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ORIGINAL TITLE	Physics as applied to injuries of the calvarium
DEGREE	MD
YEAR	2001
INSTITUTE	University of Peradeniya
LOCATION	UP(MED)
MAIN HEADING	SKULL
ABSTRACT	With respect to injuries of the calvarium e.g., cracks, fractures, deficiencies, depressions, indentations etc., the medicolegist is often called upon by court to express opinions on the nature of the injury/ies, the manner and mode of causation and, where relevant, the nature of the physical object responsible for the injury and the ferocity of the attack. The opinion may also include the type of human action, which brought about the injuries seen in the victim (patient or dead body). An opinion which starts with injuries as its data and seeks to connect such injuries ~.ith a weapon/s and also the associated human action requires a theory which provides a sound scientific basis connecting injury/ies with weapon/s and human action. Over several years two hypotheses have been dominant in guiding medicolegists in their determinations. These are the hypotheses of Gurdjian et al and Rowbotham. Gurdjian's hypothesis is limited in scope to blunt trauma and low velocity injury while Rowbotham's hypothesis is even more limited to concentrated forces, bending and depressed fractures. A need for a more broad-based theory to account for the many types of calvarial injuries was required. This study seeks to provide such a broad-based theory based on engineering physics. Engineering physics inquires into the fractures and deformations of engineering materials. These materials characteristically have as features continuity, homogeneity, of being isotropic and linearly elastic. Apart from linear elasticity, . human bone however shows none of the other features of typical engineering materials. Furthermore, human calvarial bone shows many variations in terms of geometry - size and shape - thickness of bones, grooves and foramina (which dominate the base of the skull). There is also a tri-laminar or uni-laminar structure and the joints (called sutures) show many variations. The many variations of the calvarium make difficult the handling of the actual material. Despite the difficulties and possible limitations, the view was taken that engineering physics would provide the required theory to link injuries of the calvarium with a causative physical object or human action. Four concepts of engineering physics were identified. These are those of energy, stress, shell theory and stress concentration. The nature and the strength of

bone were subordinate to the four engineering concepts stated. Several models were created _ particularly that of treating the vault of the skull as a truncated cylindrico-sphere and the base of the skull as composed of six truncated spheres .. Several simplifying assumptions were made to enable analysis . The four notions of engineering physics, the models, the assumptions were applied in turn to a host of skulls with injuries, all part of the collection of skulls located in the museum of the Dept. of Forensic Medicine, Faculty of Medicine, University of Peradeniya. The study was conducted over several years preceding the year 200 I. The results of these analyses are contained in Ch. 3 and organized on the basis of energy considerations, stress considerations - especially of excessive stress, shell theory and stress concentration where these were the dominant consideration; There were occasion when a combination of concepts e.g., stress, shell theory and stress concentration were operative. The study was expanded to include the results of previous experimental work, the interpretations given thereto and also to provide explanations as to why the calvarium takes on features of a weapon. Attention was also given to answer the question as to whether a head was supported, free to move or moving at the time of the injury . The results of the study was that all (or perhaps all) injuries of the calvarium are analyzable and explicable in terms of the four concepts of engineering physics stated above, operating alone or in combination and that the strength of bone and the nature of bone merely influence the stress necessary to injure the bone. Avenues for future research conclude the study.