

Detecting Denervation Supersensitivity (DS) with Electrical Twitch-Obtaining Intramuscular Stimulation (ETOIMS).

DS is detected when autonomous twitch movements elicited by ETOIMS at primary site are accompanied by simultaneous twitches in multiple remote areas. This hyperreactivity may be related to spinal cord abnormalities that cannot be detected clinically. However, since the goal of ETOIMS is to elicit autonomous twitches in multiple remote areas to obtain optimal pain reduction, the more likely mechanism may be related to spread of electrical current to susceptible hyper-irritable points in multiple bilateral nerve roots with denervation supersensitivity. Twitch-forces graded from 1-5 indicate degree of hypertonicity of muscles in DS. Grade 1 twitch-forces are lowest and do not cause movement effect on joint(s) over which stimulated muscle crosses over. Grade 1 twitches have minimal to no pain relieving effects unlike grade 2 twitch-forces that can shake/rock joint(s) that treated muscle crosses over indicating weak electrical penetration to stimulate MTrPs of deep muscles apposed to bones/joint(s). Surface points that allow electricity to penetrate deeply have to be sought since muscles are hypertonic. Normally, grade 2 twitch-forces are easily elicitable with equal feedback-force on each widely-separated electrode in the probe. In DS, the electrode on the MTrP with DS produces a stronger feedback. Grade 3 twitch-forces can produce anti-gravity movements of limb due to simultaneous stimulation of susceptible MTrPs causing contraction of ≥ 1 muscle. Grade 3 twitch-forces are usually elicitable only with electrical stimulation, and autonomous twitching if present is not vigorous or prolonged enough to excite remote area twitching (Video 1). Grades 4 and 5 twitches produce strong anti-gravity movements that excite MTrPs in distant muscles. Grade 4 twitches fatigue slowly over 1-10 minutes (Video 2) and grade 5 twitches fatigue rapidly over a few seconds indicating instantaneous and simultaneous depolarization of many MTrPs with DS. Higher grade twitch-forces provide better pain relief.^[2] Video 1 illustrates grade 3 twitch-force in upper limb muscles and video 2 shows grade 4 twitch-forces in lower limb muscles.