

**DEPARTMENT OF APPLIED
BIOMECHANICS**

**BIOMECHANICS AND ORTHOTIC
THERAPY**

SECOND YEAR

SKILLS WORKSHOP

**SAMUEL MERRITT COLLEGE
CALIFORNIA SCHOOL OF PODIATRIC MEDICINE**

BIOMECHANICS SECOND YEAR SKILLS WORKSHOP

- SESSION 1** Orientation, Functional Foot Orthosis Overview, and Biomechanical Evaluation, Part 1 – Class at West Pavilion Biomechanics Laboratory, Samuel Merritt College
- SESSION 2** Biomechanical Evaluation, Part 2 and Gait Analysis – Class at West Pavilion Biomechanics Laboratory, Samuel Merritt College
- SESSION 3** Non-Weight Bearing Negative Casting Technique for Foot Orthoses and Negative Cast Evaluation – Class at West Pavilion Biomechanics Laboratory, Samuel Merritt College
- SESSION 4** Non-Weight Bearing Negative Casting for Foot Orthoses and Negative Cast Evaluation – Class at West Pavilion Biomechanics Laboratory, Samuel Merritt College
- SESSION 5** Semi-Weight Bearing Casting Demonstration, Low Dye Strapping, and Full Biomechanical Evaluation and Negative Casting – Class at West Pavilion Biomechanics Laboratory, Samuel Merritt College
- SESSION 6** Positive Cast Correction Techniques – Class at ProLab Orthotics, Napa
- SESSION 7** Orthotic Fabrication, Prescription Writing and Dispensing the Orthotic – Class at ProLab Orthotics, Napa

SESSION 1

Title: Orientation, Functional Foot Orthoses Overview and Biomechanical Evaluation Part 1

Demonstration: Explanation of what will be presented in this course and what the student is expected to learn

The student will watch a videotape and then a demonstration of how to:

1. perform hip range of motion with the hip flexed and extended;
2. perform a hamstring measurement and differentiate semimembranosus from semitendinosus;
3. determine the malleolar position;
4. perform ankle joint range of motion with the knee extended and flexed;
5. measure for LLD;
6. plot the STJ axis;
7. bisect the posterior aspect of the heel and lower leg;
8. measure subtalar joint range of motion;
9. measure forefoot to rearfoot position; and
10. measure first ray range of motion

The student will perform the exam on a classmate in the exam chair

Explanation of the significance of abnormal measurements

Expectations: The student will understand the knowledge and skills they are expected to learn.

The student will be able to position the patient properly.

The student will be able to approximate hip range of motion data, hamstring data, malleolar position data, ankle joint range of motion data, limb length measurement, STJ axis, accurate calcaneal bisection, STJ ROM, forefoot to rearfoot position, STJ neutral position, and first ray ROM calculation on a fellow student under supervision.

The student will understand the relationship and significance of abnormal measurements especially the malleolar position.

Instructor: Theresa Kailikole, D.P.M.

SESSION 2

Title: Biomechanical Evaluation, Part 2, and Gait Analysis

Demonstration: The student will be shown how to measure:

1. the bisection of the tibia relative to the ground;
2. the bisection of the calcaneus relative to the ground in both the relaxed position and in the neutral position.

The student will be shown how to perform a Hubsher maneuver and how to recognize a maximally pronated foot in stance.

Types of pathologies related to an inverted, everted and perpendicular calcaneal stance will be explained to the student.

The student will watch a full gait examination that includes the normals of heel contact, midstance, heel off and swing phase of the gait cycle. A description of abductory twist, extensor substitution, and flexor stabilization and substitution will be included.

The student will hear an explanation of variations in each phase of the gait cycle and as a group watch other students walk and attempt to compare these gait variances with the educational model.

Expectations: The students will be able to:

1. approximate the amount of tibial varum or valgum in a patient,
2. place a weight bearing foot in a subtalar joint neutral position,
3. determine an inverted, everted or perpendicular calcaneus

The student will be able to determine the variance of Hallux dorsiflexion through the Hubsher maneuver.

The student will be able to identify the normal motions in the gait cycle and possible variations from the normal.

Instructor: Theresa Kailikole, D.P.M.

SESSION 3

- Title:** Non-Weight Bearing Negative Casting Technique for Foot Orthoses and Negative Cast Evaluation
- Demonstration:** The students will watch a videotape on how to prepare a treatment room, gather the necessary supplies, and position the patient for negative casting.
- The student will watch and hear an explanation of the method of negative casting in use at CSPM
- The student will view normal and mistake casts related to fifth digit position, thumb position, heel symmetry, and lateral arch.
- The student will hear an explanation of how these important criteria relate to the final orthotic.
- The students will take and evaluate their own casts relative to these points.
- Expectations:** The student will be able to properly equip a room, position a patient, and neatly apply plaster splints, which generally conform to the shape of the demonstration subject.
- The student will be able to remove the cast without distortion and evaluate whether the cast material adhered to the foot.
- The student will be able to identify whether they took a negative cast correctly, relative to this portion of the casting competency.
- The student will be able to explain why they have not produced a negative cast that is acceptable relative to the above criteria.
- Instructor:** Theresa Kailikole, D.P.M.

SESSION 4

- Title:** Non-Weight Bearing Negative Casting for Foot Orthoses and Negative Cast Evaluation
- Demonstration:** This is a continuation of the negative casting workshop to develop speed and proficiency in this technique with special emphasis on forefoot Supinatus and first ray position.
- The student will view normal and mistake casts related to the arch contour, first ray position, hallux position, and forefoot to rearfoot position.
- The student will hear why these criteria are important and their relationship to the previously discussed criteria
- Expectations:** The student will be able to accurately apply plaster to the foot, place the foot in neutral position, remove the Supinatus from the cast, and plantarflex the first ray.
- The student will be able to take an acceptable negative cast for orthotic fabrication and if not, identify why it is not an acceptable cast.
- The student will ultimately create one pair of negative casts of one classmate for the last two workshops.
- Instructor:** Theresa Kailikole, D.P.M.

SESSION 5

- Title:** Semi-Weight bearing Casting Demonstration, Low dye Strapping, and a Full Biomechanical Evaluation and Negative Casting
- Demonstration:** There will be a demonstration of semi-weight bearing casting technique for accommodative orthotics with directions of how to identify and transfer lesion markers for metatarsal lesions and navicular tuberosity.
- The student will receive instruction on why a low dye strapping helps to prognosticate the effectiveness of functional orthotics and will watch a demonstration of the preparation and application of the strapping.
- The student will be given one hour to perform a full biomechanical evaluation and non-weight bearing cast of another student as if in an office setting.
- Expectations:** The student will be able to take a semi-weight bearing cast removing the Supinatus from the medial column and accurately transfer markers for metatarsal head lesions.
- The student will be able to apply a low dye strapping that positively affects their classmate's foot function while being comfortable. The student will wear the low dye strap for 72 hours.
- In the time allotted, the student will be able to perform a full biomechanical evaluation and take an acceptable negative cast for orthotic fabrication.
- Instructor:** Theresa Kailikole, D.P.M.

SESSION 6

Title: Positive Cast Correction Techniques

Requirements: The student will bring the negative casts made of his or her foot in sessions three/four.
The student will bring his or her bio-evaluation results from sessions one/two.

Demonstration: The student will receive an orientation to an orthotic laboratory, including an introduction to the log-in, scanning and cast techniques, equipment and supplies used for the production of orthotics.

The students will first watch the process of mixing, pouring the positive, stripping the negative from the positive, cleaning and balancing the positive.

The student will examine a Root corrected cast positive and help to create a proper standard arch fill cast correction and expansion plaster positive, from their negative casts, under supervision of an orthotic technician.

The student will view the differences of Root, Blake and Kirby cast correction. The student will hear an explanation of the different indications for each correction. The student will also view the different arch fill used with each cast correction including minimum and maximum fill.

The student will modify his or her own positives with at least one of the cast correction techniques.

Expectations: The student is expected to be familiar with the techniques used to pour, strip, clean and balance a positive cast.
The student will be able to recognize if this was performed properly by himself or herself or a professional orthotic laboratory.

The student is expected to identify a usable Root corrected positive from which an orthotic can be fabricated.
The student will be able to identify a minimum, standard and maximum arch fill positive cast.

The student will be able to identify their own mistakes in this process and correct them in the following workshop.

Instructor: Jennifer Sanders, D.P.M.

SESSION 7

Title: Pressing, Orthotic Materials, Grinding and Prescribing Orthotics

Requirements: The student will bring their bio-evaluation results from session's one/two.

The student will bring tennis shoes to be worn for orthotic dispense.

The students will wear/bring scrubs or shorts for orthotic dispense.

Demonstration: The student will observe how orthotics are pressed or milled including thermoplastic, accommodative, thermographite composite material, how to heat it and how a vacuum press is used to shape the material over the positive.

The student will observe the grinding and polishing process.

A rearfoot post application of both the 4/4 and flat variety will be demonstrated.

Students will watch and imitate how to draw trim lines and heel cup depth.

The more common orthotic additions will be demonstrated and discussed.

The session will include a hands-on workshop allowing each student the opportunity to examine the multitude of functional and accommodative orthotics.

The indications and contra-indications to the various materials and material properties will be discussed.

The students will have an opportunity to identify the necessary parts of an orthotic prescription form and hear what a professional laboratory needs from a Podiatric physician.

This workshop will also focus on the process and problems

of dispensing custom orthotics to patients and solutions to shoe fit difficulties, arch pain, heel depth, failure to relieve symptoms and plantar fascial irritation. A presentation will include a discussion of problems with orthotic fit and instructions of how to trouble shoot orthotics.

The student will be able to dispense their own orthotics and troubleshoot.

Prefabricated orthotic “devices” will also be discussed.

Expectations: It is expected that the student will have an understanding of how an orthotic is pressed and ground, and also to evaluate whether it was performed properly on his or her own positives.

The student will be able to evaluate the final orthotic to determine comfort, variability, trim lines, edging, heel cup depth, and effect on the foot.

The student will be able to identify most materials used in orthotic therapy and be able to list a general indication or advantage of most of the material.

The student will be able to order an orthotic for a particular problem and list the criteria for selecting an orthotic laboratory.

The student is expected to be aware of the potential problems of dispensing an orthotic.

The student will have a pair of functional foot orthotics fabricated from their negative casts

The student will have an opportunity to evaluate his or her own device for accuracy of fit and correction of pathology.

Instructor: Jennifer Sanders, D.P.M.

At the conclusion of this session the student will complete an evaluation of the workshop rotation.

2007-2008
BIOMECHANICS SKILLS CLASS
STUDENT COURSE EVALUATION

The student's opinion of their educational experience is important to the progressive improvement of each course. Please complete the enclosed form and return it to Dr. Kailikole or Dr. Sanders. Your signature is completely voluntary. Be sincere, brief and constructive. Thank you.

Paul R. Scherer, D.P.M.
Chairman, Department of Applied Biomechanics

1. Compare the actual course to the course description:

- exactly the same
- almost the same
- completely different

2. The tempo of the course was:

- too fast
- too slow
- just right

The amount of material that was presented in the course was:

- too much
- too little
- just right

The one thing I would change about the course is: _____

The best thing about the course is: _____

Rate the faculty on knowledge, skill in teaching and attitude:

	1	2	3	4
Kailikole	Excellent	Good	Fair	Poor
Sanders	Excellent	Good	Fair	Poor

