

해외초청 연자 강연

## Sports Dentistry in Japan



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2003 ~ 2005	President of The Japan Prosthodontic Society
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Our research on sports dentistry has been started in 1987.

It is generally known that we often clench our teeth simultaneously as we throw all the strength of our body into our arms on lifting a heavy load, doing a chinup or playing a tag of war. So, our attention has been directed to analyzing the correlation between occlusion and body performance.

A number of studies reported statistically significant effects of intraoral appliance on improvement of motor performance and muscle strength of the extremities. Other studies, however, found no significant improvement between with and without it. This subject was in a long controversy in the late twenty century.

But it seems reasonable to suppose from our daily life that there might be undoubtedly some correlation between oral motor function and somatic motor function in other parts of body.

So, we paid attention to the teeth clenching as the conditioning oral motor activity and the spinal monosynaptic reflex as the test motor performance. The spinal monosynaptic reflex was the first reflex system discovered in humans (Hoffmann, 1910). The H reflex is the monosynaptic reflex evoked by percutaneous electrical stimulation on the nerve innervating the muscle from which the electromyogram (EMG) is recorded, and is at present widely used as the indicator of the excitability of the spinal monosynaptic reflex in humans in association with various kind of voluntary movement.

The results of our neurophysiologic studies using H reflex

and kinetic studies in human are as followings:

1) The amplitude of the H reflex in lower limb increased remarkably during teeth clenching. The increase of facilitation during maximal teeth clenching was greater than that induced either by maximal voluntary isometric contraction of the wrist extensors or by maximal voluntary clenching of the fists.

2) The increase in amplitude of the H reflex showed a positive correlation with the strength of teeth clenching, as monitored by recording electromyographic (EMG) activity from the masseter muscle.

3) The increase in amplitude of the soleus H reflex associated with teeth clenching started before the onset of the EMG activity of the masseter muscle, reached to the peak shortly after the onset.

4) The increase in amplitude of the H reflex in lower limb was partially decreased during the inhibitory masseteric reflex evoked by innocuous electrical stimulation of the lip.

5) The reciprocal Ia inhibition of the crural muscle was reduced during voluntary teeth clenching.

6) The isometric muscle strength in upper and lower limbs were increased in association with maximal voluntary clenching of the teeth.

7) The effect of teeth clenching on isokinetic muscle strength of knee extension was dependent on the angular velocity, and at lower angular velocities, teeth clenching increased the isokinetic muscle strength during knee extension.