

# Common Steps in General Biomechanical Approach

Every DPM needs to know which problems are mechanically induced or aggravated.

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**Editor's Note:** The following is an excerpt from Dr. Blake's *Practical Biomechanics for the Podiatrist*, with the author's permission.

**L**earning biomechanics goes much further than helping a runner complete a marathon, although that can be a fantastic adventure! Learning biomechanics will help you with every bunion surgery you do, every knee replacement patient you see or help rehabilitate, and every patient with chronic low back pain. It is only in knowing which problems are mechanically induced or aggravated that you can know what is not more neurological or inflammatory. The world needs better doctors who can implement biomechanics. It is a great and rewarding world.

These are the common steps in a general biomechanical approach for the first several visits dealing with a new patient or new problem:

- 1) *History* of the injury and the patient's reason why they were injured.
- 2) *Gait evaluation* of walking (running is crucial if their activity requires running) to decide on gait patterns and if the patient's complaint matches.
- 3) *Physical examination* of the injured part (begin to separate the 3 sources of pain: mechanical, inflammatory, and neuropathic)
- 4) Physical examination of *possible biomechanics* involved.
- 5) Is there biomechanical *asymmetry*?
- 6) *Tentative working diagnosis* is made.

7) *Common Differential Diagnosis*: common, not rare

8) *Occam's Razor* and the *Rule of 3* for initial treatment help.

9) What *phase of rehabilitation* is the patient in at this visit?

10) Should we do *imaging* at this point?

11) *First Decision*: What do I have to do to get the pain consistently between 0-2? This is the real reason that

determine if it can be prevented in the future. You can actually have a positive impact on all the different types of injuries.

### **Common History Questions**

- F (pain *frequency*; are there important *family* history findings?)
- A (patient's own *assessment* about what *activities* produce pain, what activities are okay.)

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the patient has to be put into Phase 1 of rehabilitation. The 0-2 pain level realm is where injuries can heal.

12) *Second Decision*: How much inflammation needs to be addressed?

13) *Third Decision*: Is there any neurological component that should be treated?

14) *Fourth Decision*: What mechanical changes can I make in the first few visits that may help toward pain relief, better biomechanics, and cause reversal?

### **History of the Injury and the Patient's Own Reason Why They Were Injured**

There are many types of injuries, but we have to start putting together a good picture of what happened and

- I (pain *intensity*, is there a lot of *inflammation*?)
- L (pain *location*, how *long* does the pain *last*?)
- E (what *eases* pain?)
- D (what is the *duration* of pain?)
- N (does this problem feel like *nerves*, like *numbness*, etc.?)
- O (what are the events concerning the *onset* of pain?)
- P (what *produces* the pain, *past* injuries involved?)
- Q (what is the *quality* of the pain?)
- R (does the pain *radiate*, is there *redness*; originally it was the *result* of what?)
- S (how do *shoes* help or pro-

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## Common Steps (from page 67)

duce pain? Is there *swelling*, is there *stiffness*, are there previous *surgeries* that may play a role?)

- T (what *treatments* done, what treatments helped and hurt, any *tingling*?)

- U (does the patient have *underlying* problems?)

- V (how does the pain *vary*?)

- W (has it affected *work*? Is there *weakness*?)

Most injuries are either acute (sudden onset of pain) or chronic (gradual buildup of pain). It is important with acute injuries to learn if

chain concept is important. When we overdo activities, and our bodies start complaining in an area, something is making that area a weak link. Our job is to find out why.

### Physical Examination of the Injured Part (Mechanics, Inflammation, Neurological)

Therefore, the physical examination starts to connect us to the patient, suggesting possible treatments really before a diagnosis is made, and suggesting the nature of the injury or pain. We must be able to get the patient quickly to a 0-2 pain level and decide on what Phase of Rehabilitation they are

ral flossing, wide shoes, non-painful massage, mechanical change to take pressure off nerve(s) involved

- Inability to walk—Crutches, removable boots, EvenUps, RollaBout or similar, iWalk

- Limping—investigate why?

- Inability to do single leg balance—begin rehabilitation

- Inability to do single heel raise—begin rehabilitation

Whatever your base in biomechanics, whether it is Root-based or not, there are basic biomechanics that should be taught in all podiatry schools. You may have been taught other techniques of value to you in helping patients. The physical examination findings in biomechanics are only useful if you use them. Students should practice the exam techniques over and over to develop reliability in their hands and then check with others. We are trying to make a diagnosis and reverse the stresses on that structure. There are so many ways to do it, but we have to be thinking of the possible mechanics involved.

The basic requirements of knowing a patient's biomechanics concern the following:

- 1) Are the joints involved over-flexible or too limited/dysfunctional?

- 2) Are the tendons surrounding the sore area strong enough to help the rehabilitation?

- 3) Are the bones involved in a good position, or out of normal position (stacked up correctly)?

- 4) Does the overall lower extremity biomechanics somehow put stress on the injured area?

- 5) How does the biomechanics of the injured area somehow put stress on the injury? **PM**

**The more you can make sense of the period surrounding the acute injury, the more you can help the patient rehabilitate fully and prevent the problem from occurring again.**

there were circumstances that led to the injury, like generalized weakness from an illness leading to a fall. It could just be their third or fourth ankle sprain with each one causing the ankle to get weaker and more unstable. The more you can make sense of the period surrounding the acute injury, the more you can help the patient rehabilitate fully and prevent the problem from occurring again.

I spend most of my time dealing with either acute injuries from overuse (like a Jones fracture secondary to 10 days of basketball in 12 days), or just straight overuse. Acute injuries from overuse is where the athlete was overdoing activities and finally something (like a tear in the plantar fascia) started complaining. The patient can tell you exactly when they felt pain that has not gone away.

Straight overuse typically presents as a gradual onset of pain that slowly worsens over time until it finally forces the patient to accept some restriction in activities and start some treatment. This is where an understanding of the weakest link in the

in. This is the time you occasionally find that the pain level and examination do not match up. This is explained by low or high patient pain thresholds, the patient's need to under or over-estimate the symptoms, and nerve pain. Neuropathic pain is classic for lack of physical symptoms unless a case of complex regional pain syndrome develops.

The common treatments to match our physical examination findings are:

- Swelling—contrast bathing or icing

- Weakness—active range of motion and isometrics

- Erythema—off-weighting bony prominence, blood tests

- Ecchymosis—possible investigation of structural injury

- Tightness or stiffness—stretching, mobilization, or massage

- Joint laxity—taping, splints, braces, and strengthening

- Spasm—begin investigation as to why? Nerve? Electrolytes?

- Neurological—topical lotions like Neuro Eze or Neuro One, neu-



**Dr. Blake** completed his medical education at the California College of Podiatric Medicine, as well as a one-year residency in medical-surgical podiatry and a two-year fellowship in biomechanics of the lower extremities.

He invented the Inverted Orthotic Technique, used internationally.