

EMG Hand Muscle Firing Patterns In Bowling
Thanks to *Sandcastle Lanes* – South Surrey, BC, Canada



EMG Muscle Patterns – For Bowling

- Finger Flexor Muscle Activity (red)
- Finger Extensor Muscle Activity (green)

FIGURE 1a (Finger Extensor vs. Finger Flexor Muscle Activity In Bowling)

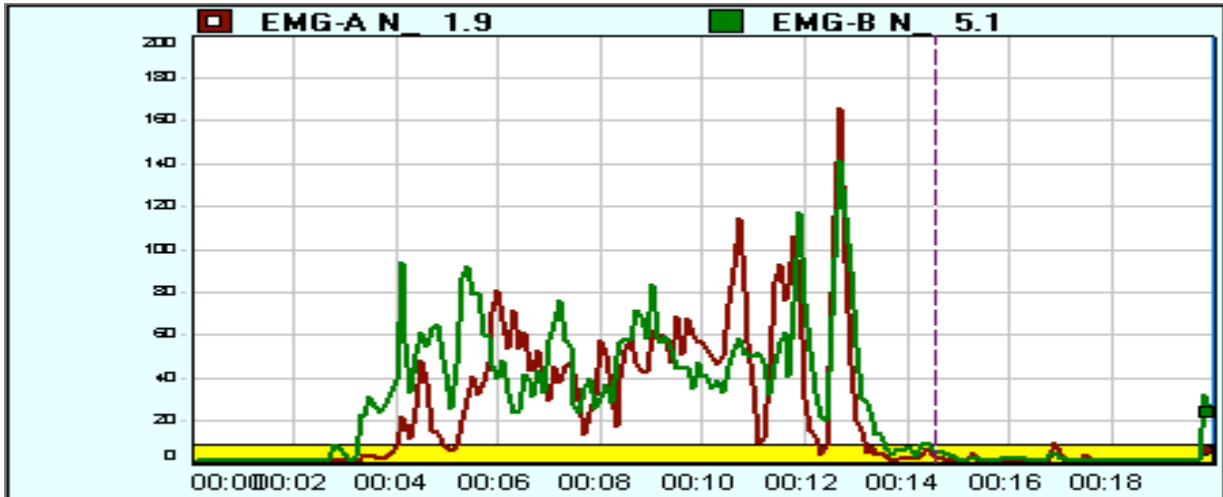
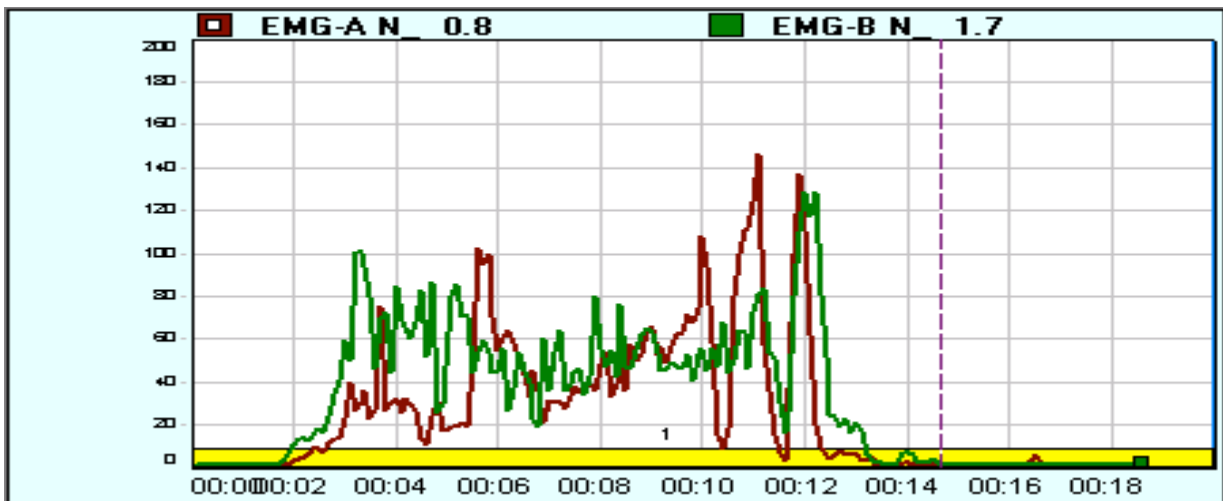


FIGURE 1b (Finger Extensor vs. Finger Flexor Muscle Activity In Bowling)

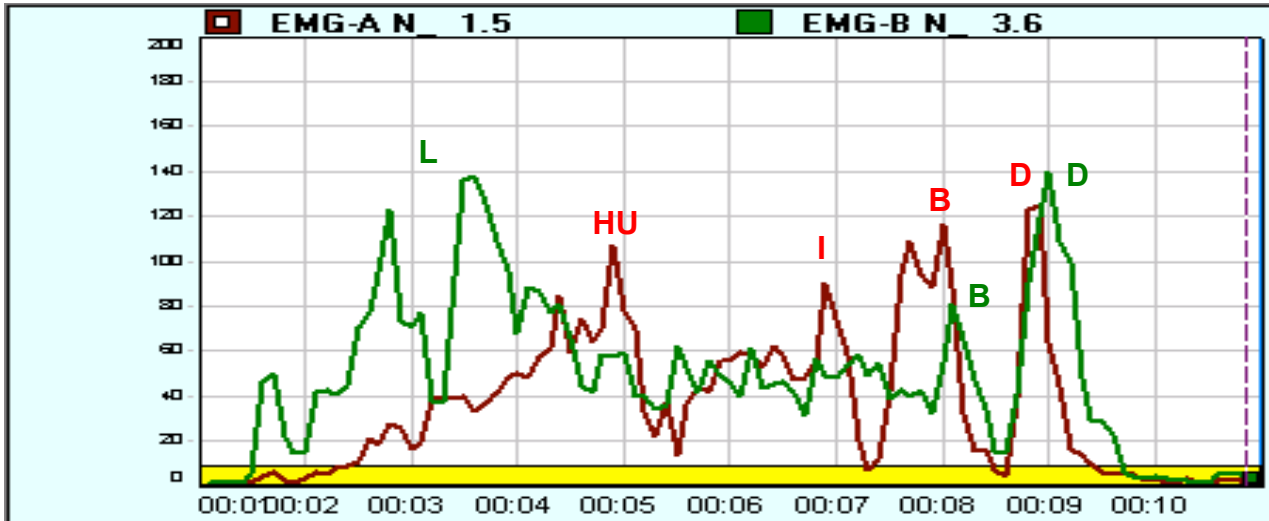


Surface electromyography (sEMG) allows an unparalleled opportunity to view the cooperative nature of the hand muscles during the bowling preparation and stroke. Notice in **Figures 1a and 1b** how both sets of muscle groups (finger flexors and finger extensors) are always very active.

The close-up view in **Figure 2** allows a more substantial study of the hand muscle firing patterns in the bowling stroke. Notice the original exertion of the finger extensor muscles (**L**) in lifting the bowling ball from the rack. Next, the

bowler turns the ball and supports its weight with the hand underneath the ball, causing a finger flexor muscle spike (HU). The finger muscle workload of the bowling stroke itself is then defined by initiation (I) of the stroke, the backswing (B/B) and the delivery (D/D). Fatigue and RSI injuries are the result in bowling.

FIGURE 2 (Close-Up of Finger Muscle Activity During Climbing)



Notice how active the finger extensor muscles are during the entire activity of picking up and delivering the ball. This is because finger extensor muscles support/stabilize the action of grip (or finger flexion), especially when the grip hand is more spread, as in gripping a bowling ball. Many bowling injuries may be the direct result of not preparing these muscles for a significant workload. Traditional thinking has assumed that only the finger flexion (grip) muscles are put to stress in bowling. These findings clearly indicate that a shift in thinking is essential. Weakness in finger extensors may even add stress to finger flexors.

Conclusions

The sEMG muscle patterns clearly illustrate the fundamental loading both to the finger extensor muscles and the finger flexor muscles during bowling. In identifying and proving this fact, the need to maintain strong healthy balanced finger flexor and finger extensor muscles becomes very clear.

The **Handmaster Plus** offers a one-step portable solution to all of the training needs of the bowler, ensuring balanced finger exercise through full natural 3-dimensional planes of motion. The result is strength, balance, speed and maximum blood flow / lymphatic drainage to the hand, wrist, forearm and elbow.

Further study and experimentation is necessary in order to more completely analyze sEMG finger muscle patterns in bowling. Further opportunities exist in using these patterns in relation to 1) teaching, 2) training and 3) injury prevention in bowling.