1

2

FOOT LEVELERS
(teaching since 2004)

PALMER
College of Chiropractic
West - 1996

MEMBER OF THE
CALIFORNIA CHIROPRACTIC ASSOCIATION
CAL CHIRO

ROCKTAPE DOC™
FMT CERTIFIED
rocktape - fascial movement taping

3

4

5

6

KEVIN'S GOALS:

- Provide knowledge so you can confidently evaluate and treat the feet/arches of all your patients.
- Illustrate how the axial spine is affected by the extremities.
- Arm you with information on the shoulders/ribs so you feel empowered to treat these areas.
- Expand your knowledge of the TMJ and its' critical role in neck and upper body stability.
- Introduce/review useful adjustments for the spine and extremities.

7

Kevin's Ultimate Goal:

Inspire/Reinforce each of you to scan (or foam cast) ALL of your patients because you understand WHY it is important to do so!

8

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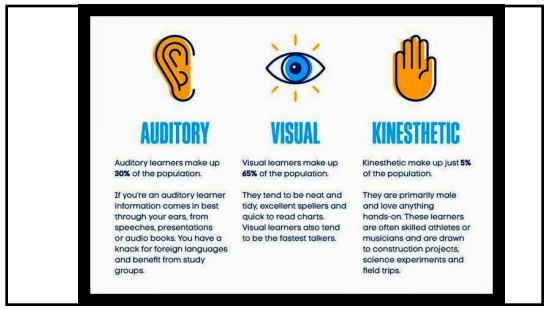
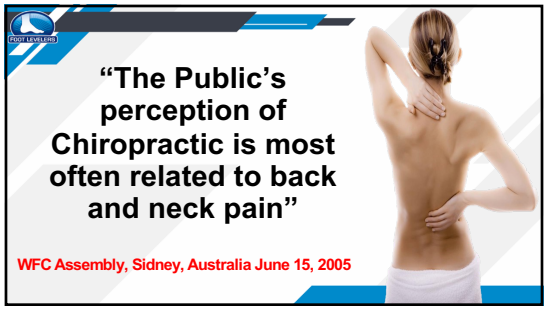
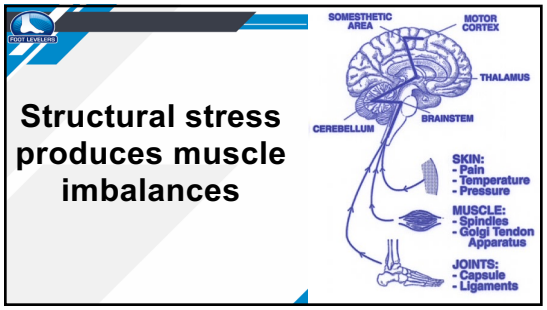
12


AUDITORY
Auditory learners make up 30% of the population.
If you're an auditory learner information comes in best through your ears, from speeches, presentations or audio books. You have a knack for foreign languages and benefit from study groups.
VISUAL
Visual learners make up 65% of the population.
They tend to be neat and tidy, excellent spellers and quick to read charts. Visual learners also tend to be the fastest talkers.
KINESTHETIC
Kinesthetic make up just 5% of the population.
They are primarily male and love anything hands-on. These learners are often skilled athletes or musicians and are drawn to construction projects, science experiments and field trips.

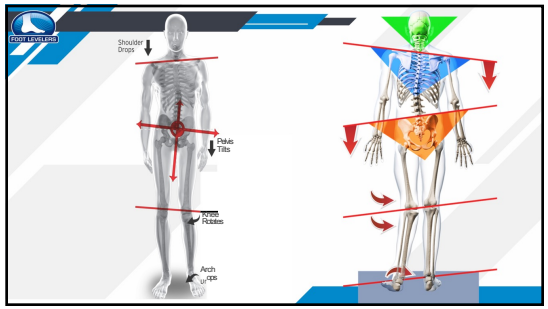
13


"The Public's perception of Chiropractic is most often related to back and neck pain"
WFC Assembly, Sidney, Australia June 15, 2005

14


Structural stress produces muscle imbalances
SOMESTHETIC AREA
MOTOR CORTEX
THALAMUS
BRAINSTEM
CEREBELLUM
SKIN:
- Pain
- Temperature
- Pressure
MUSCLE:
- Spindles
- Golgi Tendon Apparatus
JOINTS:
- Capsule
- Ligaments

15



16

WHAT CHIRO SCHOOL TEACHES

Spine = 90%

Extremities = ???

Are you adjusting extremities proficiently?

17

18

Adjust

Restore NS Integrity

Optimize Sensory Motor Reflexes

Restore Structural Alignment*

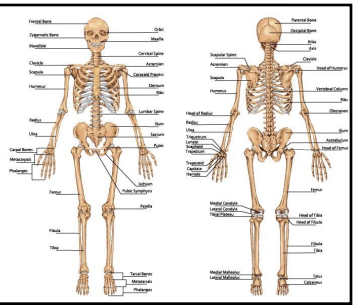
Structure – Function Model of Chiropractic

*(*restoring is one thing, maintaining is another)*

19

Game Plan

- Foot/Ankle
- Knee
- Hip
- Pelvis
- L/T/C Spine
- Shoulders
- Elbows
- Wrists/hands
- TMJ



20

21

Your Foundation

When the foundation of your home is not level, the walls will start cracking and crumbling.

The crumbling can create problems on your top floor.

It's the same with your body!

22

Start with your foundation

23

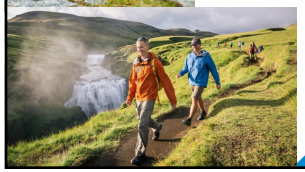
With weight bearing, the spine is supported by one leg at a time.

24

Every biomechanical imbalance is transmitted to the spine

25

Different surfaces effect forces on the LE and body.



26

LE has significant relationship to the body & clinical conditions in practice.

27

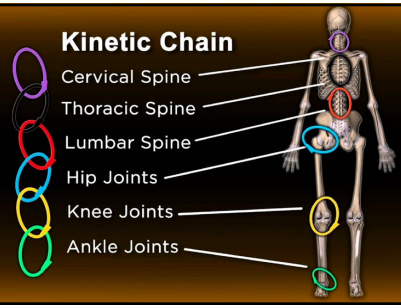
The Big Idea

The body is a fluid, kinetic chain of events…

It is **NOT** static!

28

Kinetic Chain



29

Kinetic Chain

Upper kinetic chain consists of:
- fingers,
- wrists,
- elbows,
- shoulders,
- shoulder blades
- spinal column.

Lower kinetic chain consists of:
- toes,
- feet,
- ankles,
- knees,
- hips,
- Pelvis,
- spinal column.

 30

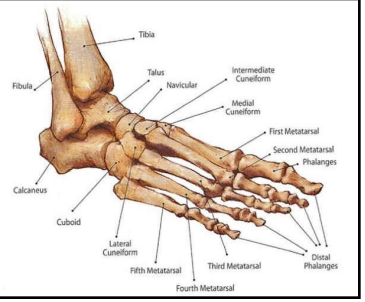
30

The entire b
su ..-....or e d
by the ee t

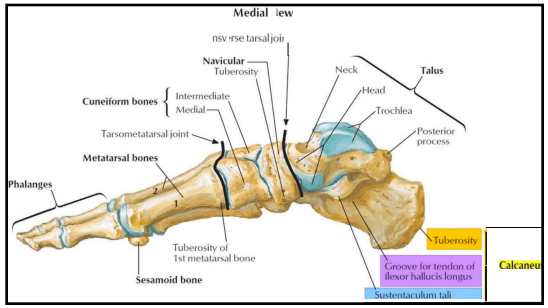
31

32

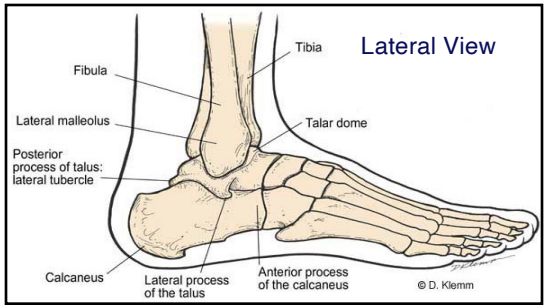
How many bones are in each foot?



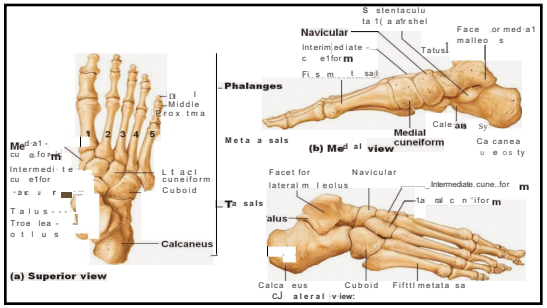
33


Medial view
Navicular Tuberosity
Cuneiform bones
Intermediate
Medial
Tarsometatarsal joint
Metatarsal bones
Phalanges
Neck
Talus
Head
Trochlea
Posterior process
Tuberosity
Groove for tendon of flexor hallucis longus
Sustentaculum tali
Tuberosity of 1st metatarsal bone
Sesamoid bone

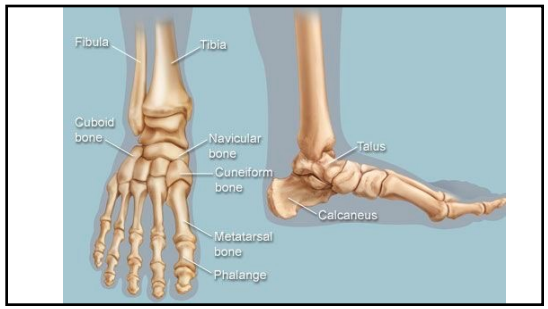
34


Lateral View
Tibia
Fibula
Lateral malleolus
Talar dome
Posterior process of talus: lateral tubercle
Calcaneus
Lateral process of the talus
Anterior process of the calcaneus
© D. Klemm

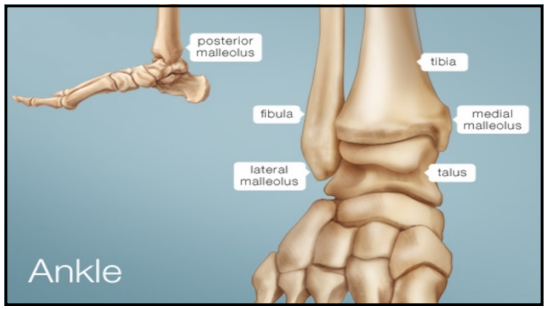
35


Navicular
Phalanges
Medial cuneiform
Calcaneus
(a) Superior view
(b) Medial view
Lateral view:
Cuboid

36


Fibula
Tibia
Cuboid bone
Navicular bone
Cuneiform bone
Talus
Calcaneus
Metatarsal bone
Phalange

37


posterior malleolus
tibia
fibula
medial malleolus
lateral malleolus
talus
Ankle

38


Will you please work with me?

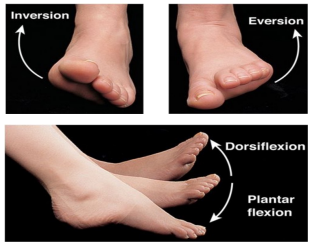
39

Palpate the Feet

- Calcaneus (heel)
- Talus (dome, just under the tibia)
- Navicular (tubercle) inside foot
- Cuboid (proximal to styloid process of MT5)
- Cuneiforms (medial, intermediate, lateral)
- Metatarsals 1- 5
- Phalanges 1- 5 (3 parts, except big toe)

40

Joint Movements



In ersio and t ersion of he oo a heankle

Dorsiflexi nand -lan1ar flexion o he 001- a le anke

41

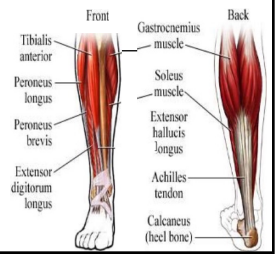
ANKLE & FOOT JOINT- MUSCLES INVOLVED

Dorsi flexion Tibialis - Extensor Digitorum longus.

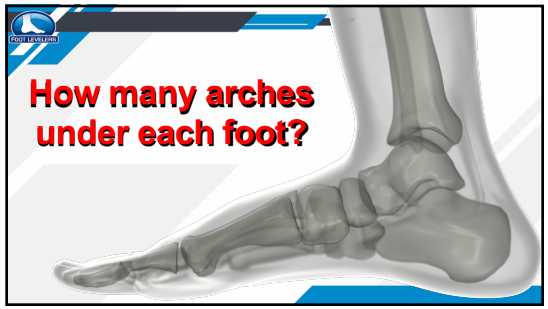
Planter Flexion:- Gastrocnemius or soleus.

Inversion: Tibialis Anterior.

Eversion:- extensor Digitorum



42


How many arches
under each foot?

43

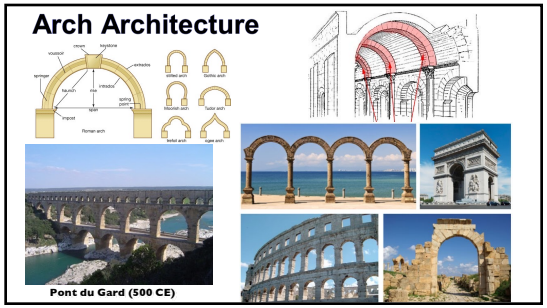

How many arches do patients think we have?

44


THE ARCHES
• Plantar vault
• Not present at birth

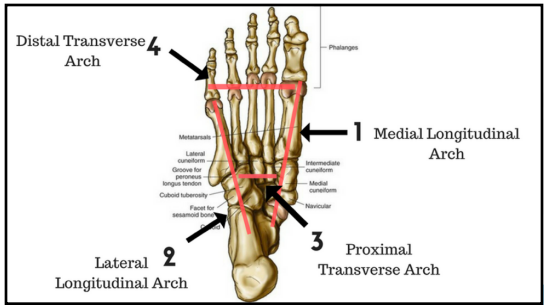
45

Arch Architecture



Pont du Gard (500 CE)

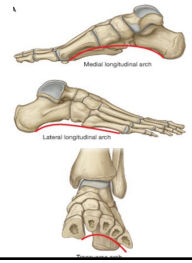
46



47

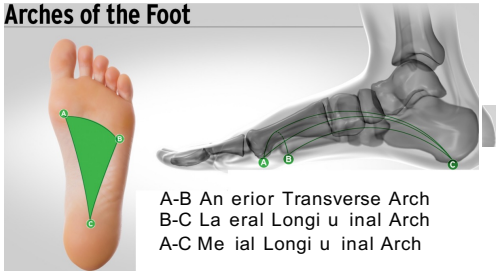
Arches of Foot

- **Medial longitudinal arch**
  - Is formed by calcaneum, talus, navicular, three cuneiform bones, and three metatarsal bones.
- **Lateral longitudinal arch**
  - Is formed by calcaneum, cuboid & two metatarsal bones
- **Transverse arch**
  - Lies at the level of the metatarsal joints, formed by bases of metatarsal bones, cuboid & 3 cuneiform bones



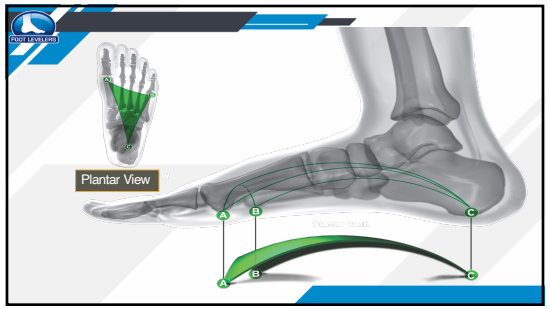
48

Arches of the Foot



A-B An erior Transverse Arch
B-C La eral Longi u inal Arch
A-C Me ial Longi u inal Arch

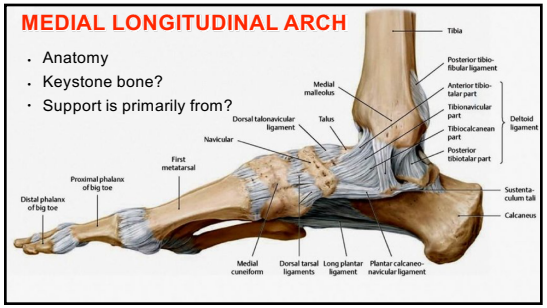
49



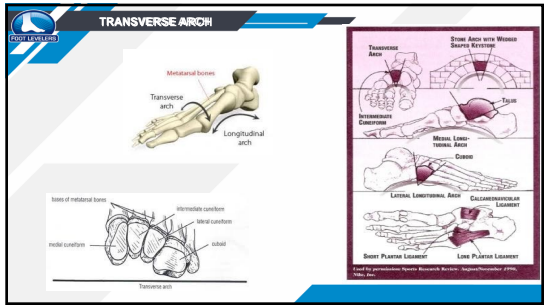
50

MEDIAL LONGITUDINAL ARCH

- Anatomy
- Keystone bone?
- Support is primarily from?



51

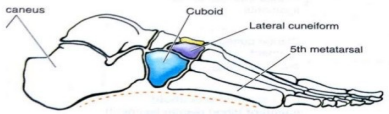


52

Lateral longitudinal Arch

- Flatter than medial longitudinal arch.
- Rests on the ground during standing.
- It is made up of – calcaneous, cuboid, 2 lateral metatarsals.

• Keystone?



(B) Lateral longitudinal arch (lateral view)

53

54

Foot Development

Not all foot bones formed at birth. (avg. Foot length is 7.6 cm)

Navicular is last to ossify (age 2-5)

Walking starts 10-16 months

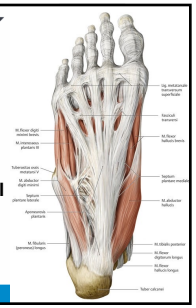
55

Skeletal maturity of the feet is ~ age 13 for girls and age 15 for boys.

56

ARCH STABILITY

- ***The highest relative contribution to arch stability was provided by the plantar fascia, followed by the plantar ligaments and spring ligament.***
- **Plantar fascia was a major factor in maintenance of the medial longitudinal arch.**
  - *Huang et al: Biomechanical Evaluation of Longitudinal Arch Stability. Foot & Ankle, Vol. 14, No. 6, July/August 1993*

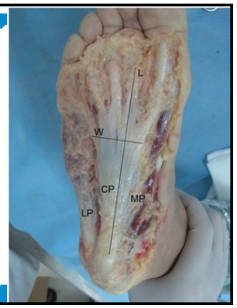


57

Arch Support

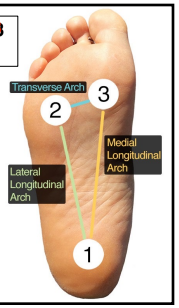
- "The first line of defense of the arches is ligamentous."
- …muscles did not come into play until a force greater than 400 pounds was exerted."

– Basmajian JV et al. The Role of Muscles in Arch Support of the Foot: An Electromyographic Study. J of Bone and Joint Surgery, Vol 45, No 8 September 1963.

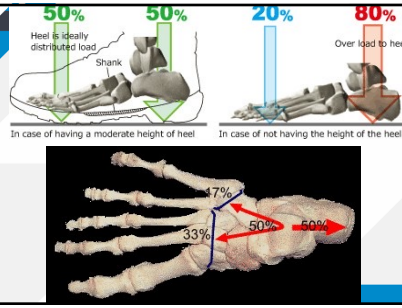


58

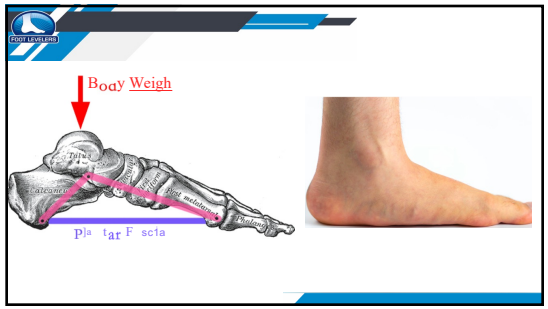
WHAT NORMALLY HAPPENS TO THE 3 ARCHES WHEN YOU STAND UP?



59



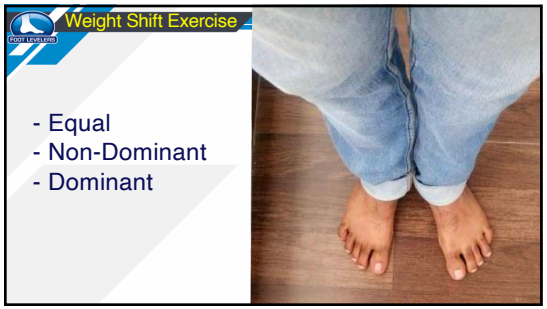
60


Body Weigh
Plantar Fascia

61


PLEASE
STAND
UP!
…ON YOUR BARE FEET

62


Weight Shift Exercise
- Equal
- Non-Dominant
- Dominant

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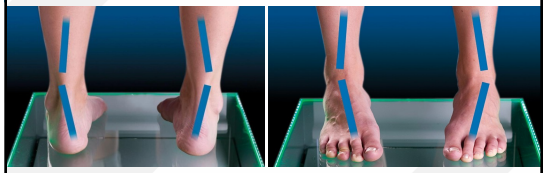
Patient Awareness Demo

Excessive Supination

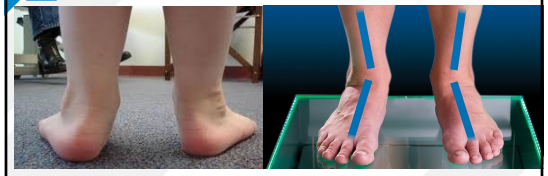


Feel your arches, ankles, knees, hips, pelvis..

64

Patient Awareness Demo

(Makes Foot-Spine-NS Connection)



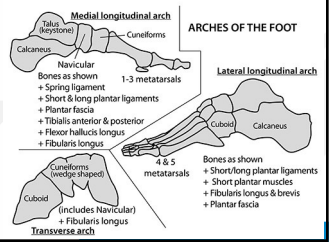
- Pronate extremely, supinate extremely with hands on greater trochanters.
- Patients ***SEE*** and ***FEEL*** connection between feet, knees, hips, pelvis and spine.

65

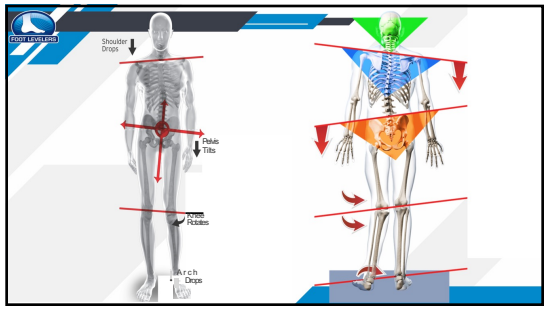
ARCH FUNCTIONS

- Shock absorption
- Support body weight
- Propel body

BONES AND ARCHES OF RIGHT FOOT



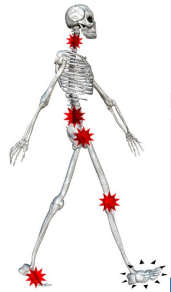
66



67

68

Heel strike force sends a shock wave up the leg to the pelvis, spine and skull



69

GROUND FORCE

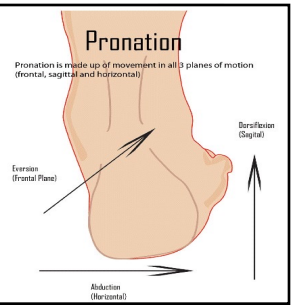
5 G's of force on the foot/ankle becomes
.5 G's at the skull (TMJ) within 10 ms*

*Hyland, John K., Musculoskeletal Shock: Causes and Prevention, 1980

70

Pronation

- Unlocks foot
- Absorbs ground shock (**30%**),



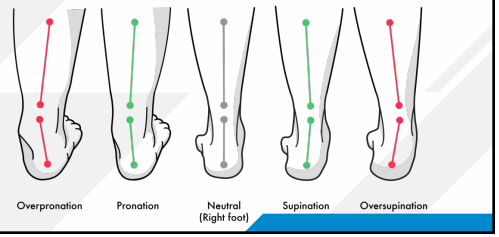
71

Normal Pronation Is Important!

- Conforms foot to grip the ground
- Then re-stiffens (supinates) for leverage as leg propels forward to the next step.

72

Pronation is necessary for correct biomechanics.



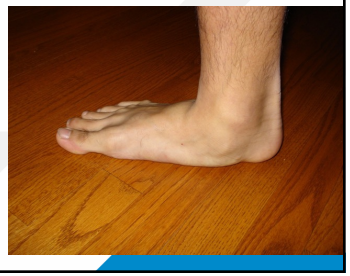
73

ELASTIC VS. PLASTIC DEFORMATION

74

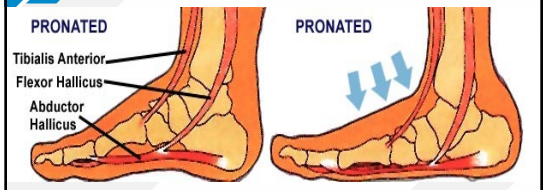
Plastic Deformation

Permanent elongation of tissue after application of prolonged, non-disruptive mechanical force.



75

EXCESSIVE FOOT PRONATION



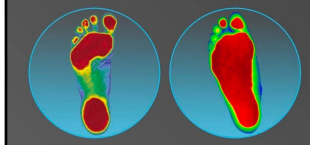
Plastic Deformation takes over!

76

99% of Population is Overpronated

Real-life, real-world experience.

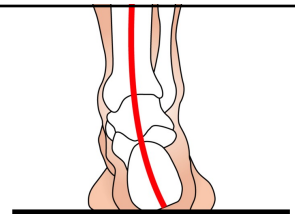
For nearly **70 years**, Foot Levelers has analyzed ***millions*** of feet. One thing we've learned: 99% of the population overpronates!



What does that mean for you? It means your feet do not perform like the optimal foot. As a result, your body is suffering which brings pain, underperformance, and injury.

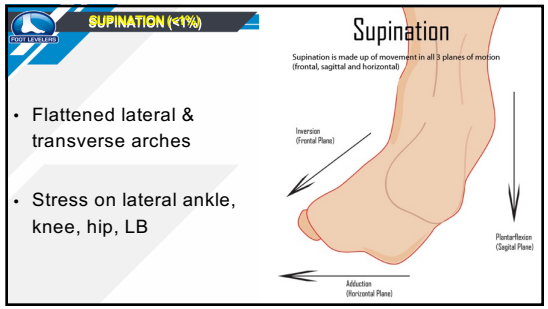
The remaining 1% is a mix of supinators and "healthy" weight bearing individuals.

77



99% of the population has some degree of overpronation

78

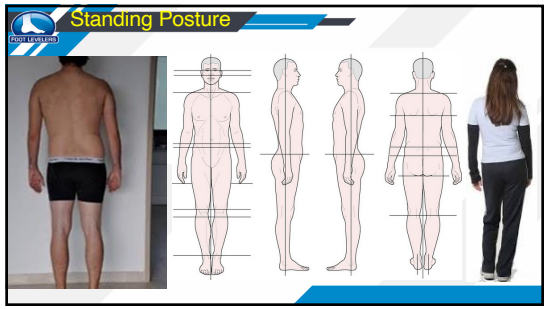


- Flattened lateral & transverse arches
- Stress on lateral ankle, knee, hip, LB

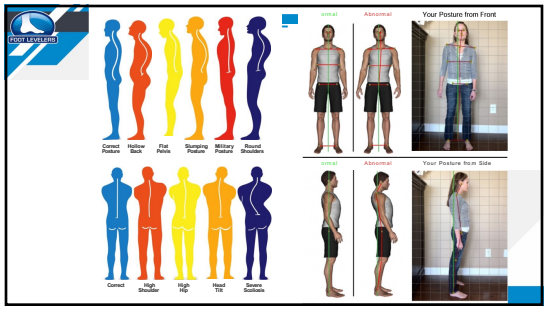
79

80

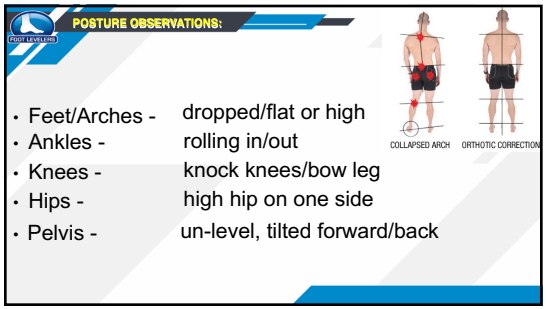
81


Standing Posture

82


Your Posture from Front
Your Posture from Side

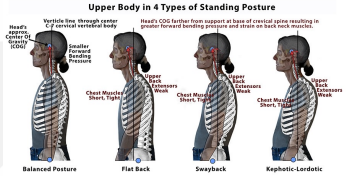
83


POSTURE OBSERVATIONS:
• Feet/Arches - dropped/flat or high
• Ankles - rolling in/out
• Knees - knock knees/bow leg
• Hips - high hip on one side
• Pelvis - un-level, tilted forward/back
COLLAPSED ARCH
ORTHOTIC CORRECTION

84

WHAT DO YOU SEE?

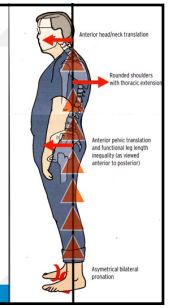
- Spine – lateral curvature?
- Shoulders – high shoulder or forward?
- Head – Tilt, ant./post. translation?



85

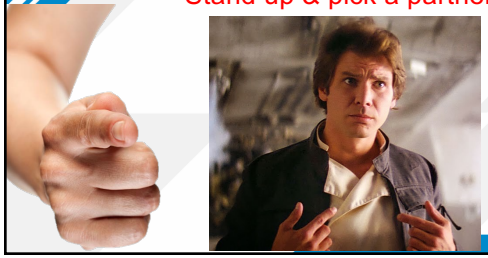
4 Global Postural Distortions caused by Excessive Pronation

1. Bilateral asymmetrical pronation
2. Anterior Pelvic tilt
3. Anterior translation of the pelvis
4. Forward translation of the head



86

Stand up & pick a partner!



87

"THE 2 SECOND EXAM"

Asymmetrical, bilateral, over-pronation

- Achilles tendons bowing inward or outward?
- Medial Arches dropping or high?

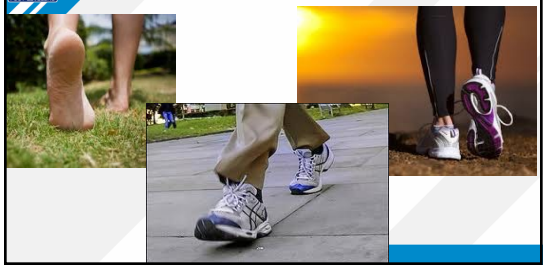
88

WHY AM I OVER PRONATING?

- Joint Fixation
- Hypermobility/Instability
- Muscle Imbalance
- Acute/Chronic Injuries

89

GAIT ANALYSIS

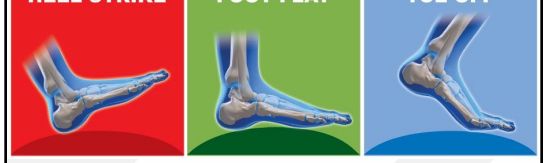


90

STANCE PHASE

60% OF GAIT

HEEL STRIKE | FOOT FLAT | TOE OFF



91

HEEL STRIKE

- Calcaneus inverts
- Foot supinates
- Force goes from heel to ankle

HEEL STRIKE

92

FLAT FOOT

FOOT FLAT

- Foot pronates at subtalar joint
- Medial rotation of tibia/femur

93

TOE OFF

- Foot supinates
- MTP's dorsiflex
- Plantar fascia tightens
- Leg externally rotates

94

EACH FORCE OF IMPACT CREATES

3.5X YOUR BODY WEIGHT

WHILE YOU'RE RUNNING.

his means that a person who weighs

160lbs

will feel

560lbs

of force while running.

95

HEEL STRIKE | MIDSTANCE | TOE-OFF

The force impact on the body created by heel strike equals:

- 3.5 x a person's body weight while running
- 2.5 x a person's body weight while walking
- .5 x a person's body weight in the neck

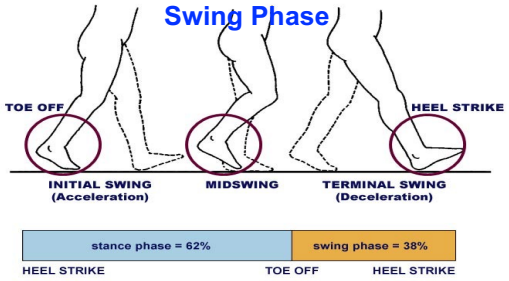
96

Different Foot Strike Patterns

heel strike midfoot strike forefoot strike

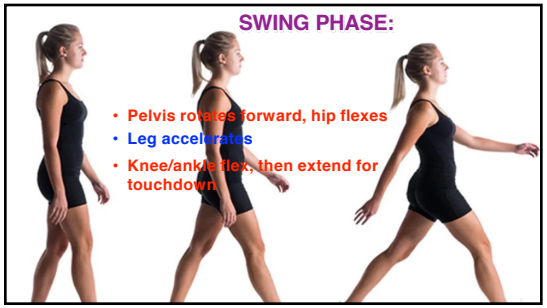
97

Swing Phase



98

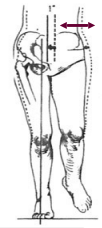
SWING PHASE:



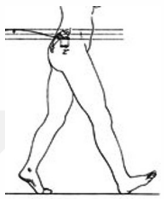
- Pelvis rotates forward, hip flexes
- Leg accelerates
- Knee/ankle flex, then extend for touchdown

99

Movement Patterns During Gait

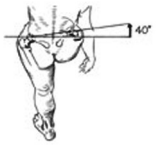


Pelvic Shift ± 1”



Pelvic Oscillation ± 2”

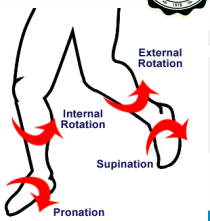
Pelvic Rotation ± 40°



100

Foot Levelers orthotics help improve pelvic movements and gait patterns as well as reducing the effects of fatigue from walking.

Journal of Manipulative & Physiological Therapeutics, 2001 Vol. 24 #4, May



101

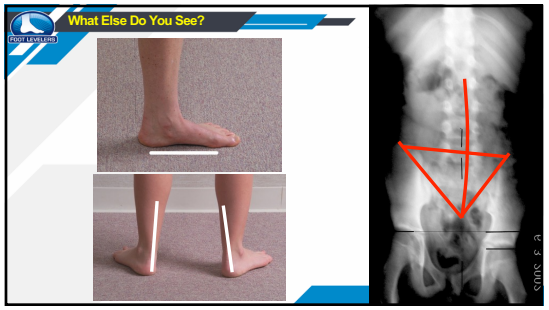
FOOT CONDITIONS BY AGE

- 99% of feet are normal at birth
- 8% of feet develop trouble by age 1
- 41% of feet develop trouble by age 5
- 80% of feet develop trouble by age 20
- Nearly everyone has foot trouble by age 40

102


WHAT ELSE DO YOU SEE?
knee pain
current/previous injury
DJD
Ankle Sprains
Plantar Fasciitis
Heel Spurs

103


What Else Do You See?

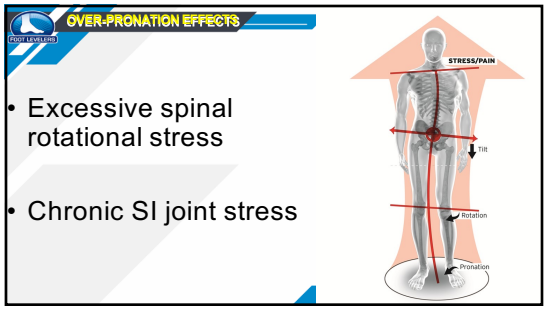
104


Don't Overlook the Lower Extremities!

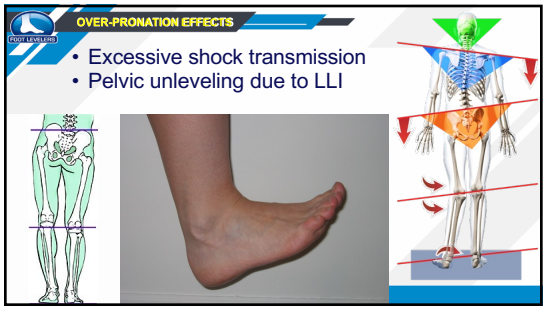
105


EVERY DAY YOU PUT A LOT
OF STRES ON YOUR FEET
7,500
STEPS
The average number of steps a person takes a day
26,000
POUNDS
Total force your feet absorb in a typical day
100,000
MILES
The number of miles the average person walks in lifetime
Research shows low back pain, knee pain, hip pain, and ankle pain are often related to foot problems. Make sure you keep your feet healthy by exercising, wearing good shoes and rotating them, and using custom orthotics to provide a balanced foundation.

106


OVER-PRONATION EFFECTS
• Excessive spinal rotational stress
• Chronic SI joint stress
STRESS/PAIN
Tilt
Rotation
Pronation

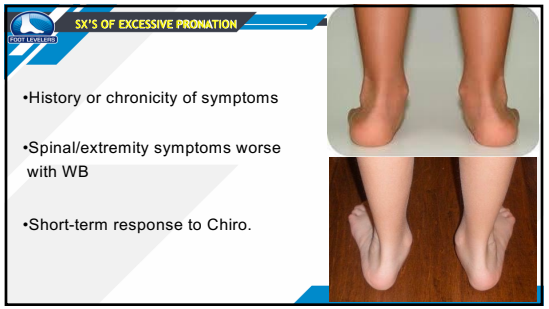
107


OVER-PRONATION EFFECTS
• Excessive shock transmission
• Pelvic unleveling due to LLI

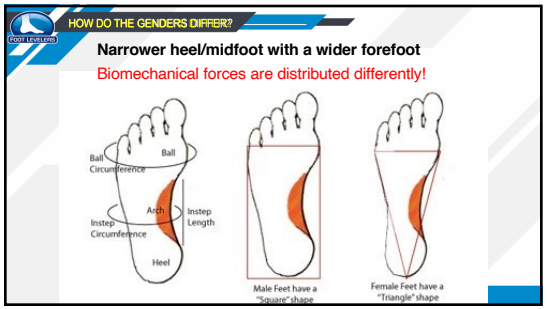
108


Factors of Pronation
GENETICS

109


SX'S OF EXCESSIVE PRONATION
•History or chronicity of symptoms
•Spinal/extremity symptoms worse with WB
•Short-term response to Chiro.

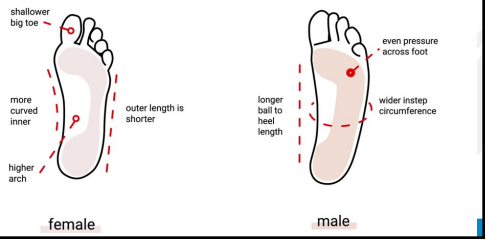
110


HOW DO THE GENDERS DIFFER?
Narrower heel/midfoot with a wider forefoot
Biomechanical forces are distributed differently!
Ball Circumference
Ball
Arch
Instep Length
Instep Circumference
Heel
Male Feet have a "Square" shape
Female Feet have a "Triangle" shape

111

Gender Differences

Women's feet are smaller for a given body height



112

Are Female Feet Different?

Biomechanical, forefoot conditions in women > men

(Bunions, hammer toes, calluses, neuromas, metatarsalgia)

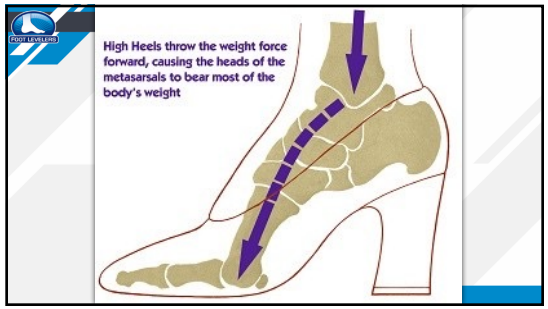
- **MT arch support is key!**

113

Footwear

- People cram feet into shoes that don't fit.
- Many don't update their shoe size as they age.
- Trace each foot while standing then trace the shoe. Any significant discrepancy means foot is cramped when standing and restricted during gait.

114


High Heels throw the weight force forward, causing the heads of the metasarsals to bear most of the body's weight

115


R

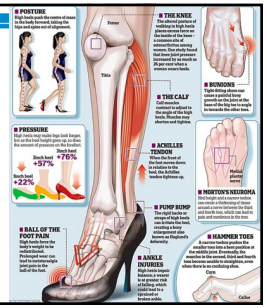
116

117

Dangers of Heels

Forefoot pressure increases by:

1 inch heel - 22%
2 inch heel - 57%
3 inch heel - 76%



118

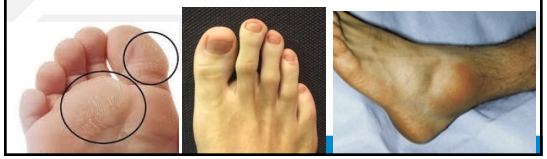
VISUAL/PALPATORY FINDINGS

- Corns
- Bunions
- Callouses
- Hammer toes
- Hallux Valgus

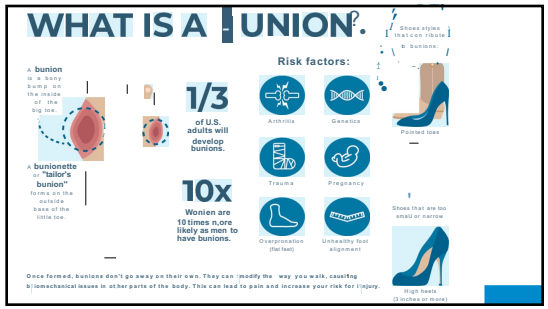
119

VISUAL FINDINGS

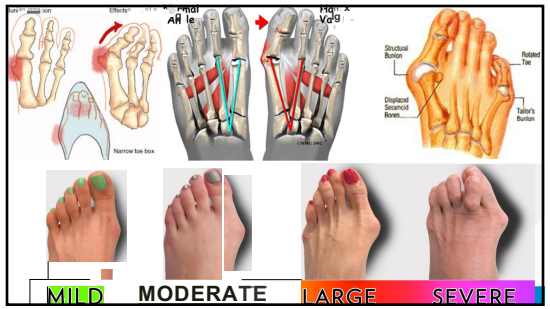
- Collapsed arches
- Morton's Foot
- Past foot/ankle injuries
- Fat/callous pads under arches



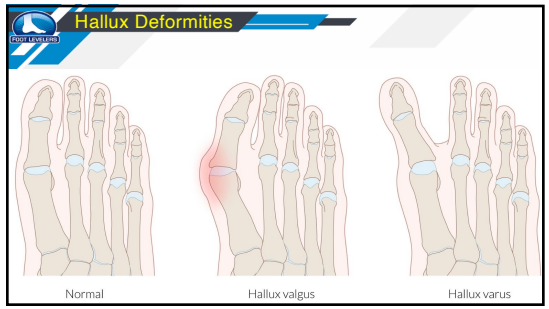
120


WHAT IS A BUNION?
A bunion is a bony bump on the inside of the big toe.
A bunionette or "tailor's bunion" forms on the outside base of the little toe.
1/3
of U.S. adults will develop bunions.
10x
Women are 10 times more likely as men to have bunions.
Risk factors:
Arthritis
Genetics
Trauma
Pregnancy
Overpronation (flat feet)
Unhealthy foot alignment
Shoes styles that can contribute to bunions:
Pointed toes
Shoes that are too small or narrow
High heels (3 inches or more)
Once formed, bunions don't go away on their own. They can modify the way you walk, causing biomechanical issues in other parts of the body. This can lead to pain and increase your risk for injury.

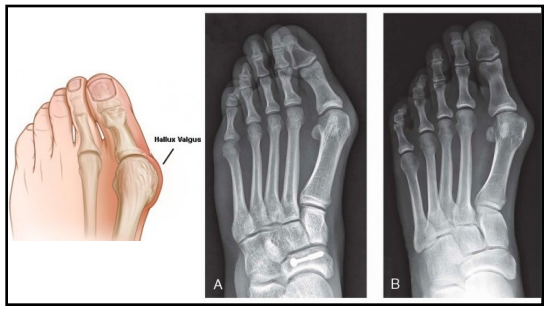
121


Narrow toe box
Structural Bunion
Rotated Toe
Displaced Sesamoid Bones
Tailor's Bunion
MILD
MODERATE
LARGE
SEVERE

122


Hallux Deformities
Normal
Hallux valgus
Hallux varus

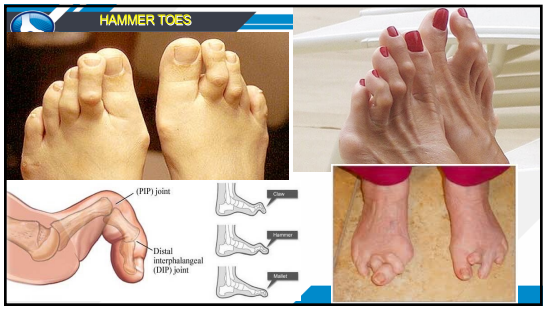
123


Hallux Valgus
A
B

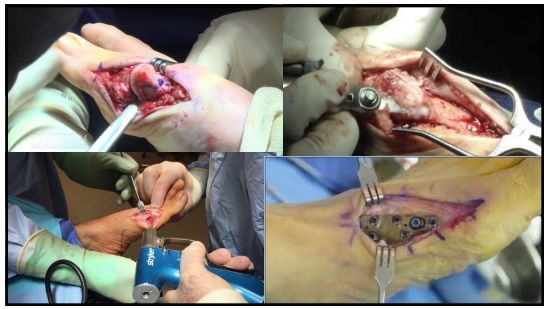
124


Bunion Aid® Splint
Metatarsal pad supports the transverse arch.
Breathable material.
Dual strapping system stabilizes the metatarsal arch.
Flexible hinge maintains foot mobility.
Adjustable strapping system realigns big toe
Copyright PediFix, Inc.

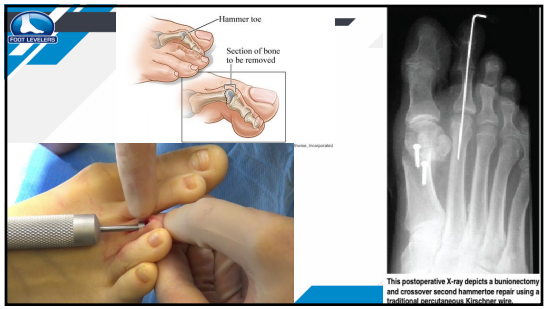
125


HAMMER TOES
(PIP) joint
Distal interphalangeal (DIP) joint
Claw
Hammer
Mallet

126



127


Hammer toe
Section of bone to be removed
This postoperative X-ray depicts a bunionectomy and crossover second hammertoe repair using a traditional percutaneous Kirschner wire.

128

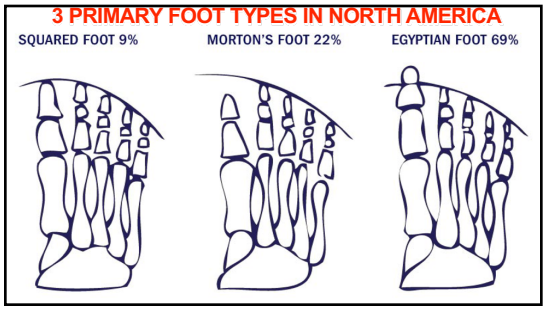

2) Three days after Surgery. Note the metal pins with white colored pin caps.

129

130


Corns
Calluses
Corn
Callus
CORNS
CALLUSES

131


3 PRIMARY FOOT TYPES IN NORTH AMERICA
SQUARED FOOT 9%
MORTON'S FOOT 22%
EGYPTIAN FOOT 69%

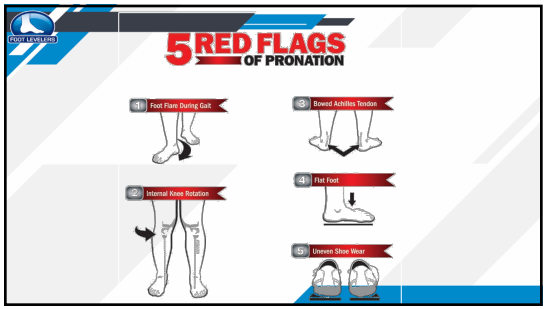
132


MORTON'S FOOT/TOE
Greek Foot
"Morton's Toe"

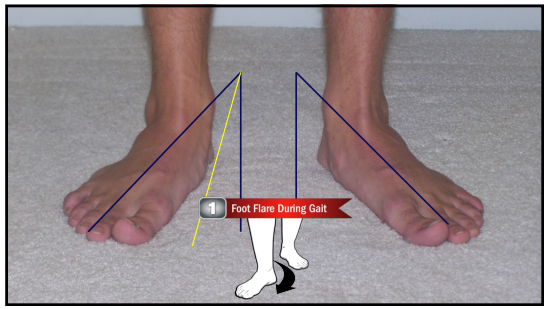
133


HAMMER TOES
Hammer toes

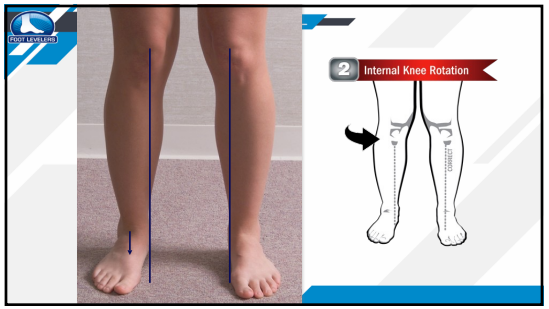
134


5 RED FLAGS
OF PRONATION
1 Foot Flare During Gait
2 Internal Knee Rotation
3 Bowed Achilles Tendon
4 Flat Foot
5 Uneven Shoe Wear

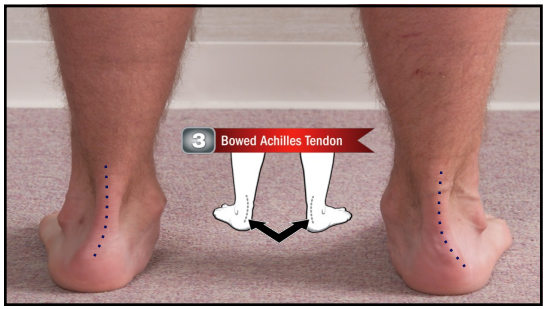
135


1 Foot Flare During Gait

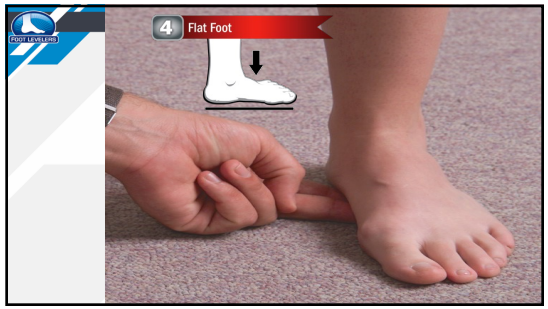
136


2 Internal Knee Rotation

137


3 Bowed Achilles Tendon

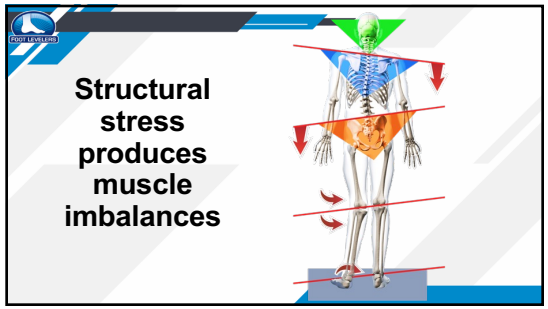
138



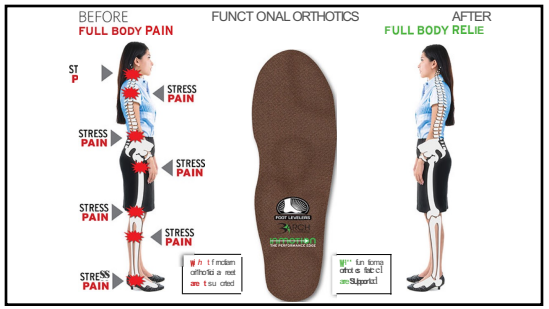
139

140

141


Structural stress produces muscle imbalances

142


BEFORE
FULL BODY PAIN
FUNCT ONAL ORTHOTICS
AFTER
FULL BODY RELIE
STRESS PAIN
STRESS PAIN
STRESS PAIN
STRESS PAIN
STRESS PAIN

143


Improve comfort. Reduce pain.
Choose Foot Levelers.

144

Who Can Benefit from orthotics?

SCAN EVERY PATIENT!

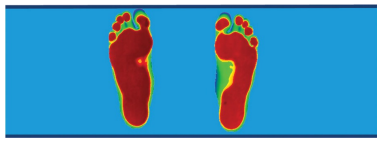
MAKE THIS YOUR PROTOCOL

WHY?? → Various studies show **overpronation creates biomechanical dysfunction**

it's an educational opportunity to show patients **the feet play an instrumental part in the care you provide**

145

SAME PERSON
DIFFERENT FEET



Scanning the feet shows immediately
asymmetrical overpronation

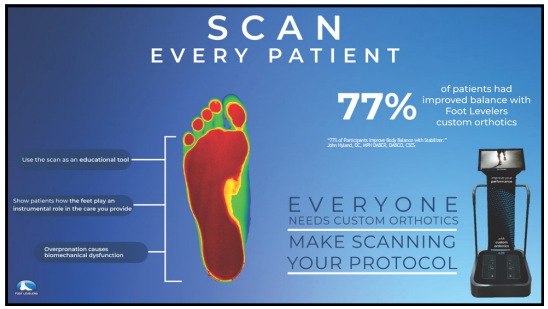
146

Scan Every Patient

- 77% of people suffer from moderate to severe pronation [1]
- 90% have some degree of leg length inequality [2]
- Back pain is the #2 cause of work-related disability in the U.S. [3]
- 80% of people will experience some sort of back pain in their lifetime [4]

1 - "77% of Participants Improve Body Balance with Stabilizer." John Hyland, DC, MPH DABCB, DABCO, CSCS
2 - NCBI: https://pubmed.ncbi.nlm.nih.gov/articles/PMC3128860/
3 - CDC: https://www.cdc.gov/niosh/topics/ergonomics/default.html
4 - NCBI: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4149077/

147


SCAN
EVERY PATIENT
77%
of patients had improved balance with Foot Levelers custom orthotics
Use the scan as an educational tool
Show patients how the feet play an instrumental role in the care you provide
Overpronation causes biomechanical dysfunction
EVERYONE
NEEDS CUSTOM ORTHOTICS
MAKE SCANNING
YOUR PROTOCOL

148


The Foot Levelers Kiosk
Standard Design Dual-Foot Kiosk
Ease Your Pain Design Dual-Foot Kiosk
Spanish Design Dual-Foot Kiosk
Performance Design Dual-Foot Kiosk

149


Foot Levelers Kiosk
PROBLEM:
"I know I need to scan all of my patients but I don't always have time."
SOLUTION:
THE FOOT LEVELERS KIOSK
Your patients scan themselves!
https://vimeo.com/299742943
RESULTS:
• Improved Outcomes
• Happier, Healthier Patients
• Practice Growth

150

Foot Levelers Kiosk

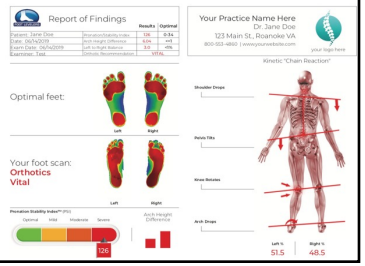
Our Best Scanning Technology!

- **TIME SAVER** - Designed so patients can scan themselves
- **Referral tool**: Patients receive social media-ready scan results
- **Patient education:** Helps patients understand how problems in their feet could be the cause of their pain
- **Cloud-based**: Near-instant Report of Findings provides patient results. Streamlines the ordering process.

151

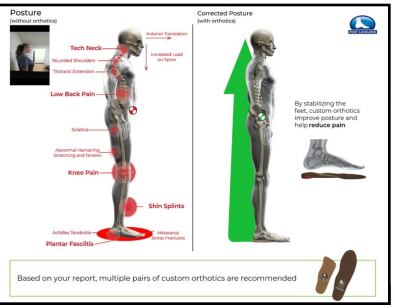
Report of Findings

- Shows patient's scan next to Optimal feet
- Shows left-to-right balance and arch height difference
- Educates the patient on the Kinetic Chain and how custom orthotics can help
- Includes your logo and contact information



152

2nd Page of Report of Findings

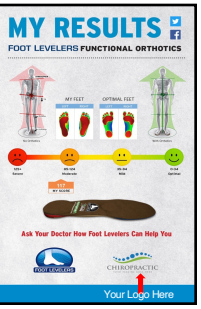


153

Shareable Patient ROF

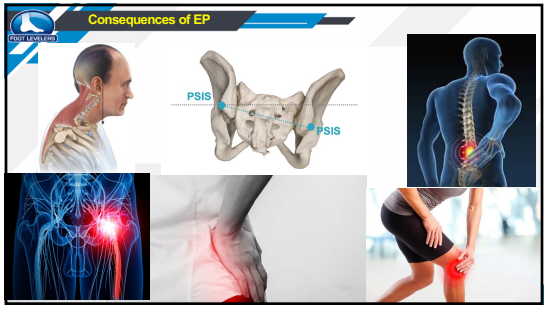
After the scan, patients are emailed their own Report of Findings (ROF)

- Patient ROF is emailed before patient steps off scanner
- Shareable on social media – **REFERRALS!**
- Branded with your practice's logo and contact information
- Helps educate on the need and value of orthotics
- Shows PSI score



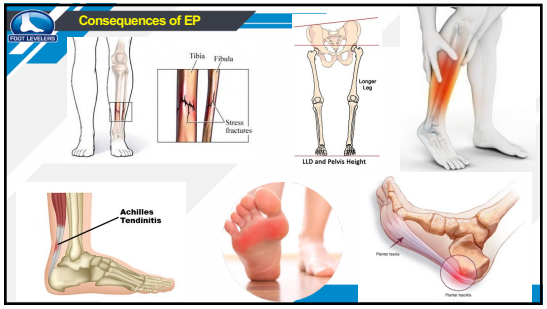
154

Consequences of EP



155

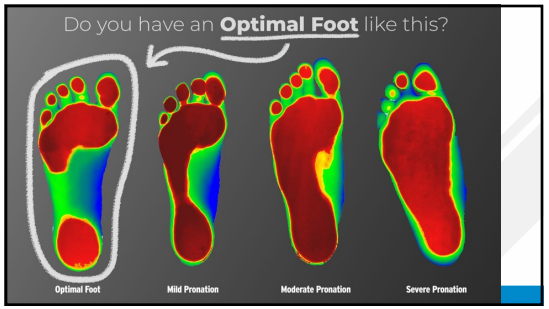
Consequences of EP



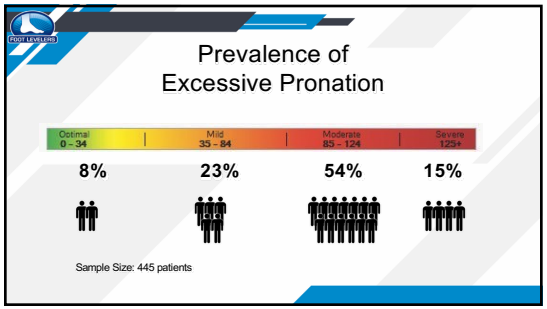
156


Pronation/flat feet can cause the following ailments:
• Foot pain
• Knee pain
• Hip pain
• Low back pain
• Neck pain
• Shin splints
• Plantar Fasciitis

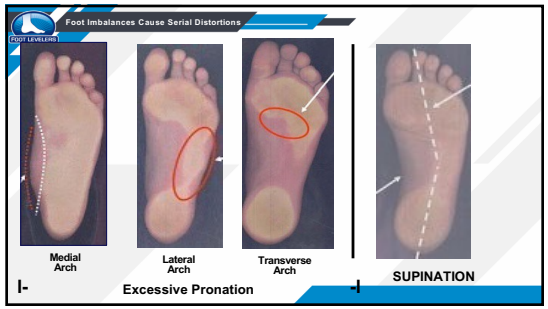
157


Do you have an Optimal Foot like this?
Optimal Foot
Mild Pronation
Moderate Pronation
Severe Pronation

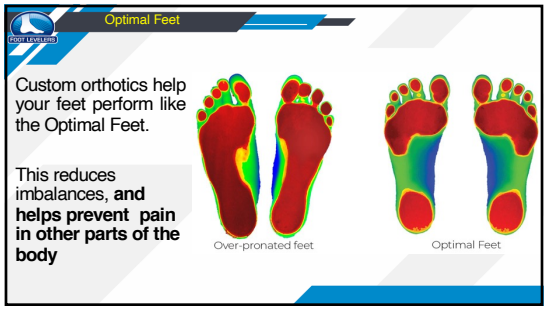
158


Prevalence of Excessive Pronation
Optimal 0 – 34
Mild 35 – 84
Moderate 85 – 124
Severe 125+
8%
23%
54%
15%
Sample Size: 445 patients

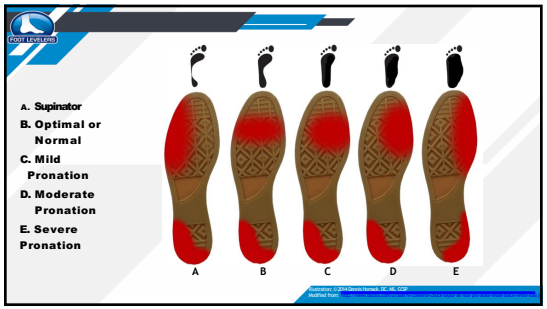
159


Foot Imbalances Cause Serial Distortions
Medial Arch
Lateral Arch
Transverse Arch
I-
Excessive Pronation
-I
SUPINATION

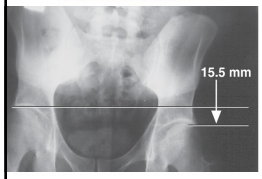
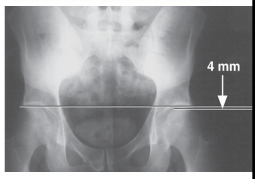
160


Optimal Feet
Custom orthotics help your feet perform like the Optimal Feet.
This reduces imbalances, and helps prevent pain in other parts of the body
Over-pronated feet
Optimal Feet

161


A. Supinator
B. Optimal or Normal
C. Mild Pronation
D. Moderate Pronation
E. Severe Pronation
A
B
C
D
E

162

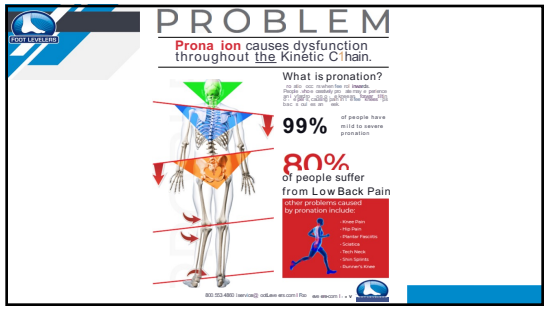
Without Orthotics	With Foot Levelers Orthotics
	
a. Pelvic torque or obliquity b. Unlevel femoral heads	c. Postural scoliosis d. Disc degeneration/spondylosis

163

SCAN EVERY PATIENT!

164

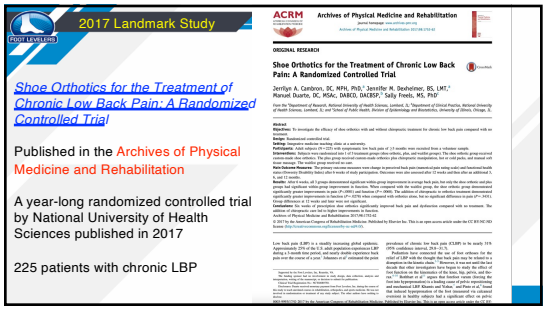
165


PROBLEM
Prona ion causes dysfunction throughout the Kinetic Chain.
What is pronation?
99%
of people have mild to severe pronation
80%
of people suffer from Low Back Pain
other problems caused by pronation include:
- Knee Pain
- Hip Pain
- Plantar Fasciitis
- Sciatica
- Tech Neck
- Shin Splints
- Runner's Knee

166


IT'S ALL ABOUT ESTABLISHING THE NEED FOR SPS's
The Best
Custom Orthotics. Period.
INMOTION

167


2017 Landmark Study
Shoe Orthotics for the Treatment of Chronic Low Back Pain: A Randomized Controlled Trial
Published in the Archives of Physical Medicine and Rehabilitation
A year-long randomized controlled trial by National University of Health Sciences published in 2017
225 patients with chronic LBP
ACRM
Archives of Physical Medicine and Rehabilitation
ORIGINAL RESEARCH
Shoe Orthotics for the Treatment of Chronic Low Back Pain: A Randomized Controlled Trial

168

Conclusions of study:

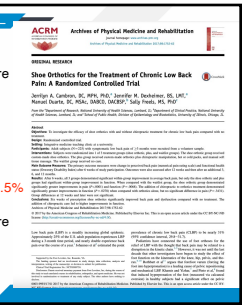
After 6 weeks of prescription shoe orthotics there was significantly improved back pain and dysfunction compared with no treatment.

The addition of Chiropractic care led to higher Improvements in function.

FLI orthotics alone improved chronic LBP by 34.5%

The combo of FLI orthotics and Chiropractic care Led to a reduction in LBP by 40.4%

FLI orthotics and Chiropractic care resulted in a 32.3% increase in function.

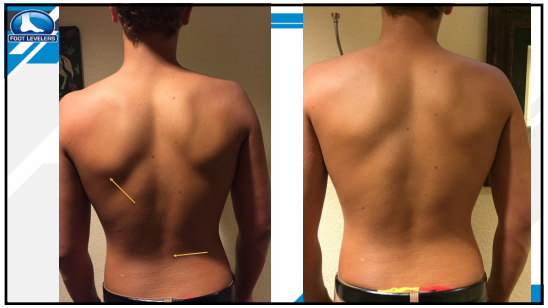


Archives of Physical Medicine and Rehabilitation

ORIGINAL RESEARCH

Shoe Orthotics for the Treatment of Chronic Low Back Pain: A Randomized Controlled Trial

169



170

Leg Length Inequality

ANATOMICAL (Bone Discrepancy)	FUNCTIONAL (Rotational Patterns)
Trauma	Pelvis
Degeneration	Hips
Congenital	Knees
Systemic	Ankles
Neoplasms	Feet

171

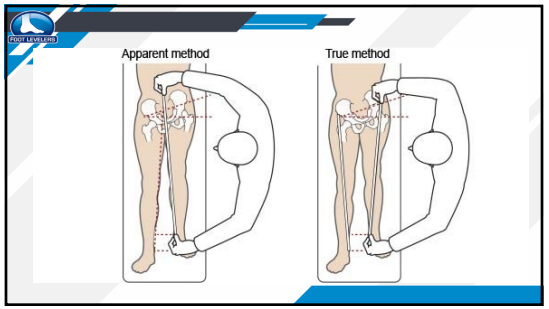
Apparent leg Length Test:

Umbilicus to medial/lateral malleolus

True (Actual) Leg Length Test:

ASIS to medial/Lateral malleolus

172

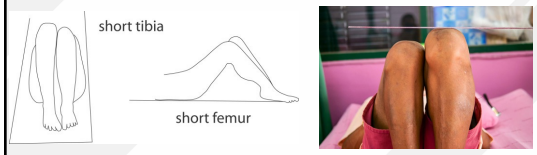


173

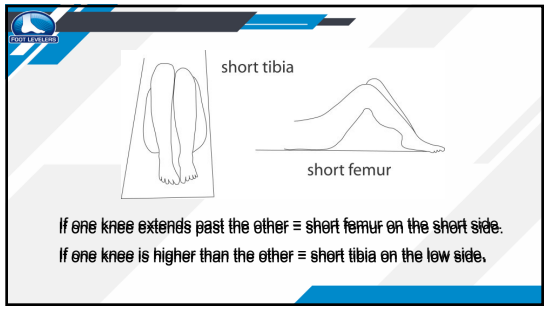
STRUCTURAL SHORT LEG

Allis Test: Supine, knees bent, feet aligned.

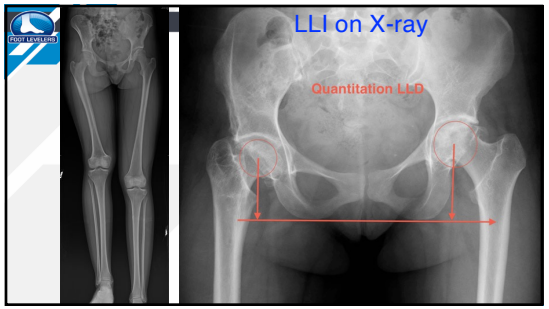
- Compare evenness of knees.



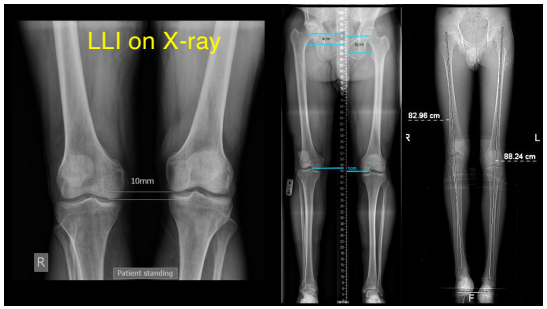
174


short tibia
short femur
If one knee extends past the other = short femur on the short side.
If one knee is higher than the other = short tibia on the low side.

175


LLI on X-ray
Quantitation LLD

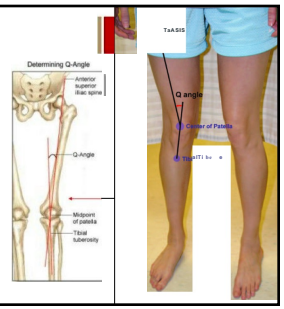
176


LLI on X-ray
10mm
R
Patient standing
82.96 cm
88.24 cm

177

Q Angle

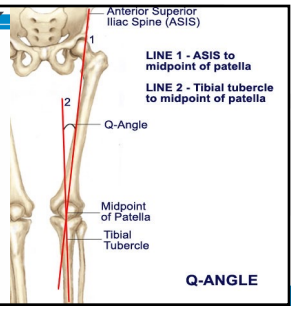
- Asse 111er of
  - Lower extrem- gnmer
  - Patella po:iti n
- Most fli i 11 e f-JI u dli eps to ftn1 • ⊂>11 i I0º
  - M l l-1
  - Fe s l l
- Genu valgum (knock kneed)
  - > 17º = excessive
- Ge varus (bowlegged)
  - Negative
- ↑ Q angle => t stress on MCL



178

Research at Logan CC by Robert Kuhn D.C., DACBR demonstrates Foot Levelers' orthotics improve Q-angle and patellar tracking.

2002 Sept Vol. 25 #7 Q-Angle and Patellar Tracking Study



LINE 1 - ASIS to midpoint of patella

LINE 2 - Tibial tubercle to midpoint of patella

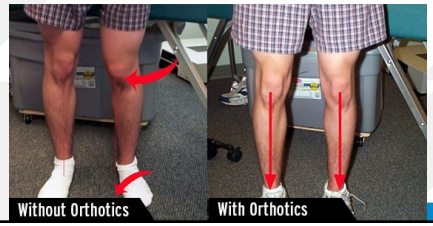
Q-ANGLE

179

Do SPS Reduce Q-Angle?

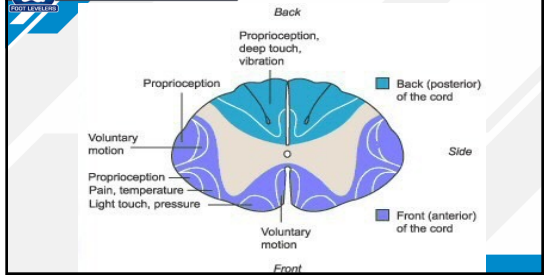
Effect on Q-Angle with insertion of an Orthotic Device

Robert Kuhn DC, Terry Yochum DC, Anton Cherry DC, Sean Rodgers DC, Dennis Nosco PhD
Accepted as a Platform Presentation, 3003 ACC – RAC VII, New Orleans, March 13-15, 2003



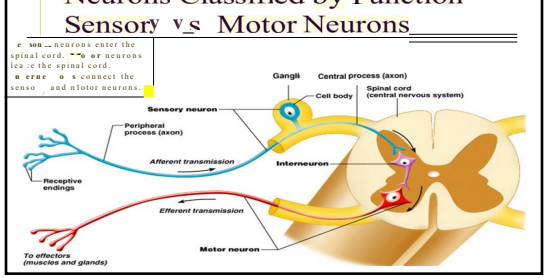
180

Spinal Cord



181

Neurons Classified by Function: Sensory vs Motor Neurons



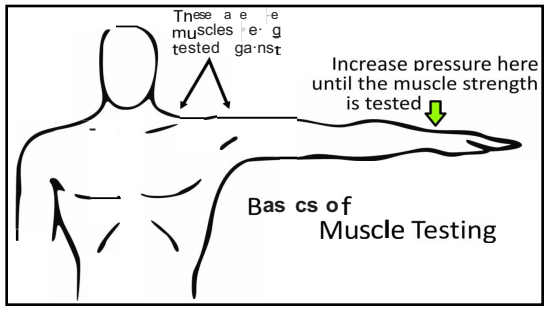
182

Muscle Test

A muscle test involves putting pressure on a muscle and interpreting the response of that muscle. The **testee** holds out his or her arm and the **tester** applies steady downward pressure on the arm.

If the muscle gives way and the arm moves, this an unlocking muscle, which indicates stress or the answer *no*. If the muscle holds and the arm stays still, this a locking muscle, which indicates no stress or the answer *yes*.

183



184

NEUROLOGICAL EXPLANATION

- Nociceptors send impulses to the spinal cord causing Pre-Synaptic Inhibition of the anterior horn cells.
- This produces 7-10 seconds of muscle weakness.

185

NEUROLOGICAL EXPLANATION

- An adjustment reduces nociceptor activity.
- Pre-Synaptic Inhibition is decreased (eliminating the 7-10 seconds of muscle weakness).
- Muscle strength is increased.

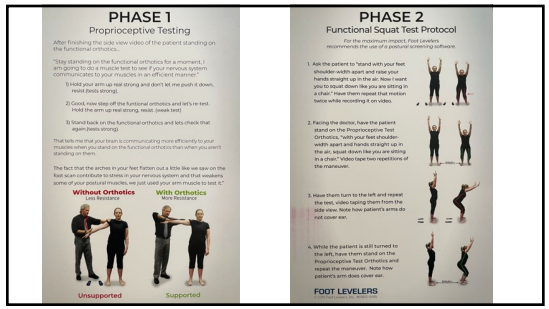
186


FUNCTIONAL MUSCLE TESTING
Test Patient:
• Unsupported
• On orthotics
• W/ Orthotics in shoes
FOOT LEVELERS

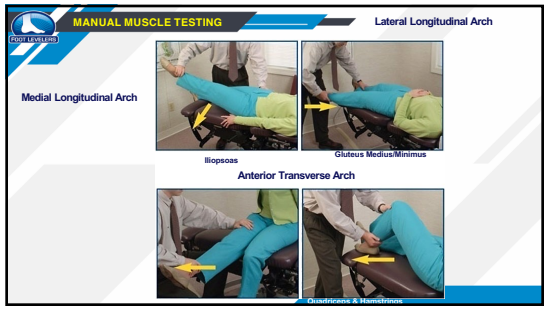
187


Proprioceptive
Test Kit
BUY ONE, GET ONE
HALF PRICE!
Muscle Testing
Functional Squat Test Protocol
FOOT LEVELERS

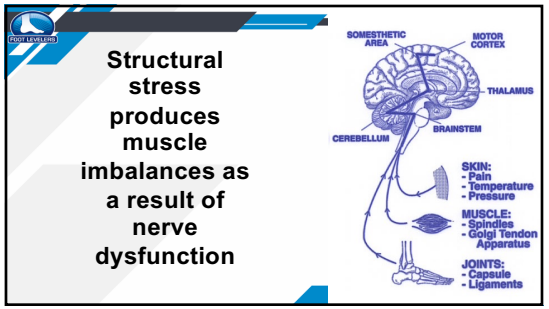
188


PHASE 1
Proprioceptive Testing
Without Orthotics
Less Resistance
With Orthotics
More Resistance
Unsupported
Supported
PHASE 2
Functional Squat Test Protocol
FOOT LEVELERS

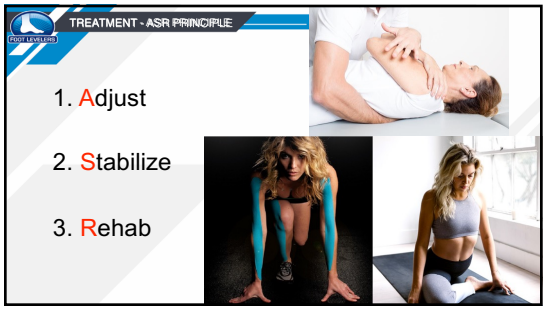
189


MANUAL MUSCLE TESTING
Lateral Longitudinal Arch
Medial Longitudinal Arch
Iliopsoas
Gluteus Medius/Minimus
Anterior Transverse Arch
Quadriceps & Hamstrings

190

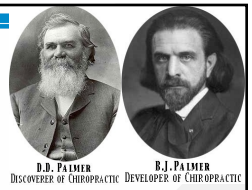

Structural stress produces muscle imbalances as a result of nerve dysfunction
SOMESTHETIC AREA
MOTOR CORTEX
THALAMUS
CEREBELLUM
BRAINSTEM
SKIN:
- Pain
- Temperature
- Pressure
MUSCLE:
- Spindles
- Golgi Tendon Apparatus
JOINTS:
- Capsule
- Ligaments

191


TREATMENT - ASR PRINCIPLE
1. Adjust
2. Stabilize
3. Rehab

192

CHIROPRACTIC



…preserves and restore health.

…removes the interference on the nervous system so that the innate can heal the body.

…restores structural balance and neurological function.

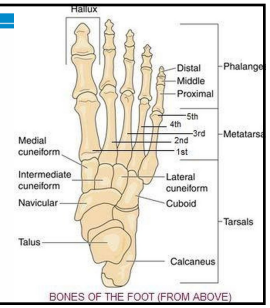
193

According to the ACA, the most frequently used techniques by DC's are:

Diversified 95.9%, Activator Methods 62.8%,Gonstead 58.5%, Cox Flexion/Distraction 58.0%, Thompson 55.9%, SOT 41.3%, AK 43.2%, Extremity adjusting 41.3%, NIMMO/ Receptor Tonus 40.0%, Cranial 37.3%, Adjustive Instruments 34.5%, Palmer upper cervical (HIO) 28.8%, Logan Basic 28.7%, Meric 19.9%, and Pierce-Stillwagon 17.1%

194

How do you want to adjust the 26 bones?



BONES OF THE FOOT (FROM ABOVE)

195


TYPES OF ADJUSTING
Manual/Diversified
Drop table
Spring Loaded Instrument

196

197


DROP TABLE TIPS
Tension
Inhale/exhale
Spinal contours
Portable Lumbo-Pelvic Drop
Extremity Drop / Speeder Board
Portable Hea

198


ACTIVATOR

199


Computerized Adjusting in Your Hands
iQ impulse
ADJUSTING INSTRUMENT
Features

200


The Pro-ArthroStim® Instrument
Variable Amplitude Knob
Auto-Fan: Custom OPTION
Spring Cushioned Pressure Responsive Stylus
Full Cushion Handle and Comfort Trigger
Speed Switch: Custom OPTION

201


INSTRUMENT ADJUSTING
• Proper tension settings, rings
• Appropriate #'s of thrusts
• Patient comfort!

202

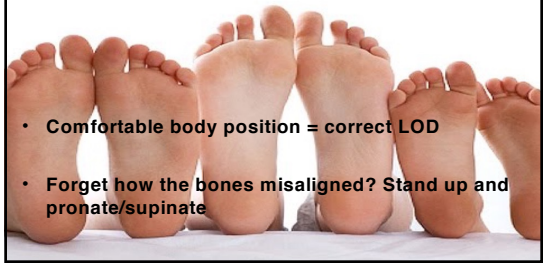

Use the Force!
• Have 3 different ways to adjust each body part.
• Close your eyes and feel. Don't do it if it feels wrong!
• Be confident in manual and light force adjusting and know when to use them appropriately!
• Using multiple techniques is a sign of maturity, NOT weakness! There is wisdom in using light force/instruments.

203


READY FOR SOME HANDS ON?

204

THE "WONG WAY" TO ADJUST THE FOOT



- Comfortable body position = correct LOD
- Forget how the bones misaligned? Stand up and pronate/supinate

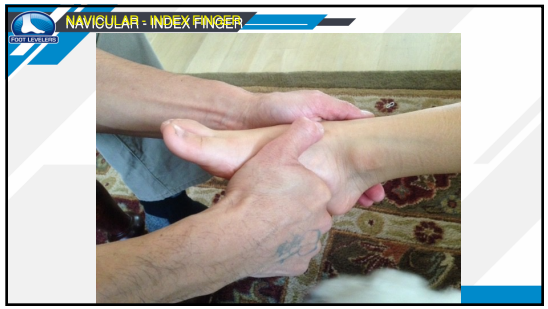
205

NAVICULAR BONE

Misaligns: inferior and medial
(down and in)
"Push" superior and lateral
(up and out)

206

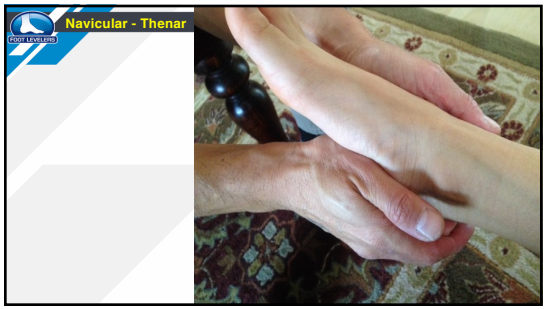
207


NAVICULAR - INDEX FINGER

208


Navicular - Index finger

209


Navicular - Thenar

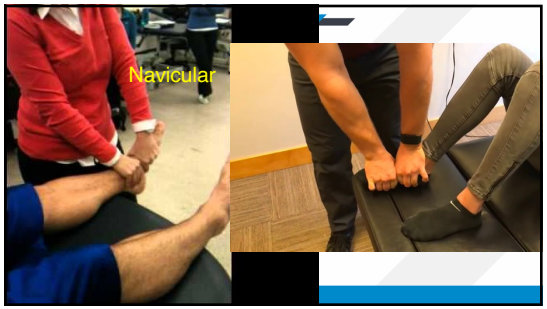
210

211

Navicular

- Prone: CP - double thumb, pisiform
- Drop table: CP - pisiform, double thumb (prone)
- Adjusting instrument:

212

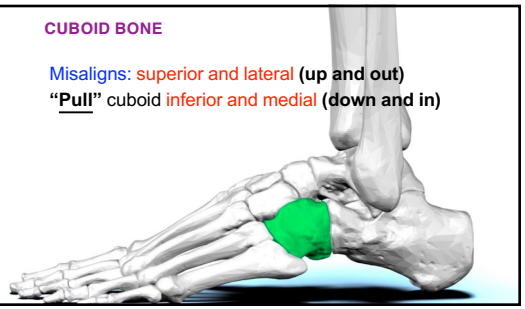


213

CUBOID BONE

Misaligns: superior and lateral **(up and out)**

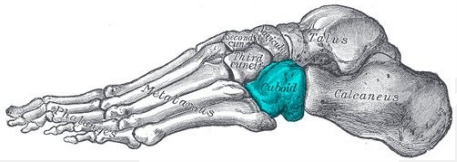
"Pull" cuboid inferior and medial **(down and in)**



214

215

CUBOID



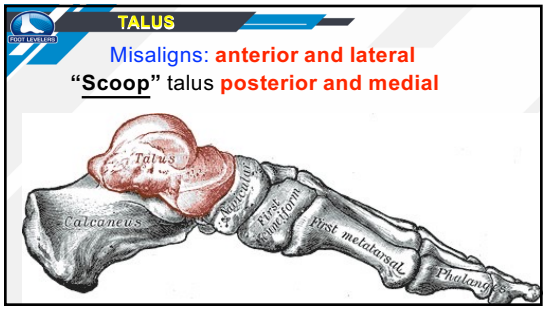
- Supine: CP-double thumb web, double index or middle finger
- Drop table: foot dorsal, lateral side up. CP-Pisiform, double thumb w/foot slightly dorsiflexed for tension.
- Spring loaded instrument: watch LOD

216


Cuboid - double index

217

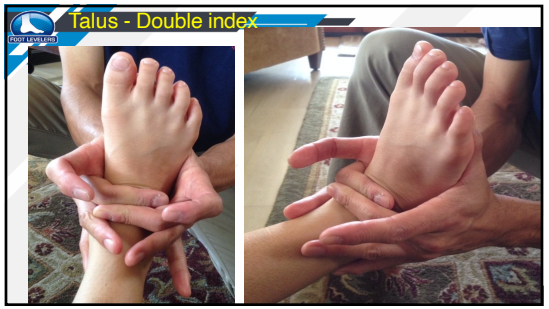
218


TALUS
Misaligns: anterior and lateral
"Scoop" talus posterior and medial
Talus
Calcaneus
Navicular
First cuneiform
First metatarsal
Phalanges

219


Talus

220


Talus - Double index

221

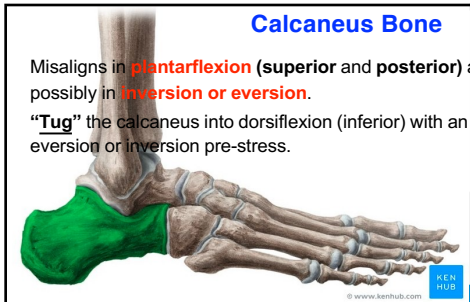

TALUS BONE
Supine: CP - double middle or index finger
Drop table: foot dorsal side up. CP is Pisiform or double thumb with foot slightly dorsiflexed
Spring loaded instrument: watch LOD

222

Calcaneus Bone

Misaligns in **plantarflexion (superior** and **posterior)** and possibly in **inversion or eversion**.

"Tug" the calcaneus into dorsiflexion (inferior) with an eversion or inversion pre-stress.



223

224

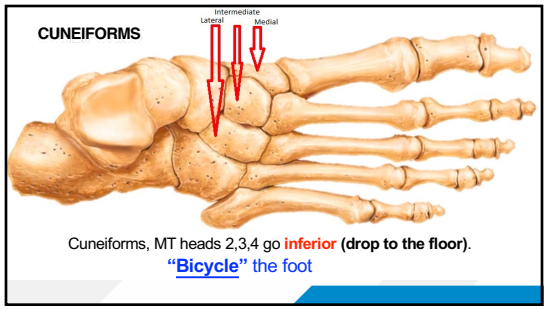
CALCANEUS BONE ADJUSTMENTS:

- Supine: CP – palm of hand
- Prone: CP - thumb web with foot over edge of table
- Drop table: foot plantar side up. CP is thumb web
- Spring loaded instrument: watch LOD

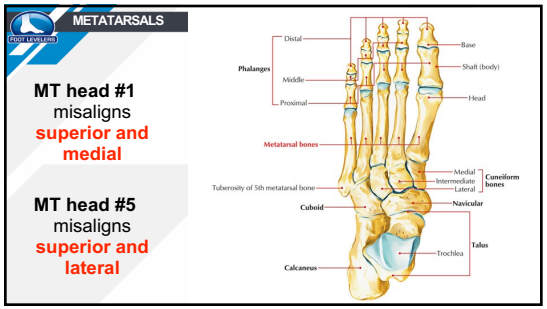
225


Calcaneus

226

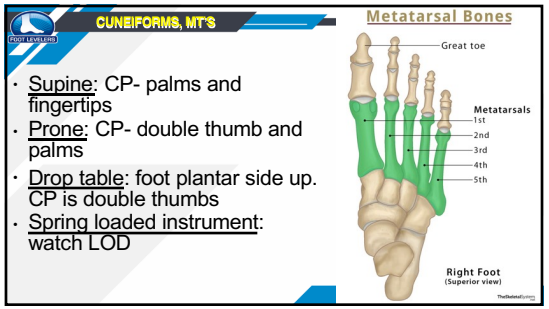

CUNEIFORMS
Intermediate
Lateral
Medial
Cuneiforms, MT heads 2,3,4 go inferior (drop to the floor).
"Bicycle" the foot

227


METATARSALS
MT head #1
misaligns
superior and
medial
MT head #5
misaligns
superior and
lateral
Distal
Phalanges
Middle
Proximal
Metatarsal bones
Tuberosity of 5th metatarsal bone
Cuboid
Calcaneus
Base
Shaft (body)
Head
Medial
Intermediate
Lateral
Cuneiform bones
Navicular
Talus
Trochlea

228

229



- Supine: CP- palms and fingertips
- Prone: CP- double thumb and palms
- Drop table: foot plantar side up. CP is double thumbs
- Spring loaded instrument: watch LOD

230

231


Cuneiforms/MT's

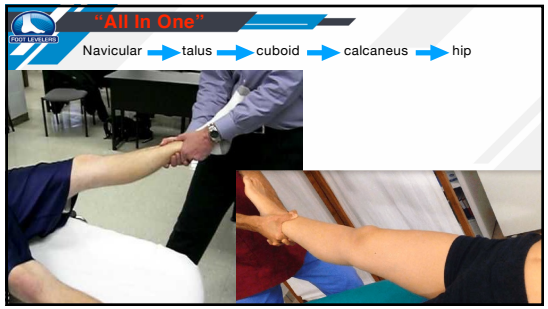
232


Phalanges

233


PHALANGES
Proximal and distal phalanxes get compressed.
"Distract" each of the phalanges.

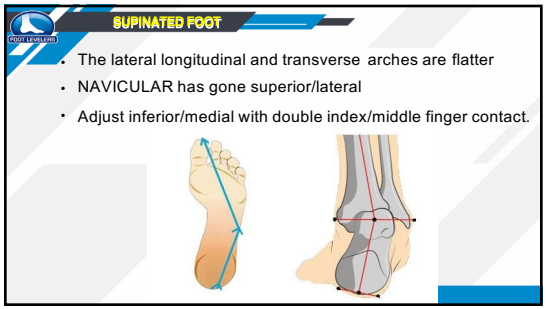
234


"All In One"
Navicular
talus
cuboid
calcaneus
hip

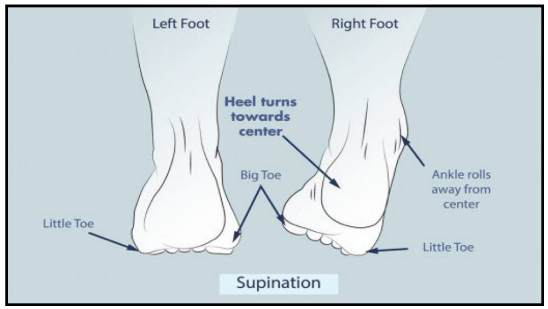
235


"All In One Move"

236


SUPINATED FOOT
The lateral longitudinal and transverse arches are flatter
NAVICULAR has gone superior/lateral
Adjust inferior/medial with double index/middle finger contact.

237


Left Foot
Right Foot
Heel turns towards center
Big Toe
Ankle rolls away from center
Little Toe
Little Toe
Supination

238


SUPPORT
• Tape
• Arch support
• Shoe types

239


Basic Application Tips
End to End Application: Tear backing 2-3" from end of tape and remove from end of tape only. Apply to skin with no stretch and rub to activate adhesive. Apply center of tape with desired stretch. Finish with no stretch in final 2".
Middle Stretch Application: Tear backing across middle and begin to peel back from center. Stretch tape as indicated and apply from center towards ends. Apply final 2" of each end with no stretch.

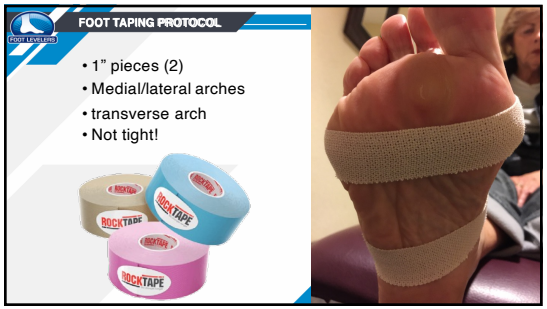
240


ROCKTAPE
Go stronger, longer
SPORT TAPING APPLICATIONS
ENDURANCE TAPE FOR ATHLETES
START HERE
INSTRUCTIONS
Apply on clean, dry skin 10 minutes before exercise. Rub vigorously to set adhesive.
Never stretch the ends of the tape, only the middle.
Rocktape can be worn up to five days and is water resistant.
Store tape in cool, dry place. Let tape come to room temperature before applying.

241


ROCKTAPE
START HERE

242


FOOT TAPING PROTOCOL
• 1” pieces (2)
• Medial/lateral arches
• transverse arch
• Not tight!
ROCKTAPE

243

TAPE CARE

- Water is fine
- Roll socks on/off carefully
- Avoid bare feet (carpet, pet hair)
- Lasts ~ 1-5 days

244

STRETCHIER
STICKIER
SUPERIOR

ROCKTAPE
Go stronger, longer

- Stretch structure, not tape
- Cut/shape but do not stretch ends
- stretch tape < 25-50%
- Warn about adhesive (no latex)

245

246

247

*Patients buy tape from you
*Tape educates for you
* Teach patient to tape their feet

ROCKTAPE Go stronger, longer | PAIN STOPS HERE

248

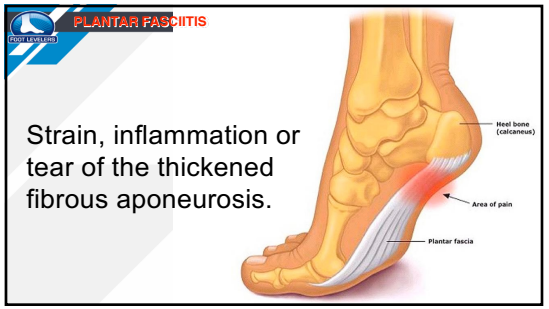
ROCK TAPE PROFESSIONAL

- Your professional pricing gives you 40% off retail.
- Call: 408-912-ROCK
- Tell them you were at a "Dr. Kevin Wong Seminar" and get set up to place your initial order.
- You can order from rocktape.com on subsequent orders.
- Your discount will be in place.

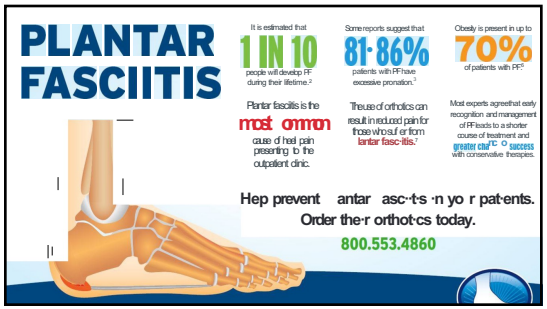
249


WITHOUT ORTHOTICS
WITH FOOT LEVELERS
CUSTOM ORTHOTICS
FOOT LEVELER

250


PLANTAR FASCIITIS
Strain, inflammation or tear of the thickened fibrous aponeurosis.
Heel bone (calcaneus)
Area of pain
Plantar fascia

251


PLANTAR FASCIITIS
It is estimated that
1 IN 10
people will develop PF during their lifetime.2
Some reports suggest that
81-86%
patients with PF have excessive pronation.3
Obesity is present in up to
70%
of patients with PF.5
Plantar fasciitis is the
most common
cause of heel pain presenting to the outpatient clinic.
The use of orthotics can result in reduced pain for those who suffer from
plantar fasciitis.7
Most experts agree that early recognition and management of PF leads to a shorter course of treatment and
greater chance of success
with conservative therapies.
Help prevent plantar fasciitis in your patients.
Order their orthotics today.
800.553.4860

252

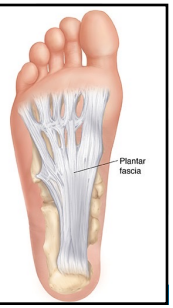
PLANTAR FASCIITIS

1. Excessive, long periods of foot pronation or supination
2. Landing hard on the sole of the foot
3. Instant foot acceleration and deceleration
4. WB activities for work or recreation

253

PLANTAR FASCIITIS – S &S's

1. Sharp heel pain that radiates
2. Heel tenderness/swelling
3. Gradual onset
4. Worse getting out of bed in AM
5. Worse with WB
6. Better with rest



254

PLANTAR FASCITIS: TX

Physiotherapy modalities

Adjustments: Calcaneus, MT's, rest of the foot

Elastic Taping

255

256

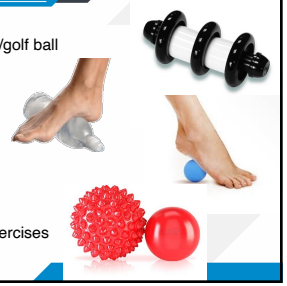
PLANTAR FASCIITIS: TREATMENT

Support:
Stabilizing Orthotics
Shoe types

257

PLANTAR FASCIITIS: REHAB

- Roll foot on foot wheel/lacrosse/golf ball
- Frozen water bottle
- Gentle stretching exercises
- Towel scrunch exercises
- Teach patient how to tape
- Basic 4 Group of Theraciser Exercises



258

259

IDEAS FOR REHAB.

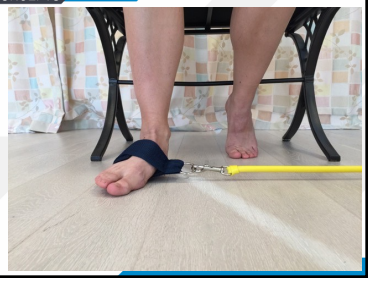
1. Retrain neuromuscular firing patterns by utilizing 'sensory-motor engrams' or 'habitual neuromuscular patterns'
2. Cardinal Rule: No Pain for Maximum Gain
3. Focus on tissues that are known to be injured or in a state of imbalance
4. Mirror Image Exercises
5. Move toward ideal posture

260

261

THERA-CISER CONCEPTS

- Isokinetic system of exercise
- Tubing permits movements through a joint's total ROM or a select portion

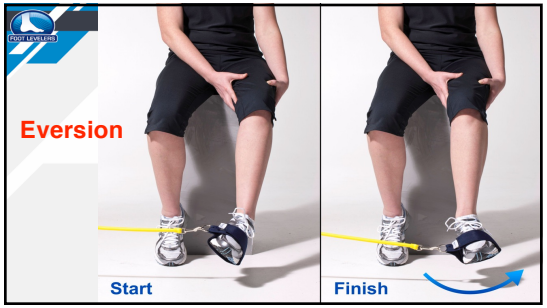


262

THERA-CISER CONCEPTS

- Wide variability of speeds from very fast motion to very slow sustained contractions.
- Resistance provided by the tubing can easily be very light to very heavy.

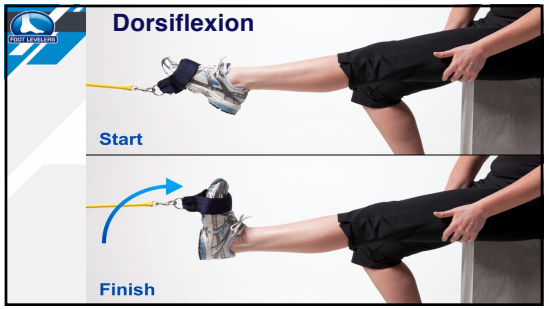
263



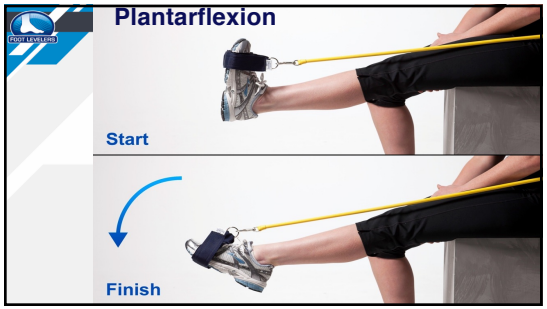
264


Inversion
Start
Finish

265


Dorsiflexion
Start
Finish

266


Plantarflexion
Start
Finish

267

THERA-CISER: TYPICAL PATIENT

Phase Motion	Range of Contraction	Speed of Exercise Motion	How Long Each
I	short	slow	1 min. daily
II	short	fast	1 min. daily
III	full	slow	1 min. every other day
IV	full	fast	1 min. every other day

Use ice after each exercise session. 2 weeks per stage.

268

THERA-CISER: ATHLETIC PATIENT

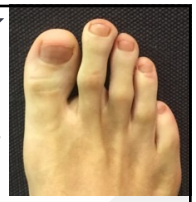
Phase	Range of Motion	Speed of Contraction	How Long Each Exercise Motion
I	short	slow	2 min. daily
II	short	fast	to fatigue daily
III	full	slow	to fatigue every other day
IV	full	fast	to fatigue every other day

After each exercise session use ice. 2 wks per phase

269

MORTON'S FOOT

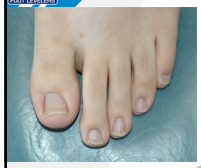
- 2nd toe longer than first
- Present 22% of time
- present in ~ 80% of pts. seeking care for musculoskeletal problems



270

MORTON'S FOOT

- 2nd toe alters toe off phase.
- Patient must externally rotate foot in order to place the 1st toe in position to toe off.



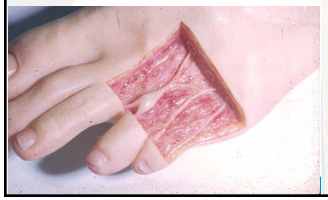
271

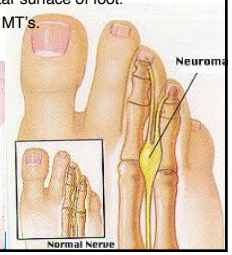
- Hypermobility of first and second toes
- Callousing of the 2nd MT head along with hammering of toes 2-3
- Leads to excessive pronation due to foot flare.

272

MORTON'S NEUROMA

- Neuralgic radiating pain on plantar surface of foot.
- Located between the 3rd and 4th MT's.





273

MORTON'S ETIOLOGY

- Increased pressure on forefoot and interdigital nerves
- Results in swelling, overgrowth or benign tumor of nerve

274

SYMPTOMS OF MORTON'S NEUROMA

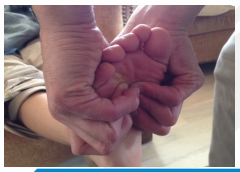
- A feeling that a rock is stuck in the bottom of your shoe.
- Seems like your sock has a bulge that you cannot seem to straighten.
- A burning sensation in the ball of your foot.
- Tingling or numbness around the impacted toe bones.
- Pain that worsens when wearing tight shoes.
- Discomfort that increases during strenuous activities.

275

MORTON'S NEUROMA: TX

Physiotherapy modalities

Adjustments: Basic Foot (MT's, toes)



276

MORTON'S NEUROMA: TX.

Support: Stabilizing Orthotics
Elastic Taping, Shoe Types

277

Morton's neuroma surgery

278

MORTON'S NEUROMA: TX.

"Basic 4" Thera-Ciser Exercises

Towel scrunch exercises

Foot wheel/Golf/tennis ball exercises

Calf Stretches

279

SEVER'S DISEASE

"Calcaneal Apophysitis"

- Inflammation of growth plate in heel of growing children, typically adolescents.
- Pain in heel due to repetitive stress to and is common in active children.

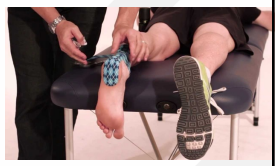
280

Sever's Disease

281

SEVER'S DISEASE: TX

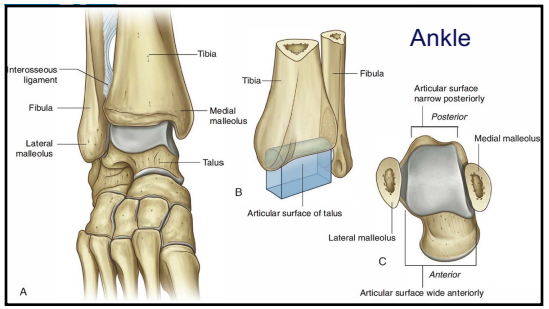
- Physiotherapy modalities (NO laser, US)
- Orthotics
- Elastic Taping
- Stretching/strengthening exercises



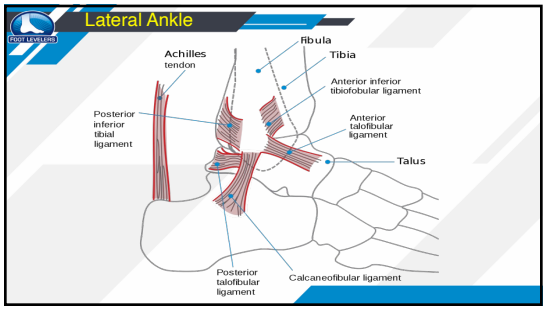
282


SEVER'S DISEASE: TAPING
50% stretch
KT

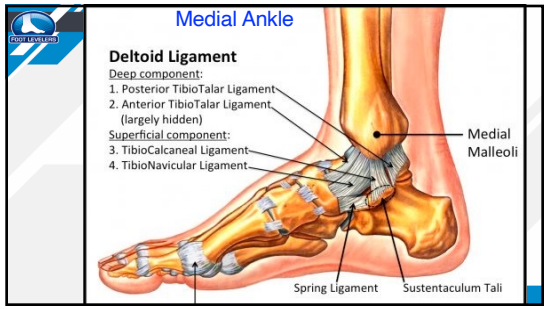
283


Ankle
Tibia
Interosseous ligament
Fibula
Medial malleolus
Lateral malleolus
Talus
A
Tibia
Fibula
B
Articular surface of talus
Articular surface narrow posteriorly
Posterior
Medial malleolus
Lateral malleolus
C
Anterior
Articular surface wide anteriorly

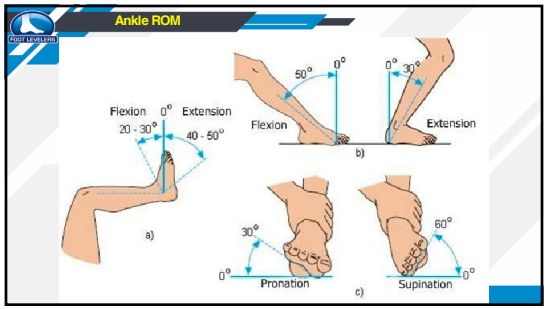
284


Lateral Ankle
Achilles tendon
Fibula
Tibia
Anterior inferior tibiofobular ligament
Posterior inferior tibial ligament
Anterior talofibular ligament
Talus
Posterior talofibular ligament
Calcaneofibular ligament

285


Medial Ankle
Deltoid Ligament
Deep component:
1. Posterior TibioTalar Ligament
2. Anterior TibioTalar Ligament
(largely hidden)
Superficial component:
3. TibioCalcaneal Ligament
4. TibioNavicular Ligament
Medial
Malleoli
Spring Ligament
Sustentaculum Tali

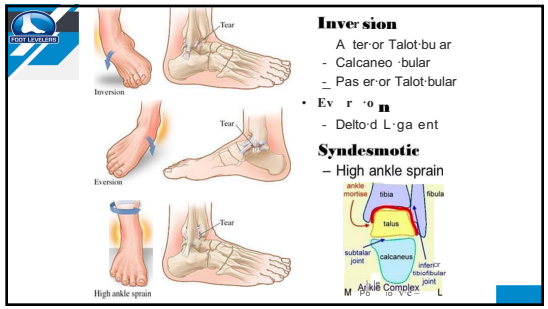
286


Ankle ROM
Flexion
Extension
20 - 30°
40 - 50°
a)
50°
0°
Flexion
b)
0°
30°
Extension
30°
0°
Pronation
c)
60°
Supination
0°

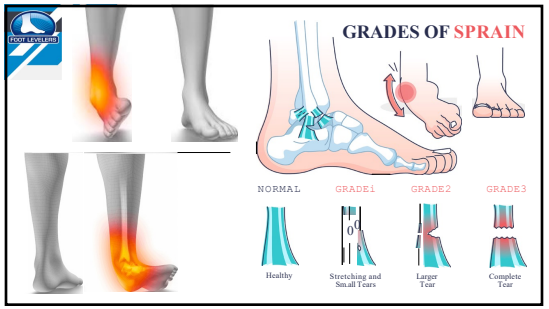
287


Inversion
Normal
APPROXIMATELY
1 MILLION
ANKLE INJURIES
OCCUR EVERY YEAR IN
THE U.S., A DAILY
THE AREA VERSION
SPRAIN INJURIES.

288


Tear
Inversion
Tear
Eversion
Tear
High ankle sprain
Inversion
A ter·or Talot·bu ar
- Calcaneo ·bular
- Pas er·or Talot·bular
Ev r ·o n
- Delto·d L·ga ent
Syndesmotic
– High ankle sprain
ankle mortise
tibia
fibula
talus
subtalar joint
calcaneus
inferior tibiofibular joint
Ankle Complex

289


GRADES OF SPRAIN
NORMAL
GRADE1
GRADE2
GRADE3
Healthy
Stretching and Small Tears
Larger Tear
Complete Tear

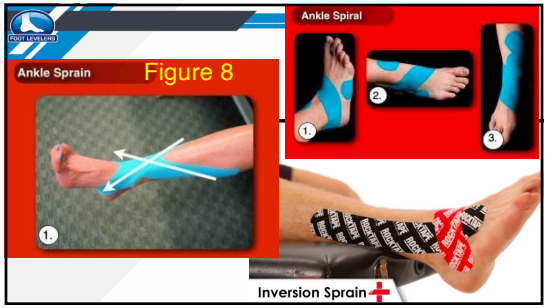
290


SPRAINED ANKLE
Inversion vs. Eversion
Acute vs. chronic
Arthritis present?
End feel (soft or bony?)
Damaged vessels from an ankle sprain can cause bruising

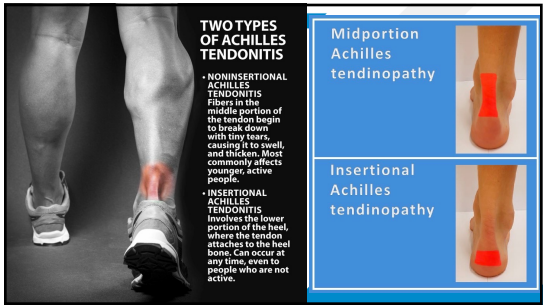
291


SPRAINED ANKLE – Tx.
• Physiotherapy modalities
• Adjust foot/ankle
• Elastic Tape
• Stabilizing Orthotics

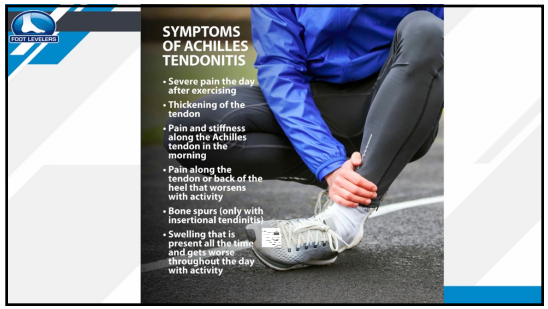
292


Ankle Sprain
Figure 8
Ankle Spiral
Inversion Sprain

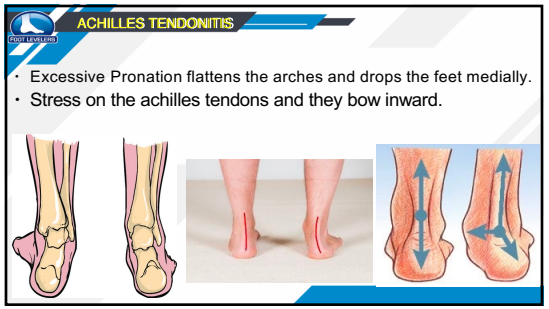
293


TWO TYPES OF ACHILLES TENDONITIS
• NONINSERTIONAL ACHILLES TENDONITIS Fibers in the middle portion of the tendon begin to break down with tiny tears, causing it to swell, and thicken. Most commonly affects younger, active people.
• INSERTIONAL ACHILLES TENDONITIS Involves the lower portion of the heel, where the tendon attaches to the heel bone. Can occur at any time, even to people who are not active.
Midportion Achilles tendinopathy
Insertional Achilles tendinopathy

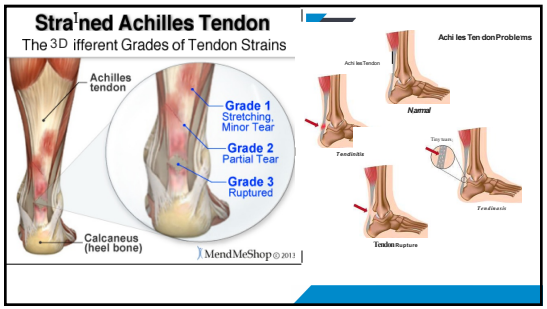
294


SYMPTOMS OF ACHILLES TENDONITIS
• Severe pain the day after exercising
• Thickening of the tendon
• Pain and stiffness along the Achilles tendon in the morning
• Pain along the tendon or back of the heel that worsens with activity
• Bone spurs (only with insertional tendinitis)
• Swelling that is present all the time and gets worse throughout the day with activity

295


ACHILLES TENDONITIS
• Excessive Pronation flattens the arches and drops the feet medially.
• Stress on the achilles tendons and they bow inward.

296


Strained Achilles Tendon
The 3 Different Grades of Tendon Strains
Achilles tendon
Calcaneus (heel bone)
Grade 1 Stretching, Minor Tear
Grade 2 Partial Tear
Grade 3 Ruptured
MendMeShop © 2013
Achilles Tendon Problems
Normal
Tendinitis
Tendinosis
Tendon Rupture

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ACHILLES TENDONITIS: TX

- Physiotherapy Modalities
- Adjust Foot/ ankle
- Elastic Tape
- Stabilizing Orthotics

298

SESAMOIDITIS

Sesamoids are connected to tendons or embedded in muscle. (Like the patella)

Two small sesamoids (size of a kernel of corn) are found under the forefoot near the big toe.

299

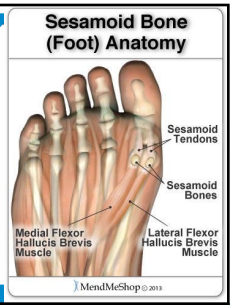
Sesamoids

Act like pulleys, providing a smooth surface so tendons can slide. This allows tendons to transmit muscle forces.

Assist with weight bearing.

Help elevate the bones of the big toe.

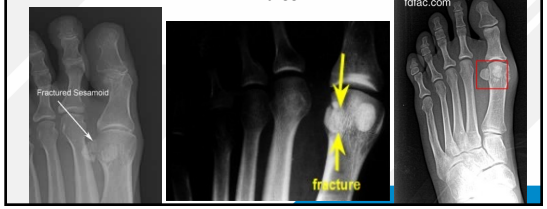
Tendons surrounding the sesamoids can become inflamed.



300

X-RAY FOR SESAMOID FX.

- The medial sesamoid bone has two parts (bipartite).
-The edges of a bipartite medial sesamoid are smooth; edges of a fractured sesamoid are more jagged,



301

SESAMOIDITIS: S & S'S

- Pain or tenderness under big toe on ball of the foot.
- Pain may develop gradually, whereas with a fracture, the pain is immediate.
- Swelling/bruising may or may not be present.
- May be difficulty and pain bending and straightening the big toe.
- Weight bearing pain

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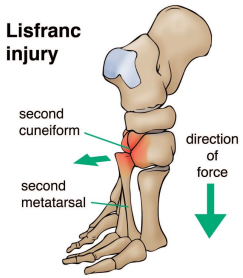
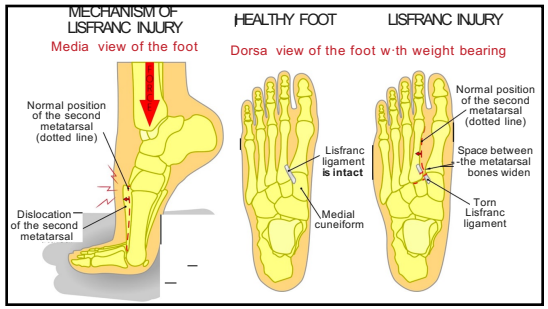
Lisfranc Fracture

A Lisfranc injury, aka "Lisfranc fracture", is an injury of the foot in which one or more of the metatarsal bones are displaced from each other.

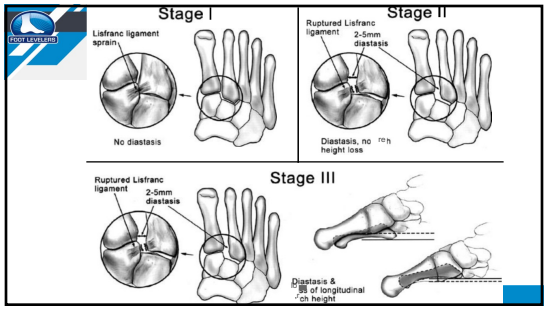
The injury is named after Jacques Lisfranc de St. Martin, a French surgeon and gynecologist who noticed this fracture pattern amongst cavalry men, in 1815, after the War of the Sixth Coalition.



303


MECHANISM OF LISFRANC INJURY
Media view of the foot
HEALTHY FOOT
LISFRANC INJURY
Dorsa view of the foot w·th weight bearing
Normal position of the second metatarsal (dotted line)
Dislocation of the second metatarsal
Lisfranc ligament is intact
Medial cuneiform
Normal position of the second metatarsal (dotted line)
Space between the metatarsal bones widen
Torn Lisfranc ligament

304


Stage I
Lisfranc ligament sprain
No diastasis
Stage II
Ruptured Lisfranc ligament
2-5mm diastasis
Diastasis, no height loss
Stage III
Ruptured Lisfranc ligament
2-5mm diastasis

305

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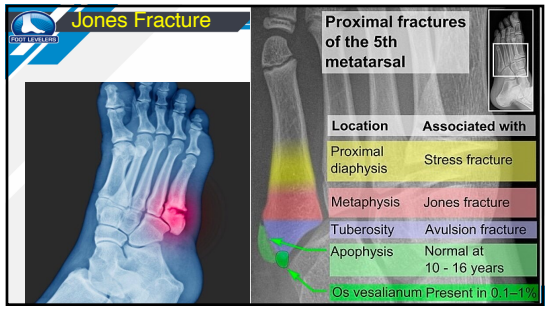
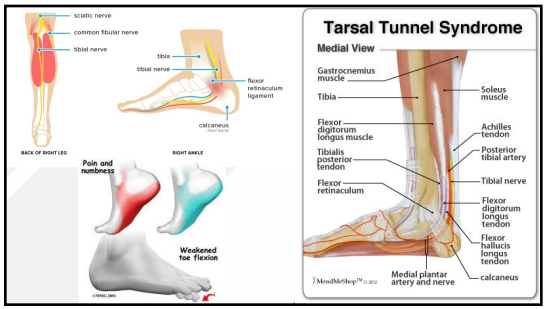
SYMPTOMS OF HALLUX RIGIDUS
Early symptoms and signs include:
• Pain and stiffness in the big toe.
• Difficulty with certain activities such as running or squatting.
• Swelling and inflammation around the joint.
As the condition gets more severe over time, the following symptoms will begin to appear:
• Chronic toe pain.
• Bone spurs (bone overgrowths).
• Dull pain in the hip, knee, or lower back.
• Limping.

307


Jones Fracture
Proximal fractures of the 5th metatarsal
Location
Associated with
Proximal diaphysis
Stress fracture
Metaphysis
Jones fracture
Tuberosity
Avulsion fracture
Apophysis
Normal at 10 - 16 years
Os vesalianum Present in 0.1–1%

308


sciatic nerve
common fibular nerve
tibial nerve
BACK OF RIGHT LEG
tibia
tibial nerve
flexor retinaculum ligament
calcaneus
RIGHT ANKLE
Pain and numbness
Weakened toe flexion
Tarsal Tunnel Syndrome
Medial View
Gastrocnemius muscle
Tibia
Flexor digitorum longus muscle
Tibialis posterior tendon
Flexor retinaculum
Soleus muscle
Achilles tendon
Posterior tibial artery
Tibial nerve
Flexor digitorum longus tendon
Flexor hallucis longus tendon
calcaneus
Medial plantar artery and nerve

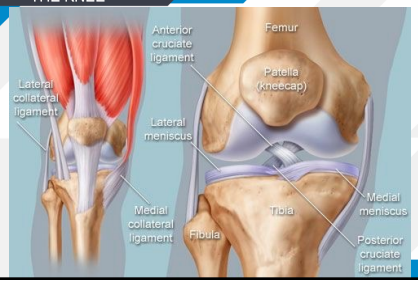
309

WHY SHOULD I CARE ABOUT THE FEET?

- Most Chiropractors NEVER check the feet.
- Medical Professionals are too focused on the location of the pain and they ignore the "Big Picture".
- The feet support and balance the entire body, including the shoulders, neck and TMJ.
- Without proper support arch issues of the feet only worsen with age; they do not improve.
- Extremity problems will destabilize the spine. Stabilize the extremities and the spine follows.

310

THE KNEE



311

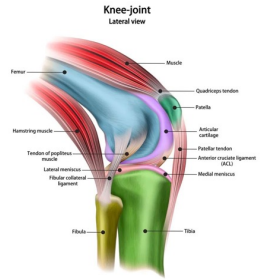
THE KNEE JOINTS

One joint is between the femur and tibia **(tibiofemoral joint)**.

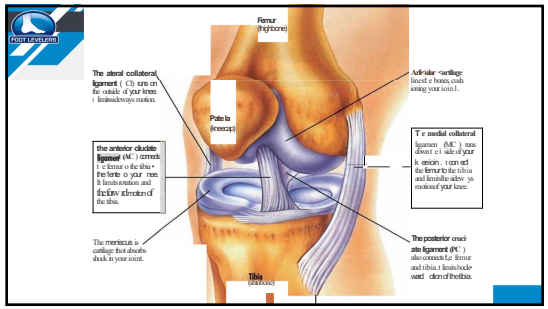
One is between the femur and patella **(patellofemoral joint)**.

Modified hinge joint allows flexion/ extension and slight internal/ external rotation.

At birth, the patella is formed from cartilage, which ossifies ages 3-5.



312



313

Knee Movements

- **Flexion** : these muscles produce flexion :
  Biceps femoris , Semitendinosus , Semimembranosus , Gracilis, Sartorius Popliteus .
  Flexion is restricted by the contact of the leg with the thigh.

Extension : by the Quadriceps femoris
Extension is limited by the tension in all the ligaments of the joint.

Medial Rotation : by the Sartorius Gracilis Semtendinosus

Lateral Rotation : by the Biceps femoris

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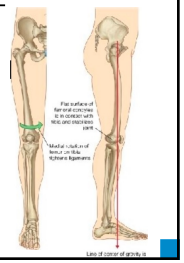
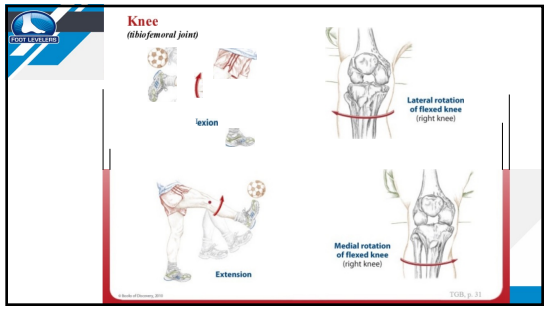
Screw Home Mechanism

- The extended knee is in locked position
  - medial rotation of the femur results in a twisting and tightening of all the major ligaments of the joint
  - The knee becomes a mechanically rigid structure
  - The cartilaginous menisci are compressed like rubber cushions between the femoral and tibial condyles



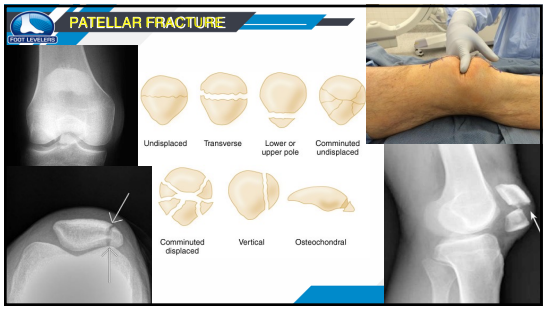
315


Knee
(tibiofemoral joint)
lexion
Extension
Lateral rotation of flexed knee (right knee)
Medial rotation of flexed knee (right knee)

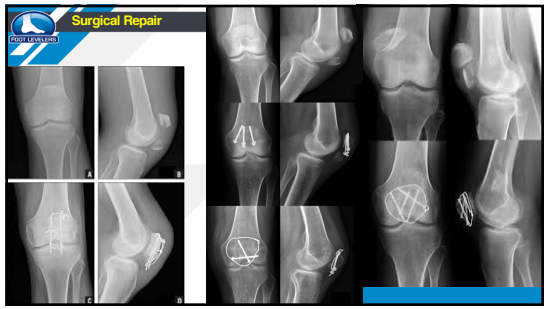
316


COMMON KNEE AILMENTS:
• Fracture (Patella most common)
• Dislocation
• ACL Injuries
• PCL Injuries
• Collateral Ligament Injuries
• Meniscal Tears
• Tendon Tears

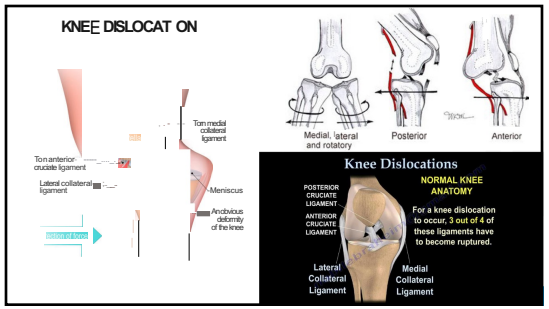
317


PATELLAR FRACTURE
Undisplaced
Transverse
Lower or upper pole
Comminuted undisplaced
Comminuted displaced
Vertical
Osteochondral

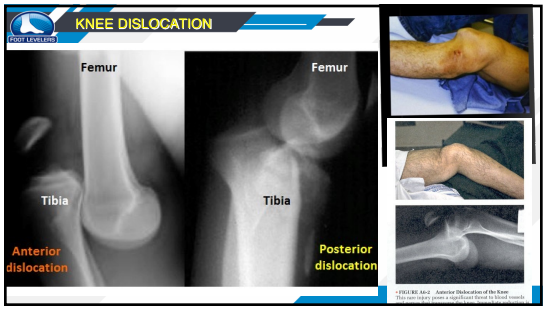
318


Surgical Repair

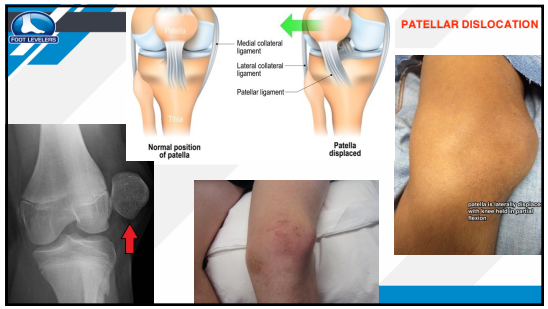
319


KNEE DISLOCAT ON
Torn medial collateral ligament
Torn anterior cruciate ligament
Lateral collateral ligament
Meniscus
Anobvious deformity of the knee
Medial, lateral and rotatory
Posterior
Anterior
Knee Dislocations
NORMAL KNEE ANATOMY
POSTERIOR CRUCIATE LIGAMENT
ANTERIOR CRUCIATE LIGAMENT
For a knee dislocation to occur, 3 out of 4 of these ligaments have to become ruptured.
Lateral Collateral Ligament
Medial Collateral Ligament

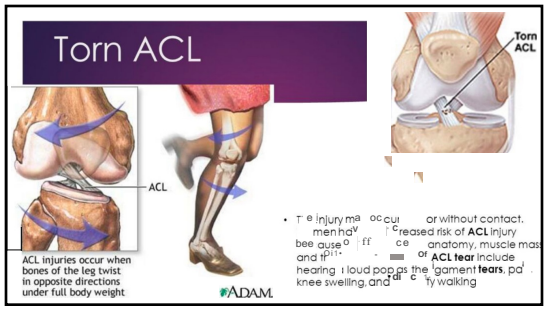
320


KNEE DISLOCATION
Femur
Tibia
Anterior dislocation
Femur
Tibia
Posterior dislocation

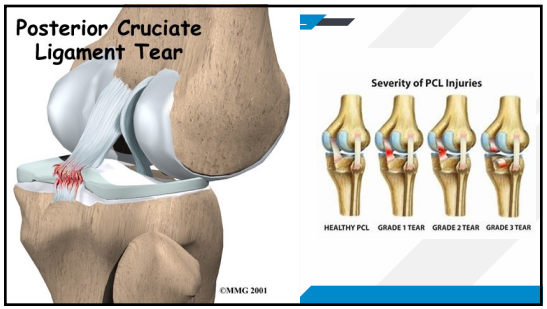
321


PATELLAR DISLOCATION
Medial collateral ligament
Lateral collateral ligament
Patellar ligament
Normal position of patella
Patella displaced

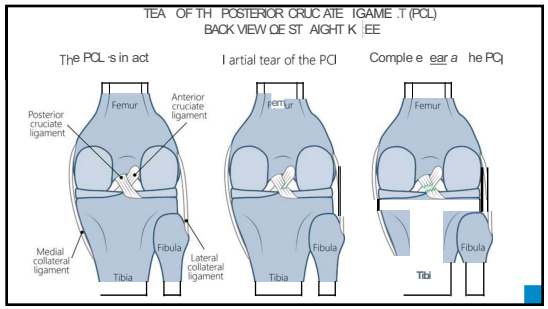
322


Torn ACL
ACL
Torn ACL
ACL injuries occur when bones of the leg twist in opposite directions under full body weight
A.D.A.M.

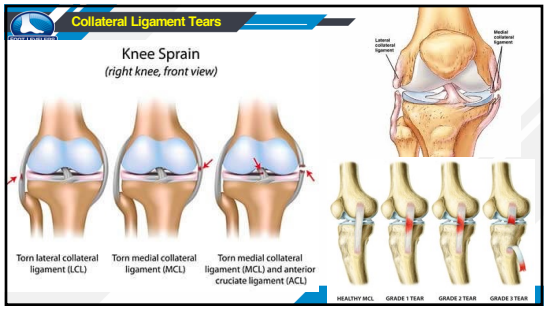
323


Posterior Cruciate Ligament Tear
Severity of PCL Injuries
HEALTHY PCL
GRADE 1 TEAR
GRADE 2 TEAR
GRADE 3 TEAR
©MMG 2001

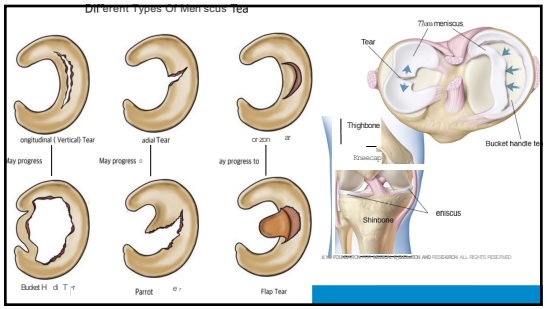
324


TEA OF TH POSTERIOR CRUC ATE IGAME .T (PCL)
BACK VIEW QE ST AIGHT K EE
The PCL s in act
I artial tear of the PCI
Comple e ear a he PCI
Femur
Posterior cruciate ligament
Anterior cruciate ligament
Medial collateral ligament
Lateral collateral ligament
Fibula
Tibia
Tibi

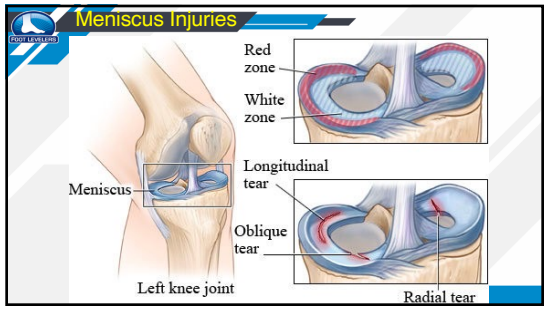
325


Collateral Ligament Tears
Knee Sprain
(right knee, front view)
Torn lateral collateral ligament (LCL)
Torn medial collateral ligament (MCL)
Torn medial collateral ligament (MCL) and anterior cruciate ligament (ACL)
HEALTHY MCL
GRADE 1 TEAR
GRADE 2 TEAR
GRADE 3 TEAR

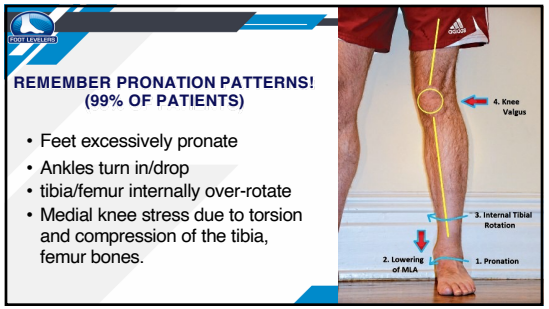
326


Tear
Thighbone
Kneecap
Shinbone
Bucket handle te
Flap Tear

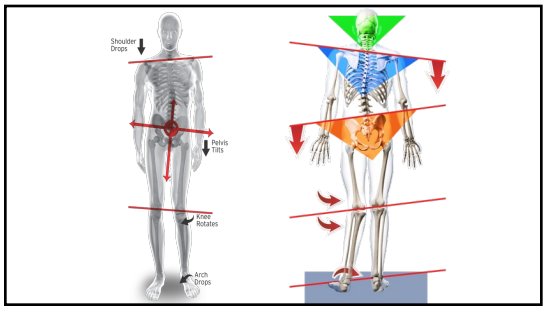
327


Meniscus Injuries
Red zone
White zone
Longitudinal tear
Meniscus
Oblique tear
Left knee joint
Radial tear

328


REMEMBER PRONATION PATTERNS!
(99% OF PATIENTS)
• Feet excessively pronate
• Ankles turn in/drop
• tibia/femur internally over-rotate
• Medial knee stress due to torsion and compression of the tibia, femur bones.
4. Knee Valgus
3. Internal Tibial Rotation
2. Lowering of MLA
1. Pronation

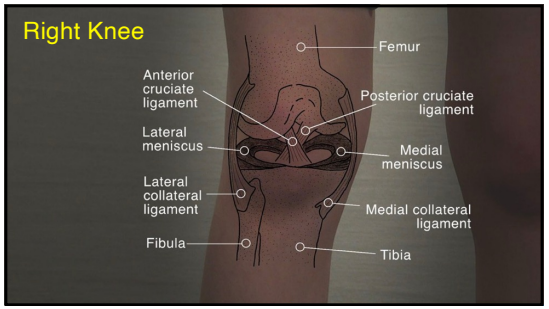
329


Shoulder Drops
Pelvis Tilts
Knee Rotates
Arch Drops

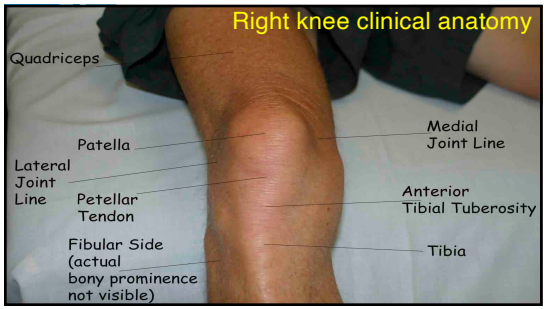
330


Partner Up!

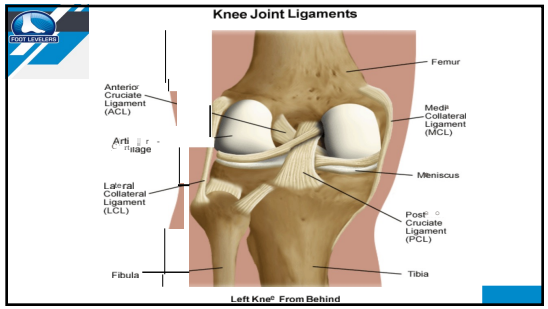
331


Right Knee
Femur
Anterior cruciate ligament
Posterior cruciate ligament
Lateral meniscus
Medial meniscus
Lateral collateral ligament
Medial collateral ligament
Fibula
Tibia

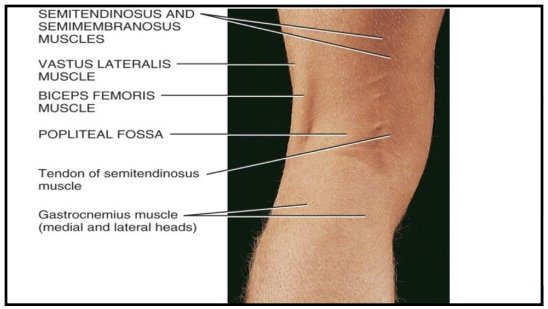
332


Right knee clinical anatomy
Quadriceps
Patella
Medial Joint Line
Lateral Joint Line
Petellar Tendon
Anterior Tibial Tuberosity
Fibular Side (actual bony prominence not visible)
Tibia

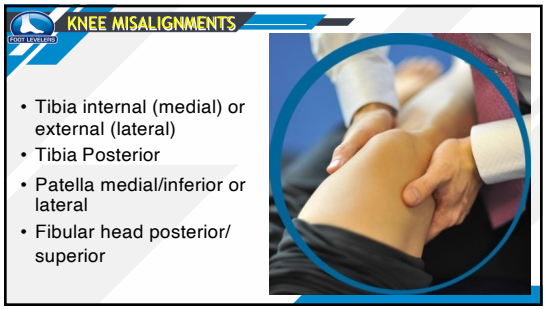
333


Knee Joint Ligaments
Femur
Anterior Cruciate Ligament (ACL)
Medial Collateral Ligament (MCL)
Meniscus
Lateral Collateral Ligament (LCL)
Posterior Cruciate Ligament (PCL)
Fibula
Tibia
Left Knee From Behind

334


SEMITENDINOSUS AND SEMIMEMBRANOSUS MUSCLES
VASTUS LATERALIS MUSCLE
BICEPS FEMORIS MUSCLE
POPLITEAL FOSSA
Tendon of semitendinosus muscle
Gastrocnemius muscle (medial and lateral heads)

335


KNEE MISALIGNMENTS
• Tibia internal (medial) or external (lateral)
• Tibia Posterior
• Patella medial/inferior or lateral
• Fibular head posterior/ superior

336

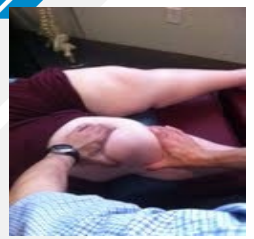
337

EXT./INT. ROTATED TIBIA:

- CP: thumb web contact w/ both hands stabilizing femur and tibia. Cushion under knee.
- Drop table: similar to manual.
- Spring loaded instrument:

338

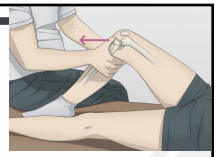
INT/EXT. ROTATED TIBIA



339

POSTERIOR TIBIA

- Supine: knee bent, interlaced fingers, slight forward tug on tibia.
- Prone: knee bent, knife edge or thumb web contact
- Drop table: same as supine or prone
- Spring loaded instrument



340

FIBULAR HEAD

- Anterior Fibula
- Posterior/Inferior Fibula
- Manual, Drop table, Spring loaded instrument

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MEDIAL/INFERIOR PATELLA

CP: supine with knee bent, thumb web

Drop table: pillow under knee

Spring loaded instrument:

342


Prone knee Adjustments

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KNEE SUPPORT

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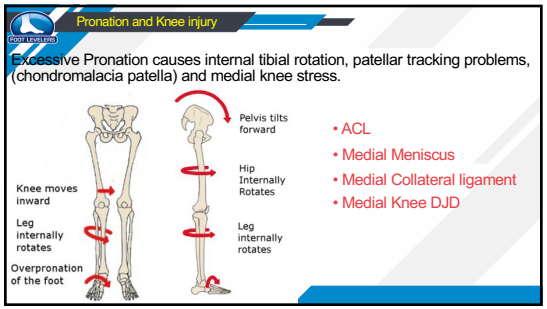
Pronation and Knee injury
Excessive Pronation causes internal tibial rotation, patellar tracking problems, (chondromalacia patella) and medial knee stress.
Pelvis tilts forward
Hip Internally Rotates
Leg internally rotates
Knee moves inward
Leg internally rotates
Overpronation of the foot
• ACL
• Medial Meniscus
• Medial Collateral ligament
• Medial Knee DJD

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YOUR FEET COULD BE
CAUSING YOUR KNEE PAIN
OPTIMAL FOOT
OVERPRONATED FOOT
(CAN CAUSE KNEE PAIN)
Femur
Patella
Tibia
softening and fibrillation of the articular cartilage
angle ~ 20° - 30°
rotation of the lower limb
overpronation of the foot
scan of optimal foot
scan of pronated foot
FOOT LEVELERS

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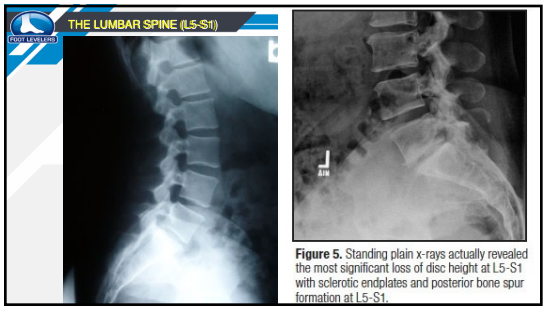
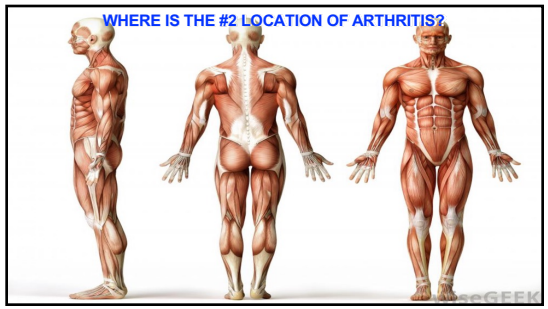
Where's the #1 Location of Arthritis?

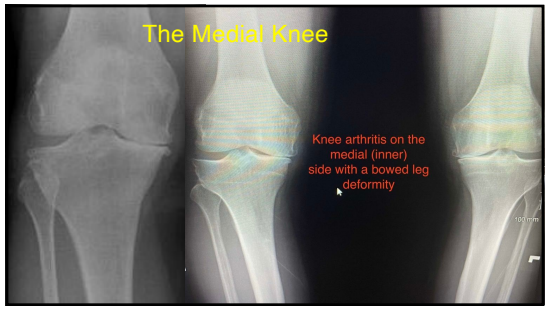
347


THE LUMBAR SPINE (L5-S1)
Figure 5. Standing plain x-rays actually revealed the most significant loss of disc height at L5-S1 with sclerotic endplates and posterior bone spur formation at L5-S1.

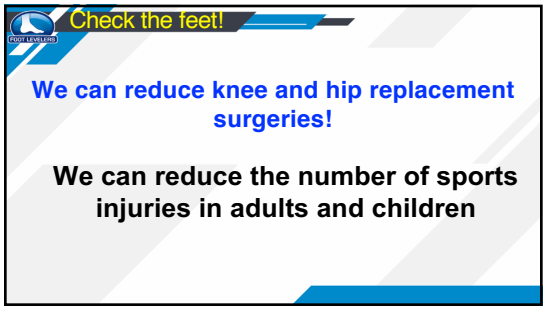
348


WHERE IS THE #2 LOCATION OF ARTHRITIS?

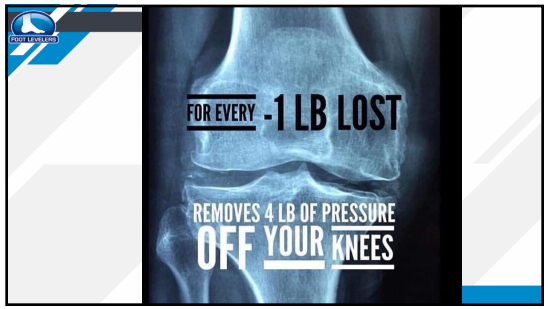
349


The Medial Knee
Knee arthritis on the medial (inner) side with a bowed leg deformity

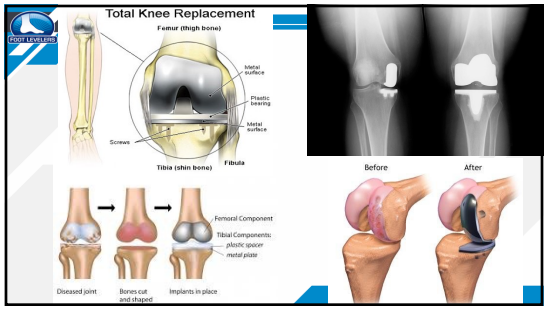
350


Check the feet!
We can reduce knee and hip replacement surgeries!
We can reduce the number of sports injuries in adults and children

351


FOR EVERY -1 LB LOST
REMOVES 4 LB OF PRESSURE
OFF YOUR KNEES

352


Total Knee Replacement
Femur (thigh bone)
Metal surface
Plastic bearing
Metal surface
Screws
Tibia (shin bone)
Fibula
Before
After
Femoral Component
Tibial Components:
plastic spacer
metal plate
Diseased joint
Bones cut and shaped
Implants in place

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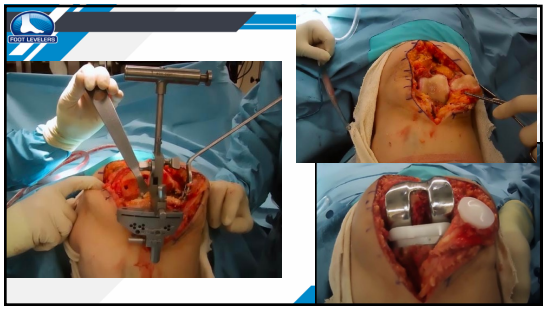
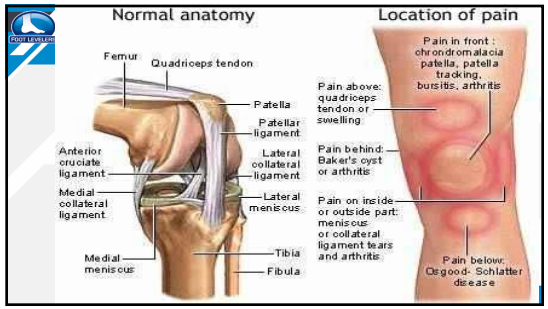


354


Normal anatomy
Location of pain
Femur
Quadriceps tendon
Patella
Patellar ligament
Anterior cruciate ligament
Lateral collateral ligament
Medial collateral ligament
Lateral meniscus
Medial meniscus
Tibia
Fibula
Pain in front : chrondromalacia patella, patella tracking, bursitis, arthritis
Pain above: quadriceps tendon or swelling
Pain behind: Baker's cyst or arthritis
Pain on inside or outside part: meniscus or collateral ligament tears and arthritis
Pain below: Osgood- Schlatter disease

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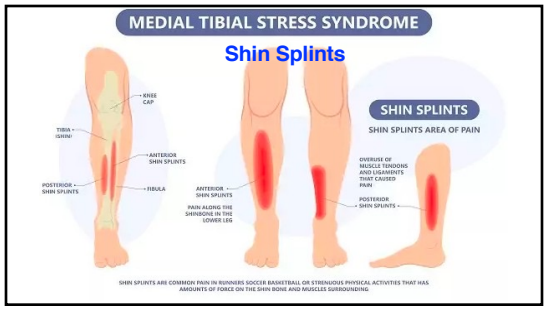
MEDIAL TIBIAL STRESS SYNDROME
Shin Splints
SHIN SPLINTS
SHIN SPLINTS AREA OF PAIN

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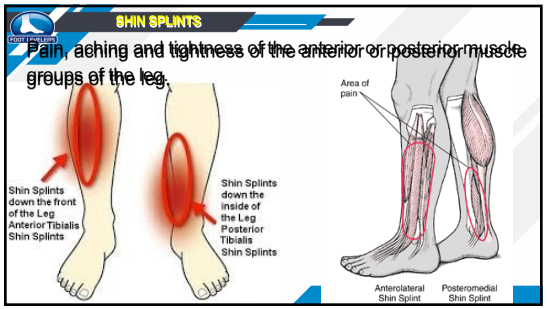
SHIN SPLINTS
Pain, aching and tightness of the anterior or posterior muscle groups of the leg.
Shin Splints down the front of the Leg Anterior Tibialis Shin Splints
Shin Splints down the inside of the Leg Posterior Tibialis Shin Splints
Area of pain
Anterolateral Shin Splint
Posteromedial Shin Splint

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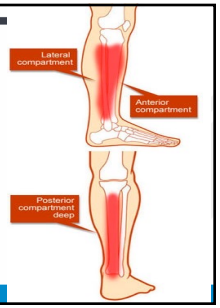
ETIOLOGY

- Overuse injury
- Inflammatory process that affects muscle, tendon and bone.
- Bone resorption
- Stress fracture
- Anyone engaged in WB activity can get th



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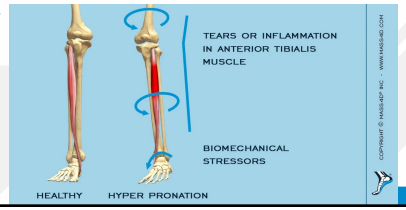
SHIN SPLINTS

Role of Excessive Pronation:

Eversion, dorsiflexion, abduction and inward leg rotation increase stretch and decelerates contraction of shin muscles.



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SHIN SPLINTS – GAIT CYCLE

Anterior Shin Splints: Anterior Tibialis muscle.
Active during heel strike, toe off, swing phase

Posterior Shin Splints: Posterior Tibialis muscle
Active just after heel strike to just prior to heel lift.

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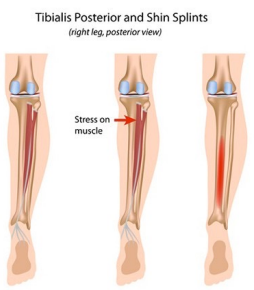
SHIN SPLINTS: S&Ss

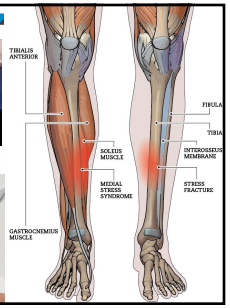
1. Hx. of change in recent activity
2. Gradual onset of pain that worsens
3. Deep, achy, throbbing
4. Location



361

SHIN SPLINTS: TX

- Physiotherapy modalities
- Adjust: talus, calcaneus, navicular, rest of the foot



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SHIN SPLINTS: TX

Support:
Stabilizing Orthotics
Elastic Taping
Types of shoes
Activities

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RESEARCH: SPORTS MEDICINE

- High correlation between shin splints and excessive pronation

DaLacerada F: *A study of the anatomical factors involved in Shin Splints*, J Orthopaedic and Sports Phys Therapy, 1980; (2) 55-59

Austin W: *Shin splints with underlying posterior tibial tendinitis: A case report*, J Sports Chiro Rehab 1996; 10 (4) 163-168.

364

Shin Pain (Shin Splints) Rehabilitation Exercises

365

SHIN SPLINTS: TX

Rehabilitation:

- "Basic 4" foot/ankle series
- Towel scrunch exercises
- Golf/tennis ball exercises

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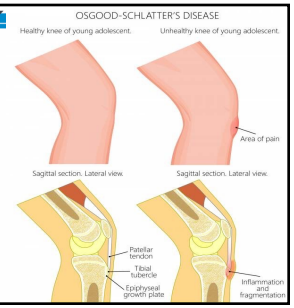
OSGOOD SCHLATTER

Development of an avulsion fracture at the tibial tubercle



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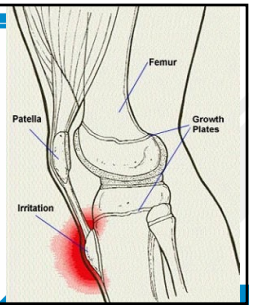
OSGOOD SCHLATTER

Forceful contraction of quadriceps femoris tendon onto immature tibial tubercle.

Children in rapid growth period are predisposed.



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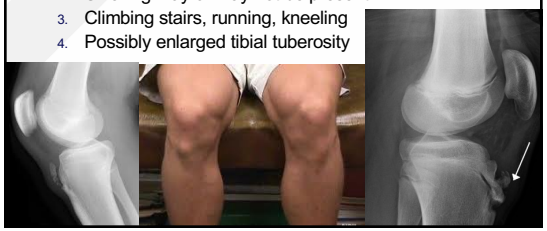
OSGOOD SCHLAGER: S & S

1. Pain, tenderness at tibial tuberosity
2. Swelling may or may not be present
3. Climbing stairs, running, kneeling
4. Possibly enlarged tibial tuberosity



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OSGOOD SCHLATTER: TX

Physiotherapy modalities:

Adjust:
Tibia
Patella
Femur

InMotion

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OSGOOD SCHLATTER: TX

Support:

Stabilizing orthotics
Taping
Osgood Schlatter Brace

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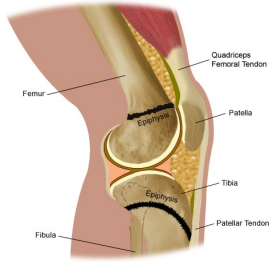
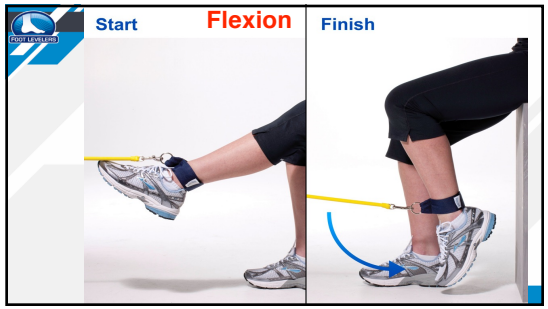
OSGOOD SCHLATTER: TX

Rehabiltiation:

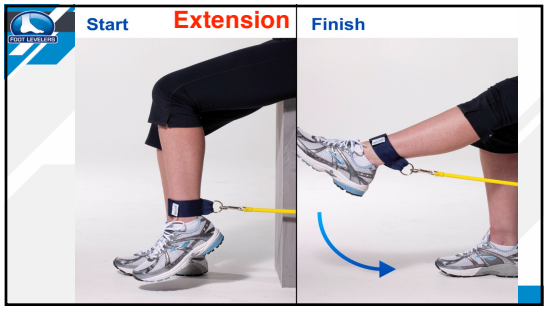
Knee Series with
the Theraciser



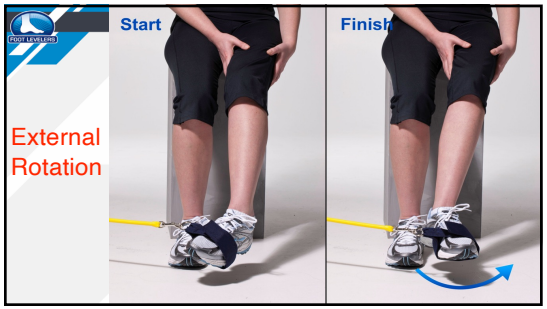
372


Start
Flexion
Finish

373


Start
Extension
Finish

374


Start
Finish
External
Rotation

375

376