

13. Unconsciousness Resulting from *Shime-waza* and the Application of “*Kappo*”.

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13. 絞め技による「落ち」と「活法」について

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柔道における試合・乱取中に見られる傷害には、整形外科的な傷害がその多くを占め、意識消失を来すような状況は極めて少ない。しかし、まれに絞め技によって「落ち」(意識消失)にいたる場合があり、また後頭部を強く打った際の脳震盪あるいは頸椎損傷、さらには試合中に急性心不全の起こった例もあり、脳血管障害も充分予想されることである。

柔道の試合・乱取中に起こるこれらの状況を想定した場合、脳震盪、頸椎損傷、脳血管障害などは、指導者、審判員等関係者は、意識消失を来した者に対しては絶対安静を保持し、ただちに救命救急関係者、臨床医等への連絡処置を講じなければならない。

このような重篤な状況ではないが、絞め技による「落ち」(意識消失)は、まれに深「落ち」の場合を除けば、一過性の機能障害による意識消失であり、試合中ならば審判員が試合終了の宣告の後ただちに処置をして自然覚醒をはやめてやるべきであり、これが通称「活」を入れると呼称されている処置である。柔術伝統の「活法」の応用される場である。

伝承される柔術の「活法」の内容は極めて多岐にわたるといわれているが、今日柔道で応用されている「活法」には、主として絞め技による「落ち」に適用される「呼吸活」数種と蹴上げられるなどして睾丸が腹腔内に押し上げられた際に施す「睾丸活」数種がある。本稿では絞め技による「落ち」(意識消失)の生理機構並びに今日も応用されている「活法」の概略、その生理的効果、今後の研究の方向性等についてふれた。

1. Introduction

Although orthopedic injuries account for most of the accidents in judo tournaments or practice, players sometimes suffer other injuries, such as an accidental lapse of consciousness resulting from the application of *shime-waza* (choking techniques), brain concussion, cervical vertebral injury

after bumping one's head against the tatami (mat), cardiac arrest, and cerebral hemorrhage.

In facing the latter serious cases, those in charge of the tournament or practice must keep the injured participant at rest. But in cases where the player falls unconscious due to a temporary functional disorder (*ochi*), it is necessary to restore the patient to consciousness as soon as possible. Techniques to do this are found in *kappo*, a system of traditional Japanese martial arts resuscitation techniques.

Although various *kappo* have been handed down, two forms in particular are applied in modern judo. One is *kokyu-katsu* (respiratory *kappo*) which is used to revive those who have lost consciousness due to *shime-waza*; the other is *kogan-katsu*, used to assist those whose testicles have been forced up and into the inguinal canal during judo practice.

2. The physiological mechanisms of *ochi* resulting from *shime-waza*

Shime-waza is frequently used in judo as an effective means of winning a match. This use of strangulation is rare in amateur combative sports. Since unconsciousness can occur, and the safety of the athlete is the first concern, a study was undertaken to completely understand the physiological mechanisms involved in *ochi*.

(1) Biological response to strangulation of the neck

Observations were made on the biological response to various forms of strangulation, and it was found that the biological response differed considerably depending on whether the trachea was obstructed, or left open and the neck pressed. The response caused by obstructing the trachea may be considered to be the result of external asphyxia, and differs in nature from *ochi* caused by *shime-waza*. No reactions due to external asphyxia were observed in *ochi* caused by the proper application of *shime-waza*.

(2) Physiological mechanisms of *ochi*

Based on the results of animal experiments, the biological responses caused by pressure on the neck may be summarized as follows:

1) Manifestations of initial responses

A few seconds following the initiation of pressure on the neck, a temporary bradycardia and elevation of femoral blood pressure were observed. These changes are attributable to the neural regulation mechanism.

2) Manifestations of latter stage responses

Approximately one minute following initiation of neck pressure, interruption of muscular discharge, mydriasis, loss of palpebral reflex, and urinary incontinence were observed. These changes are attributable to the humoral regulation mechanism. It can also be inferred from the data cited above, that the latter stage response plays an important role in *ochi* caused by *shime-waza*. The physiological mechanism can be summarized as follows: *ochi* is a state of unconsciousness caused by hypoxia of the cerebral cortex resulting from the obstruction of blood flow to the branches of the common carotid arteries.

It has been confirmed, however, that while complete obstruction of blood flow to the brain, or asphyxia by complete closure of the trachea will result in irreversible damage to the body (which could lead to death), *ochi* caused by *shime-waza* is a temporary reaction which only incapacitates the opponent for a short while, and its execution is harmless. (Fig. 1.)

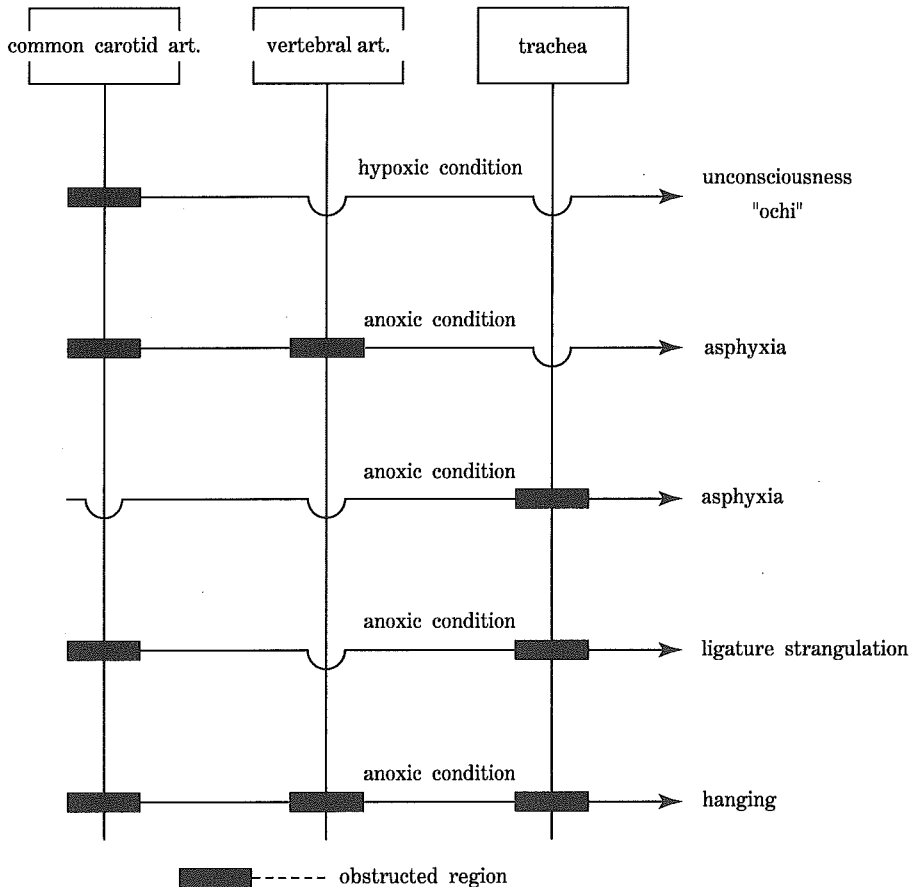


図 1 絞扼される部位とその効果
 Fig. 1 Strangled region and it's effect

(3) Effects of sustained pressure

Together with understanding the physiological changes involved with *ochi*, it is also of great importance to determine the time limits during which pressure may be safely applied.

In the animal studies, pressure of sufficient intensity to produce *ochi* was applied, and the biological response was observed over time. When the application of pressure was continued after the state of *ochi* was produced, the experimental animal developed tonic cramps after nine to fourteen minutes. This was followed by repeated cramps, slowed heart rate, elevation of femoral arterial blood pressure (systemic blood pressure), and decreased pulse pressure.

Although *ochi* is definitely different in nature from asphyxia, the secondary changes observed when pressure was sustained may cause after-effects which involve the function of higher nervous centers.

3. *Kappo*

Although judo has gained worldwide popularity only recently, its martial arts origins are ancient. During the *Sengoku* Period of the 16th century, when *jujutsu* began its development as a military art, a special method of resuscitation called *kappo* was already an established *jujutsu* technique.

In modern judo, several of the old methods of resuscitation are used. However, many of these techniques have been handed down from generation to generation by word of mouth as secret methods, and very little scientific investigation of *kappo* has been attempted. Two exceptions are found in the work of Yamada, which provides a systematic description of *kappo* history and technique with some medical explanations, and Hyodo, who analyzed *kappo* from the standpoint of respiratory and cardiovascular function.

[1] An outline of *kappo*

(1) The meaning of *kappo*

Kappo is a first aid method of resuscitating a person in a condition of syncope due to mechanical impact, strangulation, drowning, etc.

(2) The development of *kappo*

The oldest literature now in existence in which *kappo* is mentioned is that of the *Muso* school of *jujutsu*, written during the *Sengoku* Period (16th century). Since then, various methods of *satsu*

(attacking a vital spot) and *katsu* (*kappo*) have been developed by the various schools of *jujutsu* as a result of actual practice and battle-field experience. By the time of the Meiji Era (1868-1911), there were about a hundred schools of *jujutsu*, each with its own secret *katsu* and *satsu* methods. The *Muso-ryu* (“-ryu” means school), *Yoshin-ryu*, *Shinmyo Katsusatsu-ryu*, *Kito-ryu*, *Shibukawa-ryu*, *Tenjinshinyo-ryu*, and *Tenjinseiden-shinzui-ichinen-ryu* were *jujutsu* schools especially noted for their *kappo*.

(3) Special features of *kappo*

The special features of *kappo* are:

- *Kappo* is usually executed in a sedentary position, and consequently, it is possible to execute it in a very narrow space.
- The practitioner makes full use of his own hands, feet, and trunk to obtain maximum effect.
- *Kappo* has been ritualized as part of the austerities of oriental belief.

[2] Various kinds of *kappo*

In the old schools of *jujutsu*, *Kappo* was taught only to the initiated, and only by word of mouth. Consequently, it was shrouded in mystery and very little relevant literature is available for study.

The many different schools of *jujutsu* developed various forms of *kappo* -- there are said to be over one-hundred. These forms can, however, be divided into the following five categories:

(1) *Kokyu-katsu* (Respiratory *kappo*)

There are many forms: *Sasoi-katsu*, *Eri-katsu*, *So-katsu*, *Ura-so-katsu*, *Se-katsu*, *Ha-katsu*, and others. The purpose of this *kappo* is the revive normal respiration in asphyxiated subjects, or subjects that are *ochi* resulting from *shime-waza*. *Ishi-katsu* (resuscitation of hanging persons), *Asshi-katsu* (resuscitation of crushed persons), and *Enshi-katsu* (resuscitation of persons asphyxiated by smoke) are also included in this category (Fig.2 ~ Fig.5).

(2) *Kogan-katsu*

Kogan-katsu is also called *Ko-katsu* or *Inno-kappo*. *Kogan-katsu* is performed when the testicles are forced into the abdominal cavity as a result of upward impact to the scrotum.

(Fig. 6)

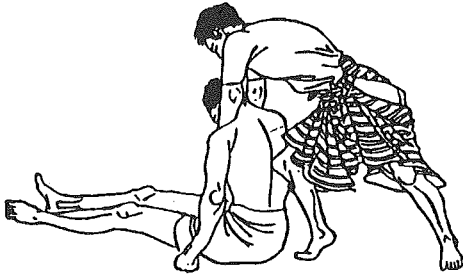


図 2 誘 活
Fig. 2 *Sasoi - katsu*



図 3 襟 活
Fig. 3 *Eri - katsu*

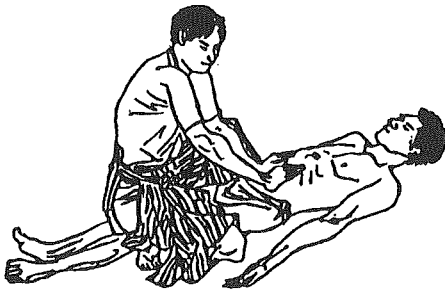


図 4 総 活
Fig. 4 *So - katsu*

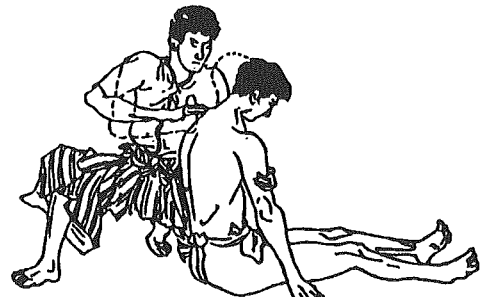


図 5 背 活
Fig. 5 *Se - katsu*

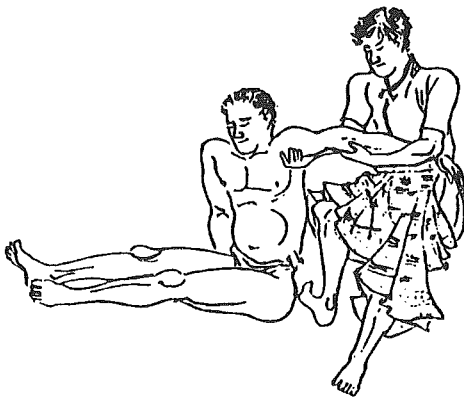


図 6 辜丸活
Fig. 6 *Kogan - katsu*



図 7 水 活
Fig. 7 *Sui - katsu*

(3) *Sui-katsu* (Artificial respiration)

Sui-katsu is used to make a drowned person expel water, after which *Eri-katsu* or *So-katsu* is performed as a means of resuscitation (Fig.7 and 8).

(4) *Ishisha-gyosha-ho*



图 8 人工呼吸術
Fig. 8 Artificial respiration

Ishisha-gyosya-ho is a method by which a person who has been hanged is lowered from a rope, after which *Eri-katsu* or *SO-katsu* is performed as a means of resuscitation (Fig.9).

(5) Others

Noshinto-katsu is used to resuscitate subjects made unconscious as a result of cerebral concussion, and rough handling is strictly forbidden. *Shinzo-katsu*, *Ki-katsu*, and *San-katsu* are used to resuscitate fainting, exhausted, or depressed subjects.

[Reference: *Shikatsujizai Sekkotsuryoho Jujutsu Seiri Sho*, written by Matsunosuke Inokuchi, 1896]

4. Concerning the physiological effects of *kappo*

There seems little application of the techniques of *kappo* in first aid outside of the sport of judo. This is understandable when we consider the history of judo, but unfortunately, these techniques are being lost rather quickly. If we leave *kappo* as it is today, we will soon see it disappear into the shadows of cultural heritage.

Kappo is still a powerful tool in judo first aid, and I believe we need to conduct careful physiological studies of it, researching the history of *kappo*, recording its techniques on videotape, and making it clear that *kappo* should be persevered for future judo generations.



图 9 縊死者仰卸法
Fig. 9 *Ishisha - gyosha - ho*

The physiological effects of *kappo* have already been investigated from the viewpoint of respiratory reflex, vasovagal syndrome, and consciousness. We observed that respiratory volume and frequency were both accelerated as a result of the execution of *Kokyu-katsu* on normal subjects at rest. This acceleration was more pronounced after the execution of *Kokyu-katsu* on subjects made unconscious using the choke *katajuji-jime*.

Kappo not only stimulates and promotes the function of the respiratory system, but also stimulates, via sensory receptors, the ascending reticular activating system (as shown by Dr. H. Magoun). The impulse from this stimulation is transmitted to the cerebral cortex and enhances its excitability.

In recent years, advances in medical electronics allow us to observe the hemodynamics of the brain non-invasively. Cerebral blood flow or cerebral oxygen consumption can be studied by means of PET (Positron Emission Tomography) scans or NIRS (Near-Infrared Spectoroscopy). As brain hemodynamics is probably the single most important factor in the analysis of the physiological effects of *kappo*, I strongly encourage research in this area.