patients, who have a greater capacity for functional recovery than older people (who make up the bulk of our case load), in whom we doubt whether such good functional outcomes are achievable.

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Illusory movements of the paralysed upper limb in stroke

Feinberg *et al* have recently reported the association between anosognosia for hemiplegia and the illusion of movement of the paralysed upper limb.¹ They considered the illusion a form of confabulation that is distinct from other phantom phenomena. This explanation is not supported by my findings in a patient with a stroke who experienced transient purposeful movements of his paretic hand.

The patient was a 66 year old right handed man who presented with acute onset weakness of his right arm and leg and slurring of his speech. He was known to be hypertensive and a non-insulin dependent diabetic patient. Neurological examination confirmed the presence of right hemiplegia with facial involvement and mild to moderately severe dysphasia. Muscle power, as measured by the Medical Research Council (MRC) scale, was 1/5 and 2/5 in the upper and lower limbs respectively. Spinothalamic and posterior column sensations were intact. No visual field defects were found on examination using the confrontation method. There was no astereognosis or sensory extinction of tactile or visual stimuli. The patient was alert and cooperative. His comprehension of spoken and written language was good but there was evidence of moderately severe nominal dysphasia. The rest of the physical examination was normal. Brain CT confirmed the presence of a non-haemorrhagic infarct in the left corona radiata. The patient scored 19 on the mini mental state examination. There was no evidence of hemineglect as assessed clinically and with the line bisection test. The patient was correct in 8/10 items of the anosognosia for hemiplegia questionnaire.¹

Six weeks after his stroke the patient developed an itchy skin condition, probably a drug hypersensitivity reaction. When he scratched his skin with his left (good) hand to relieve the itching he thought that his right hand was also simultaneously scratching the same skin area. The right hand "stopped working" when he ceased scratching his skin but the perception of movement recurred each time he scratched the same or a different skin area until his symptoms resolved 2 weeks later. The use of the left hand for other activities did not result in a similar phenomenon. The patient had good insight into his motor functional disability and described his perceived hand movements as a "silly situation".

The case reported here demonstrates that illusory movements in stroke are independent of anosognosia for hemiplegia. This finding is in agreement with those of a previous study.² It also suggests that illusory movements are unlikely to be the product of confabulations. Confabulation is primarily a memory disorder and results from lesions in the forebrain and medial temporal lobe that disrupt connections of the limbic system.³ The

patient reported here did not have an amnesic syndrome; neither was his brain lesion (as demonstrated with CT) in the limbic system area. It seems likely that the illusory movements described by Feinberg *et al* were phantom phenomena associated with reorganisation of cortical maps and neural plasticity.⁴

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- 1 Feinberg TE, Roane DM, Ali J. Illusory limb movements in anosognosia for hemiplegia. *J Neurol Neurosurg Psychiatry* 2000;68:511-13.
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- 3 Hashimoto R, Tanaka Y, Nakano I. Amnesic confabulatory syndrome after focal basal forebrain damage. *Neurology* 2000;54:978-80.
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Feinberg and Roane reply:

The patient described by Bakheit is of interest but is not relevant to our investigation.¹ To be included in our investigation, patients were required to have right hemispheric strokes and left hemiplegia. Furthermore, 10/11 patients in our study had left hemispatial neglect and left hemisensory defect. The patient described by Bakheit had a right hemiplegia, and had no neglect or sensory defects. Therefore, Bakheit's patient would not have qualified for our study and cannot be fairly compared with our study population. Additionally, the factitious movements described in Bakheit's patient differed from those experienced by our patients in two significant respects. Firstly, Bakheit's patient experienced a "mirroring" phantom movement of the plegic right limb only when the normal hand was active. In our study, to minimise the potentially confounding role of completion, we specifically excluded from the main analysis those patients who only experienced illusory limb movements when the non-plegic limb was active. Secondly, the phantom movements experienced by Bakheit's patient were restricted to a particular idiosyncratic action—namely, scratching—as opposed to our patients who experienced illusory limb movements when simply asked to raise the left arm, an action which apparently failed to elicit factitious movement in Bakheit's patient. Therefore, according to the criteria set out in our investigation, the movements experienced by the patient of Bakheit would not be categorised as illusory limb movements in our study. Finally, it should be further noted that our patients were examined within a week of onset (some within a day) of acute hemiplegia, before significant "reorganisation of cortical maps and neural plasticity" is likely to have occurred. The patient of Bakheit is reported to have had phantom movements at 6 weeks after onset of hemiplegia when cortical reorganisation and neural plastic effects are more likely to have occurred.

In our opinion, Bakheit has committed the same error that we have previously cautioned against.^{2,3} He has failed to distinguish "phantom limb movements" in his patient from illusory limb movements that occur in association with right hemispheric damage and hemineglect. Patients with true phantom limbs, as in Bakheit's case, do not deny the identity of the actual arm and recognise the phantom movements as illusory. By contrast, the patients with illusory limb movements in our study all denied ownership of the plegic arm and believed in the reality of the factitious movements. It is in this group in

which we found illusory limb movements and which bears a relation to anosognosia and represents a variety of confabulation. Finally, we point out that confabulation is not confined to amnesic patients, and occurs in other conditions such as Anton's syndrome.

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- 3 Feinberg TE, Roane DM. Anosognosia, completion, and confabulation: the neutral-personal dichotomy. *Neurocase* 1997;3:73-85.

Social deprivation and prevalence of epilepsy and associated health usage

I read the study of Morgan *et al* on social deprivation and prevalence of epilepsy and associated health usage¹ with great interest and would like to add some remarks from my experience in the most impoverished region of the United States, near the Mississippi Delta. I would caution that it is especially in a poor and traumatised population, extremely difficult to differentiate between true electrical events and non-epileptic (or pseudo) seizures.² We have known since Charcot about the correlation between psychological traumatic states, to which poverty is intimately related and conducive, and "hysterical" seizures.³⁻⁵ There is a substantial comorbidity of epileptic and non-epileptic seizures.⁶ In fact, what I see here in Mississippi is more often than not a mixture of both and without proper, expensive testing, such as video EEG, it is sometimes impossible to make the difference. Because of the way the data were collected, it is difficult to know from the paper of Morgan *et al*¹ whether pseudoseizures were properly taken into account when assessing the prevalence of epilepsy. The same caveat applies to the ascertainment of psychiatric comorbidity. A thorough neuropsychiatric screening of the clientele of an epilepsy clinic would disclose a much higher psychiatric comorbidity than the record linkage used here. Because of the way neurologists are trained, at least in the United States, most psychiatric comorbidity in neurology patients in general probably goes undiagnosed.

What the usage data of Morgan *et al* do show is how vain the treatment of neurological illness remains without addressing its social ecology. This certainly is true in Wales as well as in Mississippi.

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