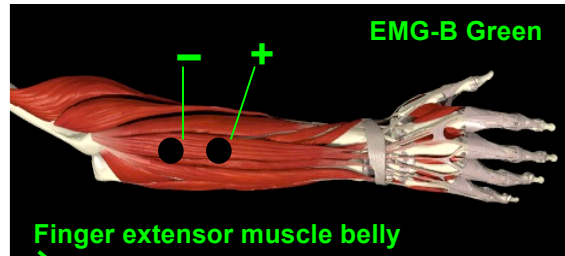
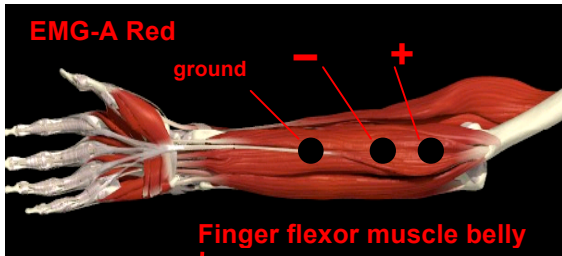


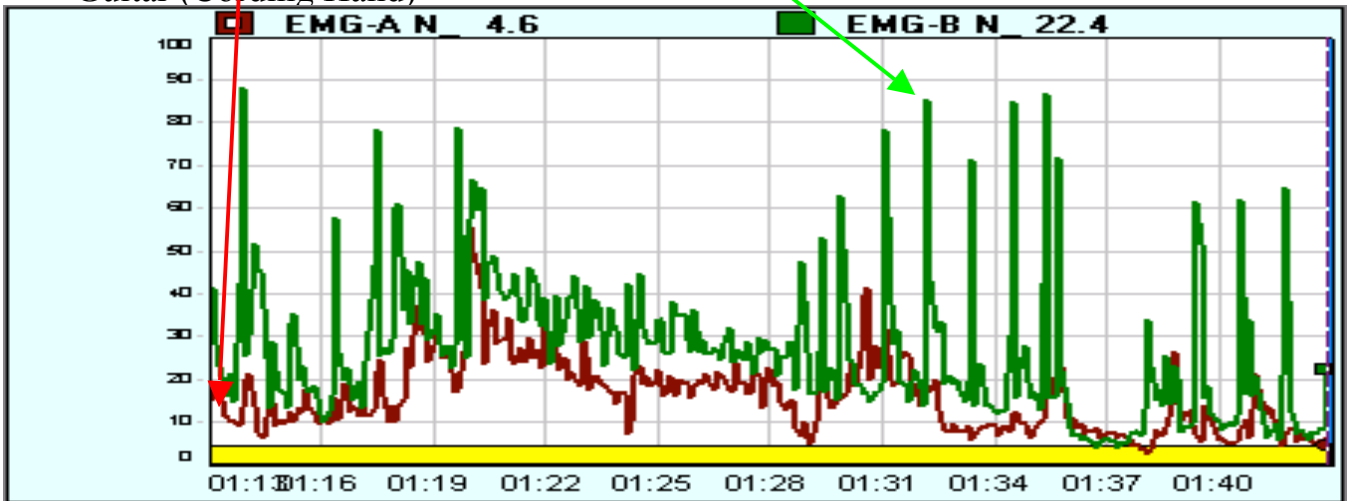
sEMG's for Music

By Dr. Terry Zachary

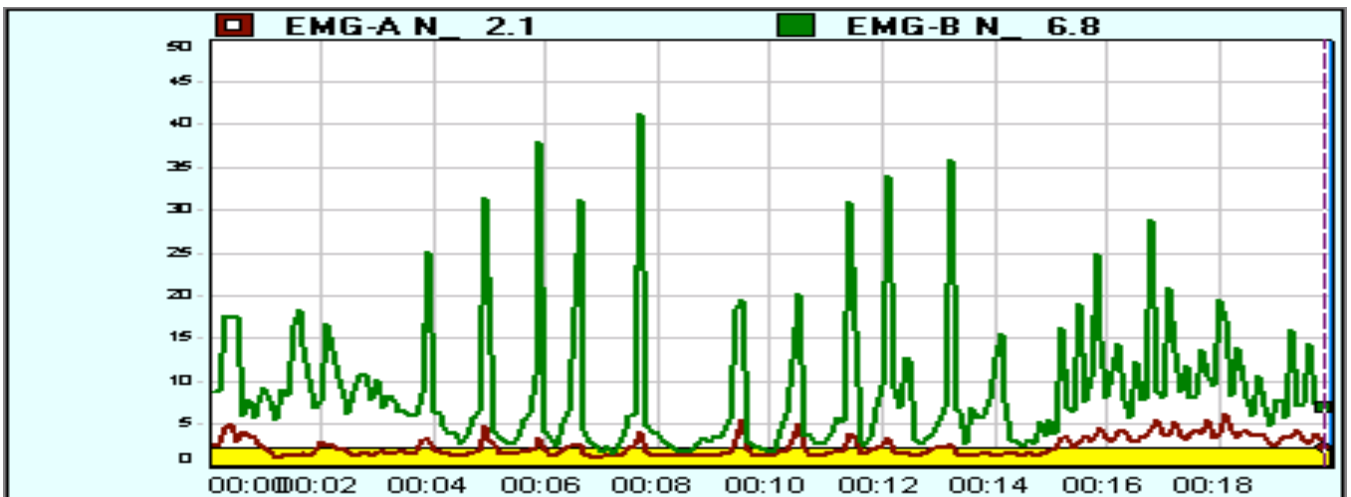
The J&J Engineering I-330 C2 Mini-sEMG (surface electromyography) was used in various trials with musicians. The EMG leads were placed on the finger flexor belly (**EMG-A Red**) and the finger extensor belly (**EMG-B Green**) of the appropriate forearm. Electrode placements were determined using palpation during isolated finger flexion and extension, respectively. Lead placement patterns are illustrated below:



Guitar (Cording Hand)



Guitar (Strum Hand – With Pick)



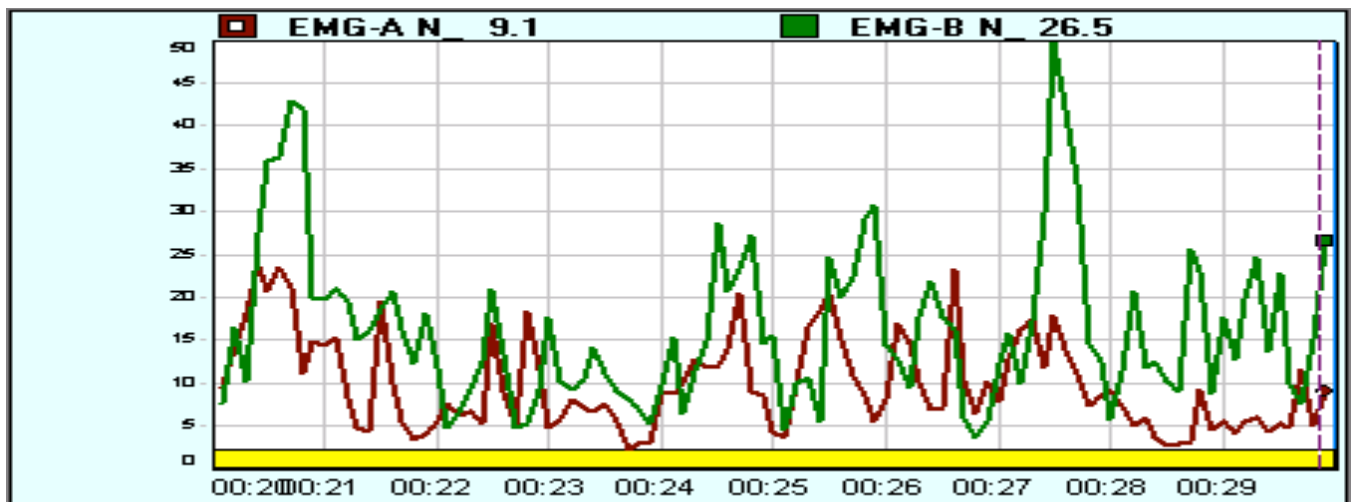
Notice how the **finger extensor muscles** located of the guitarist's forearm are extremely active; this is true in playing all musical instruments. The **finger flexor muscles** located in the forearm are also active, of course. Notice how each works in combination with the other at all times. These studies clearly indicate the use of all hand muscles.

Poor **finger extensor muscle** training results in tendonitis of the wrist, forearm and elbow. Musicians use these muscles repetitively – prepare them properly or run the risk of developing debilitating **RSI's (repetitive stress injuries)**.

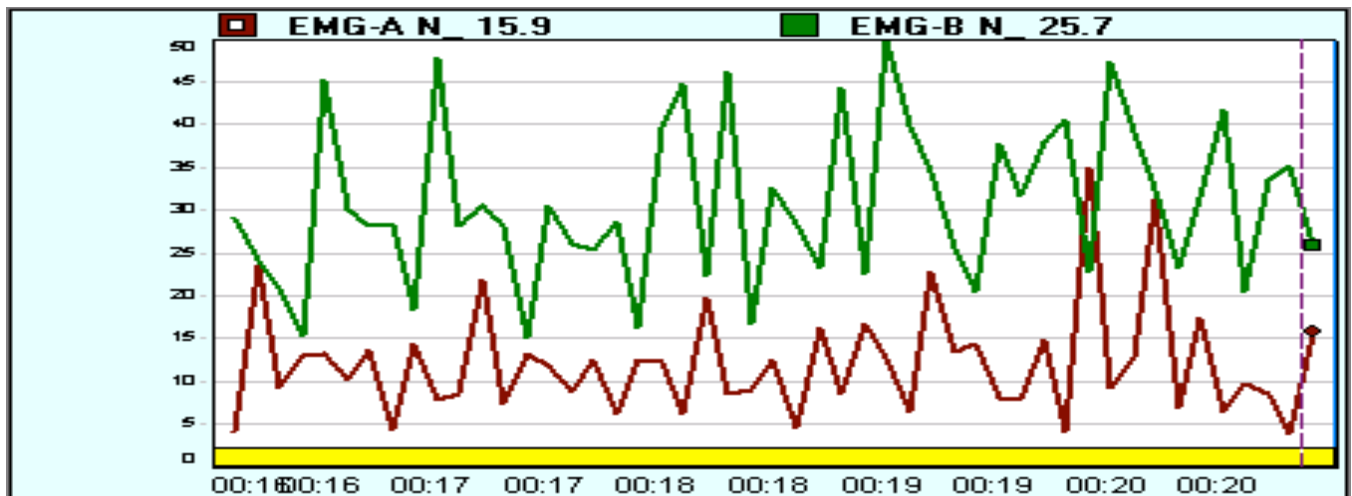
Intrinsic hand muscles (muscles within the hand itself) are not illustrated, as they require needle-insertion EMG for proper study. These are the muscles (mostly flexors) that become dominant and short in many musicians, leading to **RSI's (repetitive stress injuries)**, **carpal tunnel syndrome** and **DeQuervain's tenosynovitis**. Further study is required using needle EMG.

View additional sEMG studies of musicians:

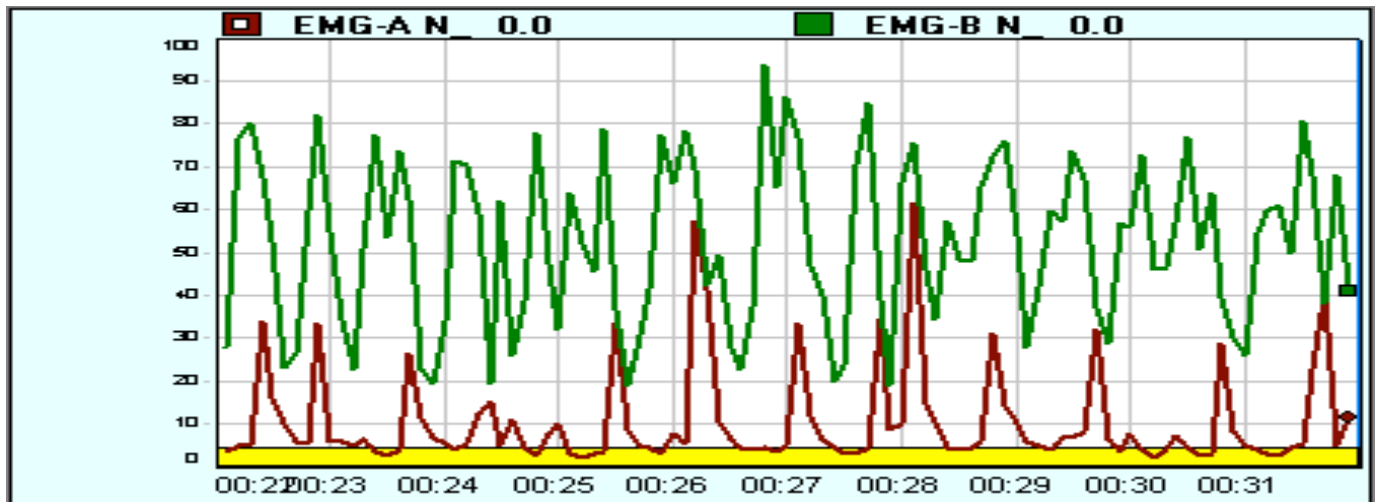
Violin (Stick Hand)



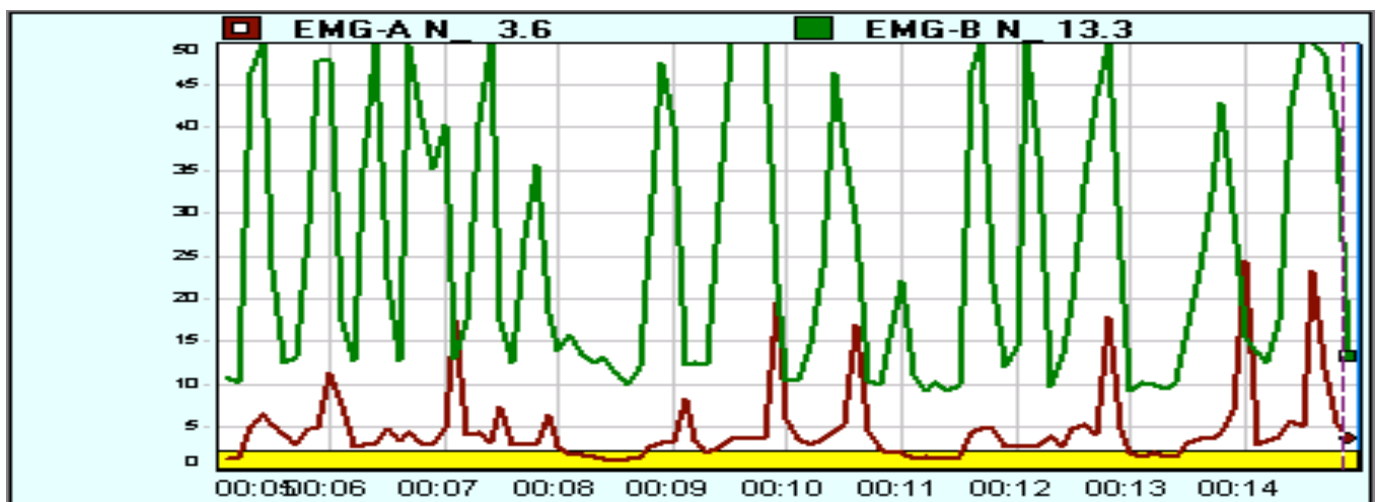
Drums



Piano



Flute



sEMG is an unparalleled way to study the hand muscle activity patterns of musicians. It is commonplace for musicians to: 1) do no exercise at all, or to 2) use 'grip-only' devices (ball only, spring-loaded or coiled) to strengthen and prepare the hand muscles and the joints/areas that the muscles act on (fingers, thumb, hand, wrist, carpal tunnel & elbow).

Musicians are as prone to hand, wrist, carpal tunnel and elbow injury as any activity. These injuries can be debilitating, and yet are very preventable through proper training.

Prepare all 18 (9 muscles close the hand, 9 muscles open the hand) of the hand muscles properly in order to prevent injury and improve performance. GHS Handmaster Plus is your complete and modern one-step solution, designed specifically to prevent music injuries resulting from overuse and imbalance (visit: www.ghsstrings.com for information).