Orthotics: Build Your Practice, Help Your Patients

6

By William Austin, DC, CCSP, CCRD

As most chiropractors know, orthotics are special shoe inserts that stabilize the spine and pelvis by correcting imbalances in the feet. Orthotics help support chiropractic adjustments, resulting in better clinical outcomes.

Many of your patients are already familiar with off-the-rack shoe inserts, but those inserts and custom-made flexible orthotics are very different in terms of quality and effectiveness. Off-the-rack shoe inserts cannot give patients the unique support and placement that their feet need to maintain proper, stable alignment. Custom-made orthotics are specifically made to fit each individual's foot. A custom-made orthotic allows for the patient's condition and the chiropractor's instructions to be taken into account when the orthotic is created.

"By supporting and balancing the feet, custom-made orthotics enhance the body's performance and efficiency, reduce pain, and contribute to total overall wellness."

The feet are the foundation of the skeletal system. When the feet are imbalanced, misalignments and pain can occur in areas throughout the body—even if the feet do not hurt. The feet, which play an integral role in biomechanics, perform better when all their muscles, arches, and bones are stable and in ideal positions.

While 99% of all feet are normal at birth, 8% develop troubles by the first year of age, 41% by age 5, and 80% by age 20.[1] By age 40, nearly everyone has a foot condition of some sort. By supporting and balancing the feet, custom-made orthotics enhance the body's performance and efficiency, reduce pain, and contribute to total overall wellness.

The Foot and Problems of the Foot

The feet support the whole weight of the body, they provide balance, they safely absorb heel-strike shock, and they adapt to walking stresses. Most importantly, feet provide the foundation of support for the spine and the pelvis.

6 Orthotics: Build Your Practice, Help Your Patients

Central to the success of the pedal foundation is the arched structure, which is actually a complex of three bony arches. Those three arches include: the medial longitudinal arch, the lateral longitudinal arch, and the anterior transverse (metatarsal) arch:

- **Medial longitudinal arch.** The largest and most obvious arch is located along the medial aspect of each foot. It is composed of the calcaneal tuberosity, the talus, the navicular bone, three cuneiforms, and three metatarsal bones. The navicular bone functions as the "keystone" of the arch.

- **Lateral longitudinal arch.** Along the outside of each foot is a lateral arch. The calcaneus, cuboid, and the fourth and fifth metatarsal bones comprise the lateral arch. This arch has been called a "true architectural arch," since the cuboid serves as a structural keystone, and this arch relies much less than the other two on connective tissues for its support.[2] For this reason, proper function of this lateral arch is very dependent on the alignment of the cuboid, which has been called the "most frequently subluxated bone of the foot."[3]

- **Anterior transverse (metatarsal) arch.** The transverse arch runs from the medial to the lateral sides of each foot and it extends from the metatarsal heads back to the tarsal bones. This arch consists of all five metatarsal bones, with the cuboid, cuneiforms, and navicular bones. At its most anterior portion, the metatarsal heads contact the ground. Most of the static support for this arch comes from the thick plantar fascia. Movement of the involved bones is shared by the peroneus and tibialis muscle groups.

The most common structural misalignment of the lower extremity is excessive pronation. At heel strike and during the initial part of the stance phase, the foot normally pronates. However, if the foot stays in pronation beyond heel strike, it is hyperpronating, or going into prolonged pronation. This movement occurs primarily at the subtalar and talonavicular joints, with excessive loading affecting all of the arches, but the medial arch most acutely.

Excessive pronation causes an obvious flattening of the medial longitudinal arch, with a medial and inferior movement of the navicular bone. This destroys the structural support of the

plantar vault, making the body at risk for subluxations as the musculoskeletal system attempts to adapt and compensate. Interestingly, the symptoms of a collapsed arch can be expressed anywhere in the musculoskeletal system—from the legs to the pelvis, and even into the back and neck. The opposite of pronation, supination (an arch that is too high), is less common. Supination causes intense heel shock and reduced and awkward support while running and walking. Supination can lead to problems such as hammer toes, heel spurs, neck pain, and hip pain.

Custom-made, flexible orthotics align and support the structures of the feet in a near-normal physiologic position to prevent dysfunction, such as pronation and supination, and to improve the function of movable body parts.[4]

Custom-made orthotics have been proven to:

- **Create a symmetrical foundation.** This foundation is created by blocking pronation or supporting supination. An asymmetrical pedal foundation is a contributing factor in pelvic unleveling and flexible scoliosis.[5-8]
- **Provide heel-strike shock absorption.** The natural shock-absorbing capacity of the foot/ankle complex is reduced with either pronation or supination. Pronated feet are more susceptible to metatarsal stress fractures, whereas the tibia is more susceptible with supination.[9,10]
- **Inhibit serial biomechanical stress up the kinetic chain.** The inward rotation of the foot/ankle complex, tibia, and fibula is a contributing factor in frequent ankle sprains, lower leg compartment syndromes, patello-femoral dysfunction, medial knee degenerative joint disease, stress fractures, ilio-tibial band inflammation, and pelvic unleveling. Foot mechanics affect all joint complexes above, including the sacroiliac joints, up to the occiput.[11,12]
- **Enhance neuromuscular re-education.** The sensory information from the mechanoreceptors of the foot play a major role in balance, gait, reciprocal inhibition and innervation of muscles, and posture.[13-15]

How Orthotics Can Help Other Conditions

The use of orthotics can help you treat other conditions, including low back pain. The major source of low back pain is some form of structural weakness or failure.[16] When forces are imposed that exceed the present level of structural strength, something must fail. The result is a symptomatic breakdown of tissues, and often permanent degenerative changes. The sources of these structural weaknesses are biomechanical errors, structural asymmetries, tissue weaknesses, and imposition of excessive external loads. All of these factors result in repetitive microtrauma, which is the underlying cause of most low back injuries. Structural weaknesses and the resulting microtrauma effects can be seen primarily in the bones and joints, and also in the connective tissues.

Orthotic support is an appropriate and cost-effective treatment for the various causes of low back pain. When excessive pronation and/or arch collapse of the foot is present, a torque force produces internal rotation stresses to the leg, hip, pelvis, and low back.[17] The result is recurring subluxation and eventual ligament instability affecting the sacroiliac and lumbar spine joints. These forces can be decreased significantly with the use of flexible, custom-made orthotics.

In patients with degenerative changes in the lumbar discs and facets, the external forces of heel strike may aggravate and perpetuate low back pain, and are easily reduced with the use of shock-absorbing orthotics. The reduction in symptoms is often dramatic due to the decrease in low-level inflammation of the affected joints.

An anatomical difference in leg length produces abnormal structural strains on the pelvis and low back. These strains can cause chronic pain and specific degenerative changes.[18,19] The use of orthotics and lifts has been shown to reduce these structural strains and bring about significant response, particularly when used in conjunction with spinal adjustments.[20]

Orthotic Screening

Long-term orthotic support can address abnormal foot and ankle biomechanics for many

patients. The most common associated imbalance that is found is excessive pronation with a low medial arch. Occasionally, chiropractors must deal with the problems caused by a high-arched foot with fixed supination. In both situations, delays in providing the proper support can interfere with effective chiropractic care.

By incorporating an orthotic "screening" procedure into the initial examination for every patient, you can rule in or rule out the need for custom-made orthotics. What works best is to focus on a few "red flags," which are indicative of lower extremity involvement.

Those criteria include:

- **History.** When the history of a patient's complaint(s) includes recurrences and flare-ups, the possibility of lower extremity asymmetry should be considered. The pattern of temporary response to chiropractic care, followed by a return of symptoms, is frequently seen with excessive pronation.

  If a patient stands or walks at work, there is a good chance that the feet have been exposed to excessive stresses over the past several years. The rigid flooring in most work places causes many patients to develop arch collapse and connective tissue problems in the lower extremities. The heavier a patient is, the greater the stresses are on the feet and ankles when standing and walking. Recreational and competitive athletic activities also place high levels of biomechanical stress on the feet and legs.

- **Examination.** A few moments spent watching each patient walk for several paces can provide useful information.[21] Look for toe-in or toe-out ("foot flare") while walking or an altered step rhythm. A subtle limp or stiffness in an ankle, knee, or hip joint spells trouble, unless the asymmetry is addressed with custom-made orthotics.

Postural evaluation must include checking from the spine all the way to the ground, and from the feet upward. Scoliosis, pelvic tilt (either forward or to the side), and even forward head posture, are often found in association with excessive pronation.

Asymmetrical or abnormal wearing of the shoes, heels, and soles is a very useful indicator of the need for orthotics. When a heel is excessively worn on the lateral side, or when there is a medial bulging of the shoe's upper leather or heel counter, the need for orthotic correction of asymmetrical function becomes obvious.

Navicular Drop Test

There is also a simple and effective test to determine if a patient needs orthotics that you can use during an orthotic screening. The Navicular Drop Test helps to verify and quantify the existence of poor spinal support from the arches. The test results provide an objective measurement of the amount of collapse of the medial arch, while highlighting any asymmetry between sides.

Here's how to perform the Navicular Drop Test:

- The only pieces of equipment needed are a marking pen and a piece of card stock (an index card works well). The procedure requires a chair and is much more accurate when performed on a noncompressible floor surface (linoleum, concrete, or a thin carpet with low nap and no foam pad).

- With the patient sitting comfortably (feet resting on the floor, but not bearing any weight), palpate the medial aspect of each foot and find the navicular prominence. This will be the most prominent bony landmark found inferior and somewhat anterior to the patient's medial malleolus. Using a water-soluble pen, mark the patient's skin at the point of the navicular prominence on each foot. Stand the card on the floor next to the medial arch of the foot and mark the card at the level of the navicular prominence. Mark on one, and then the other, foot.

- Now ask the patient to stand up, relaxing the feet and allowing the patient to bear the full weight of the body. Once the arches are weight-bearing, the navicular prominence will be somewhat lower. This is the "drop." Make a second mark on the same side of the card at the new level of navicular prominence. Perform the same procedure with the other foot. Now measure the difference on the card between the two marks for each foot. Then compare the amount of drop for each foot to see if the feet have a similar amount of drop.

- If there is a difference of 7 mm or more in an arch between sitting and standing, or if there is a difference of 4 mm or more in drop amount between the two arches, your patient has objective evidence of a significant problem in foot function—hyperpronation/collapse of the medial arch. These results indicate a strong recommendation for custom-made orthotics designed to be worn during all weight-bearing activities. Even a variance of 4 mm to 6 mm or more between sitting and standing often requires orthotic intervention, especially for athletes or others who are on their feet for long periods.

What to Look for in an Orthotic

Each foot is as unique as a fingerprint. Because every foot is different, custom-made orthotics are the most effective. A custom-made orthotic takes each individual patient's lifestyle, age, weight, activity level, and condition into account. Off-the-rack inserts cannot provide the individualized support that your patients need.

Chiropractors treat the whole body as a group of integrated and inter-related components. Chiropractors treat the foot as the foundation for the pelvis and spine, not as a separate entity. Due to this approach, chiropractors will find flexible orthotics to be superior to orthotics that are hard or rigid. Flexible orthotics are designed to provide a balanced foundation for the foot and spine and to restore normal foot function. Hard or rigid orthotics are designed with little regard for the skeletal structure, and unlike flexible orthotics, they can create hypermobility in joints above the ankle.

There are two ways to measure a patient for custom-made orthotics. The first way, weight-bearing casting, is a method in which the measurements for the orthotics are taken with the patient standing up. The second is subtalar neutral casting, in which the measurements for orthotics are taken from the patient sitting or lying down, without any weight on the foot. Weight-bearing casting or scanning is the best, because the weight-bearing method has been shown to be the most reliable, accurate, and effective process for providing patients with optimal orthotic fit and support.

The reliability of the nonweight-bearing subtalar neutral approach is doubtful. Elveru et al

demonstrated that 14 experienced clinicians could not establish a consistent level of inter-examiner reliability.[22] Traditional definitions of subtalar neutral do not accurately represent the position of the foot and ankle during dynamic weight-bearing. Two different studies have shown that while measuring the stance phase of gait in normal individuals, the subtalar joint rarely reaches the subtalar-neutral position.[23,24] The subtalar-neutral position is not functionally significant during normal gait patterns. McPoil et al and Pierrynowski et al demonstrated that the standing foot posture at rest, not the subtalar neutral, best represents the actual position of the rearfoot during the gait cycle.[23,24]

Health-care professionals concerned with restoring structural integrity, relieving symptoms and pain, and improving musculoskeletal function should always be concerned with and focused on a patient's upright posture. Pathologies in structure and function are most apparent when the body is in the position of function.

Weight-bearing stance creates functional demands on the bones and tissues of the musculoskeletal system. Stance further affects musculoskeletal integrity because it creates a closed kinetic chain among the body's four main components: the feet, pelvis, torso, and cervical region. Forces are transmitted in such a way that misalignments in one region can instigate problems elsewhere. Gravitational forces and heel-strike shock from normal gait are two examples of ordinary forces that affect the kinetic chain daily.

A third consideration of weight-bearing stance is that it creates a load or a stress that precipitates soft-tissue deformation. Over time, unchecked stress due to imbalance or structural abnormalities can create plastic deformation (permanent stretch) and laxity in connective tissue. An example is "fallen arches," the loss of support in pedal tissues due to the repeated stress of normal pronation.[25] Fallen arches or dropped metatarsals would not be evident if the foot were cast in a nonweight-bearing position.[26] From a cast showing the foot in a weight-bearing position, a skilled technician can determine the amount of hyperpronation, plastic deformation of arches, abnormal weight-bearing, and foot misalignment. A weight-bearing analysis records functional deformation, and orthotics made from that analysis provide proper fit and accurately represent arch placement when the patient is standing.

Orthotics and Chiropractic Wellness

In a chiropractic practice where many patients limp through the door with painful conditions affecting their ability to function normally, it might be challenging to envision a practice in which healthy people come in to make sure they stay that way. But when patients understand that an aligned, well-maintained body generally has a stronger immune system, it makes sense to have proactive chiropractic care as the first line of defense against illness. A wellness practice, then, is focused on both maintaining a pre-existing level of musculoskeletal balance and postural health and preventing conditions that could alter this state of health.

Orthotics, which provide total body support, can also facilitate total body wellness. Within the wellness practice concept of orthotic use, custom-made, flexible orthotics can be used to maintain a properly functioning arch alignment. Orthotics also encourage proper movement and function of the foot, while supporting all three arches in order to prevent eventual arch collapse. Improving foot alignment can help maintain knee, hip, pelvis, and even spinal postural alignment. Therefore, custom-made, flexible orthotics are appropriate for many of your patients.

References

1. Schafer RC. Chiropractic Management of Sports and Recreational Injuries. Baltimore: Williams & Wilkins, 1982: 517.
2. Hertling D, Kessler RM. Management of Common Musculoskeletal Actions and Reactions. (2nd ed.). Philadelphia: JB Lippincott, 1990: 371.
3. Scafer RC. Clinical Biomechanics: Musculoskeletal Actions and Reactions (2nd ed.). Baltimore: Williams & Wilkins, 1987: 750.
4. Kuhn DR, Shibley NJ, Austin WM, Yochum TR. Radiographic evaluation of weight-bearing orthotics and their effect on flexible pes planus. J Manip Physiol Ther 1999; 22(4):221-226.
5. Mawhiney RB. Scoliosis Manual. Roberts Publishing, 1986.
6. Smith. Pronation syndrome and global spinal posture, biomechanics, physiology, and applications to chiropractic. Chiropractic Biophysics 1992.
7. Carpintero P et al. The relationship between pes cavus (supination) and idiopathic scoliosis. Spine 1994; 19(11):1260-1263.

8. Riegler HF. Orthotic devices for the foot. Ortho Rev 1987; 16(5):293-303.
9. Bates BT et al. Foot orthotic devices to modify selected aspects of lower extremity mechanics. Am J Spts Med 1979;7.
10. McPoil T, Cornwall M. Use of soft orthotics in prevention of injuries. JAPMA 1991;81(12).
11. Harries, et al. Oxford Textbook of Sports Medicine. Oxford University Press, 1994.
12. Dahle et al. Visual assessment of foot type and relationship of foot type to lower extremity injury. JOSPT 1991;14(2).
13. Guyton AC. Textbook of Medical Physiology. Philadelphia: WB Saunders Co., 1981.
14. Lennon J et al. Postural and respiratory modulation of autonomic function, pain and health. Am J Pain Man 1994.
15. Bennet P et al. Pressure distribution beneath the human foot. JAPMA 1993; 83(12):674-678.
16. Fulton M. Lower Back Pain; new protocols for diagnosis and treatment. Rehab Management 1988; Nov/Dec:39-42.
17. Hammer WI. Hyperpronation: causes and effects. Chiro Sports Med 1992; 6:97-101.
18. Friberg O. Clinical symptoms and biomechanics of lumbar spine and hip joint in leg length inequality. Spine 1983; 8:643-51.
19. Giles LGF, Taylor JR. Lumbar spine structural changes associated with leg length inequality. Spine 1982; 7:159-162.
20. Yochum TR, Barry MS. The short leg (revised edition). Practical Research Studies 1994; 4(5).
21. Greenly LW. Gait analysis. Chirop Tech 1993;5:195-197.
22. Elveru RA, Rothsein JM, Lamb RL. Goniometric reliability in a clinical setting. Subtalar and ankle joint measurements. Phys Ther 1988;68(5):672-677.
23. McPoil TG, Cornwall MW. Relationship between neutral subtalar joint position and pattern of rearfoot motion during walking. Foot Ankle Int 1994; 15(3): 141-145.
24. Pierrynowski MR, Smith SB. Rear foot inversion/eversion during gait relative to the subtalar neutral position. Foot Ankle Int 1996;17(7):406-412.
25. Blake RL, Ferguson H. Foot orthoses for severe flatfoot in sports. J Am Pod Med Assoc 1991;81(10):549-555.
26. Greenawalt MH. Spinal Pelvic Stabilization (4th ed.). Roanoke, VA: Foot Levelers, Inc. 1990, 35.

Foreword by Philip T. Santiago, DC, DACBSP viii
Introduction x

Chapter 1 Wellness Care 1
Introduction 2
Make Your Move to Wellness by Bob Hoffman, DC 3
Why Chiropractic is Poised to Lead the Wellness Revolution by David Jackson, DC 8
Wellness: Achieving Balance in Life Through Passion and Purpose by Mark Sanna, DC 12

Chapter 2 Practice-Building Advice 21
Introduction 22
An Organized Office Lays the Foundation for Positive Patient Experiences by Susan Hoy 23
Decreasing Stress and Increasing Profit Through Office Systems by Kim Klapp 31
Establish a Code of Ethics for Your Team by Gina M. Piazza 39
A Smart Design Evokes Quality to Your Patients by Gina M. Piazza 41
Aesthetically Speaking: Designing Your Chiropractic Fitness and Wellness Center by Rudy Fabiano 43

Chapter 3 Growth and Expansion 51
Introduction 52
How to Turn Your Practice into a Marketing Machine by Michelle Geller-Vino 53
Transform Your Practice into a Thriving Fitness and Wellness Center by Len Schwartz, DC 64
How to Develop Your Own Chiropractic Marketing Niche by Ivan Delman, DC 74
Establish a Niche in the Golf Market by Gina M. Piazza 84
Becoming the Sports Injury Expert in Your Area by Alan Palmer, DC, CCSP 88
Corporate Wellness: Build Your Practice While Making a Difference in Your Community by Dean Depice, DC 97

Chapter 4 Wellness Education 105
Introduction 106
Information Fitness: A Diagnostic Work-up for Both the Patient and the Doctor by Rob Jackson, DC 107
How to Harness the Power of Patient Education by Bruce Goldsmith 113
Information is Power: Why an Educated Patient is the Best Patient by William D. Esteb 120
Total Life Fitness and Wellness: A Patient Questionnaire by John F. Demartini, DC 128
Recruit and Retain More Patients Through Patient Education by Alan Rousso, DC, PCC 133
Turn Your Office into a Fitness and Wellness Information Center by Gina M. Piazza 139

Chapter 5 Nutritional Wellness 141
Introduction 142
Optimal Health Begins at the Cellular Level by Douglas Grant 143
A Step-by-Step Guide Integrating Nutrition into Your Practice by Daryl L. DeLuca 154
A Guide Integrating Homeopathy into Your Practice by Frank King 161

Chapter 6 Assessment Solutions 171
Introduction 172
How to Hone Your Expertise in Postural Assessment by Mark N. Charrette, DC 173
Orthotics: Build Your Practice, Help Your Patients by William Austin, DC, CCSP, CCRD 183

Chapter 7 Integrating Active Care, Rehab, & Fitness 193
Introduction 194
Patients Are Changing the Landscape of Healthcare by Patrick Bodnar, DC 195
Coding Secrets You Need to Know for Active Care Procedures by Kathy Mills Chang 206
Rehab and Fitness: Good for Your Patients, Good for Your Practice by Brad Feldner, DC 211
Growing a Fitness and Wellness Practice: Linear Strategy versus Spiral Strategy by Peter A. Gratale, DC 217

Chapter 8 Fitness Leadership 223
by Gina M. Piazza
Introduction 224
Providing a Fitness Leader Complements the Practice 225
Choosing a Qualified Fitness Professional 227
Defining the Responsibilities of Your Fitness Professional 231
Determining a Nationally Recognized and Qualified Certifying Body 234
Continuing Education for Your Fitness Professional and Support Staff 237
Conducting a High-Quality Fitness and Wellness Assessment 241

Chapter 9 Choosing the Right Equipment 245
by Gina M. Piazza
Introduction 246
Initial Steps to Outfitting Your Practice 247
Low-Tech Equipment 248
High-Tech Equipment 258
Sample Equipment Package Options and Pricing Fitness Sessions 265

Chapter 10 Fitness Basics & Application 269
by Gina M. Piazza
Introduction 270
Basics First: It's All About Quality Not Quantity 271
The Importance of Stability Ball Training 275
Effective Flexibility Conditioning 280
Fitness Equipment Application 284

Chapter 11 Additional Profit Centers 303
by Gina M. Piazza
Introduction 304
Wellness Products for Profit 305
Adjunct Services for Profit 314

Appendix A Practice-Building Secrets 317
Your Thoughts Create Your Reality by Larry Markson, DC 318
Achieve Exponential Practice Growth by Focusing on Your Patients' Friends and Family by Eric Plasker, DC 319
Follow These Five Simple Steps to Recruit More New Patients by Dennis Perman, DC 320
Analysis and Planning Equals Maximum Marketing Effect by Alexis Parian, DC 321
Complement Your Services with Exercise and Nutritional Counseling by Doug Caporrino 322
Chiropractic and Acupuncture: A Successful Combination by John A. Amaro, DC, FIAMA, Dipl.Ac. L.Ac. 323
A Healthy Practice Helps Create a Healthier Community by Carol Ann Malizia, DC, CCSP 324
Creating a Powerful and Memorable Identity by Timothy J. Gay, DC 325
Get in the Swing of Things as Your Area's 'Golf Doctor' by Jeffry Blanchard, DC 326
A Focus on New Patients Creates Expansion by Maurice Pisciottano, DC 327
Succeeding as an Authentic Chiropractic Wellness Center by Patrick Gentempo, DC 328

Appendix B Practice-Building Experts 329

Appendix C Product Reviews 339

Support the Profession 365

About the Author 367