

Overview

Attempts to find out how the fusimotor system is used in controlling normal movements have mainly centred on making single unit recordings of spindle afferents and deducing from them and movement records what static and dynamic activities must be present. Three main experimental approaches have given useful data of this kind. The introduction of recording unit activity with metal microelectrodes in human nerves by Hagbarth and Vallbo (micro-neurography) has yielded much interesting data over the past thirteen years and this is reviewed separately by those authors. Equivalent data in animals were first obtained in 1973 from jaw muscle spindle afferents recorded in mid-brain in cats and monkeys, and by Prochazka and his colleagues who in 1975 were able to achieve the same result by implanting microwires in dorsal roots in the lumbo-sacral region. Loeb's group independently developed a similar technique by implanting wires in the dorsal root ganglia. The resulting data from human and animal experiments have given somewhat different views of the relationship of alpha activity to fusimotor activity. Human experimental data have been interpreted as generally supporting the idea of alpha-gamma coactivation as a principle of motor organisation. On the other hand, the animal data seem to favour more independence of action of the two systems, but according to Prochazka and Wand, with the spindles usually responding more obviously to length changes than to skeletomotor-coupled fusimotor changes. Two presentations from each camp restate these somewhat contrasting views and provide new data. Video films were shown by Hagbarth; Loeb and Hoffer; and Prochazka and Wand. The critiques which followed each pair of presentations gave a good opportunity for considered discussion to be presented. Some of the differences may have been explained but others remain to stimulate the various groups to return to their laboratories. The feeling was certainly generated amongst the audience that the two different types of experiment were studying rather different movements and that the strategy of fusimotor involvement need not necessarily be the same in both cases. It also emerged that deduction of fusimotor activity patterns from spindle activity and movement is not a simple matter.

The papers in this section were read at the symposium, with the exception of the second paper of Prochazka and Wand, the video recordings of which formed part of a demonstration.