Study demonstrates cranial bone mobility

Not often is evidence presented in physiology and medicine that directly challenges current beliefs and truths. However, Drs Adams, Heisey, Smith, and Briner do so. They present evidence for mobility of the cranial sutures in the mammal in their article, "Parietal bone mobility in the anesthetized cat," beginning on page 599.

The accurate measuring devices described in this article show conclusively that movement is possible between cranial bones in the living animal. These movements can be produced by intracranial pressure changes or by forces exerted on the skull. The measurements suggest that the cat's parietal bones can move around the sagittal suture both by suture opening and by rotating around the fulcrum of the suture. These movements were generally within accepted limits of what humans can feel with the hands and identify as movement.

Scientists are skeptical of accepting data acquired from sensory perception; subjective data are often influenced by the operator's judgment, beliefs, and other biases. For years, the experience of the osteopathic medical profession has indicated that the skull is not a rigid enclosure; rather the bones are mobile and do move in normal function. Most anatomists have not accepted this view, and the data available have not been sufficient to overcome this skepticism. This current article, coupled with research done by Ernest Retzlaff, PhD, and colleagues (*JAOA* 1975;74:869-873) which showed that cranial sutures are not normally fused, should prove sufficient to make anatomists accept the possibility that cranial bones do move around their sutures.

The data presented in this current study do not, of course, show that human cranial sutures move in rhythmic waves. More work

must be done to prove that human cranial sutures also move and that movement rhythms exist that cannot be attributed to simple vascular or muscular contractions subcutaneously or around the bones. Adams and colleagues' work suggests that such research is not far away. Available data indicating the mobility of cranial sutures should stimulate thought concerning suture involvement in normal and abnormal function. Students should be made aware that credible data do exist showing cranial bone mobility as a challenge to the standard solid-cranium dogma.

Such basic research is a vital outgrowth of the osteopathic clinical experience. In turn, this research fosters clinical theory, which can then be applied in practice. Additionally, this article demonstrates that new measuring techniques can be applied to a clinical observation long held by osteopathic medicine, but virtually ignored outside of the profession.

Although much work remains to be done in the area of cranial bone mobility and those forces that may drive cranial movements, the data here are a significant step toward verifying the clinical impressions that cranial mobility plays a vital part in human health and function.

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Contributing Editor

Education ebbs the statistical tide in cardiovascular disease

For the second consecutive year, American women have topped men in the number of cardiovascular-related deaths. According to the American Heart Association, more than 51% of the 980,000 deaths related to cardiovascular disease occurred in women in 1988, the latest year for which data are available. Specifically, more than 48% of the approximate

500,000 deaths due to heart attack occurred among women. Although the majority of deaths from heart attack occur in women aged 65 years and older, an estimated 23,000 deaths due to myocardial infarction occurred in women younger than 65 years of age, with 27% of these deaths occurring in women younger than 55 years of age.

Women who do have a heart attack have a higher mortality rate within the first year after this cardiovascular event than do men, 39% vs 31%. Similarly, more women (20%) than men (15%) die 4 years after having a heart attack. Overall, 1 in 9 women aged 45 to 65 years has some form of heart or blood vessel disease; this ratio increases to 1 in 3 for women older than 65 years. Smoking and oral contraceptive use increase the risk of stroke by 39 times when compared with women who do not light up or who use other forms of birth control.

Not surprisingly, risk factors known to precipitate cardiovascular disease—cigarette smoking, hypertension, and elevated serum cholesterol levels—are common in women: Approximately 27% of women aged 18 to 74 years have high blood pressure, with nearly 53% of women aged 55 to 64 years considered hypertensive. After age 65, the incidence of high blood pressure increases to 67.5% of all women in this age group.

Women are not faring much better when it comes to cholesterol, either. Although the total serum cholesterol levels in women younger than age 45 average less than 220 mg/dL, this concentration rises to 233 mg/dL to 246 mg/dL for women aged 45 to 55 years.

Likewise, diabetes, inactivity, obesity, and stress contribute to this undesirable rate of cardiovascular disease, not only among women but in the population at-large.

However, room for optimism exists. We are witnessing the fruits of our labor as a result of our public awareness and education efforts. Between 1979 and 1989, the mortality from cardiovascular disease declined 23.4% overall.

Yet, we cannot rest on our laurels. Much remains to be done in reducing the morbidity and mortality associated with cardiovascular disease. Specifically, understanding those mechanisms that operate within the aforementioned risk factors proves to be an ongoing challenge.

One of those mechanisms that has yet to be defined is the precise protective role high-density lipoprotein (HDL) cholesterol may play in relation to serum lipoprotein levels. In their article, "The physiologic role and clinical significance of reverse cholesterol transport," beginning on page 625 in this issue, Drs Bleicher and Lacko evaluate the significance of HDL in the early diagnosis and treatment of atherosclerosis.

Contributions such as this will enable us to better comprehend the mechanisms leading to cardiovascular disease. With all knowledge comes power. In this case, we will have the power to treat—and to prevent—cardiovascular events so that statistics such as those cited here will be the thing of the past.

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