Endnotes

PREFACE

1. Pardon the offensive language. I am just quoting this old study, which all too typically uses Colonial racist language of that era. The study also refers to the "natives" as "savages," probably in shocked reaction to their headhunting and cannibalism, both still common practices in 1939 in the area of New Guinea.

Using slightly more modern terms, the race of the natives would be considered Polynesian and that of the "Europeans" would be Caucasian. To be most correct today, you would just say that the two groups from different geographic areas have discernible genetic differences.

The study is **James**, Clifford S. (1939). Footprints and feet of natives of the Solomon Islands. In the ***Lancet***: 2: 1390-1393. Malaita, the island in the study, is next to Guadalcanal, site of famous U. S. Marine and Naval battles against the Japanese just a few years later in 1942 during World War II.

ENDNOTES

Chapter 1. Introduction

1. **Robbins**, Steven E. & Hanna, Adel M. (1987). **Running-Related Injury Prevention Through Barefoot Adaptations**. In *Medicine and Science in Sports and Exercise* 19, **148-156**.

2. **Marti**, Barnard et al. (1989). On the epidemiology of running injuries. In *The American Journal of Sports Medicine* 16: 3; 285-294, particularly pages **287** and 291.

3. **Bramble**, Dennis M. & **Lieberman**, Daniel E. (2004). Endurance running and the evolution of *Homo*. In *Nature* 432: 18 November 345-352. I find nothing to disagree with them relative to their discovery that humans evolves into a design optimized for endurance running, which made humans very successful predators. But in addition I think it is obvious and old news that man also evolved to run fast, at least relatively so, in order to be successful as individual prey escaping from a predator. In that context, I cannot avoid recalling the very old joke about a brief conversation between two people being chased by a bear. One of the pursued observed aloud that he did not need to be faster than the bear, he only needed to be faster than the other person in order to survive. Also, see Lieberman, Daniel E. et al. (2007). The evolution of endurance running and the tyranny of ethnography: A reply to Pickering and

Bunn (2007). In the *Journal of Human Evolution* 53: 439-442.

4. **Richards**, Craig et al. (2009). **Is Your Prescription of Distance Running Shoes Evidence-Based?** In *British Journal of Sports Medicine*, April. See also **Ryan**, Michael B. et al. (2011). The effect of three different levels of footwear stability on pain outcomes in women runners: a randomized control trial. In the *British Journal of Sports Medicine* 45: 715-721, particularly page **715**.

5. **McDougall**, Christopher (2010). ***Born To Run****. New York: Alfred A Knopf.* The entire book is a fabulous read, but I recommend particularly Chapters 25 and 28, which provide much more detail on the research I cited by Robbins, Marti, as well as Bramble and Lieberman. See also his article on "**The painful truth about trainers: Are running shoes a waste of money?** at Mail Online: www.dailymail.co.uk/home/moslive/articl1170253/The-painful-truth-trainers-are-expensive-running-shoes-waste-money.html. See also: "**New Study by Dr. Daniel Lieberman on Barefoot Running Makes Cover Story in *Nature* Journal**" at www.runbare.com/389/new-study-by-dr-daniel-lieberman-on-barefoot-running-makes-cover-story-in-nature-journal/. In addition, see "**The Once and Future Way to Run**" at www.nytimes.com/2011/11/06/magazine/running-christopher-mcdougall,html/?_r=2&ref=nutrition.

6. I am not counting Nike Free™ shoes here because I think it is questionable to call them a barefoot-based sole design. They are really just conventional shoe soles with a newly modified use of a very old technology: relatively deep slits (called "sipes") in the soles to create better flexibility that is more like the natural flexibility of the human foot sole. Nike Free™ also came out earlier, in 2004. That technology is largely a newly modified adaptation of the 1930's boat shoe design with siped soles for traction that were made commercially popular as the Sperry Topsider™, which is still popular today.

A recent study confirms my earlier evaluation that Nike Free™ shoes "failed to result in changes in spatio-temporal parameters when compared with running in a standard running shoe". From page 1201 of: **Squadrone**, Roberto et al. (2015). Acute effect of different minimalist shoes on foot strike pattern and kinematics in rearfoot strikers during running. In *Journal of Sports Sciences*. 33: 11: 1196-1204.

By the way, in point of indisputable fact, I invented the flexible sole with slits technology for athletic shoes in 1989 and filed U. S. and international patent applications covering the technology at that time. Both U. S. and international applications were published in their entirety several times internationally, beginning in 1991.

I came up with the simple design because I had very limited funds at that time. Back then when I was just being started in barefoot-based design I had only a very limited, jury-rigged prototyping capability. So conventional soles with deep slits for better flexibility at least more like the barefoot sole was the only cheap and easy approach available to me to make decent prototypes for real world testing.

When I tested them, I became very disatisfied with my self-testing results, so I quickly developed a far superior design in which the slits are all completely within the shoe sole, which yields far better results, especially in terms of closely following the natural design of the extremely flexible human foot sole. That design, plus further improvements later in 2005-6, were developed and patented years ago, but no footwear companies are using these designs as far as I know, even though most of the earlier designs are no longer under patent protection, since the terms of the patents have expired.

7. **Hollander**, Karsten (2015). Comparsion of Minimalist Footwear Strategies for Simulating Barefoot Running. In *PLOS ONE* DOI: 10: 1371/journal.pone.0125880 May 26

8. **Nigg**, Benno M. (2010). *Biomechanics of Sports Shoes*. Calgary, Alberta.

9. **Frederick**, E. C. (2011). Starting Over. In *Footwear Science* 3: 2: June 69-70.

10. **Bachman**, Rachel (2014). Better Than Barefoot. In *The Wall Street Journal*, July 23, D1 & D3.

11. **Ryan**, Michael (2014). Examining injury risk and pain perception in runners using minimalist footwear. In *British Journal of Sports Medicine* 48::1257-1262, especially pages 1 & 5.

Selected Other References

Altman, Alison R. & Davis, Irene S. (2012). Barefoot Running: Biomechanics and Implications for Running Injuries. In *Current Sports Medicine Reports* 11: 5: 244-250, particularly pages **245**-246, ***247**-248* and **249**. An excellent summary article.

Daoud, Adam I. et al. (2012). Foot Strike and Injury Rates in Endurance Runners: A Retrospective Study. In M*edicine and Science in Sports and Exercise*:1325-1334.

De Koning, Jos J. & Nigg, Benno M. (1993). Kinetic Factors Affecting Initial Peak Vertical Ground Reaction Forces in Running. In *Abstracts – International Society of Biomechanics XIV Congress 1993*: **673**.

Divert, C. et al. (2005). Mechanical Comparison of Barefoot and Shod Running. In *International Journal of Sports Medicine*. 26: 593-598.

Dreifus, Claudia (2011). Born, and Evolved, to Run. In *The New York Times* August 22, 2011 1-4.

Hamill, Joseph et al. (2011). Impact characteristics in shod and barefoot running. In

Footwear Science 3: 1: 33-40. particularly page **39**.

Herzog, Walter (2012). Running Injuries: Is It a Question of Evolution, Form, Tissue Properties, Mileage, or Shoes? In *Exercise and Sport Sciences Reviews* 40: 2: 59-**60**.

Jungers, William L. (2010). Biomechanics: Barefoot Running Strikes Back. In *Nature* 463 (January 28): 433-34.

Lieberman, Daniel E. (2012). What We Can Learn About Running from Barefoot Running: An Evolutionary Medical Perspective. In *Exercise and Sport Sciences Reviews* 40: 2: 63-72, especially pages 64-**65**.

Lieberman, D. E. et al. (2010). Foot strike patterns and collision forces in habitually barefoot versus shod runners. In *Nature* 463 (January 28): **531-535**.

Nigg, Benno & Enders, Hendrik (2013). Barefoot running – some critical considerations. In *Footwear Science* 5: 1: 1-7. particularly page **1**.

Oeffinger, Donna et al. (1999). Comparison of gait with and without shoes in children. In *Gait and Posture* 9: 95-100, particularly page **97**.

Ryan, Michael B. et al. (2011). The effect of three different levels of footwear stability on pain outcomes in women runners: a randomized control trial. In *The British Journal of Sports Medicin*e 45: 715-721, particularly page **775**.

Stacoff, Alex et al. (1991). The effects of shoes on the torsion and rearfoot motion in running. In *Medicine and Science in Sports and Exercise* 482-490, especially page **487** and Rearfoot Angle at **(c)** in figure.

Warburton, Michael (2001). Barefoot Running. In *SportsScience* 1-6. www.sportsci.org/jour/0103/mw.htm.

Wegener, Caleb et al. (2011). Effect of children's shoes on gait: a systemic review and meta-analysis. In the *Journal of Foot and Ankle Research* 4: 3: 1-13, particularly page 1.

Wilford, John N. (2004). Running Extra Mile Sets Humans Apart In Primates' World. In T*he New York Times*, November 18, 2004, A1 & A18.

See also **Relevant Foot Research** at Natural Footgear:
http://www.naturalfootgear.com/Relevant_Foot_Research.html

Chapter 2. ELEVATED SHOE HEELS TILT THE FOOT OUTWARD

1. **Griffen**, Nicole L. et al. (2010) Comparative *in vivo* forefoot kinematics of *Homo sapiens* and *Pan paniscus.* In the *Journal of Human Evolution* 59: 608-619, especially pages **608-609** and the Conclusion on page **617**.

2. **Kolker**, Lionel (1972). A Biochemical Analysis of Flatfoot Surgery. In *Modern Therapeutic Approaches to Foot Problems: Scientific Papers Presented at the 60th Annual Meeting of the American Podiatry Association* In Boston, Massachusetts (Altman, Morton & McGregor, Rob Roy, eds.) Mount Kisco, NY: Futura Publishing Co. 245-314, particularly pages **246-249** with **Figure 1**.

3. **Evans** (adapted from Hicks). See also **Hicks**, J. H. (1961) The Three Weight-Bearing Mechanisms of the Foot. In Chapter 7 in *Biomechanical Studies of the Musculo-Skeletal System*. F. Gaynor Evans (ed.) Springfield, Illinois: Charles C Thomas, 161-191, especially pages **175-177**. And **Hicks**, J. H. (1954). The Mechanics of the Foot II. The Plantar Aponeurosis and the Arch. The *Journal of Anatomy*, 25-30, especially p. 27-**29 with Fig.** 1-**4**. In addition, **Sarrafian**, Shahan K & Kelikian, Armen S. (2011). Functional Anatomy of the Foot and Ankle. In *Sarrafian's Anatomy of the Foot and Ankle*. Third Edition, Armen S Kelikian (ed.) Philadelphia et al: Wolters Kluwer et al, 507-643, especially pages 511, 512, 516, 519, **560** with **Fig. 10.82**, 593-**594** with **Figs. 10.142 & 10.143**, and **620** with **Fig. 10.183**.

4. Barkema, Danielle D. et al. (2012). Heel height affects lower extremity frontal plane joint moments during walking. In *Gait & Posture* 35: 483-488, particularly pages 483, 485-487 with Figures 2 & 4. See also Cronin, Neil J. (2014). The effects of high heeled shoes on female gait: A Review. In the *Journal of Electromyography and Kinesiology* 24: 258-263. particularly pages 258 and 261.

5. **Foster**, Alicia et al. (2012). The Influence of Heel Height on Frontal Plane Ankle Biomechanics: Implications for Lateral Ankle Sprains. In *Foot & Ankle International* 33: 64-69, particularly pages 64, **67 with Table 1** and **Figure 3B**, and 68.

6. **Kouchi**, Makiko & Tsutsumi, Emiko (2000). 3D Foot Shape and Shoe Heel Height. In *Anthropological Science* 108: 4: 331-343, particularly page **331**, 336-338 with **Figures 5-7**, and **342**. **Stefanyshyn** et al. (2000), The Influence of High Heeled Shoes on Kinematics, Kinetics, and Muscle EMG of Normal Female Gait. In the *Journal of Applied Biomechanics* 16: 309-319, particularly pages 309, 313-316. See also **Hong**, Wei-Hsien et al. (2013). Effect of Shoe Heel Height and Total-Contact Insert on Muscle Loading and Foot Stability While Walking. In *Foot & Ankle International* 34: 2: 273-281, particularly pages **273**-274, 276-**277** with **Figure 3(b**), and 279 with Figure 5.

7. **Derrick**, Timothy R. et al. (2002). Impacts and kinematic adjustments during an exhaustive run. In *Medicine and Science in Sports and Medicine* 998-1002, particularly pages **998** and 1000-**1001 with Table 2**. See also **Clarke,** T. E. et al. (1983). The effects of shoe design parameters on rearfoot control in running. In *Medicine and Science in Sports and Exercise* 15: 5: 376-381, particularly page **377 with Fig. 1**.

8. **Ehlen**, Kellie A. et al. (2011). Energetics and Biomechanics of Inclined Treadmill Walking

in Obese Adults. In *Medicine and Science in Sports and Exercise* 1251-1259, particularly page 1251-1252, 1256 with **Figure 3**, and 1258.

Selected Other References

Barg, Alexej et al. (2012). Subtalar Instability: Diagnosis and Treatment. In *Foot & Ankle International* 33: 151-160, particularly page 158.

Bates, Barry & Stergiou, Nicholas (1999) Forces Acting on the Lower Extremity. In Steven I. Subotnick (ed.) *Sports Medicine of the Lower Extremity*. 2nd Ed. New York, NY: Churchill Livingstone, 167-185, especially pages **172**.

Becker, James et al. (2014). Center of pressure trajectory differences between shod and barefoot running. In *Gait & Posture* 40: 504-509, especially pages 507-**508** and Figs. 3 & **4**.

Benjamin, Mike (2009). The Fascia of the Limbs and Back – A Review. In *Journal of Anatomy*, 214, 1-18, especially pages **13 with Fig. 10** and 14.

Billis, E. et al. (2007). Assessment of foot posture: Correlation between different clinical techniques. In *The Foot* 17: 65-72, particularly pages 65 & **67** with **Figures 1**-2.

Binkley, Christina (2014). Are High Heels Dead? In *The Wall Street Journal*, October 22, 2014.

Boyer, Katherine A. et al. (2014). The Role of Running Mileage on Coordination Patterns in Running. In *Journal of Applied Biomechanics* 30: 649-654, particularly including pages **652-653 with Figure 1**.

Campanelli, Valentina et al. (2011). Heel fat pad: a 3-D morphological study. In *Footwear Science*, 3:sup1, **S22-S23 with Figs. 1-2**, wherein it is noted on page S22 that the ..."[Heel Fat Pad] HFP average thickness is greater in the lateral rather [than] in the medial part of the HFP…."

Clarke, T. E. et al. (1983). Effects of Shoe Cushioning Upon Ground Reaction Forces in Running. In the *International Journal of Sports Medicine* 247-251, particularly pages 247-248.

Day, M. H. & Napier, J. R. (1964). Fossil Foot bones. In *Nature* 201: 969-970, particularly page **969** with **Figure 1**.

Ebbeling, Christine J. et al. (1994). Lower Extremity Mechanics and Energy Cost of Walking in High-Heeled Shoes. In the *Journal of Orthopaedic and Sports Physical Therapy*19:4: 190-196, particularly page 195.

Engsberg, Jack R. & Andrews, James G. (1987). Kinematic Analysis of the Talocalcaneal/Talcrural Joint During Running Support. In *Medicine and Science in Sports* *and Exercise* 19: 3: 275-284, especially pages 278 & 283.

Fredericks, William et al. (2015) Lower Extremity Biomechanical Relationships with Different Speeds in Traditional, Minimalist, and Barefoot Footwear. In the *Journal of Sports Science and Medicine* 14: 276-283, particularly page 276.

Fuller, Eric A. (2000). The Windlass Mechanism of the Foot, *Journal of the American Podiatric Medical Association* 90 No.1: 35-46, particularly pages **38-39** with **Figs. 2 & 3**.

Fuller, Joel T. et al. (2015). The Effect of Footwear on Running Performance and Running Economy in Distance Runners. In *Sports Medicine* 45: **411**-422.

Gottschall, Jinger S. & Kram, Roger (2005). Ground reaction forces during downhill and uphill running. In the *Journal of Biomechanics* 38: 445-452, particularly pages **445-446** and 450.

Griffin, Nicole L. et al. (2010). Comparative forefoot trabecular bone architecture in extant hominids. In the *Journal of Human Evolution* 59: 202-213, particularly page **202**.

Gruber, Allison H. et al. (2015). Economy and rate of carbohydrate oxidation during running with rearfoot and forefoot strike patterns. In the *Journal of Applied Physiology* 115: 2: 194-201, particularly page 194.

Hamill, Joseph et al. (2015). *Biomechanical Basis of Human Movement* (4th Edition) Philadelphia: Wolters Kluwer, particularly pages 212-217 and Figures 6-29 to 6-37. Simply the best introductory textbook and accessible but authoritative reference on biomechanics and anatomy.

Hatala, Kevin G. et al. (2013). Variation in Foot Strike Patterns during Running among Habitually Barefoot Populations. In *PLOS ONE* 8: 1: 1-6, especially **1**.

Jezersek, Matija et al. (2011). Three-dimensional laser based measurement of human foot during walking. In *Footwear Science* 3: sup1: S81-S83, particularly page **S82 with Figure 2**.

Kapandji, I. A. (1987). *The Physiology of the Joints (Volume 2): The Lower Limb (Fifth Edition)*. Edinburgh: Churchill Livingstone. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Klenerman, Leslie & Wood, Bernard (2006). How the Foot Works. In *The Human Foot*. London: Springer-Verlag, 81-101, particularly pages 89-92 with **Fig. 3.8**.

Li, Fengling et al. (2014). Lower extremity mechanics of jogging in different experienced high-heeled shoe wearers. In the *International Journal of Biomedical Engineering and Technology* 15: 1: 59-68, particularly pages 62-65 with **Figures 3-4**.

Li, Jing Xian & Hong, Youlian (2007). Kinematic and Electromyographic Analysis of the Trunk and Lower Limbs During Walking in Negative-Heeled Shoes. In the *Journal of the American Podiatric Medical Association* 97: 6: 447-456, particularly page 448.

Jones, Frederic Wood (1949). The Foot in Ontogeny. *Structure and Function as Seen in the Foot*. London: Bailliere, Tindall and Cox, 19-31, especially pages 26-28.

Mann, Roger A. (1982). Biomechanics of Running. Biomechanical Mechanisms of the Lower Limb, in *Symposium on the Foot and Leg in Running Sports* (Mack, Robert P. Ed.). St. Louis: The C.V. Mosby Company 1-29, especially pages 8 with Fig. 1-5, 10-11 with Fig. 1.6B-C, **17-21** and **25**.

McClay, Irene & Manal, Kurt (1997). Coupling Parameters in Runners With Normal and Excessive Pronation. In the *Journal of Applied Biomechanics* 13: 109-124, particularly pages **109-111** & 119.

McClay, Irene & Manal, Kurt (1998). A comparison of three-dimensional lower extremity kinematics during running between excessive pronators and normals. In *Clinical Biomechanics* 13: 3: 195-203, particularly pages **198-199 with Figures 3 & 4** and **202**.

McClay, Irene (2000). The Evolution of the Study of the Mechanics of Running. In the *Journal of the American Podiatric Medical Association* 90: 3: 133-148, especially pages 133, 134 with **Figure 1**, 140 with Figure 7, 141-142 with **Figure 9**, and **143-145**.

Morley, Joanna B. et al. (2010). Effects of Varying Amounts of Pronation on the Mediolateral Ground Reaction Forces During Barefoot Versus Shod Running. In *Journal of Applied Biomechanics* 2: 205-214, particularly pages *205* and **212**.

Mueller, Michael J. et al. (1993). Navicular Drop as a Composite Measure of Excessive Pronation. In the *Journal of the American Podiatric Medical Association* 83: 4: 198-202, particularly page 200 with Table1.

Munoz-Jimenez, M. et al. (2015). Influence of shod/unshod condition and running speed on foot-strike patterns, inversion/eversion, and vertical foot rotation in endurance runners. In *Journal of Sports Sciences* 1-8, particularly page **7**.

Nicola, Terry L. & Jewison, David J. (2012). The Anatomy and Biomechanics of Running. In *Clinical Sports Medicine* 31: 187-201, particularly pages **192-193**.

Nielsen, Rasmus Oestergaard et al. (2014). Foot pronation is not associated with increased injury risk in novice runners wearing a neutral shoe: a 1-year prospective cohort study. In the *British Journal of Sports Medicine* 48: 440-447, especially page **440**.

Nigg, B. M. et al. (1993). Effects of arch height of the foot on angular motion of the lower extremities in running. In the *Journal of Biomechanics* 26: 8: 909-916.

Nigg, Benno M. (1986). Some Comments for Runners. In *Biomechanics of Running Shoes*

(Benno Nigg ed.). Champaign, IL: Human Kinetics. See **page 163** on the huge difference between foot pronation and supination during running in running shoes compared to running barefoot.

Nigg, B. M. (1992). Range of Motion of the Foot as a Function of Age. In *Foot & Ankle* 13: 6: 336-343, particularly page **336**.

Nigg, B. M. et al. (2015). Running shoes and running injuries: mythbusting and a proposal for two new paradigms: 'preferred movement path' and 'comfort filter'. In the *British Journal of Sports Medicine* 0: 1-6, particularly pages **3-4** with **Figure 4** and **5**.

Nyska, Meir & Mann, Gideon (eds.) (2002). *The Unstable Ankle*. Champaign, Illinois: Human Kinetics, 2-26, particularly 13-15.

Phillips, Robert D. (1991). Modification of High-Heeled Shoes to Decrease Pronation During Gait. In the *Journal of the American Podiatric Medical Association* 81: 4: 215-219, particularly pages 216-217 with Figure 1-3.

Reinschmidt, C. et al. (1997). Tibiocalcaneal motion during running, measured with external and bone markers. In *Clinical Biomechanics* 12: 1: 8-16, particularly pages **11-12** with Figures **2-3**.

Riegger-Krugh, Cheryl & Keysor, Julie J. (1996). Skeletal malalignments of the Lower Quarter: Correlated and Compensatory Motions and Postures. In the *Journal of Orthopaedic &Sports Physical Therapy* 23: 2: 164-170, particularly **Tables 1 & 2 on pages 166-168**.

Sole, Christopher Charles et al. (2014). Patterns of mediolateral asymmetry in worn footwear. In *Footwear Science* 6: 3: 177-192, particularly page **177**.

Stergiou, Nicholas & Bates, Barry T. (1997). The relationship between subtalar and knee joint function as a possible mechanism for running injuries. In *Gait & Posture* 6: 177-185, particularly pages 177-**178**.

Taunton, J. E. et al. (2002). A retrospective case-control analysis of 2002 running injuries. In the *British Journal of Sports Medicine* 36: 95-101, particularly page 95.

TenBroek, Trampas M. et al. (2014). Midsole Thickness Affects Running Patterns in Habitual Rearfoot Strikers During a Sustained Run. In the *Journal of Applied Biomechanics* 30: 521-528, particularly pages **521**-522 and **524** with **Table 2**.

Tencer, Allan F. et al. (2004). Biomechanical Properties of Shoes and Risk of Falls in Older Adults. In the *Journal of the American Geriatric Society* 52: 1840-1846, especially page 1840.

van Gent, R. N. et al. (2007). Incidence and determinants of lower extremity running injuries in long distance runners: a systemic review. In the *British Journal of Sports Medicine* 41: 469-480, particularly page **469**.

Wikipedia-English (11/28-29/15). High-heel footwear. Locomotor effects of shoes.

Wilkinson, Matt. (2016). *Restless Creatures*. New York: Basic Books, particularly pages **24** and **25 with Figure 1-6**.

See also **Relevant Foot Research** at Natural Footgear:
http://www.naturalfootgear.com/Relevant_Foot_Research.html

Chapter 3. SHOE HEELS ALSO TILT THE KNEE OUTWARD, ABNORMALLY RESHAPING THE CRITICAL JOINT

1. **Rubin**, Gustav (1971). Tibial Rotation. In *Bulletin of Prosthetic Research-Spring* 1971, 95-100, especially pages **96-97**. And Inman, Verne. T. (1976). *The Joints of the Ankle*. Baltimore: The Williams & Wilkins Company, particularly pages 35-38 with Figures 9.1-9.3, 39-40, 51-**53** with **Figure 10.12** and 54-**55**, as well as 57-**66** with **Figure 11.14**.

2. **Willwacher**, Steffen, Irena Goetze, Katina Mira Fischer and Gert-Peter Bruggemann. (2016). The free moment in running and its relation to joint loading and injury risk. In ***Footwear Science*** Vol. 8, No. 1, 1-11 particularly pages **4-9** and **Figures 4-6**. Winner of the **Nike Award for Athletic Footwear Research**, the highest award presented at the **XII**th **Footwear Biomechanics Symposium** in Liverpool, UK 2015**.**

3. A prime example of external knee abduction moment: Anne **Mundermann**, Benno Nigg, Neil Humble, and Darren Stefanyshyn (2003). Foot orthotics affect lower extremity kinematics and kinetics during running. In *Clinical Biomechanics* 18: 254-262, especially pages 254 and **257-8 with Figure 2a-f**.

The results of the Mundermann et al. study are duplicated generally in many other well-accepted peer-reviewed studies, including by other researchers who are recognized as leaders in the field of biomechanics.

Although that assessment is not debatable, it required for me an excessive effort to complete, due to an almost comically confusing lack of consistency in dozens of research studies in defining the critical test results on the knee moment or torque in the frontal plane.

Sub-figure (e) of Figure 2 of the Mundermann study above shows that the knee joint (in the frontal plane) is torqued **in abduction** (forced into a tilted out or bow-legged position called a **varus position**) from touchdown to the midstance. This example is illustrated as an **internal knee abduction moment** in another study by Darren Stefanyshan et al. (among many others) in FIGURE 3.1D~~11A~~ (the left portion of FIGURES 3.1 D&E~~11A&B~~).

More specifically, that study is **Stefanyshyn**, Darren J. et al. (2006) Knee Angular Impulse as a Predictor of Patellofemoral Pain in Runners. In *The American Journal of Sports Medicine* 34: 11: 1844-1851, particularly **Figure 9, page 1850**, FIGURE 3.1D~~11A~~. Several other selected study show the same knee abduction examples: **Kerrigan**, D. Casey et al. (2009). The Effect of Running Shoes on Lower Extremity Joint Torques. In *Physical Medicine and Rehabilitation* 1:1058-1063, especially pages **1058-1060** with **Figure 1** and **1061-1062**. **Williams**, Dorsey Shelton & Wesley Isom (2012). Decreased Frontal Plane Hip Joint Moments in Runners With Excessive Varus Excursion at the Knee. In the *Journal of Applied Biomechanics* 28: 12–126, particularly pages **120-121, 123-125 and Figures 2-5**. **Johnson**, F. et al. (1980). The Distribution of Load Across the Knee. In the *Journal of Bone and Joint Surgery* 62-B: 3: 346-349, particularly pages **348-9**.

The problem is that a different but equally well-accepted study by **Mundermann** (again, among many others) with similar results defines the same knee joint torque as an **external knee adduction moment**, as shown in FIGURE 3.1E~~11B~~ (the right portion of FIGURES 3.1 D&E~~11A&B~~). But, again, the moment is forcing the knee into a **varus position**.

See for example: **Mundermann**, A., Dyrby, Chris O., and **Andriacchi**, Thomas P. (2008). A comparison of measuring mechanical axis alignment using three-dimensional position capture with skin markers and radiographic measurements in patients with bilateral medial compartment knee osteoarthritis. In *The Knee*. 15:480-485, particularly **Figure 2, page 481**, FIGURE 3.1E~~11B~~. See also several other selected examples: **Bates**, Nathaniel A. et al. (2016). Sex-based differences in knee ligament biomechanics during robotically simulated athletic tasks. In the *Journal of Biomechanics* 49: 1429-1436, particularly **Figure 3**, page **1434**. **Foroughi**, Nasim et al. (2009). The association of external knee adduction moment with biomechanical variables in osteoarthritis: A systemic review. In *The Knee* 16: 303-309, particularly pages **303-304 and 308**.

So we have the exact same moment forcing the knee into a **varus position** being defined by two different words between which it is almost impossible to distinguish either visually or in pronounciation, but which have exact opposite meanings ("adduction" is motion by a body part inward, toward the median axis of the body, and "abduction" is motion outward, away).

The only direct reference to this matched pair of contradictory of definitions that I have found was by Stephen Messier … & Paul Devita, who clearly stated that both definitions are alternatives that mean the same thing, despite being opposites. See **Messier**, Stephen P. … & **Devita**, Paul (2008). Risk Factors and Mechanisms of Knee Injury in Runners. In *Medicine & Science in Sports & Medicine* 1873-1879, especially page 1878.

This inconsistency-based confusion is a problem that has continued for many years and which still apparently has not been resolved. When I referred for clarification at last to the latest edition (2014) of a reference that I thought would provide authoritative guidance, *Research Methods in Biomechanics* by D. Gordon Robertson et al., what I found there was not very helpful news.

It seems that "there is no standard resolution coordinate system" for the presentation of moment data and four different systems are being used for 3D analysis. And, even worse, "this confusion extends, also, to the international biomechanics societies in wh ich no international standard has been proposed, let alone adopted." See Robertson, D. Gordon et al. (2014). *Research Methods in Biomechanics* (2nd Edition). Champaign: Human Kinetics, pages 164-167.

It has been suggested to me that the inconsistent use of the two terms evolved unresolved from different usages in the medical community versus biomechanics researchers. The two Mundermann studies above seem to provide confirmation of this analysis.

Just to be perfectly clear and emphatic on the most important point of potential confusion between "abduction" and "adduction" described above, in either example case shown in FIGURES 3.1 D&E~~11A&B~~ the knee motion that is forced by either moment is sideways to the outside, toward a **varus** or bow-legged position that inherently puts excessive pressure on the medial or inside portion of the knee. Which is a direct and unnatural effect of shoe heels.

3A. **Smillie**, I. S. (1970). *Injuries of the Knee Joint*, page 282. E. & S. Livingstone: Edinburgh and London.

4. **Derrick**, Timothy (2004). The Effects of Knee Contact Angle on Impact Forces and Accelerations. In *Medicine & Science in Sports & Exercise* 832-837, especially **Figure 6 on page 836**. **Kerrigan**, Casey D. (2009). The Effect of Running Shoes on Lower Extremity Joint Torques. In *Physical Medicine and Rehabilitation* 1:12: 1058-1063, particularly pages **1058** and **1060** with **Figure 1**. **Messier**, Stephen P. et al. (2008). Risk Factors and Mechanisms of Knee Injury in Runners. In *Medicine & Science in Sport & Exercise* 1873-1879, particularly page **1877-8**. See also **Novacheck**, T. F. (1998). In *Gait & Posture* 7: 77-98, especially pages 81-**82** with **Figures** 5-**6, 90-91**with **Figure 16** .

5. **Sunnegardh**, J. et al. (1988). Isometric and isokinetic muscle strength, anthropometry and physical activity in 8 and 13 year old Swedish children. In the *European Journal of Applied Physiology* 58: 291-297, especially pages **291** and **295-296 & Figure 1**.

6. **Altman**, Morton I. (1968). Sagittal Plane Angles of the Talus and Calsaneus in the Developing Foot. In the *Journal of the American Podiatry Association* 58: 11: 463-470, especially pages **466-469** and **Figures 2-6**. In *A Compendium of Podiatric Biomechanics*, Sgarlato, Thomas E. (Ed.). San Francisco: California College of Podiatric Medicine (1971), pages 191-198.

7. **Fregly**, Benjamin et al. (2012). Grand Challenge to Predict In Vivo Knee Loads. In the *Journal of Orthopaedic Research* April 503-513, especially page **505**.

8. **du Toit**, Guilluame (1955). Internal Derangement of the Knee. In *Instruction Course Lectures* (R. Beverly Raney, ed.). Vol. XII: 9-34, particularly pages **15-17**.

9. **Wood**, W. Quarry (1920). The Tibia of the Australian Aborigine. In the *Journal of Anatomy* Vol. LIV: Parts II & III (January and April): 232-257, **Figure 1** on page **235***.*

10. **Kate**, B. R. & Robert, S. L. (1965). Some observations on the upper end of the tibia in squatters. In the *Journal of Anatomy*, Lond. 99: 1: 137-141, particularly **Figure 2 on page 139**.

11. **PBS NOVA** (2014) "Roman Catacomb Mystery" It is important to note here that the proceeding photographic samples in Figures 3.4-3.5 were not cherry-picked from many other possible choices. They are simply the only ones I could find after an extensive search of available studies ranging over the last century and a half. Hopefully this book will prompt field studies conducted at the various locations all over the world where that are many ancient bones potentially available for study by professional anatomists and physical anthropology. The only contrary evidence I found was a drawing (Figure. 25 on page 177) of a Neolithic tibia in John Cameron (1934) *The Skeleton of British Neolithic Man*. London: Williams & Norgate Ltd. It shows elongation of the medial surface of the tibia, but no evidence of rotation.

12. See **Selected Knee Osteoarthritis References** below, after the last Endnote for Chapter 3

13. See for example **Kerrigan**, D. Casey et al. (1998). Women's shoes and knee osteoarthritis. In *The Lancet* 357, April 7, 1097-1098, particularly **both pages**, and **Kerrigan**, D. Casey et al. (1998). Knee osteoarthritis and high-heeled shoes. In *The Lancet* 351, May 9, 1399-1401, particularly pages **1399** and **1401**. Again, see Endnote 13 below.

14. **Butterfield**, Herbert (1965). *The Origins of Modern Science*. Free Press, pages 13-14.

Selected Knee Osteoarthritis References: (From Endnote **12** above)

Amin, Shreyasee et al. (2004). Knee Adduction Moment and Development of Chronic Knee Pain in Elders. In *Arthritis & Rheumatism* 51: 3: 371-376, particularly pages **371 and 374 with Table 2**.

Andrews, Michelle et al. (1996). Lower Limb Alignment and Foot Angle are Related to Stance Phase Knee Adduction in Normal Subjects: A Critical Analysis of the Reliability of Gait Analysis Data. In the J*ournal of Orthopaedic Research* 14: 289-295, particularly including pages **289** and **293-295.**

Andriacchi, Thomas P. et al. (2004). A Framework for the *in Vivo* Pathomechanics of Osteoarthritis at the Knee. In the *Annals of Biomedical Engineering* 32: 3: 447-457, particularly pages **447-448** and **450-453**.

Andriacchi, Thomas P. & Mundermann, Annegret (2006). The role of ambulatory mechanics in the initiation and progression of knee osteoarthritis. In *Current Opinion in Rheumatology* 18: 514-518, particularly pages **514** and **516-517**.

Andriacchi, Thomas P. et al. (2006). Rotational Changes at the Knee after ACL Injury Cause Cartilage Thinning. In *Clinical Orthopaedics and Related Research* 442: 39-44, particularly pages **42 with Figure 2** and **43 with Figure 7**.

Andriacchi, Thomas P. et al. (2009). Gait Mechanics Influence Healthy Cartilage Morphology and Osteoarthritis of the Knee. In *The Journal of Bone and Joint Surgery* 91: Suppl 1: 95-101, especially pages **95-100**.

Baliunas, A. J. et al. (2002). Increased knee joint loads during walking are present in subjects with knee osteoarthritis. In *Osteoarthritis and Cartilage* 10: 573-579, especially page **573**.

Barkema, Danielle D. et al. (2012). Heel height affects lower extremity frontal plane joint moments during walking. In *Gait & Posture* 35: 483-488, particularly pages 483, **485**-487 with **Figures 2-4**.

Barrios, Joaquin A. & Stotman, Danielle E. (2014). A Sex Comparison of Ambulatory Mechanics Relevant to Osteoarthritis in Individuals With and Without Asymptomatic Varus Knee Alignment. In the *Journal of Applied Biomechanics* 30:, 632-636, especially pages **632** and **634-35 with Tables 1-2**.

Barton, Christian et al. (2010). The Efficacy of Foot Orthoses in the Treatment of Individual with Patellofemoral Pain Syndrome. In *Sports Medicine* 40: (5) : 377-395, especially page **378**.

Bates, Nathaniel A. et al. (2016). Sex-based differences in knee ligament biomechanics during robotically simulated athletic tasks. In the *Journal of Biomechanics* 49: 1429-1436, particularly **Figure 3, page 1434**.

Bendjaballah, M. Z. et al. (1997). Finite element analysis of human knee joint in varus-valgus. In *Clinical Biomechanics* 12: 3: 139-148, particularly pages **139** and **146**.

Bourne, Robert B. et al. (1984). In Vitro Strain Distribution in the Proximal Tibia. In *Clinical Orthopaedics and Related Research* (Marshall R Urist, ed.) Philadelphia: J.B. Lippincott 285292, particularly **285**.

Boyer, Katherine et al. (2011). Kinematic adaptations to a lateral stiffness shoe in walking.

In *Footwear Science* 3: sup1: **S15-S16**.

Brouwer, G. M. et al. (2007). Association Between Valgus and Varus Alignment and the Development and Progression of Radiographic Osteoarthritis of the Knee. In *Arthritis & Rheumatism* 56: 4: 1204-1211, particularly pages **1204-1205**.

Butler, Robert J. et al. (2007). The Effect of a Subject-Specific Amount of Lateral Wedge on Knee Mechanics in Patients with Medial Knee Osteoarthritis. In the *Journal of Orthopaedic Research* September 1121-1127, especially page **1121** and **1125**.

Cahue, September et al. (2004). Varus-Valgus Alignment in the Progression of Patellofemoral Osteoarthritis. In *Arthritis & Rheumatism* 50: 7: 2184-2190, especially **pages 2184 and 2189**.

Chang, Alison et al. (2004). Thrust During Ambulation and the Progression of Knee Osteoarthritis. In *Arthritis & Rheumatism* 50:12: 3897-3903, particularly pages **3897-3898 with Figure 1** and **3901-2**.

Claes, Steven et al. (2013). Anatomy of the anterolateral ligament of the knee. In the *Journal of Anatomy* 223: 321-328, particularly pages **321** and **326-327**.

Collins, Natalie et al. (2009). Foot orthoses and physiotherapy in the treatment of patellofemoral pain syndrome: randomised clinical trial. In the *British Journal of Sports Medicine* 43: 169-171, particularly page **169**.

Deep, K. et al. (2015). The dynamic nature of alignment and variations in normal knees. In *The Bone & Joint Journal* 97-B: 4: April 498-502, especially pages 498-**501 (including footnote 18**).

Elahi, Sadaf et al. (2000). The association between varus-valgus alignment and patellorfemoral osteoarthritis. In *Arthritis & Rheumatism* 43: 8: 1874-1880, particularly page **1874**.

Englund, Martin et al. (2008). Incidental Meniscal Findings on Knee MRI in Middle-Aged and Elderly Persons. In *The New England Journal of Medicine* 359: 11: 1108-1115, particularly pages 1108-1109, 1112, and 1114.

Engsberg, Jack R. & Andrews, James G. (1987). Kinematic Analysis of the Talocalcaneal/Talcrural Joint During Running Support. In *Medicine and Science in Sports and Exercise* 19: 3: 275-284, especially pages 278 & **283**.

Erhart, Jennifer C. et al. (2008). A variable-stiffness shoe lowers the knee adduction moment in subjects with symptoms of medial compartment knee osteoarthritis. In the *Journal of Biomechanics* 41: 2720-2725, particularly pages **2720-2721**.

Erhart, Jennifer C. et al. (2008). Predicting changes in knee adduction moment due to loadaltering interventions from pressure distribution at the foot in healthy subjects. In the *Journal of Biomechanics* 41: 2989-2994, especially pages **2989** and **2994**.

Erhart, Jennifer C. et al. (2010). Changes in *In Vivo* Knee Loading with a Variable-Stiffness Intervention Shoe Correlate with Changes in the Knee Adduction Moment. In the *Journal of Orthopaedic Research* 12: 1548-1553, particularly pages **1548-1549**.

Esenyel, Meltem et al. (2003). Kinetics of High-Heeled Gait. In the Journal of the American Podiatric Medical Association 93: 1: 27-32, particularly pages 27 and 31 with **Figure 3**.

Fisher, David S. et al. (2007). In Healthy Subjects without Knee Osteoarthritis, the Peak Knee Adduction Moment Influences the Acute Effect of Shoe Interventions Designed to Reduce Medial Compartment Knee Load. In the *Journal of Orthopaedic Research* 4: 540-546, particularly page 540-541, 543 with Figure 2, and 545.

Foroughi, Nasim et al. (2009). The association of external knee adduction moment with biomechanical variables in osteoarthritis: A systemic review. In *The Knee* 16: 303-309, particularly pages **303-304** and **308**.

Foroughi, Nasim et al. (2010). Dynamic alignment and its association with knee adduction moment in medial knee osteoarthritis. In *The Knee* 17: 210-216, particularly pages **210** and **214**.

Franz, Jason R. et al. (2008). The Influence of Arch Supports on Knee Torques Relevant to Knee Osteoarthritis. In *Medicine and Science in Sports and Exercise* 913-917, particularly pages **913, 915 with Figure 2, and 916.**

Fregly, Benjamin J. et al. (2009). Effective Gait Patterns for Offloading the Medial Compartment of the Knee. In the *Journal of Orthopaedic Research* 8: 1016-1021, especially page **1016**.

Fukuchi, Claudiane et al. (2011). The influence of footwear with a small integrated lateral wedge on knee joint loading during walking. In *Footwear Science* 3: Sup1: S56-S58, especially page S57 with **Figure 2**.

Gabriel, Stefan M. et al. (2013). Unloading the Osteoarthritic Knee With a Novel Implant System. In the *Journal of Applied Biomechanics* 29: 647-654, especially pages .

Gelis, Anthony et al. (2008). Is there an evidence-based efficacy for the use of foot orthotics in knee and hip osteoarthritis? Elaboration of French clinical practice guidelines. In *Joint Bone Spine* 75: 714-720, particularly page 714.

Gok, Haydar et al. (2002). Kinetic and kinematic characteristics of gait in patients with medial knee aarthrosis. In *Acta Orthop Scand* 73: 6: 647-652, particularly pages **647** and **650-651**.

Guo, Mengtao et al. (2007). The influence of foot progression angle on the knee adduction moment during walking and stair climbing in pain free individuals with knee osteoarthritis. In *Gait & Posture* 26: 436-441, particularly pages **436-7** and 441.

Hunter, David J. et al. (2009). Alignment and Osteoarthritis of the Knee. In *The Journal of Bone and Joint Surgery* 91: Suppl1: 85-89, particularly pages **85** and **87-88**.

Hurwitz, Debra E. et al. (1998). Dynamic knee loads during gait predict proximal tibial bone distribution. In the *Journal of Biomechanics* 31: 423-430, particularly page **423**.

Hurwitz, Debra E. et al. (2002). The knee adduction moment during gait in subjects with knee osteoarthritis is more closely correlated with static alignment than radiographic disease severity, toe out angle and pain. In the *Journal of Orthopaedic Research* 20: 101-107, particularly page **101**.

Jackson, B. D.et al. (2004). Reviewing knee osteoarthritis – a biomechanical perspective. In the *Journal of Science and Medicine in Sport* 7: 3: 347-357, particularly pages **350-351**.

Jenkyn, Thomas R. et al. (2008). Toe-out gait in patients with knee osteoarthritis partially transforms external knee adduction moment into flexion moment during early stance phase of gait: A tri-planar kinetic mechanism. In the *Journal of Biomechanics* 41: 276-283, particularly pages 276, 278, and 282.

Kaufman, Kenton R. et al. (2001). Gait characteristics of patients with knee osteoarthritis. In the *Journal of Biomechanics* 34: 907-915, especially pages 907 and 913.

Kemp, Georgina et al. (2008). Reducing Joint Loading in Medial Knee Osteoarthritis: Shoes and Canes. In *Arthritis & Rheumatism* 59: 5: 609-614, particularly pages **609** and **613**.

Kerrigan, D. Casey et al. (1998). Women's shoes and knee osteoarthritis. In *The Lancet* 357, April 7, 1097-1098, particularly **both pages**.

Kerrigan, D. Casey et al. (1998). Knee osteoarthritis and high-heeled shoes. In *The Lancet* 351, May 9, 1399-1401, particularly pages **1399** and **1401**.

Kerrigan, D. Casey et al. (2002). Effectiveness of a Lateral-Wedge Insole on Knee Varus Torque in Patients with Knee Osteoarthritis. In *Physical Medicine and Rehabilitation* 83: 7: 889-893, particularly **889**, 891 with Fig. 1, and 892

Kerrigan, D. Casey et al. (2003). Men's Shoes and Knee Joint Torques Relevant to the Development and Progression of Knee Osteoarthritis. In *The Journal of Rheumatology* 30: 529-533, particularly **529**.

Kerrigan, D. Casey et al. (2005). Moderate-Heeled Shoes and Knee Joint Torques Relevant to the Development and Progression of Knee Osteoarthritis. In *Physical Medicine and Rehabilitation* 86: 5: 871-875, especially pages **871** and **874**.

Kerrigan, D. Casey et al. (2009). The Effect of Running Shoes on Lower Extremity Joint Torques. In *Physical Medicine and Rehabilitation* 1:1058-1063, especially pages **1058**-**1060** with **Figure 1** and **1061-1062**.

Koo, Seungbum & Andriacchi, Thomas P. (2007). A comparison of the influence of global functional loads vs. local contact anatomy on articular cartilage thickness at the knee. In the *Journal of Biomechanics* 40(13): 2961-2966, particularly pages **2961-2963** and **2965-2966**.

Landry, Scott C. et al. (2007). Knee biomechanics of moderate OA patients measured during gait at a self-selected and fast walking speed. In the *Journal of Biomechanics* 40: 1754-1761, particularly pages 1754 and 1760 and Fig 4 on page 1759.

Lawrence, Reva C. (1998). Estimates of the Prevalence of Arthritis and Selected Musculoskeletal Disorders in the United States. In *Arthritis & Rheumatism* 41: 5: 778-799, particularly page **778**.

Lewek, Michael D. et al. (2004). Control of Frontal Plane Knee Laxity during Gait in Patients with Medial Compartment Knee Osteoarthritis. In *Osteoarthritis Cartilage* 12(9): 745-751, particularly **Figure 1**.

Lukits, Ann (2015). Knee Surgery May Not Be the Best Option for Older Patients. In *The Wall Street Journal*, June 22, 1-7

Madden, Elizabeth et al. (2014). Effect of Rocker-Soled Shoes on Parameters of Knee Joint Load in Knee Osteoarthritis. In *Medicine and Science in Sports and Exercis*e 128-135, especially page 128.

Maly, Monica R. et al. (2002). Static and dynamic biomechanics of foot orthoses in people with medial compartment knee osteoarthritis. In *Clinical Biomechanics* 17: 603-610, especially pages **603-604 with Figure 1**.

Markolf, Keith L. et al. (1995). Combined Knee Loading States that Generate High Anterior Cruciate Ligament Forces. In the *Journal of Orthopaedic Research* 13: 930-935, particularly pages **930, 932 with Figure 2** and **933-934**.

Matsumoto, H. (1990). Mechanism of the Pivot Shift. In the J*ournal of Bone and Joint Surgery* 72-B: 816-821, especially pages 816 & 819-820 and Figs. 4, 10 & 11.

McWilliams, Daniel F. et al. (2010). Self-Reported Knee and Foot Alignments in Early Adult Life and Risk of Osteoarthritis. In *Arthritis Care & Research* 62: 4: 489-495, particularly pages **489** and **Table 4 on 493**.

Miyazaki, T. et al. (2002). Dynamic load at baseline can predict radiographic disease progression in medial compartment knee osteoarthritis. In the *Annual of Rheumatism Disease* 61: 617-622, especially pages **617,** 619 with **Figure 1,** and **621**.

Mundermann, Annegret et al. (2005). Secondary Gait Changes in Patients With Medial Compartment Knee Osteoarthritis. In *Arthritis & Rheumatism* 52: 9: 2835-2844, particularly page .

Mundermann, Annegret et al. (2008). A comparison of measuring mechanical axis alignment using three-dimensional position capture with skin markers and radiographic measurements in patients with bilateral medial compartment knee osteoarthritis. In *The Knee* 15: 480-485, particularly pages **480-481 with Figures 1-2**.

Mundermann, Annegret et al. (2008). Implications of increased medio-lateral trunk sway for ambulatory mechanics. In the *Journal of Biomechanics* 41: 165-170, especially page **165**.

Mundermann, Annegret et al. (2012). Amplitude and Phasing of Trunk Motion is Critical for the Efficacy of Gait Training Aimed at Reducing Ambulatory Loads at the Knee. In the *Journal of Biomechanical Engineering* 134: 1-6.

Ozguclu, Erkan K. (2008). Letter to the Editor: A knee osteoarthritis connected with hallux valgus-related pes planus. In the *Journal of Biomechanics 41*: 3523-3524.

Pandy, Marcus G. & Andriacchi, Thomas P. (2010). Muscle and Joint Function in Human Locomotion. In the *Annual Review of Biomedical Engineering* 12: 401-433, particularly pages **420-421** and **423-424**.

Radzimski, Andy Oliver et al. (2012). Effect of footwear on the external knee adduction moment – A systemic review. In *The Knee* 19 163-175, particularly page **163**.

Robbins, Steven et al. (2001). Vertical Impact Increase in Middle Age May Explain Idiopathic Weight-Bearing Joint Osteoarthritis. In *Physical Medicine and Rehabilitation* 82: 12: 1673-1677, particularly pages **1673** and **1676**.

Schipplein, O. D. & Andriacchi, T. P. (1991). Interaction Between Active and Passive Knee Stabilizers During Level Walking. In the *Journal of Orthopaedic Research* 9: 113-119, especially pages 115 with Figure 2, 116 and 118.

Shakoor, Najia & Block, Joel A. (2006). Walking Barefoot Decreases Loading on the Lower Extremity Joints in Knee Osteoarthritis. In *Arthritis & Rheumatism* 54: 9: 2923-2927, particularly pages **2923, 2325, & 2326**.

Shakoor, Najia et al. (2008). Effects of Specialized Footwear on Joint Loads in Osteoarthritis of the Knee. *Arthritis Rheumatism* 59(9): 1214-1220, especially page **1214**.

Shakoor, Najia et al. (2010). Effects of Common Footwear on Joint Loading in Osteoarthritis of the Knee. *Arthritis Care Research (Hoboken)* 62(7): 917-923, particularly page **917**.

Sharma, Leena et al. (1998). Knee adduction moment, serum hyaluronan level, and disease severity in medial tibiofemoral osteoarthritis. In *Arthritis & Rheumatism* 41: 7: 1233-1240, particularly pages **1233-1234**.

Sharma, Leena et al. (1999). Laxity in healthy and osteoarthritic knees. In *Arthritis & Rheumatism* 42: 5: 861-870, particularly page **861**.

Sharma, Leena et al. (2001). The Role of Knee Alignment in Disease Progression and Functional Decline in Knee Osteoarthritis. In the *Journal of the American Medical Association* 286: 2: 188-195, particularly page **188** and **195**.

Sharma, Leena (2007). Editorial: The Role of Varus and Valgus Alignment in Knee Osteoarthritis. In *Arthritis & Rheumatism* 56: 4: **1044-1047**.

Shelburne, Kevin B. (2008). Effects of foot orthoses and valgus bracing on the knee adduction moment and medial joint load during gait. In *Clinical Biomechanics* 23: 814-821, particularly page 814, Fig. 1 on page 816, and 820-821.

Shull, Pete B. et al. (2013). Six-Week Gait Retraining Program Reduces Knee Adduction Moment, Reduces Pain, and Improves Function for Individuals with Medial Compartment Knee Osteoarthritis. In the J*ournal of Orthopaedic Research* 7: 1020-1025, especially pages **1020** and **1022 with Figure 2**.

Simonsen, Erik B. et al. (2012). Walking on High Heels Changes Muscle Activity and the Dynamics of Human Walking Significantly. In the *Journal of Applied Biomechanics* 28: 20-28, particularly pages **20**, **24 with Figure 4**, and **26-27**.

Tanamas, Stephanie et al. (2009). Does Knee Malalignment Increase the Risk of Development and Progression of Knee Osteoarthritis? A Systemic Review. In *Arthritis & Rheumatism* 61: 4: 459-467, particularly pages **459** and **465-66**.

Teichtahl, A. J. et al. (2003). A comparison of gait patterns between the offspring of people with medial tibiofemoral osteoarthritis and normal controls. In *Clinical and Experimental Rheumatology* 21: 421-423, particularly pages **421** and **423**.

Trombini-Souza, Francis et al. (2011). Inexpensive footwear decreases joint loading in elderly women with knee osteoarthritis. In *Gait & Posture* 34: 126-130, especially page **128** and **Figure 2**.

Wada, Makoto et al. (1998). Relationship Between Gait and Clinical Results After High Tibial Osteotomy. In *Clinical Orthopaedics and Related Research* 354: 180-188, particularly pages **180-181** and **Table 2 on 184**.

Weidenhielm, L. et al. (1994). Adduction moment of the knee compared to radiological and clinical parameters in moderate medial osteoarthritis of the knee. In *Annales Chirurgiae et Gynaecologiae* 83: 236-242, particularly pages **236-238**.

Selected Other References

Bates, Barry & Stergiou, Nicholas (1999) Forces Acting on the Lower Extremity. In Steven I. Subotnick (ed.) *Sports Medicine of the Lower Extremity*. 2nd Ed. New York, NY: Churchill Livingstone, 167-185, especially pages **175-176 with Fig. 11-9**.

Beck, Melinda (2012). Could You Have a Jeremy Lin Knee? In *The Wall Street Journal*, April 3, D1 & D5, particularly **D1**.

Billis, E. et al. (2007). Assessment of foot posture: Correlation between different clinical techniques. In *The Foot* 17: 65-72, particularly pages 65 & **67** with **Figures 1**-2.

Biscarini, Andrea (2013). Joint Torques and Joint Reaction Forces During Squatting With a Forward or Backward Inclined Smith Machine. In the *Journal of Applied Biomechanics* 29: 85-97, particularly pages **85, 93, & 96**.

Boyer, Katherine A. et al. (2014). The Role of Running Mileage on Coordination Patterns in Running. In *Journal of Applied Biomechanics* 30: 649-654, particularly including pages **652-653 with Figure 1**.

Derrick, Timothy R. et al. (2002). Impacts and kinematic adjustments during an exhaustive run. In Medicine and Science in Sports and Medicine 998-1002, particularly pages 998 and 1000-**1001 with Table 2**.

Chantraine, Alex (1985). Knee joint in soccer players: osteoarthritis and axis deviation. In *Medicine & Science in Sports & Exercise* 434-439, especially page 434.

Cook, S. D. et al. (1983). A Biomechanical Analysis of the Etiology of Tibia Vara. In the *Journal of Pediatric Orthopedics* 3: 4: 449-454, especially page **449-450**.

Dicharry et al., Jay M. (2009). Differences in Static and Dynamic Measures in Evaluation of Talonavicular Mobility in Gait. In *Journal of Orthopaedic & Sports Physical Therapy* 39: 8: 628-634, especially page **633**.

Ferber, Reed et al. (2003). Gender differences in lower extremity mechanics during running. In *Clinical Biomechanics* 18: 350-357, especially all pages and particularly page 354 and **Figure 5**.

Fisher, David S. et al. (2007). In Healthy Subjects without Knee Osteoarthritis, the Peak Knee Adduction Moment Influences the Acute Effect of Shoe Interventions Designed to Reduce Medial Compartment Knee Load. In the *Journal of Orthopaedic Research* April 540-546.

Foch, Eric & Milner, Clare E. (2014). Frontal Plane Running Biomechanics in Female Runners With Previous Iliotibial Band Syndrome. In the *Journal of Applied Biomechanics* 30: 58-65, particularly page 58, 60 with Fig. 1, and 62 with Figures 2-3.

Gudas, Charles J. (1980). Patterns of Lower-Extremity Injury in 224 Runners. In *Comprehensive Therapy* 6: 9: 50-59, particularly pages **52-54**.

Hamill, Joseph et al. (1999). A dynamical systems approach to lower extremity running injuries. In *Clinical Biomechanics* 14: 297-308, particularly 306-307.

Hamill, Joseph et al. (2015). *Biomechanical Basis of Human Movement (4th Edition*) Philadelphia: Wolters Kluwer, particularly pages 193-209 & 230 and Figures 6-17 to 6-28. Simply the best introductory textbook and accessible but authoritative reference on biomechanics and anatomy.

Helfet, Arthur J. (1959). Mechanism of Derangements of the Medial Semilunar Cartilage and Their Management. In the *Journal of Bone and Joint Surgery* 41 B: 2: 319-336, particularly pages **320-320 with Figures 2-3, 6, 8, and 9**.

Insall, John et al. (1976). Chondromalacia Patellae. In *The Journal of Bone and Joint Surgery* 58-A: 1: 1-8,particularly pages 3 with Figure 3 and 7 with Figure 9.

Johnson, F. et al. (1980). The Distribution of Load Across the Knee. In the *Journal of Bone and Joint Surgery* 62-B: 3: 346-349, particularly pages **348-9**.

Li, Fengling et al. (2014). Lower extremity mechanics of jogging in different experienced high-heeled shoe wearers. In the *International Journal of Biomedical Engineering and Technology* 15: 1: 59-68, particularly pages 62-65 with **Figures 3-4**.

Kapandji, I. A. (1987). *The Physiology of the Joints (Volume 2): The Lower Limb (Fifth Edition)*. Edinburgh: Churchill Livingstone. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Malinzak, Robert A. et al. (2001). A comparison of knee joint motion patterns between men and women in selected athletic tasks. In *Clinical Biomechanics* 16 438-445, particularly pages 438 and 441-444, including **Figures 1**-3.

Mauntel, Timothy C. et al. (2014). Kinematic Differences Between Those With and Without Medial Knee Displacement During a Single-leg Squat. In the *Journal of Applied Biomechanics* 30: 707-712, particularly page **707**.

McClay, Irene & Manal, Kurt (1998). A comparison of three-dimensional lower extremity kinematics during running between excessive pronators and normals. In *Clinical Biomechanics* 13: 3: 195-203, particularly pages **198-199 with Figures 3 & 4** and **202**.

McLeod, William D. & Hunter, Stewart (1980). Biomechanical Analysis of the Knee: Primary Functions As Elucidated by Anatomy. In the *Journal of the American Therapy Association* 60:1561-1564, particularly pages **1562-1563** and **Figures 3 & 4**.

Morrison, J. B. (1970). The Mechanics of the Knee Joint in Relation to Normal Walking. In the J*ournal of Biomechanics* 3: 51-61, particularly page **58**.

Noehren, Brian et al. (2007). ASB Clinical Biomechanics Award Winner 2006: Prospective study of the biomechanical factors associated with iliotibial band syndrome. In *Clinical Biomechanics* 22: 951-956, particularly pages 951 and 954-955 with **Figures 2-4**.

Pohl, Michael et al. (2008). Biomechanical predictors of retrospective tibial stress fractures in runners. In the *Journal of Biomechanics* 41: 1160-1165, particularly page **1163**.

Riegger-Krugh, Cheryl & Keysor, Julie J. (1996). Skeletal malalignments of the Lower Quarter: Correlated and Compensatory Motions and Postures. In the *Journal of Orthopaedic &Sports Physical Therapy* 23: 2: 164-170, particularly **Tables 1 & 2 on pages 166-168**.

Rodrigues, Pedro et al. (2015). Evaluating the Coupling Between Foot Pronation and Tibial Internal Rotation Continuously Using Vector Coding. In the *Journal of Applied Biomechanics* 31: 88-94, particularly pages 88 and **92**-93.

Squadrone, Roberto et al. (2015). Acute effect of different minimalist shoes on foot strike pattern and kinematics in rearfoot strikers during running. In *Journal of Sports Sciences*. 33: 11, 1196-1204, particularly page 1203.

Smillie, I. S. (1978). Biomechanics of Rotation: Mechanism of Injuries of the Menisci: and Sequelae. In *Injuries of the Knee Joint (Fifth Ed.)*. Edinburgh: Churchill Livingstone. 71-82, particularly pages **73-76**.

Smith, J. W. (1956). Observations on the Postural Mechanism of the Human Knee Joint. In the *Journal of Anatomy* 90: 236-242?, especially page 240.

Stefanyshyn, D. J. et al. (1999). Knee joint moments and patellofemoral pain syndrome in runners. In the *Proceedings of the 4th symposium on Footwear Biomechanics*, Canmore, Canada, 86-87.

Stefanyshyn, D. J. et al. (2001). Dynamic variables and injuries in running. In the *Proceedings of the 5th Symposium on Footwear Biomechanics*, Zurich Switzerland 74- 75, particularly page **75**.

Stefanyshyn, Darren J. et al. (2006). Knee Angular Impulse as a Predictor of Patellofemoral Pain in Runners. In *The American Journal of Sports Medicine* 34: 11; 1844-1851, particularly pages 1844 & **1850** and **Figure 9**.

Stergiou, Nicholas & Bates, Barry T. (1997). The relationship between subtalar and knee joint function as a possible mechanism for running injuries. In *Gait & Posture* 6: 177-185, particularly pages 177-178.

Tanikawa, Hidenori et al. (2013). Comparison of Knee Mechanics Among Risky Athletic Motions for Noncontact Anterior Cruciate Ligament Injury. In the *Journal of Applied*

Biomechanics 29: 749-755, particularly pages **749 and 754**.

Thijs, Youri et al. (2012). Is High-Impact Sports Participation Associated with Bowlegs in Adolescent Boys? In *Medicine & Science in Sports & Exercise* 993-998, especially pages **993, 995, & 996**.

Valmassy, Ronald & Stanton, Brian (1989). Tibial Torsion: Normal Values in Children. In the *Journal of the American Podiatric Medical Association* 79: 9: 432-435, particularly pages **432** and **434** and **Figures 5-6**.

van Gent, R. N. et al. (2007). Incidence and determinants of lower extremity running injuries in long distance runners: a systemic review. In the *British Journal of Sports Medicine* 41: 469-480, particularly page **469**.

Williams, Dorsey Shelton & Wesley Isom (2012). Decreased Frontal Plane Hip Joint Moments in Runners With Excessive Varus Excursion at the Knee. In the *Journal of Applied Biomechanics* 28: 12–126, particularly pages **120-121**, **123-125** and **Figures 2-5**.

Willson, John D. et al. (2006). Core Strength and Lower Extremity Alignment during Single Leg Squats. In *Medicine and Science in Sports and Exercis*e 945-952, especially page **945**-46, 948 with **Figure 2**, and 950-51.

Yaniv, Moshe et al. (2006). Prevalence of Bowlegs Among Child and Adolescent Soccer Players. In the *Clinical Journal of Sports Medicine* 16: 5: 392-396, particularly **392** and **395**.

Yamazaki, J. et al. (2010). Differences in kinematics of single leg squatting between anterior cruciate ligament-injured patients and healthy controls. In *Knee Surgery Sports Traumatology Arthroscopothy* 18: 56-63, particularly pages **56**, 58-62 including **Figures** 2-**4**.

Zeller, Brian L. et al. (2003). Differences in Kinematics and Electromyographic Activity Between Men and Women during the Single-Legged Squat. In *The American Journal of Sports Medicine* 31: 4: 449-456, especially pages 449 and 452-455 with **Figures 2-4**.

Chapter 4. THE VASTUS LATERALIS AND HAMSTRING MUSCLES OF THE THIGH ARE UNNATURALLY WEAKENED

1. Also, **Smillie**, I. S. (1962). *Injuries of the Knee Joint* (3rd Ed). Edinburgh: E. & S. Livingstone, 3-5 and 99. **Smillie**, I. S. (1978). Biomechanics of Rotation: Mechanism of Injuries of the Menisci: and Sequelae. In *Injuries of the Knee Joint (Fifth Ed.)*. Edinburgh: Churchill Livingstone. 71-82, particularly pages **73-76**.

2. **Smillie**, I. S. (1980). Angular Deformity: Adult. In *Diseases of the Knee Joint* (2nd Ed.). Edinburgh: Churchill Livingstone, 311-329, most especially pages **315-317** and **Figure 9,12-15**.

3. **Baroni**, Bruno Manfredini (2013). Functional and Morphological Adaptations to Aging in Knee Extensor Muscles of Physically Active Men. In the *Journal of Applied Biomechanics* 29: 535-542, particularly pages **535** and 539 with Figure 3.

4. **Sosdian**, L. et al. (2016). Quantifying varus and valgus thrust in individuals with severe knee osteoarthritis. In *Clinical Biomechanics* 39: 44-51, particularly pages 44, 48, and **50**.

5. **Subotnick**, Steven I. (1975*)* Foot Types and Injury Predilections. In *Podiatric Sports Medicine.* Mount Kisco, New York: Futura Publishing Company, Inc. especially page **58**.

6. **Lieb**, Frederick J. (1971). Quadraceps Function. In the *The Journal of Bone and Joint Surgery* 53-A: 4: 749-758, particularly pages **749** and .

Selected Other References

Colby, Scott et al. (2000). Electromyographic and Kinematic Analysis of Cutting Maneuvers: Implications for Anterior Cruciate Ligament Injury. In *The American Journal of Sports Medicine* 28: 2: 234-240, especially including 234 and 239.

Hamill, Joseph et al. (2015). *Biomechanical Basis of Human Movement* (4th Edition) Philadelphia: Wolters Kluwer, particularly pages 201-209 and Figures 6-26 to 6-28. Simply the best introductory textbook and accessible but authoritative reference on biomechanics and anatomy.

Hewett, Timothy E. et al. (1996). Pylometric Training in Female Athletes: Decreased Impact Forces and Increased Hamstring Torques. In *The American Journal of Sports Medicine* 24: 6: 765-773, especially page 765 and 772.

Kapandji, I. A. (1987). T*he Physiology of the Joints (Volume 2): The Lower Limb (Fifth Edition)*. Edinburgh: Churchill Livingstone. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Kaplan, Emanuel B. (1958). The Iliotibial Tract. In *The Journal of Bone and Joint Surgery* 40-A: 4: 817-832, particularly page **825** with **Figures 7-A & 7-B**.

Park, Kyung-mi et al. (2010). The change in vastus medialis oblique and vastus lateralis electromyographic activity related to shoe heel height during treadmill walking. In the *Journal of Back and Musculoskeletal Rehabilitation* 23: 39-44 , particularly pages 39-40 and **42-43**.

Wild, Catherine Y. et al. (2013). Insufficient Hamstring Strength Compromises Landing Technique in Adolescent Girls. In *Medicine and Science in Sport and Exercise* 497.

Chapter 5. THE ANKLE JOINT IS ALSO ABNORMALLY RESHAPED BY SHOE HEELS

1. **Jones,** Frederic Wood (1949). *Structure and Function as Seen in the Foot*. London: Bailliere, Tindall and Cox. Page **114**.

2. **Jones,** Frederic Wood (1949). *Structure and Function as Seen in the Foot*. London: Bailliere, Tindall and Cox. Page **23.**

3. **Barnett**, C. H. & Napier, J. R. (1952). The Axis of Rotation at the Ankle Joint in Man. Its Influence Upon the Form of the Talus and the Mobility of the Fibula. In the *Journal of Anatomy* 86: 1: 1-9, particularly pages **3-4 with Figures 1-2**, 6-8, and Plate 1 with Figures 7-8.

4. Wolff's Law (1892) *The Law of Bone Remodeling* (1986 Reprint).

5. **Charles**, Havelock (1893). The Influence of Function, as Exemplified in the Morphology of the Lower Extremity of the Panjabi. In the *Journal of Anatomy and Physiology* Vol. XXVIII: 1-18, particularly pages 2 with Figure 1 and **6**-12.

6. **Boulle**, Eve-Line (2001). Evolution of Two Skeletal Markers of the Squatting Position. In *American Journal of Physical Anthropology* 115:50-56, especially pages **50-54** on tibial retroversion and lateral squatting facets.

7. **Colin** et al. (2014). Subtalar Joint Configuration on Weightbearing CT Scan. In *Foot & Ankle International* 35: 10: 1057-1062, particularly page **1060 with Figure 4**.

8. **Cavanagh**, Peter R. (1987). The Biomechanics of Lower Extremity Action In Distance Running. In *Foot & Ankle* 7: 4: 197-217, particularly pages **197**, **200-201**, **207 & Figure 11**, **210-211 & Figure 15** and **213-215 & Figure 16**. See also **Cavanagh**, Peter R. (1982). The shoe-ground interface in running. In *Symposium on the Foot and Leg in Running Sports* (Mack, Robert P. Ed.). St. Louis: The C.V. Mosby 30-44, particularly pages **33-34** with **Figure 2-3**.

9. **Nigg**, Benno M. (1986). Some Comments for Runners. In *Biomechanics of Running Shoes* (Benno Nigg Ed.). Champaign, IL: Human Kinetics Publishers, Inc., page **163**.

10. **Wells**, Lawrence H. (1931). The Foot of the South African Native. In the *American Journal of Physical Anthropology,* Vol. XV, No. 2. 186-289, particularly page **225 with Figure 6.**

Selected Other References

Barnett, C. H. & Napier, J. R. (1952). The Axis of Rotation at the Ankle Joint in Man. Its Influence Upon the Form of the Talus and the Mobility of the Fibula. In the *Journal of*

Anatomy 86: 1: 1-9, particularly pages **3-4 with Figures 1-2**, 6-8, and Plate 1 with Figures 7-8.

Barnett, C. H. (1954). Squatting Facets on the European Talus. In *Journal of Anatomy*, Vol. 88, Part 4, 509-513, especially page **512**.

Day, M. H. & Napier, J. R. (1964). Fossil Foot bones. In *Nature* 201: 969-970, particularly page **969** with **Figure 1**.

Harris, Robert I. & Beath, Thomas (1948). Hypermobile flat-foot with short tendo achillis. In *The Journal of Bone and Joint Surgery* 30-A: 1: 116-150, particularly pages 117 with Figures 534 and 535 and **126 with Figure 15-A**.

Inman, Verne. T. (1976). *The Joints of the Ankle*. Baltimore: The Williams & Wilkins Company, particularly pages 29-**31** with Figures 8.2-**8.4**.

Kapandji, I. A. (1987). T*he Physiology of the Joints (Volume 2): The Lower Limb (Fifth Edition)*. Edinburgh: Churchill Livingstone. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Klenerman, Leslie & Wood, Bernard (2006). How the Foot Works. In *The Human Foot*. London: Springer-Verlag, 81-101, particularly page 86 with **Fig. 3.5**.

Sarrafian, Shahan K & Kelikian, Armen S. (2011). Functional Anatomy of the Foot and Ankle. In *Sarrafian's Anatomy of the Foot and Ankle*. Third Edition, Armen S Kelikian (ed.) Philadelphia et al: Wolters Kluwer et al, 507-643, especially pages 511, **512 with Figure 10.7**, 516, 519, 560 with Fig. 10.82, 593-594 with Figs. 10.142 & 10.143, and 620 with Fig. 10.183.

Chapter 6. THE FOOT IS ABNORMALLY RESHAPED BY SHOE HEELS

1. **James**, C. S. (1939). Footprints and feet of natives of the Solomon Islands. In the *Lancet*: 2: 1390-1393.

2. **D'Aout**, Kristiaan (2015). Plantar pressure and foot roll-off timing during walking barefoot, in a minimal shoe, and in conventional footwear. *Footwear Science*, July, S1: S119-S121, especially page **S120** with **Figure 1**.

3. **Mays**, S. A. (2005). Paleopathological Study of Hallux Valgus. In the *American Journal of Physical Anthropology* 126: 139-149, particularly page **142 with Figure 4**.

4. **Mafart**, Bertrand (2007). Hallux valgus in a historical French population: Paleopathological study of 605 first metatarsal bones. In *Joint Bone Spine* 74: 166-170, particularly pages 167 and **169**. See also **Zipfel**, B. and Berger,L.R. (2007). Shod versus unshod: The emergence of forefoot pathology in modern humans? In *The Foot* 17: 205-213, particularly pages **205-207**.

5. **Wells**, Lawrence H. (1931). The Foot of the South African Native. In the *American Journal of Physical Anthropology,* Vol. XV, No. 2. 186-289, particularly page **259.**

Selected Other References

Barnicot, N.A. & Hardy, R. H. (1955). The Position of the Hallux in West Africans. In the *Journal of Anatomy* 89: 3: 355-361, particularly pages 355 and **358 with Figure 2**.

D'Aout, K. (2009). The effects of habitual footwear use: foot shape and function in native barefoot walkers. In *Footwear Science* Vol. 1, No. 2, 81-94, especially pages **81-83** and **89-91**.

Cong, Yan et al. (2011). In the *Journal of Biomechanics* 44: 2267-2272, particularly pages **2267** and 2269-2271.

Coughlin, Michael J. (1995). Women's Shoe Wear and Foot Disorders. In *WJM, Epitomes-Orthopedics* December 163: 6: 569-570, particularly 569.

Dingwall, Heather L. et al. (2013). Hominin stature, body mass, and walking speed estimates based on 1.5 milliion-year-old fossil footprints at Ileret, Kenya. In the *Journal of Human Evolution* 64: 556-568, particularly page **556**.

Engle, Earle T. & **Morton**, Dudley J (1931). Notes on Foot Disorders Among Natives of the Belgian Congo. In the *Journal of Bone and Joint Surgery* 13: 311-318, particularly **311-312, 314,** and **317-318**. The flat-footed condition and pronation are rare among native Belgian Congo populations that have never worn shoes (rare, even in 1931)!

Esenyel, Meltem et al. (2003). Kinetics of High-Heeled Gait. In the *Journal of the American Podiatric Medical Association* 93: 1: 27-32, particularly pages **27** and **31** with **Figure 3**.

Giladi, Michael et al. (1985). The Low Arch, a Protective Factor in Stress Fractures: A Prospective Study of 295 Military Recruits. In Orthopaedic Review XIV: 11: 709-712, particularly page 709.

Gottschalk, F. A. B. et al. (1980). A Comparison of the Prevalence of Hallux Valgus in Three South African Populations. In the *S. A. Medical Journal* 8 March 355-357, particularly 355 and 356 with Figure 3.

Gu, Yaodong et al. (2014). Plantar pressure distribution character in young female with mild hallus valgus wearing high-heeled shoes. In the *Journal of Mechanics in Medicine and Biology* 14: 1: 1-8, particularly pages 1-**5** with **Figure 4**, and 6-7,

Hamill, Joseph et al. (2015). *Biomechanical Basis of Human Movement* (4th Edition) Philadelphia: Wolters Kluwer, particularly pages 209-212 & 214-230 and Figures 6-32 to 6-45. Simply the best introductory textbook and accessible but authoritative reference on biomechanics and anatomy.

Hoffman, Phil. (1905). Conclusions Drawn from a Comparative Study of the Feet of Barefooted and Shoe-Wearing Peoples. In *The American Journal of Orthopedic Surgery*, Vol. III, No. 2, 105-136, especially pages **107-113**, **115**, **129-131**, and **133**.

Jones, Frederic Wood (1949). The Foot in Ontogeny. In the *Structure and Function as Seen in the Foot*. London: Bailliere, Tindall and Cox, 18-31, especially pages **23 with Figure 5** and **27 with Figure 9**.

Kapandji, I. A. (1987). T*he Physiology of the Joints (Volume 2): The Lower Limb (Fifth Edition)*. Edinburgh: Churchill Livingstone. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Merrifield, H. H. (1971). Female Gait Patterns in shoes with Different Heel Heights. In *Ergonomics* 14: 411-417, particularly page **411**.

Rao, Udaya B. (1992). The Influence of Footwear on the Prevalence of Flat Foot. In *The Journal of Bone and Joint Surgery,* Vol. 74-B, No. 4, 525-527, especially pages **525** and **527**.

Robbins, Steven (2016). Research of Steven Robbins MD. A treasure-trove of research on all aspects of the barefoot condition compared to the shod foot at: www.stevenrobbinsmd.com

Sachithanandam, V. & Joseph, Benjamin (1995). The influence of footwear on the prevalence of flat foot. In *The Journal of Bone & Joint Surgery* 77-B: 2: 254-257, particularly page 254.

Sarrafian, Shahan K & Kelikian, Armen S. (2011). Functional Anatomy of the Foot and Ankle. In *Sarrafian's Anatomy of the Foot and Ankle*. Third Edition, Armen S Kelikian (ed.) Philadelphia et al: Wolters Kluwer et al, 507-643, especially pages 511, **512**, 516, 519, **560** with **Fig. 10.82**, 593-**594** with **Figs. 10.142 & 10.143**, and **620** with **Fig. 10.183**.

Scott, Genevieve et al. (2007). Age-related differences in foot structure and function. In *Gait & Posture* 26: 68-75, particularly 68 and 74.

Shine, I. B. (1965). Incidence of Hallux Valgus in a Partially Shoe-wearing Community. In the *British Medical Journal* 1: 1648-1650, particularly page **1649**.

Shreeve, Jamie (2015). Mystery Man. In *National Geographic*, October 2014, 3–57, especially page **57**.

Shu, Yang et al. (2015). Foot Morphological Difference between Habitually Shod and Unshod Runners. In *PLOS ONE* DOI:10.1371/journal.pone.0131385 July 6, 2015, 1-13, especially pages **1-2**, **5** and **8-9**.

Shulman, Samual B. (1949). Survey in China and India of Feet That Have Never Worn Shoes. In *The Journal of the National Association of Chiropodists*, Vol. 49, 26-30, especially pages **28** and **29-30**.

Speksnijder, Caroline M. (2005). The higher the heel the higher the forefoot-pressure in ten healthy women. In *The Foot* 15:17-21, particularly pages 17-19 with **Figures 1-2** and 20-21.

Stavlas, Panafiotis et al. (2005) The Evolution of Foot Morphology in Children Between 6 and 17 Years of Age. In *The Journal of Foot & Ankle Surgery*, 44: 6:424-428, especially the **Abstract** and page **428**.

See also **Relevant Foot Research** at Natural Footgear:
http://www.naturalfootgear.com/Relevant_Foot_Research.html

Chapter 7. SHOE HEELS TILT OUTWARD THE THIGH AND HIP JOINT

1 & 2. **Hamill**, Joseph et al. (2015). *Biomechanical Basis of Human Movement* (4th Edition) Philadelphia: Wolters Kluwer, pages 178-193 & 230 and especially pages **180-182** and **Figures 6-9 to 6-11**. Simply the best introductory textbook and accessible but authoritative reference on biomechanics and anatomy.

Selected Other References

Bullough, Peter et al. (1968) Incongruent Surfaces in the Human Hip Joint. In *Nature* 217 March 30, **1290**.

Bullough, Peter & **Goodfellow**, John (1973). The relationship between degenerative changes and load-bearing in the human hip. In *The Journal of Bone and Joint Surgery* 55B: 4: 746-758, especially pages **746-748**, and **754-758**, and particularly **Figure 8** on page **749**.

Bonneau, Noemie et al. (2012). Study of the three-dimensional orientation of the labrum: its relations with the osseour acetabular rim. In the *Journal of Anatomy* 220: 504-513, especially pages **504-505** and **510-511**.

Boyer, Katherine A. et al. (2014). The Role of Running Mileage on Coordination Patterns in Running. In the *Journal of Applied Biomechanics* 30: 649-654, particularly pages **652-653 with Figure 1**.

Chang, Alison et al. (2005). Hip Abduction Moment and Protection Against Medial Tibiofemoral Osteoarthritis Progression. In *Arthritis & Rheumatism* 52: 11: 3515-3519, particularly page **3515**.

Dalstra, M. & Huiskes, R. (1995). Load transfer across the pelvic bone. In the *Journal of Biomechanics* 28: 6: 715-724, particularly page **718** and **722-723** and **Figure 9**.

Daniel, Matej et al. (2005). The shape of acetabular cartilage optimizes hip contact stress distribution. In the *Journal of Anatomy* 207: 85-91, particularly pages **85** and **90**.

Fabry, Guy et al. (1973). Torsion of the Femur. In *The Journal of Bone and Joint Surgery* 55-A: 8: 1726-1738, particularly page **1727**.

Greenwald, A. S. & O'Connor, J. J. (1971). The transmission of load through the human hip joint. In the *Journal of Biomechanics* 4: 507-528, particularly 507.

Goodfellow, John (1977). Joint surface incongruity and its maintenance. In *The Journal of Bone and Joint Surgery* 59-B: 4: 446-451, particularly page 446.

Kapandji, I. A. (1987). T*he Physiology of the Joints (Volume 2): The Lower Limb (Fifth Edition)*. Edinburgh: Churchill Livingstone. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Kingsley, Paul C. & Olmsted, K. L. (1948). A study to determine the angle of anteversion of the neck of the femur. In Th*e Journal of Bone and Joint Surger*y 30-A: 3: 745-751.

Neumann, Donald A. (2010). Kinesiology of the Hip: A Focus on Muscular Actions. In the *Journal of Orthopaedic and Sports Physical Therapy* 40: 2: 82-94, particularly pages **85-87** and **91-93**, as well as **Figures 1-5** and **8-10**.

Motta-Valencia, Keryl (2006). Dance-Related Injury. In *Physical Medicine and Rehabilitation Clinics of North America* 17: 697-723, particularly pages 699-700 with Table 1 and 703.

Noehren, Brian et al. (2013). Prospective Evidence for a Hip Etiology in Patellofemoral Pain. In *Medicine and Science in Sport and Exercise* 1120-1124, particularly page **1120**.

Powers, Christopher M. ((2010). The Influence of Abnormal Hip Mechanics on Knee Injury: A Biomechanical Perspective. In the *Journal of Orthopaedic and Sports Physical Therapy* 40: 2: 42-51, **particularly all of the pages**.

Reiman, Michael P. et al. (2009). Hip Function's Influence on Knee Dysfunction: A Proximal Link to a Distal Problem. In the *Journal of Sports Rehabilitation* 18: 33-46.

Riegger-Krugh, Cheryl & Keysor, Julie J. (1996). Skeletal malalignments of the Lower Quarter: Correlated and Compensatory Motions and Postures. In the *Journal of Orthopaedic &Sports Physical Therapy* 23: 2: 164-170, particularly **Tables 1 & 2 on pages 166-168**.

Shakoor, Najia et al. (2003). Asymmetric Knee Loading in Advance Unilateral Hip Osteoarthritis. In *Arthritis & Rheumatism* 48: 6: 1556-1561, particularly page **1556**.

Tateuchi, Hiroshige et al. (2011). Anticipatory Postural Adjustments During Lateral Step Motion in

Patients With Hip Osteoarthritis. In *Journal of Applied Biomechanics* 27: 32-39, particularly page **32**.

Chapter 8. SHOE HEELS TILT THE PELVIS BACKWARDS UNNATURALLY

1. **Slocum**, Donald B. & Bowerman, William (1962). The Biomechanics of Running. In *Clinical Orthopedic Periodin*, 39-45, especially pages **41-42**. See also **Bowerman**, William J. (1982). Anatomy of a running shoe. In *Symposium on the Foot and Leg in Running Sports* (Mack, Robert P. Ed.). St. Louis: The C. V. Mosby 60-63, particularly pages **62-63** with **Figures 5-1 & 5-2**.

2. **Bagwell**, Jennifer J. et al. (2016). Sagittal plane pelvis motion influences transverse plane motion of the femur: Kinematic coupling at the hip joint. In *Gait & Posture* 43: 120-124.

3. **de Lateur**, Barbara J. et al. (1991). Footwear and Posture: Compensatory Strategies for Heel Height. In the *American Journal of Physical Medicine and Rehabilitation* 246-254, particularly pages **246**, 251-**253**.

4. **Bendix**, Tom et al. (1984). Lumbar Curve, Trunk Muscles, and Line of Gravity with Different Heel Heights. In *Spine* 9: 2: 223-227, especially pages 224-6 with **Figs.** 1, 4, 6, & **7-8**.

5. **Lee**, Chang-Min et al. (2001). Biomechanical effects of wearing high-heeled shoes. In the *International Journal of Industrial Ergonomics* 28: 321-326, particularly pages 321, **323 with Figures 4 & 5**, and 324.

Selected Other References

Bates, Barry & Stergiou, Nicholas (1999) Forces Acting on the Lower Extremity. In Steven I. Subotnick (ed.) *Sports Medicine of the Lower Extremity*. 2nd Ed. New York, NY: Churchill Livingstone, 167-185, especially pages **178-180, with Figure 11-10**.

Derry, D. F (1923). On the Sexual and Racial Characters of the Human Ilium. In the *Journal of Anatomy* 58: 1: 71-83, particularly pages **80-81 with Figures 6-7**.

Hamill, Joseph et al. (2015). *Biomechanical Basis of Human Movement* (4th Edition) Philadelphia: Wolters Kluwer, pages **173-178** and **192-193**. Simply the best introductory textbook and accessible but authoritative reference on biomechanics and anatomy.

Heyns, O. S. (1944). A Study of the Bantu Pelvis. In the *Journal of Anatomy* 78: 5: 151-166, especially pages **164-165**.

Hruska, Ron (1998). Pelvic stability influenences lower-extremity kinematics. In *Biomechanics* June 23-29, particularly page **24** with **Figure 2A-**B.

Khamis, Sam & Yizhar, Ziva (2007). Effect of feet hyperpronation on pelvic alignment in a standing position. In *Gait & Posture* 25: 127-134, particularly pages **127** and **132-133 with Figure 5**.

Leroux, Alain et al. (2002). Postural adaptation to walking on inclined surfaces: I. Normal strategies. In *Gait & Posture* 15: 64-74, especially pages **64** and **72**, including **Figures 7-8**.

Levine, David et al. (2007). Sagittal Lumbar Spine Position During Standing, Walking, and Running at Various Gradients. In the *Journal of Athletic Training* 42 (1): 29-34, particularly pages **29-30** and **33-34**.

McIntosh, Andrew Stuart et al. (2006). Gait dynamics on an inclined walkway. In the *Journal of Biomechanics* 39: 2491-2502, particularly pages **2491** and **2494 with Figure 2**, and especially page **2499**.

Milch, Robert Austin (1954). Reotgenographic study of the inclination of the lateral pelvic wall and the interacetabular distance in normal adult pelves. In the *Journal of Bone and Joint Surgery* 36-A: 533-538, particularly pages **533** and **538**.

Moore, Kenny (2006). *Bowerman and the Men of Oregon*. Rodale Inc., particularly pages 182-183 and 314-315.

Schache, Anthony et al. (1999). The coordinated movement of the lumbo-pelvic-hip complex during running: a literature review. In *Gait & Posture* 10: 30-47, especially pages **31-33** with **Figure 1**, pages **40-41** with **Figures 4 & 5**, page **42**, and most particularly page **43**.

Schache, Anthony et al. (2002). Three-dimensional angular kinematics of the lumbar spine and pelvis during running. In *Human Movement Science* 21: 273-293, especially pages **273-5** and **285-89, including Figures. 5a-5c**.

Whalen, Jeanne (2014). Slouch at Your Own Peril. In *The Wall Street Journal* June 24: **D1**-D2, especially the first illustration comparing good standing posture with poor slouching posture while standing.

Whittle, Michael W. & Levine, David (1999). Three-dimensional relationships between the movements of the pelvis and lumbar spine during normal gait. In *Human Movement Science* 18: 681-692, particularly including page **690**.

Chapter 9. THE ABNORMAL FLAT-BACK CAUSES AN UNNATURAL FLAT-BUTT

Lieberman, Daniel E. et al. (2006). The human gluteus maximus and its role in running. In *The Journal of Experimental Biology* 209: 2143-2155.

Chapter 10. THE ABNORMAL FLAT-BUTT RESULTS IN AN UNNATURALLY SOFT BELLY

Selected References

Leetun, Darin et al. (2004). Core Stability Measures as Risk Factors for Lower Extremity Injury in Athletes. In *Medicine and Science in Sports and Exercise*: 926-934, especially pages **926-927** and **931**.

Willson, John et al. (2005). Core Stability and Its Relationship to Lower Extremity Function and Injury. In the *Journal of the American Academy of Orthopaedic Surgeons* 13: 316-325, particularly including pages **318-320** and **323, including Figs. 4-5**.

Chapter 11. A MAJOR MISALIGNMENT: BOTH FEET AND BOTH LEGS TILTED OUTWARD, ROTATING THE PELVIS BACKWARDS

Chapter 12. SHOE HEELS TYPICALLY MAKE BOYS BOW-LEGGED

Selected References

Baldon, Rodrigo de M. et al. (2013). Gender Differences in Lower Limb Kinematics During Stair Descent. In the *Journal of Applied Biomechanics* 29: 413-420, particularly pages **413** and **415 with Figure 1**.

Barrios, Joaquin A. & Strotman, Danielle E. (2014). A Sex Comparison of Ambulatory Mechanics Relevant to Osteoarthritis in Individuals With and Without Asymptomatic Varus Knee Alignment. In the *Journal of Applied Biomechanics* 30: 632-636, particularly pages **632** and **634-35 with Tables 1-2**.

Cahuzac, J. Ph. Et al. (1995). Development of clinical tibiofemoral angle in normal adolescents. In *The Journal of Bone and Joint Surgery* 77-B: 5: 729-732, particularly pages **729** and **731.**

Chumanov, Elizabeth S. et al. Gender differences in walking and running on level and inclined surfaces. In *Clinical Biomechanics* 23: 1260-1268, particularly pages **1260**, **1263-64** including **Tables 2 & 3**, and **1265-67**.

de Lateur, Barbara J. et al. (1991). Footwear and Posture: Compensatory Strategies for Heel Height. In the *American Journal of Physical Medicine and Rehabilitation* 246-254, particularly pages **246**, 251-**253**.

Ferber, Reed et al. (2003). Gender differences in lower extremity mechanics during running. In *Clinical Biomechanics* 18: 350-357, especially all pages and particularly pages 350-**354**

with **Figure 5** and 355-356 with Table 1.

Hashemi, Javad et al. (2008). The Geometry of the Tibial Plateau and Its Influence on the Biomechanics of the Tibiofemoral Joint. In the *Journal of Bone and Joint Surgery* 90: 2724-34, especially pages **2724**, **2727,** and **2732-33**.

Hewett, Timothy E. et al. (1996). Pylometric Training in Female Athletes: Decreased Impact Forces and Increased Hamstring Torques. In *The American Journal of Sports Medicine* 24: 6: 765-773, especially page **765** and **772**.

Horton, Melissa G. & Hall, Terry L. (1989). Quadraceps Femoris Muscle Angle: Normal Values and Relationships with Gender and Selected Skeletal Measures . In *Physical Therapy* 69: 897-901, particularly pages **897** and **900**.

Kernozek, Thomas W. et al. (2008). Gender Differences in Lower Extremity Landing Mechanics Caused by Neuromuscular Fatigue. In *The American Journal of Sports Medicine* 36: 3: 554-565, particularly pages **554** and **559 including Table 3**.

Malinzak, Robert A. et al. (2001). A comparison of knee joint motion patterns between men and women in selected athletic tasks. In *Clinical Biomechanics* 16 438-445, particularly pages **438** and **441-444**, including **Figures 1**-3.

Mauntel, Timothy C. et al. (2015). Sex Differences During an Overhead Squat Assessment. In the *Journal of Applied Biomechanics* 31: 244-249, particularly pages 244-45 and 247.

Pollard, Christine D. et al. 2007). Gender Differences in Hip Joint Kinematics and Kinetics During Side-Step Cutting Maneuver. In *Clinical Journal of Sports Medicine* 17: 1: 38-42, particularly pages 38 and 40-41, including Figures 2-3.

Nigg, Benno M. et al. (1992). Range of Motion of the Foot as a Function of Age. In *Foot & Ankle* 13: 6: 336-343, particularly page **336**.

Rodrigues, Pedro et al. (2015). Evaluating the Coupling Between Foot Pronation and Tibial Internal Rotation Continuously Using Vector Coding. In the *Journal of Applied Biomechanics* 31: 88-94, particularly pages **88** and **92-93**.

Sigward, Susan M. & Powers, Christopher M. (2006). The influence of gender on knee kinematics, kinetics, and muscle activation patterns during side-step cutting. In *Clinical Biomechanics* 21: 41-48, particularly including pages 41 and **45 with Figure 2**.

Sunnegardh, J. et al. (1988). Isometric and isokinetic muscle strength, anthropometry and physical activity in 8 and 13 year old Swedish children. In the *European Journal of Applied Physiology* 58: 291-297, especially pages **291** and **295-296** & **Figure 1**.

Willson, John D. et al. (2006). Core Strength and Lower Extremity Alignment during Single Leg Squats. In *Medicine and Science in Sports and Exercise* 945-952, especially page **945-**

46, **948 with Figure 2**, and 950-51.

Willy, Richard W. et al. (2012). Are Mechanics Different between Male and Female Runners with Patellofemoral Pain? In *Medicine and Science in Sports and Exercis*e 2165-2171, particularly pages **2165-66** and **2168-70 with Figures 2-3**.

Yamazaki, J. et al. (2010). Differences in kinematics of single leg squatting between anterior cruciate ligament-injured patients and healthy controls. In *Knee Surgery Sports Traumatology Arthroscopothy* 18: 56-63, paarticularly pages **56**, 58-62 including *Figures* 2-**4**.

Zeller, Brian L. et al. (2003). Differences in Kinematics and Electromyographic Activity Between Men and Women during the Single-Legged Squat. In *The American Journal of Sports Medicine* 31: 4: 449-456, especially pages **449** and **452-455** with **Figures 2-4**.

Chapter 13. HIGHER HEELS TYPICALLY MAKE WOMEN KNOCK-KNEED

1. **Zifchock**, Rebecca A. et al. (2006). The Effect of Gender, Age, and Lateral Dominance on Arch Height and Arch Stiffness. In *Foot & Ankle International* 27: 5: May 367-372, particularly page **367**.

2. **CBS 60 Minutes** (April 10, 2016). *Switching Teams*.

3. **PBS Newshour** (May 11, 2016). *Military Transition*.

Selected Other References

Bakalar, Nicholas (2015). Girls Are Born With Weaker Backbones Than Boys. In *The New York Times,* July 29.

Baldon, Rodrigo de M. et al. (2013). Gender Differences in Lower Limb Kinematics During Stair Descent. In the *Journal of Applied Biomechanics* 29: 413-420, particularly pages **413** and **415 with Figure 1**.

Barkema, Danielle D. et al. (2012). Heel height affects lower extremity frontal plane joint moments during walking. In *Gait & Posture* 35: 483-488, particularly pages 483, **485**-487 with **Figures** 2-**4.**

Barrios, Joaquin A. & Strotman, Danielle E. (2014). A Sex Comparison of Ambulatory Mechanics Relevant to Osteoarthritis in Individuals With and Without Asymptomatic Varus Knee Alignment. In the *Journal of Applied Biomechanics* 30: 632-636, particularly pages **632** and **634-35 with Tables 1-2**.

Benas, Daphne (1984). Special considerations in women's rehabilitation programs. In *Rehabilitation of the Injured Knee* (Hunter, Letha Y. & Funk, F. James, Eds.). St. Louis: The C. V. Mosby Company 393-405, especially pages **395** and **397**.

Cahuzac, J. Ph. Et al. (1995). Development of clinical tibiofemoral angle in normal adolescents. In the *Journal of Bone and Joint Surgery* 77-B: 5: 729-732, particularly pages **729** and 731.

Cronstrom, Anna et al. (2016). Gender differences in knee abduction during weight-bearing activities: A systematic review and meta-analysis. In *Gait & Posture* 49: 315-328, particularly pages 315 and 324.

Chumanov, Elizabeth S. et al. (2008). Gender differences in walking and running on level and inclined surfaces. In *Clinical Biomechanics* 23: 1260-1268, particularly pages **1260**, **1263-64** including **Tables 2 & 3**, and **1265-67**.

de Lateur, Barbara J. et al. (1991). Footwear and Posture: Compensatory Strategies for Heel Height. In the *American Journal of Physical Medicine and Rehabilitation* 246-254, particularly pages **246**, 251-**253**.

Farr, Joshua N. et al. (2013). Effects of Physical Activity and Muscle Quality on Bone Development in Girls. In *Medicine and Science in Sport and Exercise*, 2332-2340, particularly **2332**.

Ferber, Reed et al. (2003). Gender differences in lower extremity mechanics during running. In *Clinical Biomechanics* 18: 350-357, especially all pages and particularly page 350-**354** with **Figure 5** and 355-356 with Table 1.

Ferber, Reed et al. (2010). Competitive Female Runners With a History of Iliotibial Band Syndrome Demonstrate Atypical Hip and Knee Kinematics. In the *Journal of Orthopaedic & Sports Physical Therapy* 40: 2: 52-58, especially page **52** and **55-57 with Figures 2-4**.

Foch, Eric & Milner, Clare E. (2014). Frontal Plane Running Biomechanics in Female Runners With Previous Iliotibial Band Syndrome. In the J*ournal of Applied Biomechanics* 30: 58-65, particularly page 58, 60 with Fig. 1, and 62 with Figures 2-3.

Frey, Carol (1993). American Orthopaedic Foot and Ankle Society Women's Shoe Survey. In *Foot & Ankle* 14: 2: 78-81, particularly pages **78-79** and **Figures 1-2**.

Hashemi, Javad et al. (2008). The Geometry of the Tibial Plateau and Its Influence on the Biomechanics of the Tibiofemoral Joint. In the *Journal of Bone and Joint Surgery* 90: 2724-34, especially pages **2724, 2727**, and **2732-33**.

Hewett, Timothy E. et al. (1996). Pylometric Training in Female Athletes: Decreased Impact Forces and Increased Hamstring Torques. In *The American Journal of Sports Medicine* 24: 6: 765-773, especially page **765 and 772**.

Hollman, John H. et al. (2009). Relationships Between Knee Valgus, Hip-Muscle Strength, and Hip-Muscle Recruitment During a Single-Limb Step-down. In the *Journal of Sport*

Rehabilitation 18: 104-117, particularly pae **104-105 with Figure 1** and **116**.

Horton, Melissa G. & Hall, Terry L. (1989). Quadraceps Femoris Muscle Angle: Normal Values and Relationships with Gender and Selected Skeletal Measures . In *Physical Therapy* 69: 897-901, particularly pages **897** and **900**.

Ireland, Mary Lloyd & Ott, Susan M. (2004). Special concerns of the female athlete. In *Clinical Sports Medicine* 281-298, especially pages **282-83** with **Figure 1**, **286** with **Figure 3**, and **288** with **Figure 4**.

Kernozek, Thomas W. et al. (2008). Gender Differences in Lower Extremity Landing Mechanics Caused by Neuromuscular Fatigue. In *The American Journal of Sports Medicine* 36: 3: 554-565, particularly pages **554** and **559 including Table 3**.

Li, Fengling et al. (2014). Lower extremity mechanics of jogging in different experienced high-heeled shoe wearers. In the *International Journal of Biomedical Engineering and Technology* 15: 1: 59-68, particularly pages 62-65 with **Figures 3-4**.

Lilley, Kim et al. (2011). A biomechanical comparison of the running gait of mature and young females. In *Gait & Posture* 33: 496-500, especially pages **496**-**499**, including **Figure 1** .

Malinzak, Robert A. et al. (2001). A comparison of knee joint motion patterns between men and women in selected athletic tasks. In *Clinical Biomechanics* 16 438-445, particularly pages **438** and **441-444**, including **Figures 1**-3.

Mauntel, Timothy C. et al. (2015). Sex Differences During an Overhead Squat Assessment. In the *Journal of Applied Biomechanics* 31: 244-249, particularly pages 244-45 and 247.

McLean, Scott G. et al. (2005). Association between lower extremity posture at contact and peak knee valgus moment during sidestepping: Implications for ACL injury. In *Clinical Biomechanics* 20: 863-870, particularly pages **863**, **865-66** with **Figures 3 & 4**, and **868**.

Mika, Anna et al. (2012). The Effect of Walking in high- and Low-Heeled Shoes on Erector Spinae Activity and Pelvis Kinematics During Gait. In the *American Journal of Physical Medicine & Rehabilitation* 91:5: 425-434, especially pages 425-426, 428-430 with Figures 3-6, and **432**.

Mika, Anna et al. (2012). The influence of heel height on lower extremity kinematics and leg muscle activity during gait in young and middle-aged women. In *Gait & Posture* 35: 677-680, particularly page 680.

Miranda, Daniel et al. (2013). Knee Biomechanics during a Jump-Cut Maneuver: Effects of Sex and ACL Surgery. In *Medicine and Science in Sport and Exercise*, 942.

Nigg, Benno M. et al. (1992). Range of Motion of the Foot as a Function of Age. In *Foot &*

Ankle 13: 6: 336-343, particularly page **336**.

Nigg, Benno M. et al. (2012). Shoe midsole hardness, sex and age effects on lower extremity kinematics during running. In the *Journal of Biomechanics* 25: 1692-1697, particularly **1692**.

Noehren, Brian et al. (2007). ASB Clinical Biomechanics Award Winner 2006: Prospective study of the biomechanical factors associated with iliotibial band syndrome. In *Clinical Biomechanics* 22: 951-956, particularly pages 951 and 954-955 with **Figures 2-4**.

Pollard, Christine D. et al. (2007). Gender Differences in Hip Joint Kinematics and Kinetics During Side-Step Cutting Maneuver. In *Clinical Journal of Sports Medicine* 17: 1: 38-42, particularly pages **38** and **40-41**, including **Figures 2-3**.

Pollard, Christine D. et al. (2010). Limited hip and knee flexion during landing is associated with increased frontal plane knee motion and moments. In *Clinical Biomechanics* 25: 142-146, particularly page **142** and **145 with Figure 3**.

Rodrigues, Pedro et al. (2015). Evaluating the Coupling Between Foot Pronation and Tibial Internal Rotation Continuously Using Vector Coding. In the *Journal of Applied Biomechanics* 31: 88-94, particularly pages **88** and **92-93**.

Rossi, William A. (1999). Why Shoes Make “Normal” Gait Impossible. In *Podiatry Management* March 50-, especially page **2**.

Rossi, William A. (2001). Footwear: The Primary Cause of Foot Disorders. In *Podiatry Management* February 129-138, especially pages **129-130** and **134-136**.

Rossi, William A. (2001). Fashion and Foot Deformation. In *Podiatry Management* October 103-118, especially pages **129-130** and **134-136**.

Sigward, Susan M. & Powers, Christopher M. (2006). The influence of gender on knee kinematics, kinetics, and muscle activation patterns during side-step cutting. In *Clinical Biomechanics* 21: 41-48, particularly including pages 41 and **45 with Figure 2**.

Sunnegardh, J. et al. (1988). Isometric and isokinetic muscle strength, anthropometry and physical activity in 8 and 13 year old Swedish children. In the *European Journal of Applied Physiology* 58: 291-297, especially pages **291** and **295-296** & **Figure 1**.

Wild, Catherine Y. et al. (2013). Insufficient Hamstring Strength Compromises Landing Technique in Adolescent Girls. In *Medicine and Science in Sport and Exercise* **497**.

Willson, John D. et al. (2006). Core Strength and Lower Extremity Alignment during Single Leg Squats. In *Medicine and Science in Sports and Exercise* 945-952, especially page **945**-46, 948 with **Figure 2**, and 950-51.

Zeller, Brian L. et al. (2003). Differences in Kinematics and Electromyographic Activity Between Men and Women during the Single-Legged Squat. In *The American Journal of Sports Medicine* 31: 4: 449-456, especially pages **449** and **452-455** with **Figures 2-4**.

Anterior Cruciate Ligament (ACL) References

Andriacchi, Thomas P. & Dyrby, Chris O. (2005). Interactions between kinematics and loading during walking for the normal and ACL deficient knee. In the *Journal of Biomechanics* 38: 293-298, particularly pages **293** and **296-97**, including **Figures 2-3**.

Boden, Barry P. (2000). Mechanisms of Anterior Cruciate Ligament Injury. In *Orthopedics* 23: 6: 573-578, particularly pages **573** and **575-76** with **Figures 1-2**.

Colby, Scott et al. (2000). Electromyographic and Kinematic Analysis of Cutting Maneuvers: Implications for Anterior Cruciate Ligament Injury. In *The American Journal of Sports Medicine* 28: 2: 234-240, especially including **234** and **239**.

Hewett, Timothy E. et al. (1999). The Effect of Neuromuscular Training on the Incidence of Knee Injury in Female Athletes: A Prospective Study. In T*he American Journal of Sports Medicine* 27: 6: 699-706, particularly pages **699** and **704-705**.

Hewett, Timothy E. et al. (2005). Biomechanical Measures of Neuromuscular Control and Valgus Loading of the Knee Predict Anterior Cruciate ligament Injury Risk in Female Athletes: A Prospective Study. In T*he American Journal of Sports Medicine* 33: 4: 492-501, particularly pages **492**, **495 with Figures 3-5**, and **497-499 with Figures 9-10**.

Hewett, Timothy E. et al. (2009). Video analysis of trunk and knee motion during non-contact anterior cruciate ligament injury in female athletes: lateral trunk and knee abduction motion are combined components of the injury mechanism. In the *British Journal of Sports Medicine* 43: 417-422, particularly including pages **417**, **419-421**.

Ireland, Mary Lloyd (1999). Anterior Cruciate Ligament Injury in Female Athletes: Epidemiology. In the *Journal of Athletic Training* 43:2: 150-154, particularly **150** and **152-53 with Figures 1-3**.

Ireland, Mary Lloyd (2002). The Female ACL: why is it more prone to injury? In the *Orthopedic Clinics of North America* 33: 637-651, particularly pages **637-642 with Figures 4-7** and 644-647.

Lanshammar, Katharina & Ribom, Eva L. (2011). Differences in muscle strength in dominant and non-dominant leg in females aged 20-39 years – A population-based study. In *Physical Therapy in Sport* 12 (2011) 76-79. especially pages 76-**77.**

Olsen, Odd-Egil et al. (2004). Injury Mechanisms for Anterior Cruciate Ligament Injuries in

Team Handball: A Systemic Video Analysis. In the *American Journal of Sports Medicine* 32: 4: 1002-1012, particularly pages **1002** and **1010-1011**.

Tanikawa, Hidenori et al. (2013). Comparison of Knee Mechanics Among Risky Athletic Motions for Noncontact Anterior Cruciate Ligament Injury. In the *Journal of Applied Biomechanics* 29: 749-755, particularly pages **749** and **754**.

Yamazaki, J. et al. (2010). Differences in kinematics of single leg squatting between anterior cruciate ligament-injured patients and healthy controls. In *Knee Surgery Sports Traumatology Arthroscopothy* 18: 56-63, particularly pages **56**, 58-62 including **Figures** 2-**4**.

Patellofemoral Pain (PFP) References

Greenhalgh, Andrew et al. (2015). Patellofemoral kinetics during running in heelless and conventional running shoes. In *Footwear Science* 7: sup1: S111-S112, particularly page **S111**.

Ho, Kai-Yu et al. The influence of heel height on patellofemoral joint kinetics during walking. In *Gait & Posture* 36: 271-275, particularly **271** and 274 with **Table 1**.

Lee, Thay Q. et al. 2003). The Influence of Tibial and Femoral Rotation on Patellofemoral Contact Area and Pressure. In the *Journal of Orthopaedic & Sports Physical Therapy* 33: 11: 686-692, particularly pages **686** and **689-91 with Figures 3-5**.

Nakagawa,Theresa Helissa et al. (2012). Frontal Plane Biomechanics in Males and Females with and without Patellofemoral Pain. In *Medicine & Science in Sports & Exercise* 1747-1755, particularly page **1754**.

Powers, Christopher M. (2003). The Influence of Altered Lower-Extremity Kinematics on Patellofemoral Joint Dysfunction: A Theoretic Perspective. In the *Journal of Orthopaedic & Sports Physical Therapy* 33: 11: 639-646, especially page **639-640 with Fig. 1** and **643-645 with Figures 3-5**.

Powers, Christopher M. et al. (2003). Patellofemoral Kinematics during Weight-Bearing and Non-Weight-Bearing Knee Extension in Persons With Lateral Subluxation of the Patella: A Preliminary Study. In the *Journal of Orthopaedic & Sports Physical Therapy* 33: 11: 677-685, especially page **677** and **684 with Figure 11**.

Souza, Richard B. et al. (2010). Femur Rotation and Patellofemoral Joint Kinematics: A Weight-Bearing Magnetic Resonance Imaging Analysis. In the *Journal of Orthopaedic & Sports Physical Therapy* 40: 5: 277-285, particularly pages **277, 279 with Figure 1**, and **282 with Figure 8-9**.

Toumi, Hechmi et al. (2012). Regional variations in human patellar trabecular architecture and the structure of the quadriceps enthesis: a cadaveric study. In the *Journal of Anatomy* 220: 632-637, particularly pages **632** and **637**.

Willson, John D. & Davis, Irene S. (2008). Lower extremity mechanics of females with and without patellofemoral pain across activities with progressively greater task demands. In *Clinical Biomechanics* 23: 203-211, particularly page **203**.

Willy, Richard W. et al. (2012). Are Mechanics Different between Male and Female Runners with Patellofemoral Pain? In *Medicine and Science in Sports and Exercise* 2165-2171, particularly pages **2165-66** and **2168-70 with Figures 2-3**.

Chapter 14. UNNATURAL PELVIC SHAPE MAKES CHILDBIRTH UNNATURALLY DIFFICULT

1. **Heyns**, O. S. (1944). A Study of the Bantu Pelvis. In the *Journal of Anatomy* 78: 5: 151-166, especially pages **164-165**. **Derry**, D. F (1923). On the Sexual and Racial Characters of the Human Ilium. In the *Journal of Anatomy* 58: 1: 71-83, particularly pages **80-81 with Figures 6-7**.

2. **Trevathan**, Wenda (2010). *Ancient Bodies, Modern Lives*. Oxford: University Press, particularly page **93** and **Figure 5-2**.

3. **McDougall**, Christopher (2010). ***Born To Run****. New York: Alfred A Knopf*. Turnbull quoted on page 241*.*

Selected Other References

Economist, The (2015). Caesar's legions. August 15: 53-54.

Reddy, Sumathi (2015). Solving the Mystery of Miscarriages. In *The New York Times*, June 15.

Saint Louis, Catherine (2015). After a Stillbirth, a Silent Delivery Room. *The New York Times*, June 2.

Warrener, Ana G. … & **Lieberman** Daniel E. (2015). A Wider Pelvis Does Not Increase Locomotor Cost in Humans, withImplications for the Evolutions of Childbirth. In *PLOS ONE* | DOI:10.1371/journal.pone.0118903 March 11.

Whitcome, Katherine K. … & **Lieberman**, Daniel (2007). Fetal load and the evolution of lumbar lordosis in bipedal hominins. In *Nature* 450: 13: December 1075-1078, particularly page 1075 including Figure 1 & page 1077 with **Figure 3**.

Chapter 15. RACIAL DIFFERENCES ARE CREATED BY SHOE HEELS

1. **Giladi**, Michael et al. (1985). The Low Arch, a Protective Factor in Stress Fractures: A Prospective Study of 295 Military Recruits. In *Orthopaedic Review* XIV: 11: 709-712, particularly page **709**. See also **Dunn**, J. E. et al. (2004). Prevalence of Foot and Ankle Conditions in a Multiethnic Community Sample of Older Adults. In the *American Journal of Epidemiology* 159: 491-498, particularly page **494 with Table 4**.

2. **Golightly**, Yvonne M. et al. (2012). Racial Differences in Foot Disorders and Foot Type. In *Arthritis Care & Research* 64: 11: 1756-1759, particularly page **1756**.

3. **Cowan**, David N. et al. (1993). Foot Morphologic Characteristics and Risk of Exercise-Related Injury. In *Arch Fam Med* 2: July 773-777, particularly page **773** and **775-76 with Tables 2-3**.

4. Nelson, Amanda E. (2016). Racial differences in patterns of osteoarthritis: Data from the Johnston County Osteoarthritis Project. From the *40th Annual Meeting of the American Society of Biomechanics*, Raleigh, NC. USA August 2nd-5th, 2016, pages 296-297.

Selected Other References

Altshuler, David & Gates, Henry Louis (2014). Race in the Age of Genomics. In *The Wall Street Journal*, June 7-8, 2014, A13.

Angel, J. Lawrence (1946). Skeletal change in ancient Greece. In the *American Journal of Physical Anthropology* 4: 69-97, especially pages **76-77, 90-91** and **94**.

Bryce, Thomas H. (1897). On a pair of negro femora. In the *Journal of Anatomy* 32: 1: 76-82.

Cameron, John (1934). *The Skeleton of British Neolithic Man*. London: Williams & Norgate Ltd., 21-256, particularly page 177 with **Figure 25**. See also **Chapter XX: Census of Neolithic and other ancient skeletal material in museums of Great Britain, 257-?.**

Economist, The (2015). Editing humanity: The prospect of genetic enhancement. August 22-28, 2015, 11 & 19-22.

Epstein, David (2013). *The Sports Gene*. New York: the Penguin Group.

Gould, Stephen Jay (1984). *The Mismeasure of Man*. New York: W. W. Norton & Company.

Harris, Robert I. & Beath, Thomas (1948). Hypermobile flat-foot with short tendo achillis. In *The Journal of Bone and Joint Surgery* 30-A: 1: 116-150, particularly pages 117 with Figures 534 and 535 and **126 with Figure 15-A**.

Hrdlicka, Ales (1916). *Physical Anthropology of the Lenape or Delawares, and of the Eastern Indians in general*. Washington: Government Printing Office.

Hrdlicka, Ales (1939). *Practical Anthropometry*. Philadelphia: The Wistar Institute of Anatomy and Biology, particularly pages **168-169** and **172**.

Ingalls, N. William (1926). The cartilage of the femur in the white and the negro. In the *American Journal of Physical Anthropology* IX: 3: 355-374, particularly pages **372-374**.

Kate, B. R. & Robert, S. L. (1965). Some observations on the upper end of the tibia in squatters. In the *Journal of Anatomy*, Lond. 99: 1: 137-141, particularly **Figure 2 on page 139**.

Kostick, E. L. (1963). Facets and imprints on the upper and lower extremities of femora from a Western Nigerian population. In the *Journal of Anatomy, Lond.* 97: 3: 393-402, particularly page *400*.

Lanier, Raymond Ray (1939). The presacral vertebrae of American white and negro males. In the *American Journal of Physical Anthropology* XXV: 3: 341-420.

McClay, Irene (2000). The Evolution of the Study of the Mechanics of Running. In the *Journal of the American Podiatric Medical Association* 90: 3: 133-148, especially pages **144-145**.

Ossenfort, William F. (1926). The atlas in whites and negroes. In the *American Journal of Physical Anthropology* IX: 4: 439-443, particularly pages **439-440** and **442**.

Parsons, F. G. (1914). The characters of the English thigh-bone. In the *Journal of Anatomy* 48: 3: 238-267.

Redman, Samuel J. (2016). *Bone Rooms: From Scientific Racism to Human Prehistory in Museums*. Boston: Harvard University Press.

Ridley, Matt (2015). Ancient DNA Tells a New Human Story. In *The Wall Street Journal*, May 1, 2015.

Thompson, Randall C. (2013). Atherosclerosis across 4000 years of human history: the Horus study of four ancient populations. In *The Lancet* 381, April 6, 2013. 1211-22, particularly page 1211.

Trinkaus, Erik & Shang, Hong (2008). Anatomical evidence for the antiquity of human footwear: Tianyuan and Sunghir. In the *Journal of Archaeological Science* 35: 1928-1933, particularly page 1928-1929.

Turner, William (1887). On variability in human structure as displayed in different races of men, with especial reference to the skeleton. In the *Journal of Anatomy and Physiology* 20: 2: 473-495, particularly **478-481**, **487-88**, and **especially 491-492** and **494-495**.

Veves, A. et al. (1995). Differences in Joint Mobility and Foot Pressures Between Black and

White Diabetic Patients. In *Diabetic Medicine* 12: 7: 585-589, particularly page **585**.

Wade, Nicolas (2014). *A Troublesome Inheritance*. The Penguin press.

Wade, Nicolas (2014). Race Has a Biological Basis. Racism Does Not. In *The Wall Street Journal*, June 23, 2014. A13.

Wells, Lawrence H. (1931). The Foot of the South African Native. In the *American Journal of Physical Anthropology,* Vol. XV, No. 2. 186-289, particularly **Figure 10 on page 235**.

Chapter 16. SHOE HEELS CAUSE THE CROSSOVER OF FEET

1 & 2. **Subotnick**, Steven I. (1999). Sport Specific Biomechanics. In Steven I. Subotnick (ed.) *Sports Medicine of the Lower Extremity*. New York, NY: Churchill Livingstone, 187-198, especially page **189, Figure 12-2,** and **page 194, Figure 12-7**, wherein Dr. Subotnick points out that "Of prime importance is the increase in functional varus seen as one progresses from leisure walking to race walking to running, and finally to sprinting". This is exactly what you would expect to see as the adverse effect of shoe heel-caused outward tilting of the knee. As speed waking and then running increases, the knee correspondingly bends more and under increasing load, causing the observed increasing functional varus...[and] "...functional varus is usually associated with rapid, often excessive, pronation".

Selected Other References

Cavanagh, Peter R. (1987). The Biomechanics of Lower Extremity Action In Distance Running. In *Foot & Ankle* 7: 4: 197-217, particularly pages **197**, **200-201**, **207 & Figure 11**, **210-211 & Figure 15** and **213-215 & Figure 16**.

Chodera, J.D. & Levell, R.W. (1972). Footprint Patterns During Walking. In *Perspectives in Biomedical Engineering* (ed. R.M. Kenedi). Baltimore: University Park Press, 81-90, especially page **89**.

Chapter 17. SHOE HEELS MAKE RUNNING ASYMMETRICAL

1. **Sadeghi**, Heydar et al (1997). Functional gait asymmetry in able-bodied subjects. In *Human Movement Science* 16 243-258, especially pages **243-244, 252, 254-257**. **Sadeghi**, Heydar et al (2000). Symmetry and limb dominance in able-bodied gait: a review. In *Gait & Posture* 12: 34-45, particularly pages **34-45**.

2. **Stefanyshyn**, Darren J. & Engsberg, Jack R. (1994) Right to left differences in the ankle

joint complex range of motion. In *Medicine and Science in Sports and Exercise* 551-555, particularly **551-552** and **554**.

3. **McDougall**, Christopher (2009). *Born to Run*. New York: Alfred A Knopf, Chapters 11-14 & 16.

Selected Other References

Brandler, William M. et al. (2013). Common Variants in Left/Right Asymmetry Genes and Pathways Are Associated with Relative Hand Skill. In *Genetics* 9: 9: 1-19.

Cavanagh, Peter R. (1987). The Biomechanics of Lower Extremity Action In Distance Running. In *Foot & Ankle* 7: 4: 197-217, particularly pages **197**, **200-201**, **207 & Figure 11**, **210-211 & Figure 15** and **213-215 & Figure 16**. See also **Cavanagh**, Peter R. (1982). The shoe-ground interface in running. In *Symposium on the Foot and Leg in Running Sports* (Mack, Robert P. Ed.). St. Louis: The C.V. Mosby 30-44, particularly pages **42-43** with **Figure 2-9**.

Cochet, Helene & Byrne, Richard W. (2013). Evolutionary origins of human handedness: evaluating contrasting hypotheses. In *Animal Cognition* 16: 4: 531-542, particularly 531-535.

Damholt, V. & Termansen, N. B. (1978). Asymmetry of plantar flexion strength in the foot. In *Acta Orthop. Scand.* 49: 215-219, particularly pages **215** and **218**.

Deep, K. et al. (2015). The dynamic nature of alignment and variations in normal knees. In *The Bone & Joint Journal* 97-B: 4: April 498-502, especially pages **498-501 (including footnote 18)**.

Edwards, Suzi et al. (2012). Lower Limb Movement Symmetry Cannot Be Assumed When Investigating in the Stop-Jump Landing. In *Medicine and Science in Sports and Exercise* 1123-1130, particularly pages 1123 and **1129**.

Herzog, Walter et al. (1989). Asymmetries in ground reaction force patterns in normal human gait. In *Medicine and Science in Sports and Exercise* 110-114, particularly pages 110 and **113-114**.

Hoerzer, Stefan et al. (2014). Footwear decreases gait asymmetry during running. Poster Abstract at *International Calgary Running Symposium,* **96 including Figure 1**.

Lanshammar, Katharina & Ribom, Eva L. (2011). Differences in muscle strength in dominant and non-dominant leg in females aged 20-39 years – A population-based study. In *Physical Therapy in Sport* 12 (2011) 76-79. especially pages **76-77**.

Laroche, Dain P. et al. (2012). Strength Asymmetry Increases Gait Asymmetry and Viability in Older Women. In *Medicine and Science in Sports and Exercise* 2172-2181, particularly pages **2172** and **2175**.

Leach, William F. & Brower, Thomas D. (197?). Shin Splints Said to Result From Way Some Runners Run. Tribune Sports Report in *Medical Tribune*, 23.

Lewek, Michael D. et al. (2014). The Relationship Between Spatiotemporal Gait Asymmetry and Balance in Individuals With Chronic Stroke. In the *Journal of Applied Biomechanics* 30: 31-36, particularly pages **31** and **35**.

Lukits, Ann (2012). The Research Report: Unbalanced feet and falls. In *The Wall Street Journal* September 11 D3.

Lundin, T. M. et al. (1994). On the assumption of bilateral lower extremity joint moment symmetry during the sit-to-stand task. In the *Journal of Biomechanics* 28: 1: 109-112, particularly pages **109-111**.

Muybridge, Eadweard (1887). *The Human Figure in Motion*. New York: Dover Publications, Inc (1955), particularly Plate 23, Man Running, Frames 4 & 10, rear views and Plate 21, Frame 2, rear view.

Patek, Sadie (1926). The angle of gait in women. In *The Anatomical Record* 32: 3: 239.

Riskowski, Jody (2011). Evaluating forefoot-to-rearfoot symmetry during gait in healthy older adults. In *Footwear Science* 3: sup1: S132-S133.

Sadeghi, H. et al. (2004). Simultaneous, Bilateral, and Three-Dimensional Gait Analysis of Elderly People Without Impairments. In the *American Journal of Physical Medicine & Rehabilitation* 83: 2: 112-123, particularly pages **112-113** and **121**.

Schofield, Jonathon S. (2014). Leg Dominance May Not Be a Predictor of Asymmetry in Peak Joint Moments and Ground Reaction Forces During Sit-to Stand Movements. In the *Journal of Applied Biomechanics* 30: 179-183, especially pages 179-180 and 182.

Seeley, Matthew K. et al. (2008). A test of functional asymmetry hypothesis in walking. In *Gait & Posture* 28: 24-28, particularly pages **24** and **28**.

Seeley, Matthew et al. (2010). The relationship between mild leg length inequality and able-bodied gait asymmetry. In the *Journal of Sports Science and Medicine* 9: 572-579, particularly pages **572-575** and **577**.

Subotnick, Steven I. (1975*) Podiatric Sports Medicine.* Mount Kisco, New York: Futura Publishing Company, Inc. 189-194, especially pages **189-190, 192** and **194 with Figs. 1-3**.

Subotnick, Steven I. (1977*) The Running Foot Doctor*. Mountain View, CA: World Publications, particularly pages **5** and **76-79**.

Subotnick, Steven I. (1999). Sport Specific Biomechanics. In Steven I. Subotnick (ed.) *Sports Medicine of the Lower Extremity*. New York, NY: Churchill Livingstone, 187-198, especially pages **194-195**.

Sunnegardh, J. et al. (1988). Isometric and isokinetic muscle strength, anthropometry and pysical activity in 8 and 13 year old Swedish children. In the *European Journal of Applied Physiology* 58: 291-297, especially pages **291 and 295-296 & Fig 1**.

Wen, Dennis Y. et al. (1998). Injuries in Runners: A Prospective Study of Alignment. In the *Clinical Journal of Sport Medicine* 8: 187-194, particularly pages **187-188** and **193**.

Wikipedia – English (11/17/15). Handedness. Footedness. Laterality. Cross-dominance. Ambidexterity. Ocular dominance.

Zifchock, Rebecca A. et al. (2006). The Effect of Gender, Age, and Lateral Dominance on Arch Height and Arch Stiffness. In *Foot & Ankle International* 27: 5: May 367-372, particularly page **367**.

Chapter 18. SHOE HEELS MAKE RUNNING BAREFOOT POTENTIALLY DANGEROUS

1. **Hoerzer**, Stefan et al. (2014). Footwear decreases gait asymmetry during running. Poster Abstract at *International Calgary Running Symposium,* **96 including Figure 1**.

2. **Munoz-Jimenez**, M. et al. (2015). Influence of shod/unshod condition and running speed on foot-strike patterns, inversion/eversion, and vertical foot rotation in endurance runners. In *Journal of Sports Sciences*. 1-8, particularly page **7**, wherein it is stated:

> Concerning the degree of inversion/eversion, the results obtained demonstrate that a high percentage of runners showed inversion when running in both conditions and speeds.

Selected Other References and Comments

Gruber, Allison et al. (2011). Lower extremity segment coordination during barefoot running. In *Footwear Science* 3: sup1: S62-S64.

Willems et al., T.M. (2006) A Prospective Study of Gait Related Risk Factors for Exercise-related Lower Leg Pain. *Gait & Posture* 23: **91**-98, especially the following passage (p. **96**) on the results of the barefoot running study of subjects with ERLLP (shin splints, shin pain, medial tibial stress syndrome, periostitis, compartment syndrome and stress fractures):

> ...Because the rearfoot and the knee are mechanically linked by the tibia …, eversion in the foot normally leads to internal rotation at the knee. However, in our study eversion and abduction at the rearfoot was increased in the injury group but the internal rotation at the knee was not increased.

...The third characteristic identified in subjects with subsequent was an accelerated re-inversion with a more lateral roll-off.

This study shows how the elevated shoe heel-induced mechanism whereby foot supination forces the tibia to rotate externally and that external rotation of the knee is locked in throughout the time the abnormally tilted out leg is forcing an unnaturally excessive degree of pronation and pain in barefoot runners. And, more importantly, how this unnatural shoe heel-induced mechanism is locked into the body structure and function of barefoot runners even without the mechanism causing shoes on. So this study shows that running barefoot does not solve the shoe heel-induced problem, which is baked in over time.

Chapter 19. SHOE HEELS TILT THE PELVIS ASYMMETRICALLY

Chapter 20. SHOE HEELS CAUSE SPINAL PROBLEMS, STARTING WITH LOW BACK PAIN

1. **Seay**, Joseph et al. (2011). Influence of Low Back Pain Status on Pelvis-Trunk Coordination During Walking and Running. In *Spine* 36: 16: E1070-E1079, particularly pages **E1070** and **E1079**.

2. **Whitcome**, Katherine K. et al. (2007). Fetal load and the evolution of lumbar lordosis in bipedal hominins. In *Nature* 450: 13: December 1075-1078, particularly page 1075 including Figure 1 & page 1077 with **Figure 3**.

Selected Other References

Burwell, R.G. et al. (1992). Pathogenesis of idiopathic scoliosis: The Nottingham concept. In *Acta Orthopaedica Belgica* 58: Suppl 1: 33-58, particularly pages 33-35, 42-43 with Figs. 11-13, 45 with **Figure 16**, and 51-54 with Figs. 23-26.

Delgado, Traci L. et al. (2013). Effects of Foot Strike on Low Back Posture, Shock Attenuation, and Comfort in Running. In *Medicine and Science in Sports and Exercise* 490-496, especially pages **490-491** and 495.

Inkster, R.G. (1927). The Form of the Talus with special reference to that of the Australian Aborigine. *Thesis for the degree of Doctor of Medicine*, Edinburgh University, particularly page **2**.

Jackson, Douglas W. (1989). Spine Problems in the Runner. In *Prevention and Treatment of*

Running Injuries (2nd Ed.). D'Ambrosia, Robert D. & Drez Jr., David (Eds.) New Jersey: Slack Incorporated. 83-96.

Kapandji, I. A. (1974). T*he Physiology of the Joints (Volume 3): The Trunk and Vertebral Column (Second Edition)*. Edinburgh: Churchill Livingstone, especially **48**-49, 106-107 and 96-97. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Nadler, Scott F. et al. (2000). The Relationship Between Lower Extremity Injury, Low Bac k Pain, and Hip Muscle Strength in Male and Female Collegiate Athletes. In *Clinical Journal of Sport Medicine* 10: 89-97, particularly pages **89-90**.

Odgers, P. N. B. (1933). The lumbar and lumbo-sacral diarthrodial joints. In the *Journal of Anatomy* LXVII: 2: 301-317, particularly pages 310-311.

Meakin, Judith R. et al. (2013). The relationship between sagittal curvature and extensor muscle volume in the lumbar spine. In the *Journal of Anatomy* 222: 608-614, especially page **608**.

Nag, Pranab et al. (2011). Influence of footwear on stabilometric dimensions and muscle activity. In *Footwear Science* 3: 3: 179-188, especially page **179**.

Ogon, M. et al. (2001). Footwear Affects the Behavior of Low Back Muscles When Jogging. In the *International Journal of Sports Medicine* 22: 414-419.

Panjabi, Manohar M. (1992). The Stabilizing System of the Spine. Part I. Function, Dysfunction, Adaptation, and Enhancement. In the *Journal of Spinal Disorders* 5: 4: 383-389, particularly pages 383-384.

Pearson, Wallace M. (1951). A Progressive Structural Study of School Children: An Eight-Year Study of Children in the Rural Areas of Adair County, Missouri. In *The Journal of the American Osteopathic Association* 51: 3: 155-167, particularly the Review of Literature on pages 155-**158**.

Robinson, Robert O. et al. (1987). Use of Force Platform Variables to Quantify the Effects of ChiropracticManipulation on Gait Symmetry. In the *Journal of Manipulative and Physiological Therapeutics* 10: 4: 172-176, particularly page 172.

Shore, L. R. (1930). Abnormalities of the vertebral column in a series of skeletons of Bantu natives of South Africa. In the J*ournal of Anatomy* 64: 2: 207-238, particularly pages **218** and 235-237.

Slocum, Donald B. & Bowerman, William (1962). The Biomechanics of Running. In *Clinical Orthopedic* Periodin , 39-45, especially pages **41-42**.

Wikipedia-English (11/28/15). Lordois

Wilke, Hans-Joachim et al. (2012). Internal morphology of human facet joints: comparing cervical and lumbar spine with regard to age, gender and the vertebral core. In the *Journal of Anatomy* 220: 233-241, particularly page **233**.

Zukowski, Lisa A. et al. (2012). The influence of sex, age, and BMI on the degeneration of the lumbar spine. In the *Journal of Anatomy* 220: 57-66, particularly pages 57-58 and 64.

Chapter 21. SEXUAL PERFORMANCE, SATISFACTION AND FERTILITY

1. Taylor, Jeremy (2015). *Body By Darwin*. Chicago: The University of Chicago Press, page 9. See also pages 99-101.

2. Strassmann, Beverly I. Quoted by Carl Zimmer in “Fathered by the Plumber? It's Probably an Urban Legend. *The New York Times*, April 9, 2016,A1-A3.

Chapter 22. THE TWISTED THORACIC SPINE AND PRESSURED HEART

1. Miles, M. (1944)

2. **Thompson**, Randall C. et al. (2013). Athersosclerosis across 4000 years of human history: the Horus study of four ancient populations. In *The Lancet* 381: April 6, 1211-22, particularly page **1211**. And *Iceman Reborn* (2015) PBS NOVA airing on February 17, 2015.

3. *The New York Times* (May 19, 2015). A Strong Grip is a Good Sign.

4. **Roach**, Neil (2012). The effect of humeral torsion on rotational range of motion in the shoulder and throwing performance. In the *Journal of Anatomy* 220: 293-301, especially pages **293-295 with Figures 1-2, 298,** and **300.**

5. Passan, Jeff (2016). *The Arm: Inside the Billion-Dollar Mystery of the Most Valuable Commodity in Sports*. Harper.

Selected Other References

Burwell, R.G. et al. (1992). Pathogenesis of idiopathic scoliosis: The Nottingham concept. In *Acta Orthopaedica Belgica* 58: Suppl 1: 33-58, particularly pages 33-35, 42-43 with Figs. 11-13, 45 with **Figure 16**, and 51-54 with Figs. 23-26.

Goldberg, Caroline et al. (1997). Scoliosis and Development Theory. In *Spine* 22: 19: 2228-2238, particularly page **2228**.

Kapandji, I. A. (1970). T*he Physiology of the Joints (Volume 1): Upper Limb (Second Edition)*. Edinburgh: Churchill Livingstone. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Kapandji, I. A. (1974). T*he Physiology of the Joints (Volume 3): The Trunk and Vertebral Column*. *(Second Edition)* Edinburgh: Churchill Livingstone, particularly pages 52-53. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Chapter 23. SCOLIOSIS IS CAUSED BY ELEVATED SHOE HEELS

1. **PBS** *Secrets of the Dead* episode titled "Resurrecting Richard III" (2014).

2. **PBS** *Independent Lens* episode titled "An Honest Liar" March 29, 2016.

Other Related References

Burwell, R.G. et al. (1992). Pathogenesis of idiopathic scoliosis: The Nottingham concept. In *Acta Orthopaedica Belgica* 58: Suppl 1: 33-58, particularly pages 33-35, 42-43 with Figs. 11-13, 45 with **Figure 16**, and 51-54 with Figs. 23-26.

Goldberg, Caroline et al. (1997). Scoliosis and Development Theory. In *Spine* 22: 19: 2228-2238, particularly page **2228**-2229, **2232**, and 2234.

Gum, Jeff L. et al. (2007). Transverse plane pelvic rotation in adolescent idiopathic scoliosis: primary or compensatory? In *European Spine Journal* 16: 1579-1586, particularly pages **1579** and **1584**.

Kapandji, I. A. (1974). T*he Physiology of the Joints (Volume 3): The Trunk and Vertebral Column (Second Edition)*. Edinburgh: Churchill Livingstone. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Karski,Thomaz (2002). Etiology of the so-called "idiopathic Scoliosis". Biomechanical explanation of spine deformity.Two groups of development of scoliosis. New rehabilitation treatment; possibility of prophylactics. In *Research into Spinal Deformities* 4: 37-46, particularly pages 39 and 41 with Fig. 3.

Karski, Tomasz (2005). Biomechanical Explanation of Etiology of the So-Called Idiopathic Scoliosis, Two Etiopathological Groups – Important for Treatment and Neo-Prophylaxis. In *Pan Arab J Orth.Trauma* 9:1: 123-135, particularly 123.

Karski, T. (2010). Explanation of biomechanica l etiology of the so-called idiopathic scoliosis (1995-2007). New clinical and radiological classification. In *Locomotor System* 17: 1+2: 26-42, especially pages **26-27 and 36-38.**

Saji, M. J. et al. (1995). Increased Femoral Neck-Shaft Angles in Adolescent Idiopathic

Scoliosis. In *Spine* 20: 3: 303-311, particularly pages 303-304, 307 with **Figure 4**, and **310**.

Qui, Xu-Sheng et al. (2012). Anatomical study of the pelvis in patients with adolescent idiopathic scoliosis. In the *Journal of Anatomy* 220: 173-178, especially pages **173** and **176-177**.

Weinstein, Stuart L. (2008). Adolescent idiopathic scoliosis. In *The Lancet* 371 May 3 1527-1537, particularly pages 1527 and 1534.

Chapter 24. THE CERVICAL SPINE IS BENT AND TWISTED BY HEELS

Selected References

Bascomb, Neal (2004). *The Perfect Mile*. New York: Houghton Mifflin Company. The cover photograph.

Kapandji, I. A. (1974). T*he Physiology of the Joints (Volume 3): The Trunk and Vertebral Column (Second Edition)*. Edinburgh: Churchill Livingstone, 168-251, particularly pages **216-217, 220 221,** and **238-243**. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Nielssen, Emil Walsted et al. (2013). High Prevalence of Exercise-Induced Laryngeal Obstruction in Athletes. In *Medicine and Science in Sport and Exercise* 2030-2035, particularly pages **2030** and **203**2.

Runner's World (September, 2003). From the Runner's World Archive, **78-79.**

Rutledge, Brad et al. (2013). Differences in Human Cervical Spine Kinematics for Active and Passive Motions of Symptomatic and Asymptomatic Subject Groups. In the *Journal of Applied Biomechanics* 29: 543-553, particularly page **543**.

Wilke, Hans-Joachim et al. (2012). Internal morphology of human facet joints: comparing cervical and lumbar spine with regard to age, gender and the vertebral core. In the *Journal of Anatomy* 220: 233-241, particularly page **233**.

Chapter 25. THE SKULL IS THE SKELETAL STRUCTURE MOST AFFECTED BY HEELS

Selected References

Claes, Peter et al. (2012). Sexual dimorphism in multiple aspects of 3D facial symmetry and asymmetry defined by spatially dense geometric morphometrics. In the *Journal of Anatomy*

221: 97-114, particularly page **110**.

Claes, Peter et al. (2012). Dysmorphometrics: the modelling of morphological abnormalities. In *Theoretical Biology and Medical Modelling* 9: 5: 1-28.

Esteve-Altava, Borja & Rasskin-Gutman, Diego (2014). Beyond the functional matrix hypothesis: a network null model of human skull growth for the formation of bone articulations. In the *Journal of Anatomy* 225: 306-316, particularly pages **306-308 with Figs. 1-2, Figs. 4-7 of 310-312,** and **313-314**.

Lieberman, Daniel E. (2011). *The Evolution of the Human Head*. Cambridge: The Belknap Press of Harvard University Press, particularly pages **182-183, 210-219, 220-223, and 338-373**.

Kapandji, I. A. (1974). T*he Physiology of the Joints (Volume 3): The Trunk and Vertebral Column (Second Edition)*. Edinburgh: Churchill Livingstone, 168-251, particularly pages **216-217, 220 221,** and **238-243**. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Ossenfort, William F. (1926). The atlas in whites and negroes. In the *American Journal of Physical Anthropology* IX: 4: 439-443, particularly pages **439-440** and **442**.

Rutledge, Brad et al. (2013). Differences in Human Cervical Spine Kinematics for Active and Passive Motions of Symptomatic and Asymptomatic Subject Groups. In the *Journal of Applied Biomechanics* 29: 543-553, particularly pages 543.

Chapter 26. HUMAN BRAIN STRUCTURE IS CHANGED BY SHOE HEELS

1. Bradshaw, John L. and Rogers, Lesley J. (1993). *The Evolution of Lateral Asymmetries, Language, Tool Use, and Intellect.* San Diego: Academic Press. Inc.

2. Hawrylycz, Michael J. (2012). An anatomically comprehensive atlas of the adult human brain transcriptome. In *Nature* 489: 391-399. Pletikos, Mihovil (2014). Temporal Specification and Bilaterality of Human Neocortical Topographic Gene Expression. In *Neuron* 81: 2: 321-332. See also the Wikipedia entry on ”Brain Asymmetry” for a lengthy paragraph listing all of the specific asymmetries of the modern human brain.

3. Hyodo, Kazuki, … & **Soya**, Hideaki et al (2016). The association between aerobic fitness and cognitive function in older men mediated by frontal lateralization. In *NeuroImage* 125: January 15, 291-300.

4. Sears, Candice et al. (2016). The many ways adherent cells respond to applied stretch. In the Journal of Biomechanics 49: 1347-1354.

5. **Theil**, Stephan (2015). Trouble in Mind. In *Scientific American* October 34-42. See also

Markram, Henry (2012). The Human Brain Project. In *Scientific American* June, 50-55.

Selected Other References

Brandler, William M. (2013). Common Variants in Left/Right Asymmetry Genes and Pathways Are Associated with Relative Hand Skill. In *PLOS GENETICS* Sep 9:9: 1-19, particularly pages **1-2**.

Cochet, Helene & Byrne, Richard (2013). Evolutionary origins of human handedness: evaluating contrasting hypotheses. In *Anim Cogn* Jul 16: 4: 531-542 or 1-17, particularly pages **5-7**.

Cook, Gareth (2015). Mind games: Using crowdsourcing and artificial intelligence, a Princeton neuroscientist is hoping to map the intricate wiring of the human brain. If he succeeds, could we live forever as data? In *The New York Times Magazine*, January 11, 2015.

Corballis, MC (2012). Lateralization of the human brain. *Prog Brain Res* 195: 103-21, particularly 103.

Corballis, MC (2012). Right hand, left brain: genetic and evolutionary bases of cerebral asymmetries for language and manual action. In *Wiley Interdiscip Rev Cogn Sci* Jan 1: 1: 1-17, particularly page 1.

Corballis, MC (2013). Early signs of brain asymmetry. *Trends Cogn Sci.* Nov. 17: 11: 554-5, particularly 554.

Corballis, Michael C. (2014). Left Brain, Right Brain: Facts and Fantasies. In *PLOS BIOLOGY* January 12: 1: 1-11, especially pages **1-4** and **6**.

Gazzaniga, Michael S. et al. (2014). *Cognitive Neuroscience: The Biology of the Mind* (4th Ed.). New York: W. W. Norton & Company, particularly pages 4 with Fig. 1.3, 39 with Fig. 2.17, 47 with Fig. 2.26, 91-94 with Figs. 3.16-3.18, and 121-161, especially **125-128 with Figs. 4.5 & 4.6**, **154-156**, 157, **158 with Fig. 4.36**, 159, and **620-621**.

Gazzaniga, Michael S. (2015). *Tales From Both Sides of the Brain: A Life in Neuroscience*. New York: HarperCollins, especially pages **114-115, 151-153, 292-296, 336-357,** and **359-361**.

Hall, Stephen S. (2014). Neuroscience's New Toolbox: With the invention of optogenetics and other key technologies, researchers can investigate the source of emotions, memory, and consciousness for the first time. In the *MIT Technology Review*. July/August 20-28.

Hecht, David (2014). Cerebral Lateralization of Pro- and Anti-Social Tendencies. *Exp*

Neurobiol. Mar 23: 1: 1-27, especially pages **1-4** and **16**.

Howard, Pierce J. (2014). *The Owner's Manual for the Brain* (4th Ed.). New York: HarperCollins. Table 8.1 on page 231.

Insel, Thomas R. (2010). Faulty Circuits: Neuroscience is revealing the malfunctioning connections underlying psychological disorders and forcing psychiatrists to rethink the causes of mental illness. In *Scientific American* April, 44-51.

Kahneman, Daniel (2011). *Thinking Fast and Slow*. New York: Farrar, Straus and Giroux

Kapandji, I. A. (1974). T*he Physiology of the Joints (Volume 3): The Trunk and Vertebral Column (Second Edition)*. Edinburgh: Churchill Livingstone. A wonderful set of three volumes, each with alternative pages of text and drawings describing the form and function of the human body.

Lein, Ed & Mike Hawrylycz (2014). The Genetic Geography of the Brain. In *Scientific American* April, 71-77.

Nielsen, Jared A. et al. (2013). An Evaluation of the Left-Brain vs. Right-Brain Hypothesis with Resting State Functional Connectivity Magnetic Resonance Imaging. In *PLOS ONE* August 13, 1-12 , particularly page 1.

Proust-Lima, C. et al. (2008). Gender and education impact on brain aging: a general cognitive factor approach. In *Psychol Aging* Sep 23: 3: 608-20, particularly page 608.

Tomasi, Dardo & Volkow, Nora D. (2012). Laterality Patterns of Brain Functional Connectivity: Gender Effects. In *Cerebral Cortex* June 22: 6: 1455-1462, particularly page **1455**.

Wikipedia-English (11/17/15). **Brain Asymmetry**. **Lateralization of Brain Function**. **Laterality**. Dual Brain Theory. Left Brain Interpreter.

Yuste, Rafael & Church, George M.(2014). The New Century of the Brain. In *Scientific American* March, 39-45

Chapter 27. THE RENAISSANCE, THE REFORMATION, THE RISE OF MODERN SCIENCE AND TECHNOLOGY, AND ELEVATED SHOE HEELS

1. **Semmelhack**, Elizabeth (2015). *Standing Tall: The Curious History of Men in Heels* (2015). Toronto: The Bata Shoe Museum Foundation. See also by the same author: *Heights of Fashion: A History of the Elevated Shoe (2008)*. Pittsburgh: Gutenberg Periscope Publishing, Ltd. As well as *On A Pedestal: From Renaissance Chopines to Baroque Heels* (2009). Toronto: The Bata Shoe Museum Foundation.

2. Burrell, Brian D. (2015). Genius in a Jar. *Scientific American* (September) pages 82-87.

3. Falk, Dean et al. (2013). The cerebral cortex of Albert Einstein: a description and preliminary analysis of unpublished photographs. In *Brain* 136: pages 1304-1327.

4. Carter, Rita (2014). *The Human Brain*. New York: DK Publishing, page 198.

5. Ellis, Lee et al. (2008). *Sex Differences*. New York: Psychology Press, page 59.

6. Previous Endnote, page 60.

Wikipedia-English

Chapter 28. UNIMAGINABLY HIGHER MEDICAL COSTS

1. Marmot, Michael (2015). *The Health Gap.*

Chapter 29. QUALITY OF LIFE SEVERELY REDUCED

Selected References

Amin, Shreyasee et al. (2004). Knee Adduction Moment and Development of Chronic Knee Pain in Elders. In *Arthritis & Rheumatism* 51: 3: 371-376, particularly pages **371** and **374** with **Table 2**.

DeVita, P. et al. (2015). The Relationships between Age and Running Biomechanics. In *Medicine and Science in Sports and Exercise*

Englund, Martin et al. (2008). Incidental Meniscal Findings on Knee MRI in Middle-Aged and Elderly Persons. In *The New England Journal of Medicine* 359: 11: 1108-1115, particularly pages **1108-1109, 1112,** and **1114**.

Freedman, Marc (2015). How to Make the Most of Longer Lives. In *The Wall Street Journal* May 31 1-10, particularly 8.

Munro, Bridget et al. (2011). Can flexible shoes improve function in the older foot? In *Footwear Science* 3: sup1: S116-S117.

Reynolds, Gretchen (2015). Why Runners Get Slower With Age (and How Strength Training May Help). In *The New York Times* September 9 1-4, particularly 2-3.

Scott, Genevieve et al. (2007). Age-related differences in foot structure and function. In *Gait & Posture* 26: 68-75, particularly **68** and **74**.

Tencer, Allan F. et al. (2004). Biomechanical Properties of Shoes and Risk of Falls in Older Adults. In the *Journal of the American Geriatric Society* 52: 1840-1846, especially page **1840**.

Chapter 30. NEW RESEARCH IS THE HIGHEST PRIORITY

Chapter 31. WHAT IS THE NEXT STEP?

Chapter 32. CONFIGURABLE SOLE STRUCTURES CONTROLLED BY SMARTPHONE AND THE CLOUD

1. **Harris**, Richard (2017). *Rigor Mortis: How Sloppy Science Creates Worthless Cures, Crushes Hope and Wastes Billions*. Basic Books.

Offit, Paul A. (2017). *Pandora's Lab*. National Geogaphic.

Chapter 33. ANATOMIC RESEARCH INSTITUTE

Chapter 34. INTERNAL HARDWARE PROTECTION IS REQUIRED TO PROTECT PRIVACY AND SECURITY OF SMARTPHONE AND CLOUD

Chapter 35. OVERVIEW OF THE NATURALLY FORMED HUMAN BODY

1. **Scholz**, Melanie N. et al. (2006). Vertical jumping performance of bonobo (Pan paniscus) suggests superior muscle properties. In the *Proceedings of the Royal Society* 273: 2177-2184, particularly pages **2177-2178**.

Selected Other References

Ingalls, N. William (1926). The cartilage of the femur in the white and the negro. In the *American Journal of Physical Anthropology* IX: 3: 355-374, particularly pages **372-374**.

Chapter 36. DO ELEVATED SHOE HEELS CAUSE CANCER?

1. Agus, David B. (2014). *A Short Guide to a Long Life*. Simon & Schuster.

2. Wikipedia-English (2016). Obesity and cancer (4/1/16). See also the same topic at the NIH National Cancer Institute website @ http://www.cancer.gov/about-cancer/causes-prevention/risk/obesity/obesity-fact-sheet.

3. Vucenik, Ivana & Stains, Joseph P. (2012). Obesity and cancer risk: evidence,

mechanisms, and recommendations. In the *Annals of the New York Academy of Sciences* 1271:37-43, particularly page 37.

4. Wikipedia-English (2016). Physical exercise (4/2/16). See also NIH National Cancer Institute website (2016). Physical Activity and Cancer (4/1/16) @ http://www.cancer.gov/about-cancer/causes-prevention/risk/obesity/physical-activity-fact-sheet.

5. Ballard-Barbash, Rachel et al. (2012). Physical Activity, Biomarkers, and Disease Outcomes in Cancer Survivors: A Systemic Review. In the J*ournal of the National Cancer Institute*104: 11: 815-840, particularly page 815. https://www.ncbi.nih.gov/pmc/articles/PMC3465697/.

6. Zhang, Peizhen et al. (2014). Association of Changes in Fitness and Body Composition with Cancer Mortality in Men. In *Medicine & Science in Sports & Exercise* **1366**-1374.

7. Reynolds, Gretchen (2016). Does Exercise Fend Off Cancer? In *The New York Times*, March 1, 2016.

8. Bernstein (2015). **Nature** (12/23/2015)

Chapter 37. DID EVOLUTION DESIGN THE HUMAN BODY POORLY?

1. Quoted by Jeremy Taylor (2015) in *Body By Darwin*. Chicago: The University of Chicago Press, pages 83-85.

2. Taylor, Jeremy (2015). *Body By Darwin*. Chicago: The University of Chicago Press, pages 99-105.

Chapter 38. HIDDEN HUMAN PHYSICAL POTENTIAL IS VAST

Selected Other References

Bennett, Matthew R. et al. (2009). Early hominin Foot Morphology Based on 1.5-Million-Year-Old Footprints from Ileret, Kenya. In *Science* 323: February 27 1197-1201, particularly page 1200 with Figure 4B.

Bramble, Dennis M. & **Lieberman**, Daniel E. (2004). Endurance running and the evolution of *Homo*. In *Nature* 432: 18 November **345-352**.

Day, M. H. & **Napier**, J. R. (1964). Fossil Foot bones. In *Nature* 201: 969-970, particularly page **969** with **Figure 1**.

Dingwall, Heather L. et al. (2013). Hominin stature, body mass, and walking speed estimates based on 1.5 milliion-year-old fossil footprints at Ileret, Kenya. In the *Journal of Human Evolution* 64: 556-568, particularly page **556.**

Griffin, Nicole L. et al. (2010). Comparative forefoot trabecular bone architecture in extant hominids. In the *Journal of Human Evolution* 59: 202-213, particularly page **202**.

Jenkins, Farish A. Jr. (1972). Chimpanzee Bipedalism: Cineradiographic Analysis and Implications for the Evolution of Gait. In *Science* 178: 877-879, particularly Figures 1-2.

Scholz, Melanie N. et al. (2006). Vertical jumping performance of bonobo (Pan paniscus) suggests superior muscle properties. In the *Proceedings of the Royal Society* 273: 2177-2184, particularly pages **2177-2178**.

Parr, William C. H. et al. (2011). Inter- and intra-specific scaling of articular surface areas in the hominoid talus. In the *Journal of Anatomy* 218: 386-401, particularly 386 & **399**.

Preuschoft, Holger (2004). Mechanisms for the acquisition of habitual bipedality: are there biomechanical reasons for the acquisition of upright bipedal posture? In the *Journal of Anatomy* 204: 363-384, particularly pages 375-380 with Figures 14, 15, 17, and **18.**

Wilford, John Noble (2015). Homo Naledi, New Species in Human Lineage, Is Found in South African Cave. In *The New York Times*, September 10, 2014 1-5, particularly 4.

Wong, Kate (2014). Rise of the Human Predator. In *Scientific American* April 48-51, particularly page 49 with Figure.

Chapter 40. WHAT SHOULD YOU DO NOW?

1. **Ko**, Dong Yeol et al. (2013). The Changes of COP and Foot Pressure after One Hour's Walking Wearing High-heeled and Flat Shoes. In the *Journal of Physical Therapy Science* 25: 1309-1312, particularly page **1309**.