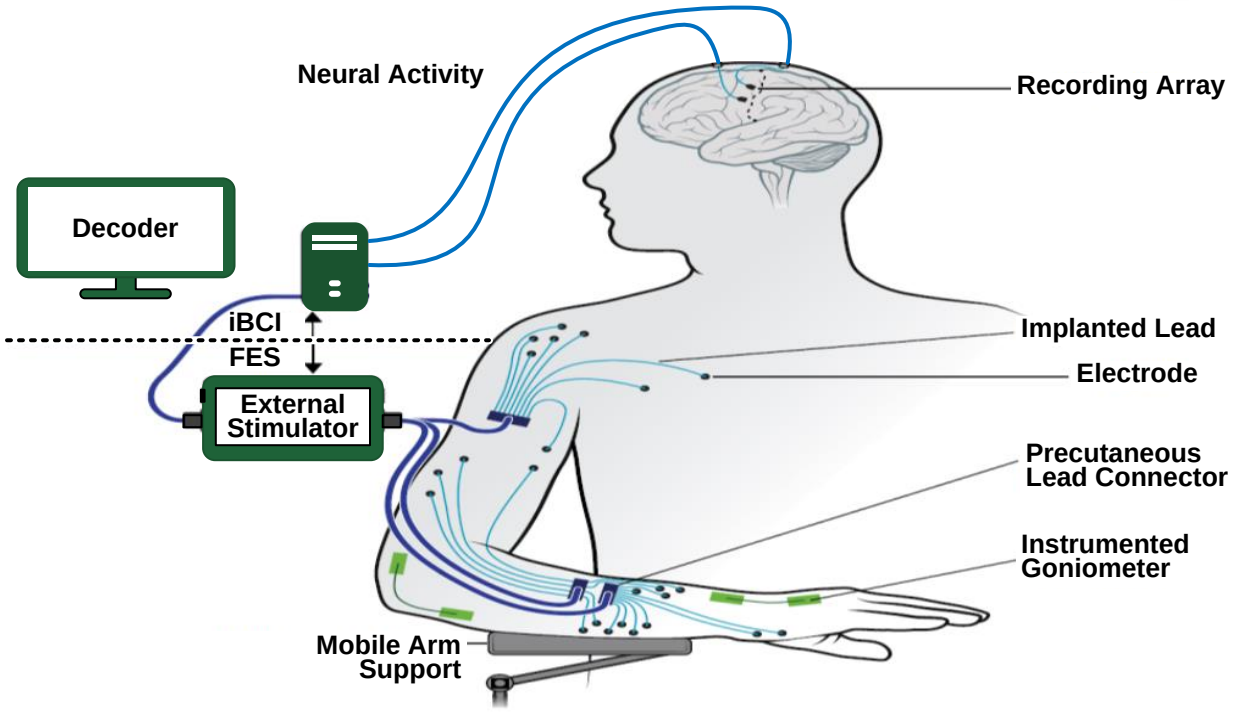
Wearable Muscle Fatigue/Recovery Monitor

20-008

Wearable wireless device incorporating low power ultrasonics monitors muscle function

While there are commercially available sensors for heart rate, skin temperature, electrolytes, electromyography, etc., no commercially available wearable sensors allow probing of tissues deep inside the body for monitoring muscle function. Currently available skin-based sensors cannot differentiate between deep overlying muscles. As muscles activate and generate force, they expand radially. Fatigued muscles lose force production and generate force/move less quickly. Doppler ultrasound methods measure the movement speed of muscles related to their generated force.

The wearable wireless device incorporates low power ultrasound sensors and analysis algorithms to monitor muscle function. The device determines when function is declining due to muscle fatigue. Additionally, the device assesses muscle recovery. The monitoring technology is ideal for sports medicine, personal fitness, and rehabilitation applications. The device is also used in conjunction with functional electrical stimulation (FES), an established method for generating muscle force in individuals who experience movement limitations (such as in stroke or spinal cord injuries.) However, FES has severe limitations including rapid muscle fatigue and electrical interference. Traditional monitoring methods, such as electromyography, cannot be used in conjunction with FES. In sports medicine, noninvasive monitoring of muscles' ability to generate force is critically important. Advantages of this novel device include FES compatibility, robust portability during physical exertion, real-time usage and processing, as well as prior FDA approval for other uses in humans.



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