

## **MODERN HUMAN ANATOMY**

### **LIST OF DRAFT FIGURES AND VIDEOS**

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However, I fully respect the most expansive view of the rights of such copyright owners and therefore will remove any such materials from this online article on the above website if my very limited use is objected to by such owners who formally notify me at the website.

**Initial Figure** View of bottom sole from an **Adidas Feet You Wear** concept advertisement/ promotional material.

**Figure 1A** Identical bare footprints of always barefoot European and Solomon Island native from **James, Clifford S.** (1939). Footprints and feet of natives of the Solomon Islands. In the *Lancet*: 2: 1390-1393.

**Figure 1B** Different bare footprints of shoe-wearing European and barefoot Solomon Island native from **James, Clifford S.** (1939) above.

**Figure 2A&B** Figure 2B is Elevated shoe heel elevating the wearer's foot heel and thereby plantarflexing the ankle joint, based on Figure 290 of the classic 1918 Edition of Henry *Gray's Anatomy of the Human Body*, available online at [www.Bartleby.com/107/](http://www.Bartleby.com/107/). Fig. 2A is from unknown web source.

**Figure 3A-C** The ankle joint and subtalar ankle joint of the foot, based on Figures 268 and 271 of the 1918 Edition of *Gray's Anatomy*.

**Figure 4A&B** Based on Figure 290 of the 1918 Edition of *Gray's Anatomy* and adapted from Hicks, J.H. (1961) The three weight-bearing mechanisms of the foot. In: Evans, F.G., ed. Biomechanical Studies of the Musculo-Skeletal System. Springfield, IL: Charles C. Thomas. From Kelikian, Armen (2011). *Sarafian's Anatomy of the Foot and Ankle*, page 620. Philadelphia: Wolters Kluwer.

**Figure 5A** Based on Figures 16 and 20, pages 61 and 67, from Sgarlato, T. E. (Ed.) (1971). *A Compendium of Podiatric Biomechanics*. San Francisco: California College of Podiatric Medicine.

**Figure 5B** Figures 1 and 2 of Gustav Rubin (1971). Tibial Rotation. *Bulletin of Prosthetic Research*. Spring, 1971.

**Figure 6A&B** Comparison between barefoot and heeled shoe of the path of the ankle joint (talar trochlear) when rotated externally to the outside by shoe heel-induced supination of the subtalar joint, based on Figures 244 and 258 of the 1918 Edition of *Gray's Anatomy*.

**Figure 7** Figure 3.2 based on Plate 18 Man Running, Frame 10 side view, from Muybridge, Eadweard (1887). *The Human Figure in Motion*. New York: Dover Publications, Inc. (1955).

**Figure 8A** Perspective view of body weight forces during running on the lower leg tilted to the outside, based on a part of a figure from *De dissectione partium corporis humani libri tres* by Charles Estienne. Paris, 1545.

**Figure 8B** Simple graph of the force vectors of Fig. 8A.

**Figure 8C** Knee Moment Frontal Plane & Transverse Plane Graphs from Figure 4 of Steffen **Willwacher** et al. (2016). The free moment in running and its relation to joint loading and injury risk. In *Footwear Science* Vol. 8, No. 1, 1-11. Winner of the Nike Award for Athletic Footwear Research presented at the XII<sup>th</sup> Footwear Biomechanics Symposium in Liverpool, UK 2015.

**Figure 8D** Figure 9, page 1850, from 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.

**Figure 8E** Figure 2, page 481, from Mundermann, 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.

**Figure 9A&B** Comparative views of the European and Australian Aborigine tibial plateaus (lower surface of the knee joint) from W. Quarry Wood (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.

**Figure 9C&D** Comparative upper surfaces of the talus (ankle joint) of an Egyptian and a European, Figure 61, page 114, of Jones, Frederic Wood (1949). *Structure and Function as Seen in the Foot*. London: Bailliere, Tindall and Cox.

**Figure 9E** Cone-shaped trochlear surface of modern ankle joint, modified from an upper view of the talus in the 1918 Edition of *Gray's Anatomy*.

**Figure 10** Basic misalignment of lower extremity joints, showing the right and left knee joints of right and left legs rotated unnaturally to outside by elevated shoe heels/subtalar joint interaction, away from the direction of forward locomotion indicated by the pelvis, as seen in a horizontal plane view, modified from upper views of the foot, tibial plateau, and pelvis in the 1918 Edition of *Gray's Anatomy*.

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**Figure 11C** Rear view of modern hip joint bones, from page 31 also from *Albinus on Anatomy* (1979).

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**Figure 15A&B** Side view of typical human spines, from Dynamic to Static, based on Figure 8, page 61, from Kapandji, I. A. (1974). *The Physiology of the Joints (Volume 3): The Trunk and Vertebral Column (Second Edition)*. Edinburgh: Churchill Livingstone.

**Figure 15C** Eadweard Muybridge standing naked by a chair, frontal view, from the second frame on the title page of Muybridge, Eadweard (1887). *The Human Figure in Motion*. New York: Dover Publications, Inc. (1955).

**Figure 16A** Skeleton of a typical full-term fetus showing its disproportionate very large relative size of head, front view, by Ontleding des menschelyken lichaams (1690). In *Human Anatomy: A visual History from the Renaissance to the Digital Age*, page 135. (2006) Rifkin, Benjamin A. and Ackerman, Michael J. New York: Abrams.

**Figure 16B** Pelvic openings in selected primate species including human, Figure 5-2, page 93, from Trevathan, Wenda (2010). *Ancient Bodies, Modern Lives*. Oxford: University Press.

**Figure 16C** Four main types of pelvises, from Figure 24, page 75, of Francis, Carl C. (1952). *The Human Pelvis*. St. Louis: The C. V. Mosby Company.

**Figure 16D** Fetus during labor, from figure by William Smellie (1754) *A Sett of Anatomical Tables*, from page 203, in *Human Anatomy: A Visual History from the Renaissance to the Digital Age*, page 203. (2006) Rifkin, Benjamin A. and Ackerman, Michael J. New York: Abrams.

**Figure 16E** Typical asymmetrical prenatal position of human fetus in the womb, right ear facing outward, from Figure 4.36, page 158, of Gazzaniga, Michael S. et al. (2014). *Cognitive Neuroscience: The Biology of the Mind* (4<sup>th</sup> Ed.). New York: W. W. Norton & Company.

**Figure 16F** Pelvis as a basin for viscera, from figure by Giulio Cesare Casseri (1627) *De humani corporis favrica libri decem*. Page 118 in *Human Anatomy: A visual History from the Renaissance to the Digital Age*, page 135. (2006) Rifkin, Benjamin A. and Ackerman, Michael J. New York: Abrams.

**Figure 16G** Viscera spilling out, unsupported by pelvic basin, Plate 57 of Andreas Vesalius from the First Edition of the *De Humani Corporis Fabrica* (1543), page 165 of *The Illustrations from the Works of Andreas Vesalius of Brussels* by Saunders, J. B. deC. M. and O'Malley, Charles D. (1950) New York: Dover Publications, Inc.

**Figure 17A** Plate 23 Man Running, Frame 4 rear view at midstance, from Muybridge, Eadweard (1887). *The Human Figure in Motion*. New York: Dover Publications, Inc. (1955).

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**Figure 17C** Composite of previous Frames 4 and 10 above with pelvis leveled in order to show the true relative position of the flexed legs at the maximum weight-bearing load in the midstance position.

**Figure 17D** Rear view of a Bushman running barefoot from a **YouTube** video clip of *Barefoot running Bushman versus me (shod Finn)* <https://www.youtube.com/watch?v=H1Ej2Qxv0W8>. Published on May 26, 2013.

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**Figure 23B** Same male surgically made bow-legged, with relatively wasted vastus lateralis, Figure 9.10 of

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**Figure 25** 1960's Limbo King Mike Quashie, in *The New York Times* (March 13, 2010) page A13.

**Figure 26A** Neck torsion and skull positions, Figures 64 and 65, page 219, from Kapandji, I. A. (1974). *The Physiology of the Joints (Volume 3): The Trunk and Vertebral Column (Second Edition)*. Edinburgh: Churchill Livingstone.

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**Figure 26D** Composite of previous Frames 4 and 10 like Figure 17.2A above with pelvis leveled in order to show the true relative position of the flexed legs at the maximum load-bearing at midstance position and showing the effect of the unstable pelvis when tilting to bend-out the spine and the head. Plate 23 Man Running, from Muybridge, Eadweard (1887). *The Human Figure in Motion*. New York: Dover Publications, Inc. (1955).

**Figure 27A** Five still frames (three right and two left, all at the midstance position) from a front view video clip of Usain Bolt's head while running in a Gatorade advertisement.

**Figure 27B** An Xray example of typical cervical vertebrae asymmetry from unknown web source.

**Figure 27C** Side view of the eye muscles, from Figure 885 in the classic 1918 Edition of Henry Gray's *Anatomy of the Human Body*.

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**Figure 28B** Foville's drawing of a top view of the human brain (1844). From Sandrig, Susan (2016). A brief history of topographical anatomy. In *Journal of Anatomy* 229: 32-62, **Figure 10** on page 56. Plate 11 in Achille Louis Foville's Atlas published with *Traite complet de l'anatomie, de la physiologie et de la pathologie du system nerveux cerebro-spinal* (1844), from the President and Council of the Royal College of Surgeons of England.

**Figure 28C** Christopher Wren's drawing of the base of the human brain, the first figure of Thomas Willis' *Cerebri anatome* (1664), from the President and Council of the Royal College of Surgeons of England. From Sandrig, Susan (2016). A brief history of topographical anatomy. In *Journal of Anatomy* 229: 32-62, **Figure 7** on page 44. Arraez-Aybar, Luis-Alfonso et al. (2015). Thomas Willis, a pioneer in translational research in anatomy (on the 350<sup>th</sup> anniversary of *Cerebri anatome*), **Figure 3** on page 295. In *Journal of Anatomy* 226: 289-300. Available on <https://archive.org/stream/cerebrianatomecu00will#page/n71/mode/2up>.

**Figure 28D** The Base of the Brain, Figure 196, page 337, torsional-shift anatomical asymmetries between the right and left hemispheres, Henry Gray (1858). *Gray's Anatomy*. Illustrated by Henry Vandyke Carter.

**Figure 29A** The asymmetrically twisted body of wheel-chair-bound Steven Hawking from **Hawking** (2014), a PBS biography of his life.

**Figures 29B** A photo of Steven Hawking's college age asymmetrical standing posture, with higher right shoulder from **Hawking** (2014), a PBS biography of his life.

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**Figure 30** Photo of computer simulation of human brain concussion with intense sideways motion shown in frontal plane cross-section causing maximum tissue stretch in the central brain, from a TED Talk titled *Why Helmets don't prevent concussions – and what might* by David Camarillo, Ph.D. of Stanford University on April 24, 2016.

**Figure 31** Photo of frontal plane cross-section of a normal human brain showing the corpus callosum (circled in red), the physical portion of the brain that provides a fiber bundle connecting the two hemispheres.

**Figure 32** A similar photo like the previous figure, but of a retired NFL football player who suffered from CTE, his highly abnormal brain indicating extreme deterioration of the corpus callosum.

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