

\*( ), ( ), , , ,  
( )

## Analysis of Muscular Activity for the Swing Motion Using Soft Golf

K. Kim\*(Dept. of Biomedical Engineering, CBNU), Y. Y. Kim(Center for HealthCare Technology Development), B. H. No, T. K. Kwon, C. U. Hong, N. G. Kim(Div. of Bionics and Bioinformatics Eng. CBNU)

### ABSTRACT

The purpose of this study was to analyze the pattern of muscle usage during swing motion with a soft golf club in comparison with that with a normal golf club. The subjects were normal healthy young adults. The subjects performed swing motion using normal and soft golf clubs in turn. Then, we compared and analyzed the muscular activities for the two cases. The muscular activities of the subject was measured using MP100(BIOPAC Systems, Inc.). For the analysis of muscular activities, we measured EMG(Electromyography) of the subjects during swing motion. The muscles analyzed were deltoid, latissimus dorsi, external oblique, and rectus abdominis of the upper limbs and rectus femoris, biceps femoris, gastrocnemius, and soleus of the lower limbs. The result of the experiment showed that the pattern of muscle usage with soft golf club was similar to that with a normal golf club but the muscular activities with the soft golf was smaller than that with the normal golf club.

**Key Words** : Muscular activity( ), electromyography( ), soft golf( )

### 1.

가

[1], J. R. Park

[2],

[3]. Y. T. Lim

[4].

T. Y. Shim

가

### 2.

가

#### 2.1

가 (10,000 )

Fig. 1

가

1/4

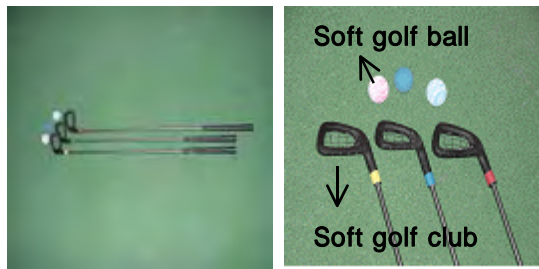


Fig. 1 Soft golf club and ball

2.2

Fig. 2

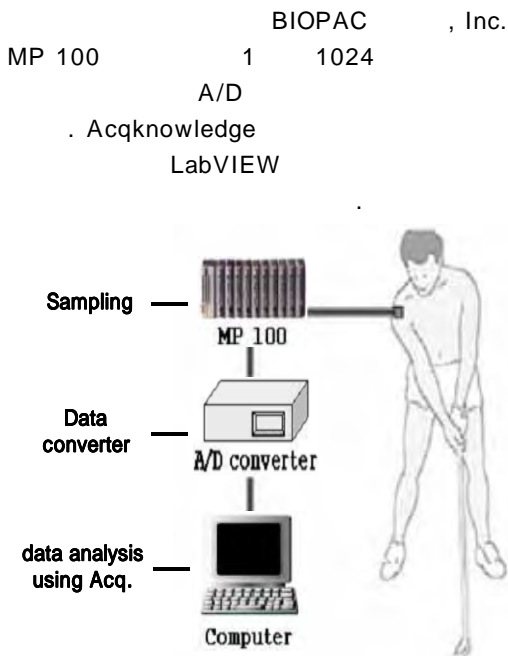


Fig. 2 Diagram of the experiment for measuring the muscular force

Fig. 3

(deltoid), (latissimus

dorsi), (rectus abdominis), (rectus femoris), (biceps femoris), (gastrocnemius)

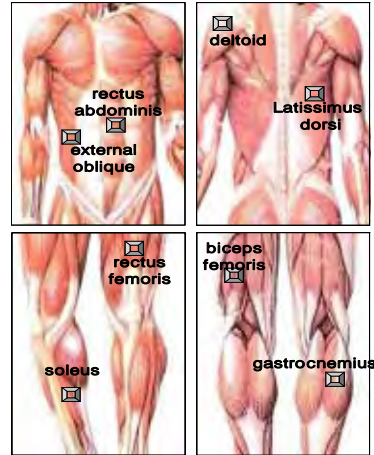


Fig. 3 Position of measured muscle on the swing of soft golf

3.

30, Fig. 4



Fig. 4 Photo of subject pasted electrode of upper and lower limbs

4

1

1

3

2

4

가  
가  
10  
Fig. 5

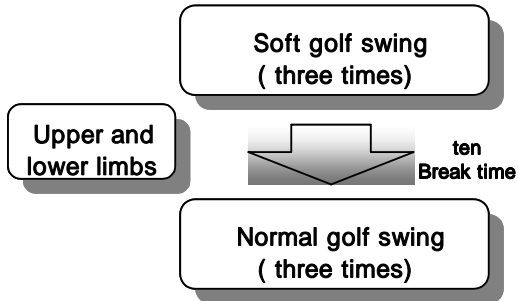


Fig. 5 Block diagram of experiment

4.

4.1

Fig. 6

가  
(address time)

(follow swing)

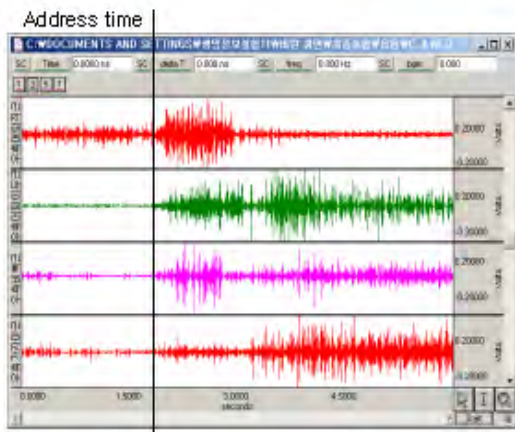


Fig. 6 EMG of the lower limbs using soft club

가  
가  
Fig. 6

, 가  
(address time)

Fig. 7

LabVIEW  
EMG raw data, power spectrum  
power spectrum peak frequency,  
mean frequency, mdian frequency

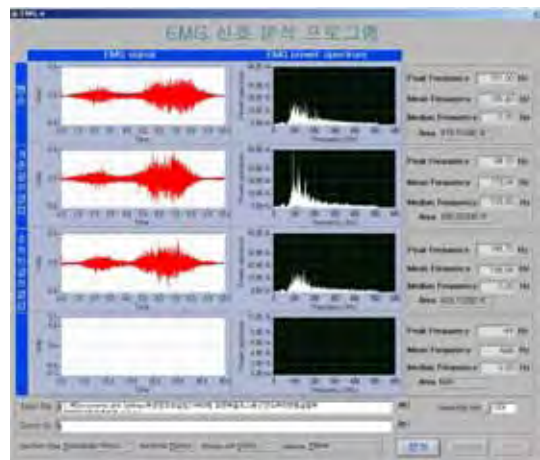


Fig. 7 Analysis program of EMG signal

4.2

Fig. 8

가  
3  
가  
가  
85%, 90%, 92%

Fig. 9

가

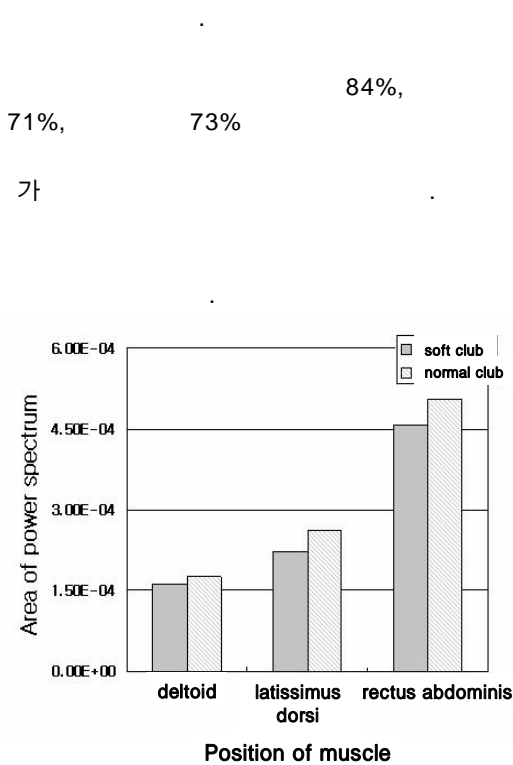


Fig. 8 Power spectrum of EMG of the upper limbs using soft and normal club

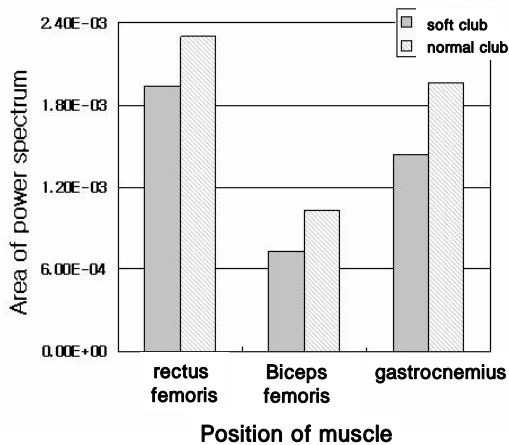


Fig. 9 Power spectrum of EMG of the lower limbs using soft and normal club

79% ,  
 79% ,  
 가

5.

가 89% ,  
 77% ,  
 79% ,

2005

1. " " , 11 1 , pp. 13 26, 2001.
2. Park, Jong -Rul, Cho, Young -Jae, Park, Bum -young, "The Analysis of Electromyography During Golf Driver Swing," The Korean Journal of Physical Education, Vol. 43, No. 2, pp. 837 844, 2004.
3. Park, Jong -Rul, "The Analysis of Electromyography for Pro golfer's Driver Disrance," Korea Sport Research 2004, Vol. 15, No. 4, pp. 1509 1528, 2004.
4. Lim, Young -Tae, "Electromyographical Analysis of Trunk Muscle Activities During a Golf Swing," The 2000 Seoul International Sport Science Congress, pp. 134 142, 2000.

가  
 가  
 가  
 89%  
 77%