ABSTRACTS

Brain, 97,2, 337-350, June 1974: Motor Functions of the Left Hemisphere, by D. Kimura and Y. Archibald.

The authors query the concept that all disorders arising from damage to the left hemisphere are attributable to a disturbance of representational and symbolic functions. In order to try to determine the fundamental cause of apraxia they examined manual dexterity in a group of 16 patients with left hemisphere damage and 14 patients with right hemisphere damage. All but one of the patients were right-handed. Since a hemiplegic limb is not testable, the group with left hemisphere damage were selected primarily on the grounds of the presence of aphasia, and only nine of this group were hemiplegic. Apart from the inability to test a hemiplegic limb the presence or absence of hemiplegia was not found to influence the results.

The tests administered involved tests for aphasia, visuo-spatial tests and a series of specially designed motor tasks. These motor tasks involved firstly isolated finger flexion, secondly the copying of hand postures and lastly the copying of hand movements. In addition they were given the traditional tests for apraxia and, when it became apparent that some of the subjects had a movement-copying disorder, a specially designed movement-recognition test whereby instead of copying a movement the subject pointed to a picture of it.

The authors findings showed that the group of patients with left hemisphere damage were clearly impaired in the performance of complex motor sequences, but that this was so even on motor patterns which were both unfamiliar and meaningless and where verbal mediation therefore played no significant role. In cases without hemiplegia, where both sides could be tested, both hands were equally impaired. The same patients who showed a movement-copying disorder showed no difficulty in isolated finger flexion or in copying a static hand posture Since there was no relation to verbal impairment, the authors concluded that the left hemisphere has important functions in motor control which are unrelated to symbolic or representational content. They even postulate that the speech disorders seen with left hemisphere damage may be due to a defect of motor-sequencing rather than to a disturbance of symbolic or language function.

S.I.C.

McCloskey, D. I. (1973): Position sense after surgical disconnexion of the cerebral hemispheres in man, Brain, 96, 269-276.

Summary:

The author examined three patients, who had undergone surgical division of the neocortical sommissures, in order to establish whether the disturbances of certain sensori-motor functions seen in such patients could be due to a disturbance of proprioceptive input. It is known that proprioceptive afferents from both joint and muscle receptors project predominantly to the contralateral hemisphere.

The article is of interest in that the author has devised tests to differentiate between joint sense and muscle sense. Three separate tests were carried out. The first was a simple test of position sense involving both joint and muscle receptors; the blindfolded patient was required to move one elbow in alignment with movements carried out by the examiner on the other elbow. The second test isolated muscle sense by applying vibration to the tendon of either biceps or triceps. It has been shown elsewhere that vibration applied to the tendon of a muscle results in the illusion that that muscle is being stretched—and the subject demonstrates this in his movements of the other arm. The third test isolated joint receptors by excluding any tension on the muscles operating over the distal interphalangeal joint of the middle finger; this is achieved by holding the middle finger fully flexed at the proximal interphalangeal joint whilst fixing the other fingers in extension. Position sense derived from the joint receptors of the distal interphalangeal joint can then be tested.

The results of testing in two of the three patients showed no abnormality, from which the deduction was made that proprioceptive information given to one side is normally distributed to both hemispheres despite division of the neucortical commissures. The abnormal results in the third patient were thought due to the pre-operative existence of signs of widespread neurological impairment.

S.I-C.

Dimitrijevic, M. R. and Nathan, P. W. (1973): Studies of Spasticity in Man—6. Habituation, dishabituation and sensitization of tendon reflexes in spinal man, Brain, 96, 337-354.

Summary:

In a previous article (abstracted in this journal in September 1971) the authors investigated the polysynaptic flexor reflex and found that repetitive stimulation caused discontinuation of the reflex. The reflex could be re-activated by an increase in stimulus intensity or by a change in rate or type of stimulus, as well as by stimuli applied to other sites. Since the mechanism of habituation was thought to occur within interneural pathways the authors were interested to examine whether the same phenomena would occur in the monosynaptic tendon reflex. They found that whereas habituation and a decreasing response did occur under certain conditions of stimulation it happened less consistently than in the polysynaptic flexor reflex; under conditions of increased excitability of the spinal cord, an increasing response occurred. They listed the conditions of stimulation inducing these two, opposite, responses as the following:

Decreasing response (habituation)	**Increasing response (sensitization)**
Regular or random, weak stimuli.	Regular or random, strong stimuli.
Regular, weak or moderate stimuli (at any rate).	Regular, strong stimuli at any rate.
Constant site of stimulation.	Random, moderate stimuli.
Other inputs to spinal cord minimal.	Changing site of stimulation.
Long periods of stimulation	Other inputs to spinal cord present—especially inputs originating in the bladder.

Physiotherapists may find their observations of assistance when dealing with spasticity in patients with spinal cord lesions.

S.I-C.