Evolutionary 'proof' of poor intestine support actually evidence of design

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A *Smithsonian Magazine* review lists the top 10 "glaring, yet innately human, imperfections" as a consequence of having evolved. Number four is "a lack of support for the intestines".[1] North Carolina State University Professor of Biology Robert Dunn explains that once humans began to walk

> "… upright, our intestines hung down instead of being cradled by our stomach muscles. In this new position, our innards were not as well supported as they had been in our quadrupedal ancestors. The guts sat atop a hodgepodge of internal parts, including, in men, the cavities in the body wall through which the scrotum and its nerves descend during the first year of life. Every so often, our intestines find their way through these holes—in the way that noodles sneak out of a sieve—forming an inguinal hernia."[1]

A critical problem with this reasoning claiming poor design is it fails to mention specifically how the structures that support the intestines are poorly designed and what specifically could be altered to improve the design. The only evidence offered for the claim of poor design is related to pathology, i.e. when things go wrong. Actually, our intestines and other abdominal structures are cradled by a set of strong muscles and accessory structures, including a bone structure called the pelvic girdle. The pelvis bone design "provides somewhat rigid support for muscles engaged in locomotion [e.g. walking, and running]".[2] The fact is, "Skeletal muscle architecture is the strongest predictor of a muscle's functional capacity", meaning in this case that the existing muscle design is the best indicator of its proper role and claims of poor design are suspect.[3] Nonetheless, anything that weakens any part of the healthy pelvis muscle system will also affect the pelvic floor's level of support for the contents of the abdominal cavity. The pelvic floor muscles which perform this support role stretch from the tailbone (coccyx) to the pubic bone (front to back) and from one sitting bone to the other sitting bone (side to side).

The pelvic floor muscle set (see figure 1) is normally strong enough in the female to also support a 4.5 kg (10 pound) baby in addition to other organs, as well as assist in the birthing process. If problems develop, they are not due to poor design, but because these muscles are weakened due to disease, loss of muscle mass caused by a poor diet (including extreme diets), marasmus (chronic undernourishment in childhood), ageing, or genetic predisposition due to mutations. Other causes of pelvic floor weaknesses include obesity stressing the pelvic floor; straining caused by chronic constipation; chronic coughing; heavy lifting; high-impact exercise; damage from caesarean section delivery, and even sexual abuse, as well as bladder or bowel problems; and in men, prostate cancer surgery.

Other causes include direct trauma, such as from falling off of a bike or horse; underactive pelvic floor muscles caused by prolonged sitting; or even long-term bed rest which also causes weakness in numerous other muscles.[4] Pelvic floor exercises in some cases can improve muscle tone and prevent the need for corrective surgery.

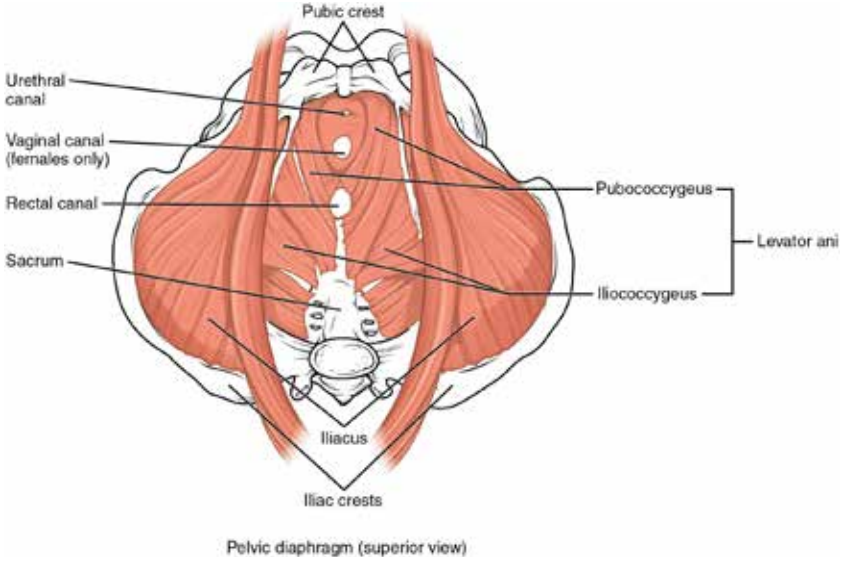

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Figure 1. The pelvic floor muscle set is not a hodgepodge set of internal parts but as the illustration shows it is obviously well designed to support the pelvic organs.

Pelvic floor muscle passages

In males, the pelvic floor muscle contains two passages for the urethra and anus, and three in women, for the urethra, vagina, and anus. The pelvic floor muscles normally wrap firmly around these openings to help keep the area around the tubes that pass through them sealed. To ensure this seal is maintained, an extra circular muscle wraps around the opening area for the

anus, the anal sphincter, and around the urethra, the urethral sphincter.[5]

The inguinal hernia

The possible consequences of the alleged design flaws mentioned by Professor Dunn included the formation of an inguinal hernia. A hernia is an abnormal protrusion of some organ through muscle or connective tissues, producing a bulge in that area. An inguinal hernia occurs when a portion of the intestine bulges through a vulnerable part of the abdominal wall in association with the inguinal canal that traverses through the wall near the groin. An *indirect inguinal hernia* can occur when the internal inguinal canal is not properly closed at birth, thus is the consequence of a birth defect, not poor design. A *direct inguinal hernia* is when part of the intestine bulges through a vulnerable place in the abdominal muscles *adjacent* to the inguinal wall canal.

Of the many possible causes listed for these problems in the literature, poor design was not mentioned once in the many references that I consulted. Instead, birth defects, disease, injury, and other pathologies were listed. The risk factors for an inguinal hernia include anything that causes an abnormal level of abdominal pressure, such as a chronic excessive amount of gas accumulation and collections of fluid (edema, but could also be blood) in the abdominal cavity or lining. Other causes listed were an enlarged pancreas, liver, gallbladder, or spleen that puts abnormal pressure on the surrounding structures.[6] In all these cases something has to give, and the abdominal wall can serve as a safety valve.[5] Lifting excessive weight and obesity are also risk factors. However, we all know of morbidly obese persons who manage to avoid an inguinal hernia, or persons who lift enormous weight as part of their employment, as myself when younger, that likewise never suffer an inguinal hernia.

Severe tissue inflammation within the abdominal cavity can also cause a chronic increase of abdominal pressure, as can harsh coughing, e.g. caused by tobacco and marijuana smoking or allergies. Constantly straining during bowel movements may also cause inguinal hernias.[5] As an individual ages, muscle tone is typically lost.[7] None of the authorities I consulted mentioned poor design as a cause, as noted, but they did note that the female pelvic floor design is much stronger than that in males in order for women to carry a baby; thus for this and other reasons, women have about a 10 times smaller chance of developing an inguinal hernia than men.[5] The lifetime risk of inguinal hernias is 27% for men and only 3% for women.

This difference is only partly attributed to employment differences (men are far more likely to be involved in heavy work, such as construction) and weight differences (men on average weigh more than women), plus hormone differences between men and women.

Repair rates of inguinal hernia range from 10 per 100,000 in the United Kingdom population to 28 per 100,000 in the United States population.[8] All types of abdominal wall hernias have a prevalence of only 1.7% per year for all ages, and 4% for those over 45 years.

Comparisons of human and ape pelvic floors

Comparisons of human and ape pelvic floors found that the human pelvic floor, in contrast to the claims of Professor Dunn, is specifically well designed to walk upright. A study comparing rhesus macaque and human pelvic floor muscles found that they "were similar with respect to architecture. However, the magnitude of similarity varied between individual muscles, with the architecture of the most distinct" muscle being that of the human pelvic floor muscle, specifically the human iliocaudalis which was designed to be "well suited for quadrupedal locomotion".[9]

Much yet to be learned

Researchers in this area admit that, to fully understand the pelvis floor's design, much more research needs to be done, noting:

> "The critical barrier that limits progress in identifying the precise cause of PFD [pelvic floor disorders] is our lack of understanding of fundamental mechanisms that lead to pelvic floor dysfunction."[10]

Summary

The human pelvic floor design is able to handle a much greater level of stress than what is normally required to carry abdominal load levels of a normal healthy person. Genetic abnormalities, excess weight from obesity, accidents and body abuse, or a combination of these, are common causes of both pelvic floor failure as well as the inguinal hernia problem, not poor design. The pelvic floor cannot be infinitely strong, and rarely causes problems in most healthy adults. Most problems are due to specific health conditions. Furthermore, according to the anatomy and physiology lecture program at the University of Hawaii, the pelvic girdle is well "designed to stabilize and support the body".[11] In conclusion:

> "The human pelvis is a remarkable structure that plays a central role in many critical biological processes, most notably bipedal locomotion, thermoregulation and parturition (childbirth)."[12]

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