# Skull survey could improve vehicle safety

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Women's skulls are thicker than men's, but they both shrink slowly after we reach adulthood. That's the conclusion of a new imaging study of 3000 people published in the Inderscience International *Journal of Vehicle Safety*. The detailed results could help in the design of more effective devices for protecting the head in vehicle collisions and other accidents.

Jesse Ruan of the Ford Motor Company and colleagues at Tianjin University of Science and Technology have devised a non-invasive method for determining and analyzing the critical geometric characteristics of a person's skull. Their approach is based on head scan images of 3000 patients at the Tianjin Fourth central Hospital.

The researchers found that the average thicknesses of the skull in men was 6.5 millimeters, but 7.1 mm in women. The average front to back measurement for men was 176 mm in men, but was less in women at 171 mm. Average width was 145 mm in men and 140 mm in women, the team found.

"Skull thickness differences between genders are confirmed in our study," Ruan says, "The next step will be to find out how these differences translate into head impact response of male and female, and then we can design the countermeasure for head protection."

Skull thickness, as one might expect, improves the outcome for anyone suffering a head injury, but studies have also demonstrated that skull shape can also have an effect. However, the detailed relationship

between skull thickness and shape and how well a person tolerates a head injury have not been settled with most studies simply extrapolating from smaller to larger skull and thickness to predict the likely effects of an impact.

The current research, which involved a detailed statistical analysis of the various measurements for all 3000 people scanned. The analysis shows that the distribution of skull size, shape and thickness do not follow a so-called "normal" distribution pattern and so such extrapolations may be invalid.

"Reliable biomechanical geometric data of the human skull can help us to better understand the problem of head injury during an impact," the researchers say, "and help in the design of better head protective devices.

Source: Inderscience Publishers