# Real-time electromyography feedback to change relative muscle activity

Published date: May 23, 2019

## Technology description

Stanford researchers have developed a novel, real-time biofeedback system that may help reduce pain for patients suffering from movement disorders such as osteoarthritis, patellofemoral pain syndrome, or stroke. This system trains patients to change their coordination strategy (activate different, redundant muscles) to achieve a desirable clinical outcome during dynamic movements such as walking. For example, changing which calf muscle an individual with knee osteoarthritis uses during walking can reduce the forces in the knee which has been shown to reduce pain. Surface electromyography (EMG) measures the activation of individual muscles, processes the signal, reduces the complex signals into a small set of understandable, relevant values, and gives the user real-time feedback. The feedback could be visual, haptic (touch), or auditory. The current implementation uses a desktop computer and tools in a motion capture laboratory, but a future implementation will be a simple, wearable device for at-home rehabilitation.Figure:

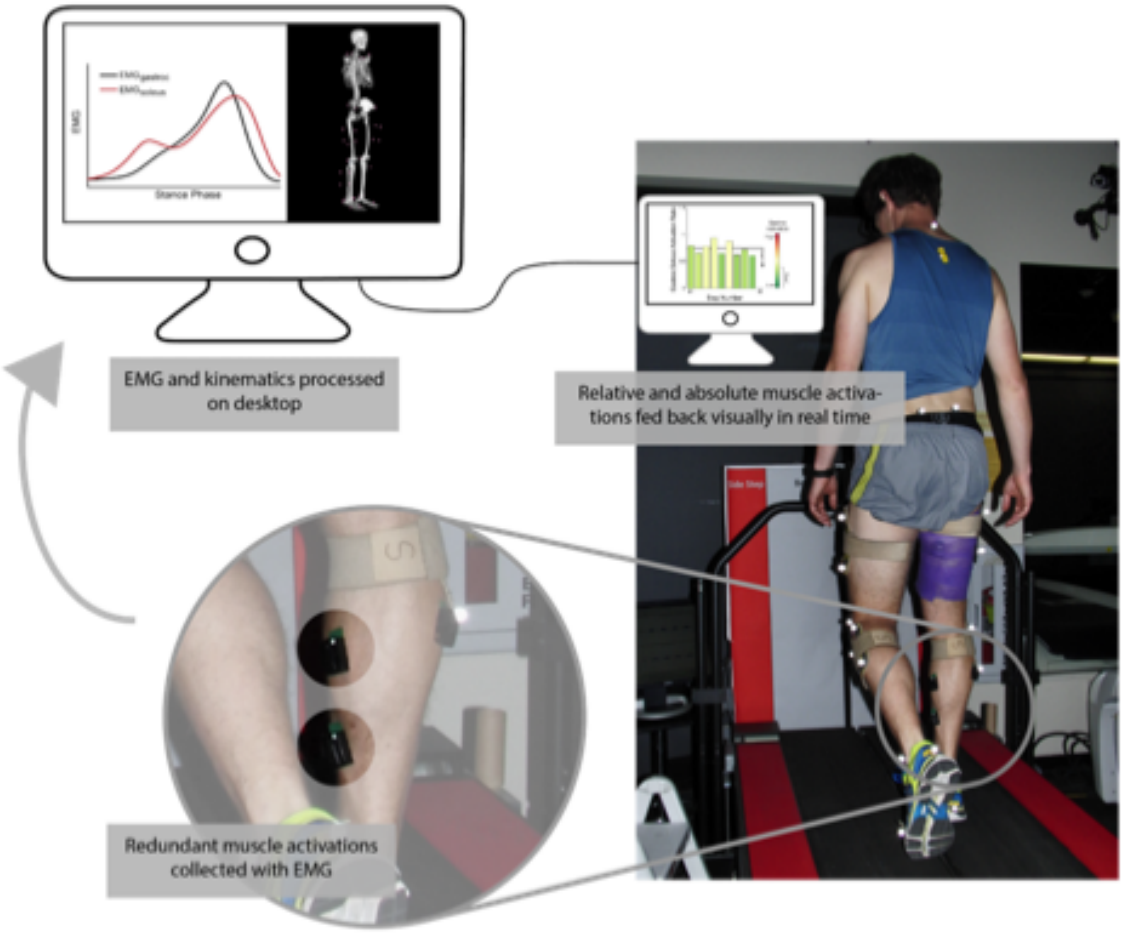


Figure Description:Real-time EMG feedback setup

## Additional Information

**https://nmbl.stanford.edu/people/**

## Application area

Physical Therapy:could help physical therapists train individuals to use appropriate muscles for movement in clinic
At-home treatmentCould fill treatment gap between pain medications/injections and knee replacementCan potentially delay more invasive treatments such as knee replacement

## Advantages

Real-time feedbackvia sensors to determine which muscles are activating and being trained

New algorithmsto process electromyograms from multiple muscles
Can replace braceswhich are uncomfortable
Could slow disease progressionGoal is to implement as asimple, wearable mobile deviceBig market size- 8 million American patients below age of 65 who are probably too young for knee replacement

## Institution

Stanford University

## Inventors

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