

FUNCTIONAL MANUAL THERAPY APPROACH TO THE MANAGEMENT OF THE FOOT AND ANKLE

INSTRUCTORS

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The purpose of this one day seminar is to present a systematic assessment and treatment approach for the foot and ankle and the concepts of regional interdependency. Assessment will begin with the utilization of five functional tests to correlate foot and ankle dysfunction to inefficient motor control and postural stability. The course material includes systematic identification of each muscle and an evaluation to identify dysfunctions of muscle play, tone, functional excursion, and neuromuscular control. In addition, participants will perform selected assessment of related articular dysfunction. Functional Mobilization™ treatment tools for the management of restricted soft tissues and articulations will be presented, including direct passive mobilization, mobilization through active movement, and mobilization utilizing resisted PNF techniques.

- ❖ Define and learn anatomy of region
- ❖ Define the three general foot types – efficient, supinated and compensated supinated
- ❖ Propose a developmental theory regarding dysfunctional feet
- ❖ Define the efficient structure and function of the foot and ankle
- ❖ Present and practice Functional Mobilization™ – Mobilization of soft tissues and joints coupled with PNF techniques
- ❖ Identify soft tissue and articular dysfunction

The IPA Basic Treatment Philosophy and Premise

Evaluation and Treatment of the Mechanical Components:

- ❖ Evaluate the joint, soft tissue, muscular and neurovascular components which limit range of motion or function.
- ❖ Treatment should involve soft tissue and joint mobilization, Functional Mobilization, Functional Neurovascular Mobilization and PNF techniques for increasing range of motion such as Combination of Isotonics, Hold Relax, and Contract Relax.

Evaluation and Treatment of the Neuromuscular Components:

- ❖ Evaluate the patient's muscular ability to efficiently initiate and demonstrate proper strength and endurance for any given contraction.
- ❖ Evaluation can include actual manual muscle resistance, as well as the Lumbar Protective Mechanism and the Elbow Flexion Test.
- ❖ Treatment should include manual facilitation techniques such as PNF as well as a directed exercise program.
- ❖ Be sure to assess and treat both the core automatic muscular response, as well as the global initiation, strength and endurance.

Evaluation and Treatment of the Motor Control Components:

- ❖ Motor control and motor learning refer to the individual's ability to utilize efficient mechanical and neuromuscular components to effectively assume a balanced posture and perform efficient functional activities with necessary balancing reactions.
- ❖ Motor learning is trained through resistance and repetition, focusing on the patient's kinesthetic and proprioceptive awareness and enhancement.
- ❖ Effective motor control allows for an efficiently timed activation of the core and global muscles.

DEFINITION OF TERMS

- A. End Feel** – Quality of tissue tension at end range - Normal being springy and dysfunctional being hard or non compliant. All FM evaluations and treatment depends on End Feel.

B. MYOFASCIAL DYSFUNCTIONS

- 1. Evaluation** – The specific direction of the restriction is identified through the quality of end feel of the tissues. Tissues in different regions may differ in excursion, but end feel when healthy is always springy or giving. Restrictions are identified through end feels, which are hard and non springy. Assess for the location and direction of the maximal restriction.
- 2. Muscle Play - Gratz – 1938** Actually described the space that is created between structures by fascia as functional joints. A functional joint was described as a “space built for motion.” Fascia separates muscles and structures allowing independent function while joining them together as a functional unit - Muscle play – Normal accessory muscle mobility in relationship to surrounding muscles, neurovascular, and bony structures. Evaluated in both lengthened and shortened range of motion
- 3. Muscle Tone** – Points of increased density (hyperirritability) with a hard end-feel. These points are often tender to palpation with or without referral pain patterns.
- 4. Muscle Functional Excursion** – Capacity of myofascial structures to lengthen and fold. In efficient state therapist will identify a springy end-feel. A dysfunctional state will have either a hard end-feel (inability to efficiently lengthen) or a boggy end-feel (inability to shorten). In this course we will utilizing PNF patterns to evaluate soft tissue mobility.

- C. SOFT TISSUE LAYER CONCEPT** – A foundational concept of this treatment method is to respect and treat according to the specific layer of tissue restriction or motion barrier. The superficial layers are first evaluated and treated prior to proceeding to the deeper layers. Dysfunctions are identified by specific depth, direction, and angle of restriction.

- D. SOFT TISSUE MOBILIZATION (STM)** – A system to evaluate and treat soft tissue dysfunction that precipitates myofascial pain, but also evaluate and treat those dysfunctions that alter structure and function and produce mechanical strains upon symptomatic structures.

1. Sustained Pressure

- a. Pressure** – Applied with fingertip(s) or thumbs Usually through the medial border of the middle finger tip.
- b. Tension** - Applied to the specific direction of identified restriction.
- c. Therapist body position** - In line so that technique can be applied toward restriction.
- d. Maintain pressure on the same layer** – Following the path of release.
- e. Re evaluate.** – For remaining tissue restrictions

2. Assisting Hand Procedures

a. Tissues Shortened – While treatment hand maintains tension on the restriction.

- 1) Assisting hand creates slack of the tissues around the restriction by shortening the same layer of tissue.
- 2) In most cases try shortening first and if the restriction does not begin to release within 10 seconds try tissues lengthening.

b. Tissues Lengthened –Treatment hand maintains tension on the restriction.

- 1) The Assisting Hand creates tension/traction on the restriction by stretching away surrounding tissue of the same layer.
- 2) The exact direction varies with different restrictions.

3. Muscle play

a. Perpendicular Mobilization (Transverse Deformation)

- 1) **Purpose** – To evaluate and treat the restrictions limiting muscle play (accessory mobility) of a muscle.
- 2) **Evaluation Procedures** – Identify restriction of muscle play for specific location, direction, and depth. Often identified through perpendicular strumming or perpendicular deformation.

3) Treatment Procedures (Cascade of techniques)

a) **Specific Sustained Pressure** – Treatment hand pressure directly on a specific restriction (location, depth, direction).

- (1) Assisting hand can lengthen or shorten the surrounding tissues. Perform an associated oscillation to assist in facilitating a release.
- (2) If dysfunction is not normalizing next utilize an unlocking spiral.
- (3) Then use associated or direct oscillation.

b) **Rhythmical Oscillatory Technique (Direct Oscillation)** - Rhythmically deform muscle in the direction of specific restriction.

- (1) Patient's body should move with the oscillation. This aids the patient in relaxing.
- (2) Speed of oscillation will vary with depth of restriction and size of patient.
- (3) This is similar to a grade III or IV mobilization procedure.
- (4) Maintain contact and appropriate layer.
- (5) Assisting hand can shorten or lengthen surrounding tissues.

b. Parallel Mobilization (Longitudinal Deformation)

1) Purpose

- a) To evaluate and treat the restrictions of a muscle in relationship to surrounding structures;
- b) This is an additional evaluation and treatment procedure in conjunction with perpendicular strumming and perpendicular mobilization.

2) Evaluation Procedure - Parallel (Longitudinal deformation) - Angled pressure directed parallel to muscle belly or the seam between it and other structure. This is a parallel assessment to identify restrictions of a specific direction, depth, and angle which limits the muscles accessory mobility or play. The hamstrings are a good region in which to practice parallels techniques.

3) Treatment Procedures

- a) **Treatment hand** - Apply sustained pressure, unlocking spiral, or direct oscillation to identified restrictions.
- b) **Assisting hand** - Place muscle on slack around restriction. As the restriction normalizes, stretch tissues away from the restriction.
- c) **Use of appropriate body position, finger position, and body mechanics.**

E. FUNCTIONAL MOBILIZATION (FM) - is the integrated use of soft tissue and joint mobilization combined with the dynamic principles and procedures of PNF. This is a step-by-step evaluation and treatment approach, which combines mobilization or stabilization with neuromuscular reeducation. These combined tools provide the therapist with a dynamic capacity to effectively evaluate and treat mechanical and neuromuscular dysfunctions of multiple movement segments.

1. MOBILIZATION – The use of Manual Therapy to enhance the mobility of restricted tissues or articulations.

- a. **Passive Mobilization** – Use of oscillations or sustained pressure to the barrier to enhance mobility.
- b. **Active Mobilization** – Use of the patients directed active motion to enhance mobility. The therapist maintains pressure in the precise direction of the barrier during the patient's active contractions and continues to maintain pressure as the restriction releases and follows the path of release.
- c. **Resisted Mobilization** – Use of resisted hold (true isometric contraction), contract (maintained isotonic contraction) or combination of isotonic to engage the barrier and enhance mobility.
- d. **Percussion Mobilization** – Use of a quick glancing percussion force (of appropriate force) through a finger or supportive device to enhance mobility. In most cases the percussion is applied while the patient is performing a holding localizing contraction.
- e. **Resisted Enhanced Manipulation (REM)** – Use of an appropriate holding contraction to localize the restriction which is maintained during the application of the thrusting procedure.

- 2. NEUROMUSCULAR FACILITATION** – Utilizing prolonged holds (isometric or maintained isotonic) to facilitate core the inhibited core musculature to enhance the Automatic Core Engagement (ACE). The purpose of this phase is to enhance muscular initiation, strength and endurance.
- 3. MOTOR CONTROL** – Development of coordinated and dynamic movement patterns.

Functional Mobilization - Treatment Progression

I. Identification Phase of Restriction (FM I)



II. Localization Phase to Hardest end feel (FM I)



Direct Localization
Treatment Hand

Indirect Localization
Adjusting extremity or trunk



III. Mobilization phase – Functional Mobilization



Sustained Contraction
Isometric or Maintained Isotonic contraction.
This is performed in the direction that restricted
tissues or joint would normally move.

Combination of Isotonics
Take up slack as restriction releases.



IV. Neuromuscular Stabilization Phase

Prolonged hold in new range – To develop ability to efficiently stabilize movement segments.
Progress through phasic shakes to stabilizing contraction to combination of isotonics.



V. Motor Control Phase

To improve coordinated movement and postural control.



Combination of Isotonics

Isotonic Reversals

composed by Rachel Miller, PT, CFMT 2/06

WEIGHT AND NON-WEIGHT BEARING TREATMENT OF LOWER LEG, ANKLE, AND FOOT

A. INTRODUCTION AND RELATIVE ANATOMY

1. **Structure and function of the foot**
2. **Use of orthotics** – The hypermobile, rigid and the atrophied foot.
3. **Types of feet**
 - a. **Efficient structure and function**
 - b. **Supinated foot**
 - c. **Compensated supinated foot**
 - d. **Pronated foot**
4. **Concepts of dysfunctional feet**

Netter References:

- *Bones of Foot – Lower Limb*
- *Bones of Foot – Ankle and Foot*

5th edition 511 and 512
4th edition 523 and 524

B. STEP-BY-STEP EVALUATION

1. **Observe** – Alignment – Note position of femur, tibia, and patella.
2. **Tracing** – Use of hands to trace lower extremity soft tissues and position of foot and **circumferential assessment of the calf and thigh.** (Fig. 1)
3. **Knee tracking** – Observe and palpate knee tracking and foot stability. (Fig. 2)
4. **Calcaneus** – Position and medial/lateral mobility. Calcaneal weight bearing – Fingers under medial and lateral aspect assessing weight bearing then assess during knee tracking.
5. **Tibia, fibula and talus mobility during knee tracking.**
6. **Plantar surface weight bearing including during knee tracking.**
7. **Mid foot** – Width.
8. **First ray and great toe position.**
9. **First and fifth MP weight bearing during knee tracking.**
10. **Squatting** – Evaluate ability to keep heels on floor.
11. **Balance** – Bilateral and unilateral standing on heels and toes.
12. **Gait assessment.**

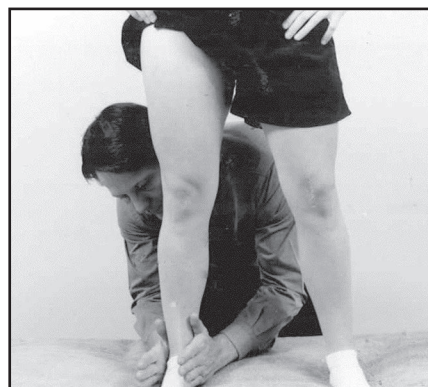


figure 1



figure 2

13. Foot Posture and Mobility Evaluation

a. Sitting

- 1) **Apply vertical compression** through the knee into foot in a natural position and evaluate the response of the foot and ankle. (Fig. 1)
- 2) Attempt to **mold foot** into a neutral subtalar and forefoot position (Fig. 2)
- 3) Note **structural limitations** to assuming this position
- 4) **Retest vertical compression.**

b. Standing

- 1) Observe and define normal foot posture and note changes during knee tracking. (Efficient state should have the knee tracking over the second ray)
- 2) Mold foot - and support in a balanced posture so that during treatment, knee tracking is toward second toe.



figure 1



figure 2

C. TREATMENT

The following treatment segment is integrated. Initial evaluation and treatment is performed in weight bearing, and then as dysfunctions are identified, they are treated ideally in a non-weight bearing position. The evaluation and treatment strategy is organized in a sequence progressing from calcaneus proceeding forward to the toes.

1. CALCANEUS

The calcaneus is the first structure evaluated and treated. In standing, observe apparent weight-bearing pattern and position. Attempt to move from medial to lateral position. In the efficient state, it is mobile in standing with neutral weight bearing.

- a. **Calcaneal Talar articulation - Distraction** - To enhance mobility of calcaneus in relation to talus - Position supine with foot held in full dorsi flexion. Grasp calcaneus (dysum helps to provide better grip) and place long axis pull. FM through patient actively shrugging hip cranially. On relaxation take up the slack. Can perform an REM. To be performed prior to shearing (calcaneal inversion and eversion) treatment.(Fig. 1 & 2)



figure 1



figure 2

- b. **SIDE-LYING** – Evaluate bilaterally for ability to translate and tilt.

- 1) Heel slightly off edge of table stabilize foot and hold in full dorsiflexion with lateral leg or **strap**. Stabilizing hand's first finger placed under calcaneus along joint line to block talar motion. While the heel of the treatment hand mobilizes calcaneus in direction of restriction. Can grip under table to increase force. Use active dorsiflexion and plantar flexion or resisted eversion or inversion. **STM** along joint line. (Fig. 3)
- 2) **Half foam roll** – Mobilize over arched surface. (Fig. 4)

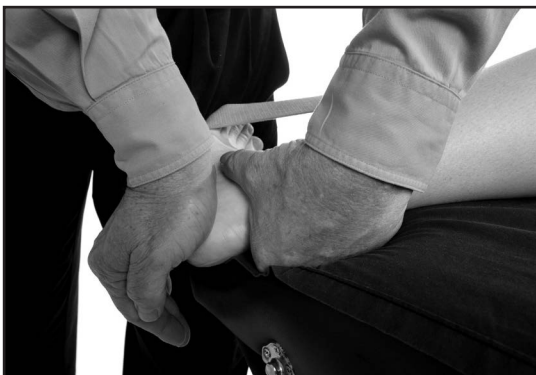


figure 3



figure 4

2. SOFT TISSUE MOBILIZATION

- a. **PLANTAR SURFACE** – In the efficient state, palpation of the plantar surface during knee tracking will not produce any noticeable tension in the tissues or fascia. In a dysfunctional state there will be constant or intermittent tension developed during the motion. Trace and isolate the dysfunctional tissue.

1) **Prone – Fat pad** – Mobilization of the fat pad over the calcaneus. (Fig. 1)

2) **Prone or supine with foot off edge of table** – This is the best position to access the region. In acute stages of plantar pain, treatment can be performed in shortened ranges of motion of the foot and progressed to passive dorsiflexion during treatment and then during active motions. It is important to assess the soft tissue along the bony contours of the calcaneus (Fig. 2)



figure 1



figure 2

- b. **POSTERIOR MYOFASCIAL STRUCTURES** – In the efficient state they remain pliable, mobile in relation to each other and do not produce torsions during motion. – **Achilles tendon** – In the efficient state, it is mobile medial/laterally and posteriorly, as well as aligned vertically. Evaluate the ability of the tendon to slide freely within the surrounding soft tissues.

1) **PRONE – FMP – FOOT CIRCLES – Repeated passive/active dorsiflexion** – Observe and palpate effects on Achilles tendon, knee, calf muscles, and the extremity as a whole. Especially observe the knee. (Fig. 3)



figure 3

a) **Knee extension, achilles tendon and bony contours** – Evaluate and treat achilles tendon, bony contours, calf, and plantar surface with active and passive ankle motions.

Note: In an efficient state, there will not be any compensatory motions or selected tensions on soft tissues. Circumferential mobilization.

Achilles Tendon (Fig. 4)

- Sheath
- Medial to lateral play
- Anterior to posterior mobility



figure 4



figure 1



figure 2

- b) **Gastroc/soleus play** – Bend knee and grasp gastroc. Hold foot in dorsiflexion and extend knee to mobilize the interface between the gastroc and the soleus. (Fig. 1)
- c) **Knee flexion** – Evaluate and treat flexibility of plantar surface (active dorsi and plantar flexion), tibialis posterior, and flexor digitorum longus. (Fig. 2).
- d) **Soleus, Posterior Tibialis, and Toe flexor Mobilization – STM** – with stramming and sustained pressure with active foot dorsi and plantar flexion.
- e) **Interosseous membrane in prone with knee extension** (*only demonstrated*) – Restriction can limit separation of the tibia and fibula. Place a ½ foam roll under ankle. Sink fingers in vertical to intraosseous space while foot is in plantar flexion, then rotate fingers horizontally and have patient actively dorsi and plantar flex. (Fig. 3)



figure 3



figure 1



figure 2



figure 3



figure 4

c. **ANTERIOR MYOFASCIAL STRUCTURES** – In standing, assess the bony contours of the tibia and fibula during knee tracking. Also, assess ability of anterior myofascial structures to separate (play) and for increased tone.

1) **SUPINE – FMP – Foot Circles** (*Back Porch Doodling*) Note excursion, control of motion, and torsions of leg and knee. Evaluate myofascial structures for play, bony contour of tibia and fibula, plantar surface and toes, and treat restrictions while: (Fig.1, 2, 3 & 4)

a) **Therapist passively dorsiflexes foot** – *Note:* Patterns of ease and restriction.

b) **Patient actively oscillates foot** into dorsi and plantar flexion with foot inversion and eversion and toe flex/ext. – Mobilize while patient actively performs contrary motions of dorsiflexion with toe flexion and plantar flexion with toe extension.

c) **Therapist resists foot and ankle** motions to evaluate NMC. (*FMLQ*)

d. **ADDITIONAL POSITIONS** (*only demonstrated in class*)

1) **Side-lying** – Treat on side with restriction superiorly. Hold foot in dorsiflexion and perform active or resisted motions during mobilization of soft tissues and bony contours. Can use FMP of active and passive ankle motions. **FMP** – Inferior and superior leg tracking. (Fig. 2)

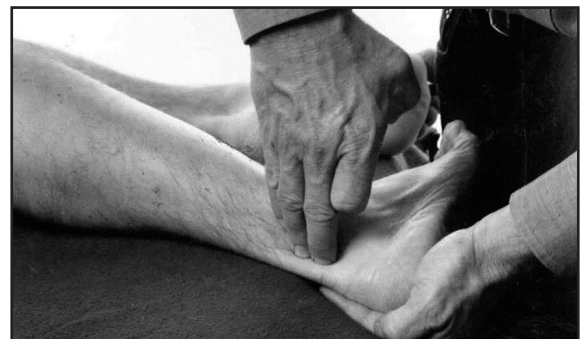


figure 2

- 2) **Hooklying** – This is a good position to assess the posterior soft tissues on slack. Also a very good position to access the deeper posterior structures such as the tibialis posterior. Use of circumferential with FMP Armadillo. (Fig. 1 & 2)

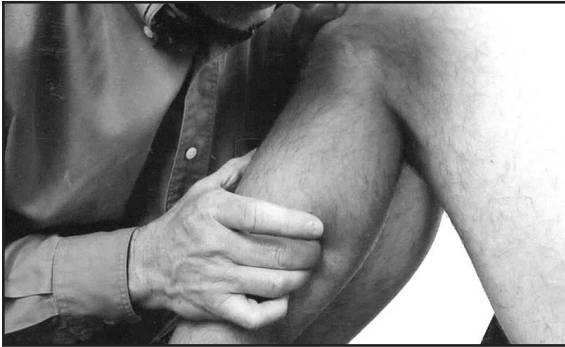


figure 1

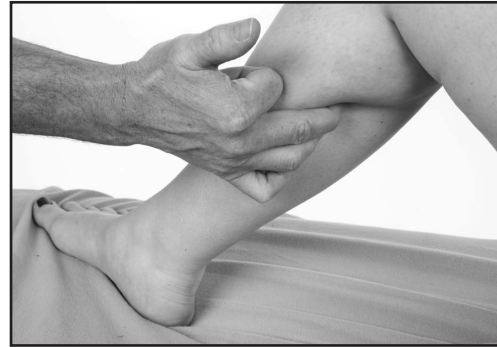


figure 2

- 3) **Sitting/Hooklying** – Good positions to access dysfunctions of bony contours and myofascial structures.
- 4) **Standing or half-kneeling – STM** – Treat anterior soft tissue restrictions and limited play with sustained pressure during knee tracking and inversion/eversion motions. Apply circumferential techniques. Also assess the posterior and anterior knee structures. (Fig 3 & 4)



figure 3



figure 4

- 5) **Standing or half-kneeling** – Place pressure on restricted tissues soleus, gastrocnemius, tibialis posterior, etc., during knee tracking. Patient can also perform inversion and eversion to further assist mobilization of tissues. Use **circumferential** techniques (Fig. 5, 6, & 7).



figure 5



figure 6

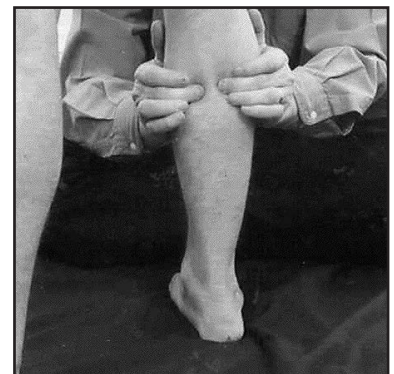


figure 7

3. ANKLE STRUCTURES

The ankle structures are evaluated in standing for their ability to fold over the palpating finger during knee tracking. Begin with distal end of the tibia and progress to medial talus, lateral talus and distal end of fibula.

- a. **FMP – Knee tracking in standing, sitting, and half-kneeling mobilization ankle structures** (*Moon Walking*) Evaluate the capacity for the anterior ankle structures to fold in response to knee tracking. A dysfunctional state is when fingers are pushed out of position (Fig. 1).
- b. **SUPINE - Talar/tibial distraction** - With foot held in full dorsi flexion distract the talus from the tibia. See two different grips. The emphasis is pressure on the head of the talus. FM through patient actively shrugging hip cranially. On relaxation take up the slack. Can perform an REM. (This is performed prior to shear correction). (Fig. 2, 3, & 4)



figure 1



figure 2



figure 3



figure 4

- c. **SIDE-LYING – Talus Glide** – Evaluate medial and lateral glide of talus with heel on half foam roll, in appropriate side-lying position. Place in full dorsiflexion and have patient actively evert or invert. A very important glide often lost after an ankle sprain. (Fig. 5 & 6)

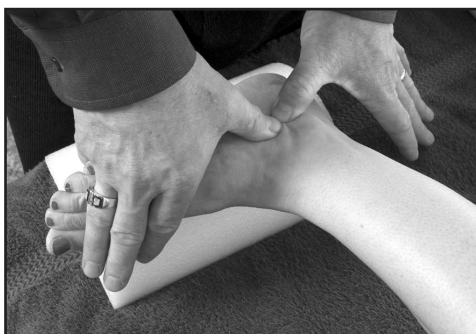


figure 5



figure 6

- d. **SUPINE – Ankle Mobilization** – Mobilize fibular and tibiotarsal articulation with active and passive dorsi flexion. Goal is to produce folding of the anterior ankle structures during dorsiflexion. Can also mobilize with resisted plantar and dorsiflexion. Use of strap over PT's foot to assist mobilization. (Fig. 1 & 2)



figure 1



figure 2

- e. **HANDS AND KNEES – Tibia, fibula, and talus anterior mobilization.** Sitting on heels, evaluate plantar flexion mobility and anterior structure mobility. (Fig. 3)



figure 3

- f. **SITTING, HALF KNEELING AND STANDING– Ankle Mobilization** – Mobilization of talus, tibia, and fibula articulations while patient is performing knee tracking. Use of thumbs or fingers directed onto restricted structure while sustaining pressure during motion. (Fig. 4)

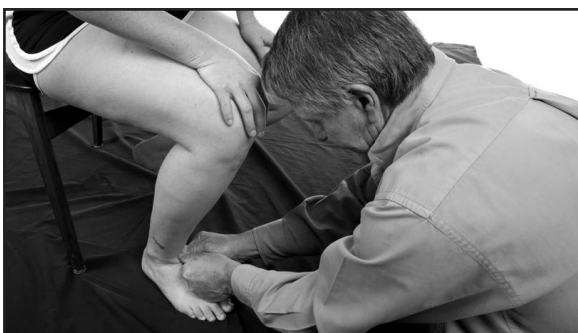


figure 4

g. **WEIGHT BEARING ANKLE MOBILIZATION**

1) **SITTING OR HOOKLYING** – Ankle Mobilization – Mobilization of talus, tibia, and fibula articulations while patient is performing knee tracking. Use of thumbs or fingers directed onto restricted structure while sustaining pressure during motion. (Fig. 4)



figure 4

2) **STANDING AND HALF KNEELING** - Treat dysfunctions of talus, tibia, and fibula during active knee motions to encourage them to move posterior of ankle axis. (Fig. 1 & 2)

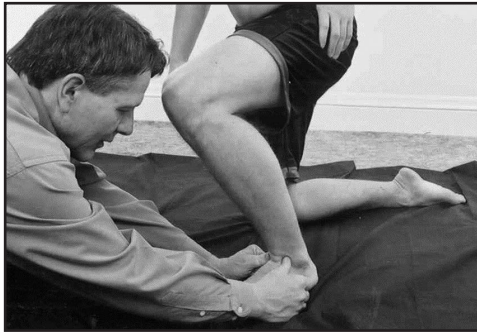


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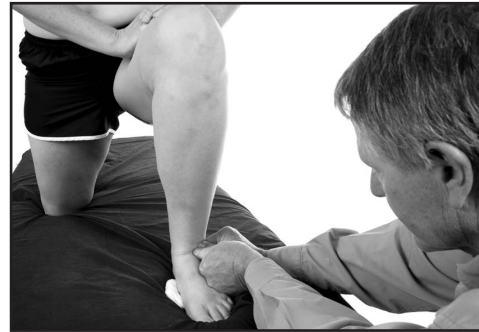


figure 2

a) **Use of interlocking grip** with heels of hands on malleoli. (*Art Ando, MS, PT, CFMT*) (Fig. 3)



figure 3

b) **Use a belt or strap** wrapped around ankle to place selective pressure on dysfunction. (Fig. 5 & 6)



figure 5



figure 6

4. MID-FOOT

Assess the navicular, cuneiforms, and cuboid for mobility in **standing** during knee tracking over second toe.

a. **In the efficient state** during knee tracking, the knee progresses over the second toe. The weight distribution produces a general spreading of the foot to keep the weight bearing balanced.

b. **Palpation in the efficient state**

- 1) Initially, as weight is transferred into the **navicular**, it translates forward and then as knee tracking or dorsi flexion proceeds, it moves plantarly and inferiorly. Evaluate for navicular to move medially and laterally for glide, superiorly for distraction from the talus, and for superior inferior mobility.
- 2) The **three cuneiforms and cuboid** should move forward and separate from each other. The **intermediate (second) cuneiform** also can be felt to drop inferior and move forward. The larger **medial (first) cuneiform** can be felt to move medially and forward. The **lateral (third) cuneiform and cuboid** spread laterally and forward.

c. **Importance of region** – This is a region often implicated in foot dysfunction.

- 1) The **navicular** in the supinated foot is usually limited in medial glide, while in the compensated supinated foot (valgus), it will be excessively positioned medially and will be limited in lateral glide.
- 2) The **cuneiforms** often lose their ability to spread and distribute weight forward. This often produces a narrow in-step and a supinated foot. This can lead to an uncompensated supinated rigid foot with a high medial arch or a compensated supinated foot resulting in ankle pronation (major components can be calcaneal inversion, navicular and talar drop) and apparent loss of the arch. This dysfunction can precipitate hallux valgus.

d. **Treatment** – the goal is to reinstate mobility of the mid-foot structures. This is accomplished in standing, sitting, or hooklying during active knee tracking or foot supination and pronation while the therapist maintains pressure on the restricted articulations.

- 1) **Restricted Navicular** – Place foot on half foam roll in inversion and supination with hip external rotation. Mobilize the navicular from lateral to medial utilizing patient active supination/pronation and resisted hip internal rotation. (Fig. 1)
- 2) **Dropped Navicular** – Place in sidelying with foot to be treated inferiorly and bend knee. Place foot on a half foam roll in dorsi flexion and inversion. Mobilize the navicular laterally in an arched direction to assist in relocating in it's proper position. Often the relocated navicular needs to be taped into place and use of arch supports until the articulation stabilizes. (Fig. 2)



figure 1

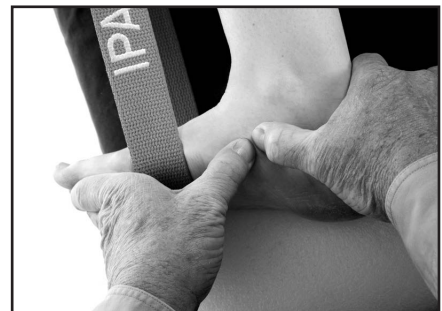


figure 2

- 3) **Cuneiforms** - Also includes the proximal metacarpal articulation with the cuneiforms each cuneiform for mobility and ability to separate from each other. Localize the restrictions and mobilize as with the navicular. (Fig. 1, 2, 3, 4 & 5)

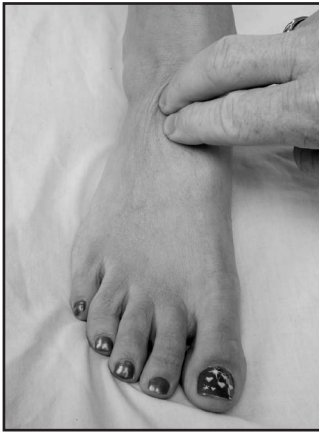


figure 1



figure 2



figure 3



figure 4



figure 5

- 4) **Prone** – Evaluate the ability for the cuneiforms, navicular, and cuboid to glide superiorly. (Fig. 6)



figure 6

- 5) **Cuboid mobilization in quadruped** – Identify hard end-feel and have patient sit back and mobilize by moving from side to side. (Fig. 7)

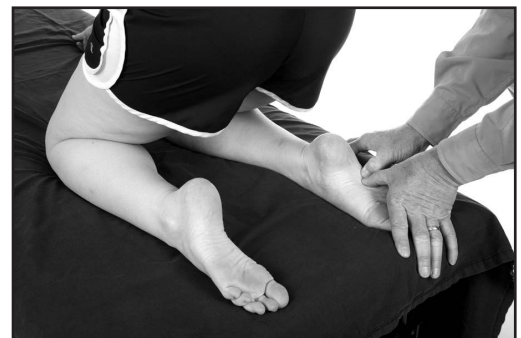


figure 7



figure 1



figure 2



figure 3

- 6) **Standing** – Position foot in neutral with support under arch. Utilizing fingers, tool, or heel of foot and mobilize while patient performs knee tracking. These joints can be some of the most restricted articulations in the body and often require firm pressure and discomfort for the patient. (Fig. 1, 2 &3)

e. **Home Program** (Fig. 4)



figure 4

5. FOREFOOT

- a. **Metatarsals** – In the efficient state, the metatarsals can be palpated spreading during knee tracking with the weight proceeding forward to center and then distribute from the second tarsal and toe. To evaluate, place a finger underneath the MP articulation of the first and fifth ray, and you should feel equal weight bearing during tracking.

Standing, half-kneeling, sitting, and hooklying – Identify metatarsals that are not separating (*like rib mobilization*), and place pressure in direction of barrier. Mobilize through active motions such as knee tracking. (Fig. 5)

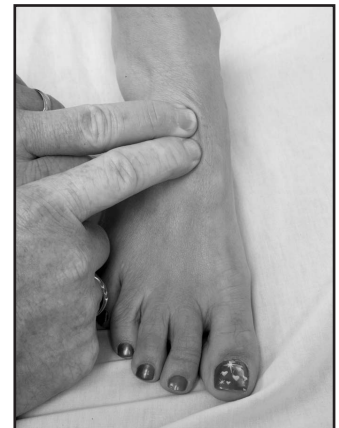


figure 5

- b. **TOES/ PHALANGES** – In the efficient state, the phalanges are straight extensions from the metatarsals and lengthen and spread during forward knee tracking.

- 1) The first **MP** is the most frequently dysfunctional articulation. This is first treated by mobilizing the navicular, medial cuneiform, and first metatarsal, which frequently contribute to hallux valgus by increasing the lateral proximal to medial distal angle of the first metatarsal, creating the condition for the first phalanx to migrate laterally. Treat by positioning the end of the first MP laterally and distracting the toe and moving it medially during knee tracking. (Fig. 1 & 2)



figure 1



figure 2

Standing, half-kneeling, sitting and hooklying – Position toe or toes in more efficient position and superimpose motion to mobilize.

c. **TRAINING DURING BRIDGING AND COMING TO STANDING**

- 1) Evaluate natural patterns of coming to standing.
- 2) Treat soft tissue and articular dysfunctions.
- 3) Training of weight acceptance and balance during motion. Can begin this training process by using bridging.

D. DEMONSTRATION OF EVALUATING NEUROMUSCULAR CONTROL THROUGH PNF

To evaluate the pattern weakness and lack of CoreFirst Strategies™ that develop from foot type. Weakness in flexion abduction with a supinated foot and with flexion adduction with a compensated supinated foot. (*FMLQ Material*)

E. STRUCTURES TO BE EVALUATED

- a. **Prone** – Plantar surface (plantar aponeurosis, flexors, abductors, adductors and lumbricalis), individual phalanges and tarsals, calcaneal position, Achilles tendon (anterior and posterior aspects), calf muscles as in previous section.
- b. **Supine** – Plantar surface, dorsal surface (extensor tendons, inferior and superior extensor retinaculum, flexor retinaculum, extensor digitorum and hallucis brevis), subtalar joint, cuboid, navicular, cuneiform, talocrural joint (ankle), inferior tibiofibular joint, tibialis anterior, extensor hallucis and digitorum longus, peroneus longus, superior tibiofibular joint.

F. HOME PROGRAM CONSIDERATIONS

1. **Standing tracking** – To train the neuromuscular mechanism.
2. **Soft tissue and joint mobilization of ankle in half kneeling.**
3. **Foot Intrinsic** – Development of strength and control through gripping (*towel, sand, bare foot walking*)
4. **Standing Foot Circles** – Bilateral/unilateral for use of full foot.
5. **Use of balancing surfaces** – Ankle boards, balls, BAPS, profitter.
6. **High Stepping bare footed** – to develop calf and foot intrinsics

Shoe Tying

Remove top lace out of top hole, and insert lace into same side hole above making "rabbit ears."



Feed laces through opposite loop.



For inside support tighten medial lace more.

For outside support tighten lateral lace more.



HOW TO BUY AND TIE THE RIGHT SHOE FOR YOU!

Johnson and Johnson Physical Therapy
&
The Institute of Physical Art, Inc.



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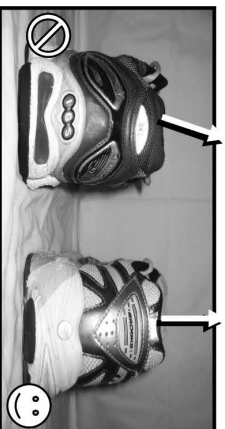
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*This brochure is not intended to endorse or discredit any particular brand or style of shoe.

Selecting the Proper Shoe

1. Assess how the shoe sits.

Should sit flat rather than angled.



2. Forward and backward shoe rocking.

Rock straight without tilting medial or lateral.



3. Should rock equally forward and backward.



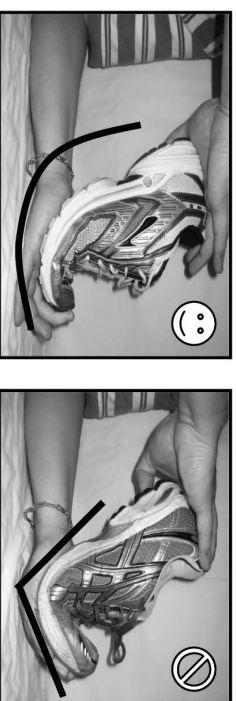
5. Landing.

Allow shoe to fall back to table while assessing landing. Does it land flat, or tend to tilt medial or lateral?



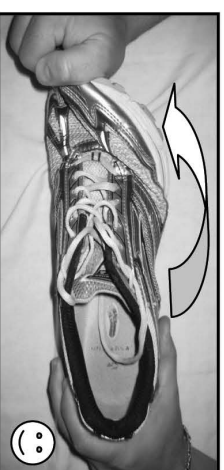
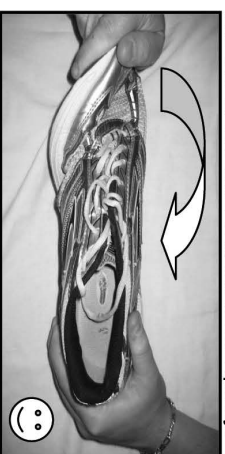
6. Shoe bending.

The entire front of shoe should bend equally.



7. Shoe rotation.

The toe of the shoe should twist equally.



4. Toe balance.

Rock forward and balance on toe while assessing tilt.

