strikes the ground. These forces propagate through the body and are believed to be responsible for a wide variety of stress injuries and degenerative arthritis. However, these forces can be attenuated by the locomotor system or by changes in body stiffness. Studies of human running have shown that impact forces can decrease substantially with increased hip and knee flexion.

In this study, we quantified normal shock attenuation for a sample of 360 steps from healthy, young male and female adults. Subjects were outfitted with low-mass, skin-mounted piezoelectric accelerometers to record impact shock at the distal tibia, sacrum, and head. Magnitude of the impact spike at heel strike was recorded at all three positions during normal and "compliant" (bent-hip, bent-knee) walking.

The results show that during normal walking, the impact spike experienced at the sacrum and the head were 2.8 and 3.3 times smaller respectively than those experienced at the ankle. The force magnitude at the sacrum and head are 6.1 and 9.5 times smaller respectively than those experienced at the ankle when subjects walk with deeply bent hips and knees.

Clearly, our experiments demonstrate that the adoption of a compliant walking gait significantly improve the ability of a person to attenuate heel-strike impact forces. Early hominids had less stabilized hind limb joints and sacra, smaller femoral heads, and smaller vertebral centra compared to modern humans. Thus, the postcranial anatomy of australopithecines was probably not as well suited to attenuate impact shocks during bipedal walking. However, the adoption of a bent-hip, bent-knee gait could have significantly reduced heel-strike impact shocks experienced by early hominids.

Relationships between prefrontal volume and behavior in normal human females.

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Not only did the hominid brain increase more than three-fold in size during our evolutionary history, but it appears that certain areas of the brain contributed more to this increase than others. In particular, the prefrontal region appears to be twice as large (considered as a percentage of cortical surface area) as homologous regions in non-human primates.

It is not clear why this region of the brain shows such a disproportionate increase. The prefrontal region is not involved in primary sensory processing, but rather appears to be important for higher-order cognitive tasks, such as planning and strategy. Areas in the prefrontal cortex also appear to be important for breaking perseverative tendencies, and for memory of serial order. However, whether variability in prefrontal volume and/or surface areas may be correlated with specific behavioral abilities has not been extensively investigated in normal humans.

The present study assessed the extent to which prefrontal volumes and surface-areas correlate with a variety of psychometric tests, both between- and within-families. 36 pairs of sisters (72 individuals total) where given a diverse battery of cognitive tests that included four tests known clinically to show prefrontal specificity: STROOP, TRAILS, WCST, and VERBAL FLUENCY. High-resolution MRI brain scans (voxel size: ~1.3 mm^3, with no gaps between slices) where obtained, from which prefrontal volumes and surface where quantified. Within- and between-family correlations were calculated (controlling for age and simple reaction time) among the behavioral and neuroanatomical variables.

The results showed that between-families two tests correlated significantly with prefrontal volumes: STROOP and TRAILS. Within-families, the STROOP test (but not TRAILS) remained significant. These findings suggest that significant correlations may exist between localized neuroanatomical volumes and specific cognitive abilities. Details of the STROOP and TRAILS tests are given, and possible evolutionary implications of these findings are discussed.

Meningeal diseases in infancy from prehistory to Early Modern Times. - M. SCHULTZ, Center of Anatomy, University of Göttingen (Germany).

To clear up the history of meningeal diseases, a total of 2714 child skeletons dating from the Mesolithic to the Late Middle Ages/Early Modern Times were examined by macroscopic, radiological, endoscopic, light and scanning-electron microscopic techniques.

Bacterial meningitis was not diagnosed in the Mesolithic and very Early Neolithic Times when man was living as a hunter-gatherer. In Neolithic Times, once the sedentary way of life had been established only a few cases of hemorrhagic-inflammatory meningitis were diagnosed. In the Old World, during the Early and the Middle Bronze Age as well as during the Late Bronze Age and the Iron Age meningeal diseases remained relatively rare while in the Middle Ages the frequency became extremely high. This increase in hemorrhagic-inflammatory diseases correlates with the increase in infectious diseases in the middle ear region and the paranasal sinuses.

For the European Early Middle Ages, a gradually increasing incidence of tuberculous leptomeningitis was observed in a few populations. In the Late Middle Ages and in Early Modern Times, the frequency of tuberculous leptomeningitis increased dramatically and was probably caused not only by a weakening of the immune system, but by the continuous population growth and the deterioration in the economy and the political situation.

Changes in infant nutrition with the evolution of food production: isotopic evidence from the North American Midcontinent. M. R. SCHURR and M. L. POWELL. Department of Anthropology, University of Notre Dame, Notre Dame, IN 46556.

Changes in infant feeding practices and nutrition have often been suggested as important causes for population