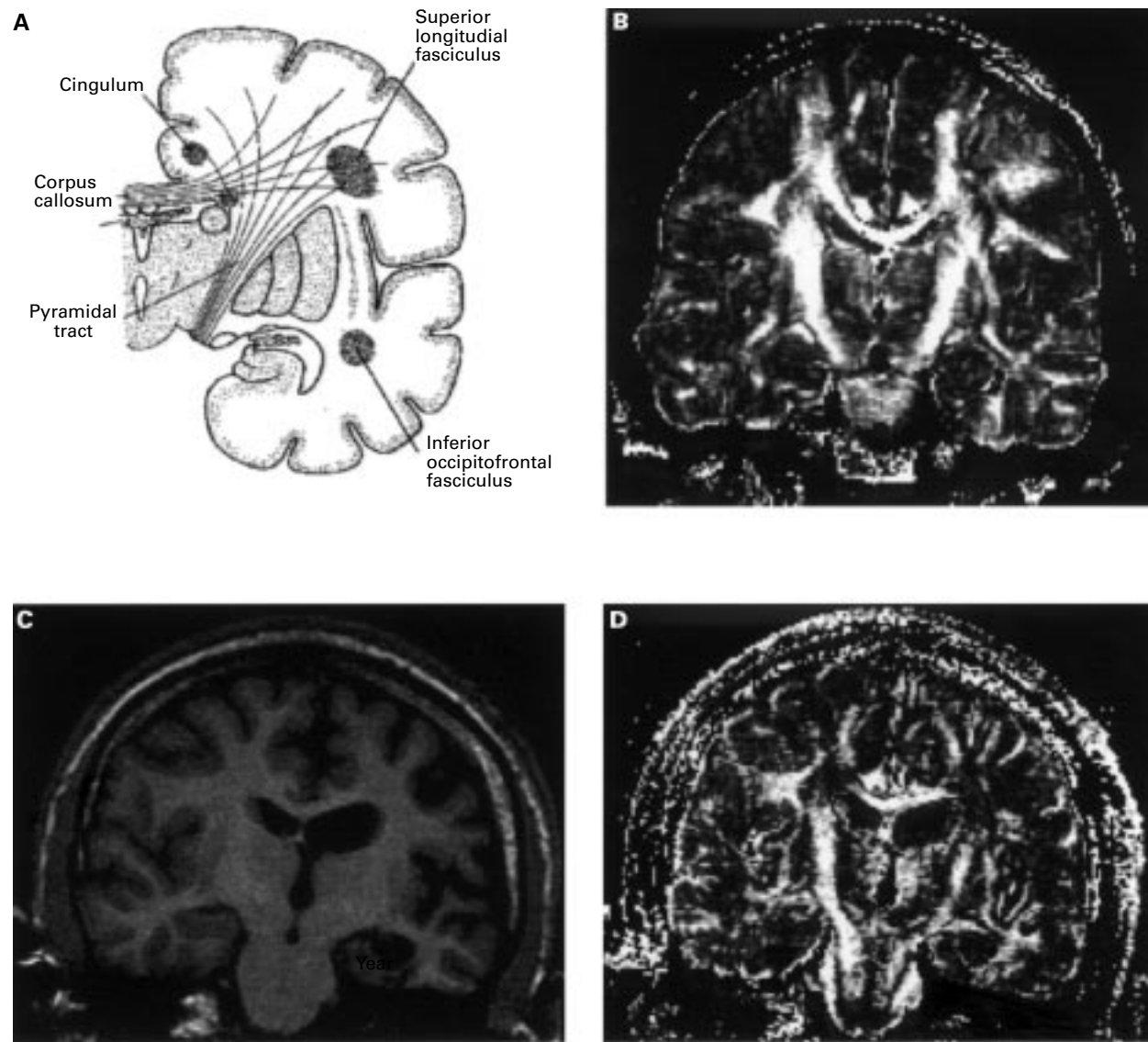


NEUROLOGICAL PICTURE

Diffusion weighted MRI demonstrates abnormal pyramidal tract in hemiparesis



Diffusion weighted imaging (DWI) is a magnetic resonance imaging technique which is sensitive to the molecular motion of water and allows measurements of anisotropy (the directionality) of water diffusion.¹ Measurements of anisotropy provides information about tracts, because water molecules travel predominantly parallel but not perpendicular to tracts.² The anisotropy of diffusion can be calculated on a pixel by pixel basis and calculated images (maps) of anisotropy can be generated. We investigated the pyramidal tract in two patients with hemiparesis using a method to estimate anisotropy proposed by Van Gelderen *et al.*³ On anisotropy maps the pyramidal tract was visible and symmetric in all six investigated control subjects. In the two patients a reduction of anisotropy suggesting a disruption of the microstructural organisation of the pyramidal tract⁴ was detected on the clinically abnormal side on anisotropy maps. Our finding suggests that anisotropy measurements can be used as a tool to visualise abnormal tracts in vivo. (A) schematic drawing of a coronal section through the hemisphere. The pyramidal tract consists of projection fibres and forms the posterior limb of the internal capsule. (B) Anisotropy map of a normal control subject. (C) T1 weighted image of a patient with hemiparesis. (D) Anisotropy map of the same patient showing the abnormal pyramidal tract.

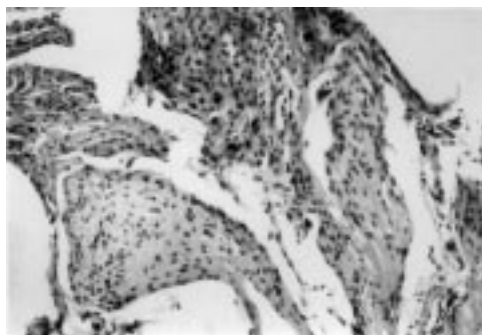
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Historical note (continued from page 796)



Pathological specimen showing meningeothelial cells consistent with the diagnosis of meningioma. (Haematoxylin and eosin originally $\times 20$.)

Cushing's strong belief on the aetiology of meningiomas.³ General Leonard Wood, Major General and Chief of Staff of the United States Army, developed a parasagittal meningioma 12 years after hitting his head on a chandelier. Cushing first examined General Wood in 1909, at a time when the diagnosis of suspected brain tumour still relied predominantly on clinical findings. After an "initial wait and see" policy, Cushing decided to perform the operation in two stages, 4 days apart. The surgery was a tremendous success and the patient was walking around his room 11 days after the procedure. This was the first time that Cushing had successfully removed a parasagittal meningioma.¹ This procedure catapulted Cushing's career and he was soon promoted to Surgeon in Chief of the new Peter Bent Brigham Hospital in Boston. Additionally, it invigorated the fledgling specialty of neurosurgery and instilled a positive attitude by the public towards brain surgery and the possibility of survival from such operations.

Our case is reminiscent of the General Wood case described by Cushing.³ Our patient was fishing on a causeway when he was struck on the right frontal skull by a full beer bottle thrown from a passing car. The patient

sustained a large laceration which bled profusely. At the time, he was seen by emergency room personnel and the laceration was sutured. He remained symptom free for 11 years, until the last admission. Examination of the patient disclosed a healed scar over the 11 year old laceration. The presence of disrupted bone and remoulding with hyperostosis as well as lysis of bone matrix at the point of injury supports a direct causal relation. The histological confirmation of cicatrix adjacent to tumour implicates scar formation as the oncogenic factor in meningioma formation. The leptomenigeal formation of this partially calcified meningioma and the precise correlation with the wound corroborates Cushing's original premise.

We present a case supporting Cushing's hypothesis that a causal relation exists between head trauma, resultant scar formation, and the development of meningiomas.

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