Fasciculation

A fasciculation /fəˌsɪkj□'leɪʃən/, or muscle twitch, is a small, local, involuntary muscle contraction and relaxation which may be visible under the skin. Deeper areas can be detected by EMG testing, though they can happen in any skeletal muscle in the body. Fasciculations arise as a result of spontaneous depolarization of a lower motor neuron leading to the synchronous contraction of all the skeletal muscle fibers within a single motor unit. An example of normal spontaneous depolarization is the constant contractions of cardiac muscle, causing the heart to beat. Usually, intentional movement of the involved muscle causes fasciculations to cease immediately, but they may return once the muscle is at rest again.

Fasciculations have a variety of causes, the majority of which are benign, but can also be due to disease of the motor neurons. They are encountered by virtually all healthy people, though for most, it is quite infrequent. In some cases, the presence of fasciculations can be annoying and interfere with quality of life. If the neurological exam is otherwise normal and EMG testing does not indicate any additional pathology, a diagnosis of benign fasciculation syndrome is usually made.

The usefulness of multichannel surface recording of fasciculations was evaluated by a retrospective study of 116 patients with various neurological disorders. Eight channels of a conventional electroencephalograph were used with plate electrode recordings from the upper arms and legs. Wide-spread fasciculations (defined as five or more of the eight muscle groups) were recorded in 48 of 54 patients with motor neuron disease, spinal muscular atrophy or postpolio syndrome, but noted on routine clinical examination at presentation in only 6. Eleven of 23 patients with peripheral neuropathy or myelopathy had fasciculations in five or more leads compared to one clinically, and 3 of 39 with other neurological diseases had fasciculations electrically but in only one were they clinically observed. The method is a noninvasive and sensitive adjunct to clinical examination for detecting fasciculations. Its diagnostic value is limited by the relatively high incidence of fasciculations in neuropathies and myelopathies. However, this study suggests that “false negatives” are rare and that the diagnosis of motor neuron disease should be reconsidered when less than five leads shows fasciculations [1)].

Fasciculations and cramps may occur in motor neuron disease or as part of a more benign syndrome. A man with apparently benign fasciculations and cramps for 4 years developed progressive muscle weakness and wasting. Such a previously undocumented evolution of benign fasciculations and cramps to motor neuron disease may further implicate anterior horn cell dysfunction in the pathogenesis of muscle fasciculation-cramp syndromes [2)].

1)
Howard RS, Murray NM. Surface EMG in the recording of fasciculations. Muscle Nerve. 1992 Nov;15(11):1240-5. doi: 10.1002/mus.880151104. PMID: 1488061.
2)
Fleet WS, Watson RT. From benign fasciculations and cramps to motor neuron disease. Neurology. 1986 Jul;36(7):997-8. doi: 10.1212/wnl.36.7.997. PMID: 3714060.