior

EXTERNAL OBLIQUE

spleenius capitis

SCM

INTERNAL OBLIQUE
RECTUS ABDOMINIS
iliacus
ADDUCTOR LONGUS
biceps femoris
peroneus longus
tibialis anterior
extensor hallucis

Foot Drop
Passive/Entrapment Assessment
Lateral

- thoracolumbar fascia
- QUADRATUS LUMBORUM
- ADDUCTOR MAGNUS
- GLUTEUS MEDIIUS
- iliotibial band
- vastus lateralis
- tibialis posterior
- peroneus longus
- soleus
- achilles tendon
- plantar aponeurosis
- flexor hallucis longus

Posterior Spiral

- Lumbricals
- extensor carpi ulnaris
- triceps
- posterior deltoid
- SCM
- LATISSIMUS DORSI
- THORACOLUMBAR FASCIA
- splenius capitis
- SACROILIAC JOINT
- GLUTEUS MEDIUS
- GLUTEUS MAXIMUS
- iliotibial band
- vastus lateralis
- tibialis posterior
- peroneus longus
- soleus
- achilles tendon
- plantar aponeurosis
- flexor hallucis longus
Everyone is Crooked Man

Knee Pain
Passive Chain Assessment
Lateral

thoracolumbar fascia
QUADRATUS LUMBORUM

ADDUCTOR MAGNUS
GLUTEUS MEDIUS
iliotibial band
vastus lateralis
tibialis posterior
peroneus longus
soleus
achilles tendon
plantar aponeurosis
flexor halluces longus

Posterior Spiral

Lumbricals
extensor carpi ulnaris
triceps
posterior deltoid

SCM
LATISSIMUS DORSI
THORACOLUMBAR FASCIA

splenius capitis

SACROILIAC JOINT
GLUTEUS MEDIUS
GLUTEUS MAXIMUS
iliotibial band
vastus lateralis
tibialis posterior
peroneus longus
soleus
achilles tendon
plantar aponeurosis
flexor halluces longus
Knee Pain
Active Chain Assessment

Deep Longitudinal

abductor pollicis
extensor carpi radialis longus
brachialis
middle deltoid

pectoralis
serratus anterior
upper trapezius
ERECTOR SPINAE

THORACOLUMBAR FASCIA
Sacroiliac Joint
Sacrotuberous Ligament

iliotibial band
gluteus medius
adductor magnus
rectus femoris
BICEPS FEMORIS
PERONEUS LONGUS
TIBIALIS ANTERIOR
extensor hallucis longus
Anterior Spiral

dorsal interossei
extensor carpi radialis longus
brachialis

splelius capitis

pectoralis major
serratus anterior

EXTERNAL OBLIQUE

dorsal interossei
extensor carpi radialis longus
brachialis

pectoralis major
serratus anterior

SCI

INTERNAL OBLIQUE
RECTUS ABDOMINIS
iliacus
ADDUCTOR LONGUS
biceps femoris
peroneus longus
tibialis anterior
extensor hallucis

Everyone is Crooked Man

Shoulder Drop

Pelvic Imbalance

Internal Knee Rotation

Imbalanced Foundation
Pelvic Dysfunction
Passive Chain Assessment -- CORE

---

### Lateral

- **Thoracolumbar Fascia**
  - Quadratus Lumborum

- **Adductor Magnus**
  - Gluteus Medius

- **Iliotibial Band**
  - Vastus Lateralis

- **Tibialis Posterior**
  - Peroneus Longus

- **Achilles Tendon**
  - Plantar Aponeurosis

- **Flexor Halluces Longus**
  - Opponens Digiti Minimi

---

### Lumbricals

- Extensor Carpi Ulnaris
- Triceps

---

### Kinetic Chain

#### Ipso-Lateral

- Hip Flexion
  - Flexor Halluces Longus
- Hip Extension
  - Gluteus Maximus
- Knee Extension
  - Vastus Lateralis
- Finger Adduction
  - Lumbricales

#### Core-Lateral

- Quadratus Lumborum
- Obliques
- Lumbricals
- Finger Adduction

---

### Synergist

- Quadratus Lumborum
- Gluteus Maximus
- Vastus Lateralis
- Lumbricales
- Adductor Pollicis
  - Opponens Pollicis
  - Opponens Digiti Minimi

---

### Core-Lateral

- Lumbricals
- Extensor Carpi Ulnaris
- Triceps
Pelvic Dysfunction

Breathe

<table>
<thead>
<tr>
<th>Kinetic Chain</th>
<th>Structure</th>
<th>Function</th>
<th>Action</th>
<th>Synergist</th>
</tr>
</thead>
<tbody>
<tr>
<td>cranial bones</td>
<td>cerebrospinal fluid pump</td>
<td>Cranial sures and the spinal wave function as the primary pump for cerebrospinal fluid</td>
<td>cranial sutures, breathing apparatus</td>
<td></td>
</tr>
<tr>
<td>jaw</td>
<td>mastication, speaking</td>
<td>The jaw forms shapes to create sound tones while speaking</td>
<td>lateral &amp; medial pterygoid, temporalis, masseter, temporalis, diaphragm</td>
<td></td>
</tr>
<tr>
<td>throat glottis</td>
<td>swallowing, speaking</td>
<td>The tongue and hyoid are primary functions of the airway</td>
<td>arytenoid, thyrohyoid, thyrohyoid, stylohyoid, stylohyoid, tongue</td>
<td></td>
</tr>
<tr>
<td>neck</td>
<td>vestibular orientation</td>
<td>The neck's intricate structure enables the head to maintain relationship to gravity</td>
<td>sternocleidomastoid, sternocleidomastoid, levator scapulae, scalene, anterior, posterior, scalene, subclavicular</td>
<td></td>
</tr>
<tr>
<td>spine</td>
<td>axial mobility</td>
<td>The spine's movement is three-dimensional to support the head and appendicular skeleton</td>
<td>multifidus, erector spinae, iliocostalis, longissimus</td>
<td></td>
</tr>
<tr>
<td>rib cage</td>
<td>thoracic stability</td>
<td>The rib cage supports the diaphragm in creating negative pressure</td>
<td>scalene, SCM, pectoralis minor, internal intercostals, serratus posterior superior</td>
<td></td>
</tr>
</tbody>
</table>

Core Subsystem

diaphragm | top of the core cylinder, bellows for lungs | As the diaphragm contracts, negative pressure draws air into the lungs | internal intercostals, serratus posterior superior |

Core Subsystem

transverse abdominis | spinal stabilizer, exhalation | Abdominal activation creates positive intra-abdominal pressure | external intercostals, external & external oblique, serratus posterior inferior |

pelvis | lumbar support | The three-dimensional function of the pelvis is the base of support for the spine and viscera | transversus abdominis, quadratus lumborum, transverse abdominis, internal & external oblique |

Core Subsystem

multifidus | spinal stabilizer, inhalation | The intrinsic spinal muscles support the spinal wave | rotatores, intertransversarii, interspinales |

Core Subsystem

pelvic floor | bottom of the core cylinder, visceral support | The pelvic floor is the foundation for the viscera supporting abdominal pressure | internal, pubococcygeus, levator ani, iliococcygeus, extensor digitorum longus, perineal, gluteus, glutaeus, internal, external |

Intrinsic

- DIAPHRAGM
- TRANSVERSE ABDOMINIS
- MULTIFIDUS
- PELVIC FLOOR
Everyone is Crooked Man

Lower Crossed Syndrome

- Tight/Facilitated
  - Rectus Femoris
  - Vastus intermedialis
  - Erector Spinae
  - Quadratus Lumborum
  - TFL/Hip Flexors
  - Piriformis

- Weak/Inhibited
  - Core:
    - Abdominals
    - Gulteal Muscles
    - Vastus Lateralis
    - Vastus Medialis
    - Tibialis Anterior
    - Tibialis Posterior
    - Peroneus Longus

Tight BUT Weak
- Gastrocnemius
- Soleus
- Hamstrings
### Lower Crossed Syndrome

**Active Chain Assessment**

<table>
<thead>
<tr>
<th>Kinetic Chain</th>
<th>Deep Longitudinal</th>
<th>Action</th>
<th>Prime Mover</th>
<th>Synergist</th>
</tr>
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<tbody>
<tr>
<td>Ipsi-Lateral</td>
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<tr>
<td><strong>Lateral</strong></td>
<td>ankle flexion</td>
<td>extensor hallucis longus</td>
<td>extensor hallucis longus</td>
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<td></td>
<td>knee flexion</td>
<td>popliteus longus</td>
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<td><strong>Contra-</strong></td>
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</tbody>
</table>

**Deep Longitudinal**

- abductor pollicis
- extensor carpi radialis longus
- brachialis
- middle deltoid

**Thoracolumbar Fascia**

- pectoralis
- serratus anterior
- upper trapezius
- erector spinae

**Sacroiliac Joint**

- iliotibial band
- gluteus medius
- adductor magnus
- rectus femoris

**Biceps Femoris**

**Peroneus Longus**

**Tibialis Anterior**

**Extensor Hallucis Longus**
Anterior Spiral

dorsal interossei
extensor carpi radialis longus
brachialis

splenius capitis
pectoralis major
dorsal interossei
lumbricales

phrenic nerve
intercostal nerve
iliacus
serratus anterior

external oblique
romberg's hand

 internship
iliacus

 Lower Crossed Syndrome
Passive Chain Assessment -- CORE
Lateral

- Lateral
- ADDUCTOR MAGNUS
- GLUTEUS MEDIUS
- iliocostal band
- vastus lateralis
- tibialis posterior
- peroneus longus
- soleus
- achilles tendon
- plantar aponeurosis
- flexor hallucis longus

Posterior Spiral

- Lumbricals
- extensor carpi ulnaris
- triceps
- posterior deltoid

- splenius capitis

- SACROILIAC JOINT
- GLUTEUS MEDIUS
- GLUTEUS MAXIMUM
- iliocostal band
- vastus lateralis
- tibialis posterior
- peroneus longus
- soleus
- achilles tendon
- plantar aponeurosis
- flexor hallucis longus
Everyone is Crooked Man

Upper Crossed Syndrome

- Tight/Facilitated
  - Pectoralis Musculature
  - Upper Trapezius
  - Erector Spinae
  - Splenius Musculature
  - Levator Scapulae
  - Piriformis

- Weak/Inhibited
  - Neck Flexors
  - Rhomboids
  - Serratus Anterior
  - Lower Trap

Tight BUT Weak
- Suboccipitals
Upper Crossed Syndrome
Active Chain Assessment

Deep Longitudinal
abductor pollicis
extensor carpi radialis longus
brachialis
middle deltoid

pectoralis
serratus anterior
upper trapezius
ERECTOR SPINAES

THORACOLUMBAR FASCIA
SACROILIAC JOINT
SACROTUBEROUS LIGAMENT
iliotibial band
gluteus medius
adductor magnus
rectus femoris
BICEPS FEMORIS
PERONEUS LONGUS
TIBIALIS ANTERIOR
extensor hallucis longus
Lateral

- Thoracolumbar fascia
- Quadratus lumborum
- Gluteus medius
- Iliotibial band
- Vastus lateralis
- Tibialis posterior
- Peroneus longus
- Soleus
- Achilles tendon
- Plantar aponeurosis
- Flexor hallucis longus
- Lumbricals
- Extensor carpi ulnaris
- Triceps
- Posterior deltoid
- Thoracolumbar fascia

Posterior Spiral

- Lumbricals
- Extensor carpi ulnaris
- Triceps
- Posterior deltoid
- SCM
- Latissimus dorsi
- Thoracolumbar fascia
- Splenius capitis
- Sacroiliac joint
- Gluteus medius
- Gluteus maximus
- Iliotibial band
- Vastus lateralis
- Tibialis posterior
- Peroneus longus
- Soleus
- Achilles tendon
- Plantar aponeurosis
- Flexor hallucis longus
Everyone is Crooked Man

Upper Ribs Wrist
Active Chain Assessment
Deep Longitudinal

- abductor pollicis
- extensor carpi radialis longus
- brachialis
- middle deltoid
- pectoralis
- serratus anterior
- upper trapezius
- erector spinae

THORACOLUMBAR FASCIA
Sacroiliac Joint
SacroTuberosus Ligament

- iliotibial band
- gluteus medius
- adductor magnus
- rectus femoris
- biceps femoris
- peroneus longus
- tibialis anterior
- extensor hallucis longus

Anterior Spiral

- dorsal interossei
- extensor carpi radialis longus
- brachialis
- pectoralis major
- serratus anterior

SCM

- splenius capitis
- external oblique

INTERNAL OBLIQUE
RECTUS ABDOMINIS
iliacus
ADDUCTOR LONGUS
biceps femoris
peroneus longus
tibialis anterior
extensor hallucis
## Passive Chain Assessment -- CORE

<table>
<thead>
<tr>
<th>Kinetic Chain</th>
<th>Midline Stabilization</th>
<th>Action</th>
<th>Prime Mover</th>
<th>Synergist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateral-Lateral</td>
<td>lower limb flexion</td>
<td>flexor hallicus longus</td>
<td>flexor hallucis brevis, lumbricals</td>
<td></td>
</tr>
<tr>
<td>Lateral-Lateral</td>
<td>hip adduction</td>
<td>adductor magnus</td>
<td>quadratus lumborum</td>
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</tr>
<tr>
<td>Lateral-Lateral</td>
<td>ipsi-lateral</td>
<td>thoracolumbar fascia</td>
<td>erector spinae</td>
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<tr>
<td>Lateral-Lateral</td>
<td>contralateral</td>
<td>iliolumbar muscle</td>
<td>latismissus dorsi</td>
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<tr>
<td>Lateral-Lateral</td>
<td>efferent fibers</td>
<td>triceps</td>
<td>flexor carpi ulnaris</td>
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<tr>
<td>Lateral-Lateral</td>
<td>fingers adduction</td>
<td>lumbricals</td>
<td>adductor pollicis, opponens pollicis, opponens digit minimi</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Kinetic Chain</th>
<th>Posterior Spiral</th>
<th>Action</th>
<th>Prime Mover</th>
<th>Synergist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateral-Lateral</td>
<td>lower limb flexion</td>
<td>flexor hallicus longus</td>
<td>flexor hallucis brevis, lumbricals</td>
<td></td>
</tr>
<tr>
<td>Lateral-Lateral</td>
<td>hip extension</td>
<td>glutus maximus</td>
<td>quadratus lumborum</td>
<td></td>
</tr>
<tr>
<td>Lateral-Lateral</td>
<td>thoracolumbar fascia</td>
<td>erector spinae</td>
<td>latismissus dorsi</td>
<td></td>
</tr>
<tr>
<td>Lateral-Lateral</td>
<td>extensor carpi ulnaris</td>
<td>flexor carpi ulnaris</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral-Lateral</td>
<td>adductor pollicis, opponens pollicis, opponens digit minimi</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Lateral

- **Thoracolumbar Fascia**
- **Quadratus Lumborum**
- **Upper Trapezius**
- **Middle Trapezius**
- **Latissimus Dorsi**
- **Triceps**
- **Flexor Carpi Ulnaris**
- **Adductor Pollicis, Opponens Pollicis, Opponens Digit Minimi**

### Adductor Magnus

- **Gluteus Medius**
- **Iliotibial Band**
- **Vastus Lateralis**
- **Tibialis Posterior**
- **Peroneus Longus**
- **Soleus**
- **Achilles Tendon**
- **Plantar Aponeurosis**
- **Flexor Hallucis Longus**

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**3/14/2019**
Posterior Spiral

Lumbricals
extensor carpi ulnaris
triceps
posterior deltoid

SCM
LATISSIMUS DORSI
THORACOLUMBAR FASCIA

SACROILIAC JOINT
GLUTEUS MEDIIUS
GLUTEUS MAXIMUS
iliotibial band
vastus lateralis
tibialis posterior
peroneus longus
soleus
achilles tendon
plantar aponeurosis
flexor hallucis longus

Everyone is “Crooked Man”

Orthotics
+ Simple Structure-based Rehab
+ Chiropractic
= TRUE SUCCESS
Success Requires You to Work Backwards

1. How much do you need / want to earn?

2. How long do spend with each patient?

Once you know these answers, you then can determine the amount you need to charge.

The Five Axioms

1. Chiropractic
2. Exercise
3. Positive Mental Attitude
4. Nutrition
5. Sleep
F E A R Acronym

• False
• Evidence
• Appearing
• Real