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Deaths Allegedly Caused by the Use of “Choke Holds” (Shime-Waza)

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ABSTRACT: Shime-waza or the “choke hold,” when properly applied, should not cause death; therefore, its primary purpose should be to subdue violent suspects. When properly applied, the choke hold causes unconsciousness in 10 to 20 s. No fatalities as a result of shime-waza have been reported in the sport of judo since its inception in 1882. Among the methods of “control holds” taught to law enforcement officers is the choke hold similar or identical to shime-waza used in judo. Using the choke hold, officers may afford themselves maximum safety while subjecting the suspect to a minimum possibility of injury. The author has reviewed 14 fatalities with autopsy findings where death was allegedly caused by the use of choke holds.

KEYWORDS: pathology and biology, choke holds, law enforcement, death

The “choke holds” known as shime-waza used in the sport of judo have been taught and used by law enforcement officers to subdue violent suspects. Recently, however, there have been reports of deaths allegedly caused by the use of choke holds, which have led to class action suits against its use from local to state to the United States Supreme Court. Apparently, the use of choke holds was thought to be a safe and harmless way of controlling and subduing violent suspects without the use of weapons. The use of choke holds or shime-waza in judo is similar or identical to the techniques used by the law enforcement officers.

Investigations have shown that no deaths had occurred by these techniques since the sport of judo was founded by Professor Jigoro Kano in 1882 in Tokyo, Japan [1]. A survey made by this author in 1979, based on a questionnaire to all International Judo Federation (IJF) country members, revealed that although there were 19 judo fatalities, none was due to shime-waza [2].

The statistics in the use of shime-waza have been kept by the International Judo Federation on World Class Judo Championships, Olympics (Munich—1972, Montreal—1976, Moscow—1980, and Los Angeles—1984), World Judo Championships (Mexico City—1969, Ludwigshafen—1971, Lausanne—1973, Vienna—1975, Paris—1979, and Maastricht—1981), and the Junior World Judo Championship in Rio de Janeiro—1974. Of the 2198 techniques used to score, 97 were shime-waza (4.41%) [3].² No fatalities were recorded.

As of 1985, 113 countries are members of the IJF. All these federations have numerous tournaments at local, regional, national, and international levels where shime-waza is used.

In 1981, a class action suit was brought against the City of Los Angeles regarding fatalities

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allegedly to have been caused by the "bar-arm" and carotid artery control holds. The control holds used are similar to the shime-waza used in judo. Since no death has been reported in the sport of judo, other studies on cases of deaths allegedly caused by the use of choke hold had to be investigated.

Case 1—5/75

The strong decedent, who was a black male, age 25 to 30, 111.4 kg, height 195.6 cm, resisted violently. The two officers used their batons and physical holds (choke) to handcuff and place leg restraints on the decedent. He was transported to the police station where on arrival no pulse could be found. He was then rushed to the hospital where doctors could not find any vital signs.

Autopsy Findings

The autopsy findings were:

- (1) fracture of left cricoid cartilage,
- (2) petechial hemorrhages of laryngeal mucosa,
- (3) submucosal hemorrhage of posterior arch of thyroid cartilage with separation of the mucosa from the cartilage,
- (4) contusion of the neck muscles,
- (5) petechial hemorrhages over the eyelids and heart, and
- (6) subarachnoid blood stain over the brain.

The reported cause of death was asphyxiation as a result of manual compression of neck.

Case 2—8/75

The decedent, who was a white male age 21, 52.3 kg, height 185.4 cm, was reported to have taken lysergic acid diethylamide (LSD) four days before his death. The arresting officer applied "restraint" on the man's neck. The decedent was transported to the police station in a convulsive state, then collapsed and did not respond to stimuli.

Autopsy Findings

The autopsy findings were:

- (1) ecchymosis of prelaryngeal and pharyngeal muscles,
- (2) retropharyngeal ecchymosis,
- (3) ecchymosis in the vascular structures of the neck,
- (4) ecchymosis of the greater horn of hyoid and the superior horn of the thyroid cartilage, and
- (5) no fractures or luxation of laryngo-trachea grossly or by semiradiography.

The reported cause of death was not only by mechanical asphyxia but also by compression of the vascular circulation to the brain.

Case 3—11/75

An altercation ensued with the decedent, who was a black male age 28, 80.9 kg, height 177.8 cm, and the police. The officers tried to apply an approved type of choke hold and the decedent became unconscious at the scene.

Autopsy Findings

The autopsy findings were:

- (1) pulmonary edema and congestion,
- (2) perilaryngeal hemorrhage,
- (3) submucosal laryngeal hemorrhage,
- (4) old needle tracks, both arms, and
- (5) fine cutaneous abrasions.

The reported cause of death was acute cardiorespiratory arrest as a result of compression of the neck. The other significant condition was acute heroin-morphine intoxication.

Case 4—10/76

The suspect, who was a black male age 19, 72.7 kg, height 181.6 cm, was in custody of the police as a possible case of angel dust inhalation. The arresting officer used a neck hold to restrain the suspect. He had cardiorespiratory arrest in the backseat of the police car. Cardiopulmonary resuscitation (CPR) was instituted. The paramedics found the decedent in agonal rhythm with vomitus in his mouth. CPR used in the field and at the emergency room was not effective.

Autopsy Findings

The autopsy findings were:

- (1) acute passive congestion of visceral organs;
- (2) aspiration of vomitus;
- (3) two small fresh linear abrasions 1/4 in. (6.35 mm) each on neck, right mandible;
- (4) bilateral conjunctival petechial hemorrhage; and
- (5) congenital hypoplasia of right kidney.

The reported cause of death was asphyxiation to neck restraint procedure for abnormal behavior associated with phencyclidine (PCP) use. Other significant conditions were aspiration of vomitus and sickle cell disorder.

Case 5—7/77

After being legally arrested for terroristic threats and creating a turmoil, this white male, age 25, 71.8 kg, height 180.3 cm, was placed in the rear of the police car. He kicked out the rear window, exited through the broken window, and continued to kick and strike at the officer. The decedent was subdued by an officer who, using his flashlight as a choke stick, grabbed the subject about the neck and tried to choke him while bringing him down to the ground. The subject continued to fight; consequently, the officer rolled him over on his stomach and continued to keep "hold" on him until the subject was handcuffed. The "hold" on him was repeated when the subject started to fight again. Finally, the subject was placed in a police wagon, with wrists and ankles handcuffed, face down. The subject was transported to an emergency room; however, after he was placed on a wheel chair, he was found to be unconscious and was finally pronounced dead.

Autopsy Findings

The autopsy findings were:

- (1) petechial hemorrhages of conjunctiva and sclera of eyes;

- (2) petechial hemorrhages of visceral pleura of lungs;
- (3) pulmonary edema and congestion with aspiration of gastric contents;
- (4) cerebral edema;
- (5) focal soft tissue hemorrhage, right lateral neck;
- (6) fracture of hyoid bone, right anterior aspect;
- (7) blunt force scalp laceration, left fronto-parietal; and
- (8) multiple abrasions and contusions of skin of neck, torso, face, and extremities.

The reported cause of death was cardiorespiratory arrest caused by asphyxia as a result of strangulation and aspiration of gastric contents.

Case 6—1/78

The subject, who was a black male age 21, 81.8 kg, height 185.4 cm, was taken into custody for possibly being under the influence of PCP and reckless driving. The police had to use neck restraint in the arresting procedure. He was taken to jail, but then broke the restraints and had to be restrained again. Later in the evening, in his cell, he was found not to be breathing. Then he was taken to the hospital and was pronounced dead on arrival (DOA).

Autopsy Findings

The autopsy findings were:

- (1) hemorrhages, soft tissue of right and left sides and front of neck;
 - (2) mucosal hemorrhage, larynx;
 - (3) hemorrhage, anterior longitudinal ligament mid cervical spine;
 - (4) hemorrhage anterior right chest wall, under surface of scalp, and mucosa of airways;
- and
- (5) extensive fresh bruises and abrasions of head, face, neck, and upper chest.

The reported cause of death was sudden cardiorespiratory collapse in a psychotic patient with severe stress and exhaustion after prolonged combativeness, sleeplessness, and refusal to take nourishment.

Case 7—2/78

The decedent, a black male age 34, 72.3 kg, height 177.8 cm, was combative while being arrested, so a bar arm control hold was used. He kicked the driver during transport, and, at the station, restraints were used and a bar arm control hold had to be used again. He was transported to another jail which had padded cells. During transport he was placed on a gurney, face down, but the subject appeared to be unconscious at that time. He was placed in a padded cell, but at that time the subject was not breathing. He was transported to the dispensary where all attempts failed to revive him.

Autopsy Findings

The autopsy findings were:

- (1) hemorrhages, soft tissue of left side of neck;
- (2) hemorrhage, anterior longitudinal ligament;
- (3) Laceration, posterior longitudinal ligament;
- (4) fractures of intervertebral discs between 3 and 4, 4 and 5 cervical vertebrae, with abnormal mobility of cervical spine;
- (5) hypermotility between laminae (C6-C7), transverse tear, l.flavum;

- (6) acute spinal epidural hematoma (C5-C8); and
- (7) petechiae of both eyelids.

The reported cause of death was asphyxia as a result of neck compression during restraining procedure. The other significant condition was interstitial myocardial fibrosis.

Case 8—7/78

The decedent, a black male, age 39, 58.6 kg, height 170.2 cm, had a family dispute, then turned on the officer on the scene, and the subject was eventually subdued by a "regular choke hold." When he became unconscious, he was cuffed and carried outside; he was still unconscious as the rescue ambulance arrived. He was pronounced dead on arrival at the hospital.

Autopsy Findings

The autopsy findings were:

- (1) soft tissue hemorrhage around neck organs;
- (2) petechial hemorrhages in eyes, epiglottis, and over the heart and lungs;
- (3) acute passive congestion of lungs;
- (4) subgaleal hemorrhages;
- (5) abrasions and bruises over the body;
- (6) fatty metamorphosis of liver; and
- (7) interstitial myocardial fibrosis.

The reported cause of death was asphyxia as a result of neck compression during restraining procedure.

Case 9—1/80

The subject, a white male, age 32, 61.4 kg, height 172.7 cm, was stopped for a traffic violation. Getting out of the car, he brandished a knife. The officers subdued him with a choke hold and placed him in the police car. At this point, he "passed out." He was transported to the hospital and died while in custody. The subject was a suspected drug dealer and abuser.

Autopsy Findings

The autopsy findings were:

- (1) hypoxic encephalopathy,
- (2) pulmonary congestion and edema, and
- (3) congestion of viscera.

The reported cause of death was hypoxic encephalopathy as a result of respiratory arrest following struggle with police officers while in a state of acute ethanol and cocaine intoxication.

Case 10—3/80

The subject, a black male, age 41, 66.2 kg, height 167.6 cm, was in the lobby of a hotel, yelling and screaming at an off-duty officer. The officer applied a "bar arm control hold" on the decedent and he "went down." The paramedics were called and worked on the subject at the scene. They then transported him to a hospital where he was pronounced dead.

Autopsy Findings

The autopsy findings were:

- (1) fracture of the left superior cornu of thyroid cartilage;
- (2) petechiae of the epiglottis and epicardium, mild;
- (3) acute pulmonary congestion and edema; and
- (4) history of carotid control hold by an officer.

The reported cause of death was acute cardiorespiratory arrest as a result of carotid control hold of neck. The other significant condition was nonspecific cardiomyopathy.

Case 11—3/82

The decedent, a white male age 21, 81.8 kg, height 182.9 cm, an apparent psychotic inmate in jail, put up a tremendous struggle several times, and was finally subdued by four detention officers. One applied a carotid artery choke hold "not more than 20 seconds," and the subject was placed in leather restraints attached to a cell bunk, face down. The inmate stopped struggling, developed a weak pulse and shallow breathing, and became cyanotic. A nurse and the paramedics were called. He was resuscitated by the paramedics but expired a few days later in the hospital.

Autopsy Findings

The autopsy findings were:

- (1) anoxic encephalopathy;
- (2) marked edema and softening of the brain;
- (3) erosions of the laryngeal and esophageal mucosa;
- (4) contusions over right lateral aspect of larynx, fading;
- (5) fading conjunctival hemorrhages;
- (6) bronchopneumonia, right lower lobe;
- (7) severe hyperemia and edema of lungs; and
- (8) abrasions of wrists, left shoulder, and left elbow.

The reported cause of death was anoxic encephalopathy, probable forearm strangulation.

Case 12

During the 1981 Sixth International Judo Federation (IJF) Medical Symposium in Maastricht, Netherlands, 31 Aug. 1981, Kjell Salling of Norway called attention to a fatal case as a result of choking. The death was reported in Paris, France, June 1954. The accident was published and reported by newspapers, *Le Parisien Libere* and *France-Soir* on 24 June 1954. The incident was also reported in the *Official Bulletin of the French Judo Federation* [4]. Investigation revealed that the death was not in the sport of judo, but a method called "Vo et Vat" taught by a Vietnamese instructor. Vo et Vat was estimated to be a more violent form of judo. The method was not recognized by the French Judo Federation and the instructor was not a member of that organization.

The subject was a 34-year-old male Vietnamese Vo et Vat instructor who was "choked" by one of his own students, age 17. For demonstration purposes, the student was ordered by the instructor to use all his strength when he applied a reverse cross choke (gyaku-juji-me). This choke is applied from above with the instructor lying on his back on the mat. The instructor was going to demonstrate a method of resistance and counter attack. The instructor was not able to counter attack, and the student after the passing of "some minutes," exhausted by his effort, terminated the "choking." The instructor apparently died on the mat. His demise

was witnessed by his students, who were sitting around the two demonstrating. A doctor was summoned, but he could only state that the instructor was dead.

The autopsy findings were published in the *Annales de Medicine Legale* [5].

Autopsy Findings

The autopsy findings were:

- (1) ecchymosis of prelaryngeal and pharyngeal muscles,
- (2) retropharyngeal ecchymosis,
- (3) ecchymosis in the vascular sheath (neck),
- (4) ecchymosis of the greater horn of the hyoid and the superior horn of the thyroid cartilage, and
- (5) no fracture or luxation of the laryngo-trachea, grossly or by semi-microradiography.

The reported cause of death was not only by mechanical asphyxia but also by compression of the vascular circulation to the brain.

Case 13

A 58-year-old retired janitor [6] suffered cardiac arrest two years before and was successfully resuscitated, but showed evidence of hypoxic brain damage which caused personality changes. He was committed to a mental hospital because of withdrawn behavior. He had arteriosclerotic heart disease; his electrocardiogram (EKG) showed premature ventricular contractures which was partially controlled by quinidine.

When an order was granted, two police officers were dispatched to his home to bring him to the hospital. Coaxing by the police officers proved futile. In an attempt to overpower and handcuff him, one officer stepped behind the victim and grabbed him about the neck. The hold intended by the officer was the carotid sleeper with the neck of the victim in the crook of the arm and forearm of the officer. After a brief but violent struggle, during which both the officer and victim fell to the floor, the victim became lifeless. He did not respond to CPR. An EKG taken during resuscitation showed cardiac arrest. Witnesses, including family members, stated that the entire struggle lasted only a "short time," with the neck hold in place several seconds.

Autopsy Findings

The autopsy findings were:

- (1) fracture, left greater cornu of thyroid cartilage;
- (2) focal hemorrhage and few petechae of laryngeal mucosa;
- (3) petechae in conjunctivae, left greater than right;
- (4) heart, left ventricular hypertrophy with mild atherosclerotic coronary arteries; microscopy: interstitial fibrosis; and
- (5) brain, evidence of hypoxia (loss of neurons in the hippocampus).

The reported cause of death was cardiac arrest, arteriosclerotic hypertensive heart disease, and neck compression, contributory, classified as homicide.

Case 14

A 35-year-old manual laborer [6] was taken into custody for threatening his wife with a shotgun. He had been treated on many occasions for manic depressive psychosis and had been on maintenance dose of lithium.

On the third day in jail, although on lithium, he became combative, disruptive, and threatened the life of another prisoner. He resisted the restraining attempt of six guards, but was finally overpowered and handcuffed and moved to a solitary confinement cell where he remained violent and combative.

He was forced face down on the bunk while the handcuffs were removed and replaced by nylon flex cuffs. During this time, a guard put the victim's head in a neck hold which the guard described as the carotid sleeper. The prisoner ceased to struggle and the guards left him to recover. A few minutes later when a guard returned to check on the prisoner, the prisoner was found apneic. CPR was immediately begun, and in a matter of minutes medical personnel arrived at the scene. EKG showed fine ventricular fibrillation which progressed to cardiac standstill.

Autopsy Findings

The autopsy findings were:

- (1) petechiae of conjunctivae, left greater than right;
- (2) lower lip bruised, superficial abrasions over right shoulder;
- (3) fracture of left greater cornu of thyroid cartilage;
- (4) small hemorrhage in right sternocleidomastoid muscle at the level of the thyroid gland; and
- (5) heart, normal in size with only minimal coronary atherosclerosis.

The reported cause of death was neck hold.

Control Holds Used by the Police

The Modified Carotid Takedown and Control

A right-handed officer maneuvers behind the suspect, wraps the right arm around the suspect's neck between the throat and the carotid (Fig. 1) [7]. At this point, pressure is applied to the suspect's neck between the throat and the carotid artery with the lower forearm. The suspect is then pulled backwards so that the suspect's back is in contact with the officer's chest. The technique is the same as hadakajime used in judo in the standing position. The suspect is then pulled down to a sitting position. If the suspect continues to resist, the move is made to go into the "locked carotid control" (Fig. 2). The officer can do this by driving the right thumb into the left armpit, then grip the upper left arm with the right hand. The right arm is flexed and the left hand is extended beyond the right shoulder. This maneuver will draw the officer's right arm tighter around the suspect's neck.

The Bar Arm Takedown and Control

In the event that the suspect is uncontrollable and the officer is unable to apply the modified carotid hold, the officer may have to resort to the bar arm to taken the suspect down [7]. The locked bar arm control is performed by gripping the left biceps with the right hand. At the same time, the officer bears down with the left and against the back of the suspect's head. The suspect is pulled down to a sitting position with the same maneuver as the carotid takedown and control. This technique is the same as the one method of hadakajime (naked choke-lock) used in judo.

It is important to point out that the police training manuals emphasize that the application of pressure must be stopped as soon as the suspect ceases resisting or goes limp. When a



FIG. 1—Carotid control hold. The right arm is wrapped around the suspect's neck between the throat and the carotid. At this point pressure is applied to the suspect's neck between the throat and the carotid artery with the lower forearm. (From the Training Bulletin, Los Angeles Police Department, May 1978, Vol. X, Issue 13, p. 2).



FIG. 2—Locked carotid control hold. The right arm is wrapped around the neck and the left arm is behind the neck with the left hand extended beyond the right shoulder—this will draw the officer's right arm tighter around the suspect's neck. (From the Training Bulletin, Los Angeles Police Department, May 1978, Vol. X, Issue 13, p. 4).

situation escalates to the point that a control hold is necessary to restrain and control a suspect, both the officer and the suspect are prone to injury. It is preferable to use persuasion and command presence to control a situation. When it does become necessary to apply a control hold, proficiency with the control holds described will help to restrain a combative suspect [7].

Discussion

The 14 fatalities presented were allegedly caused by "choke holds"; 13 by law enforcement officers, 1 by a student learning Vo et Vat, a Vietnamese version of judo. In the sport of judo, which started in 1882, no fatalities have been reported. Judoists are taught to apply shime-waza using the principle "maximum efficiency with minimum effort" [8]. The maximum pressure is applied directly on the "carotid triangle" without applying the pressure on other parts of the neck, causing unnecessary damage.

In all 14 cases, this author has noted evidence of injuries to the structures of the neck from bruises, ecchymosis, hemorrhages to fractures of the cartilage of the neck (Cases 1, 5, 10, 13, and 14), and intervertebral discs (Case 7). Submucosal or mucosal injuries are noted in the larynx in Cases 1, 2, 6, 11, and 13. All these findings indicate that tremendous force was exerted on the necks of the suspects.

If the carotid artery hold is properly applied, unconsciousness occurs in approximately 10 s (8 to 14 s). After release, the subject regains consciousness spontaneously in 10 to 20 s. Neck pressure of 250 mm of Hg or 5 kg of rope tension is required to occlude carotid arteries. The amount of pressure to collapse the airway is six times greater.

Anatomically, the anterior cervical triangle of the neck contains the superior carotid triangle (Fig. 3). The pressure can be applied to either side. The anterior cervical triangle is a triangle bordered by the sternocleidomastoid muscle (large neck strap muscle) laterally, the mandible (jaw bone) above, and medially by the cervical midline, a line drawn from the tip of

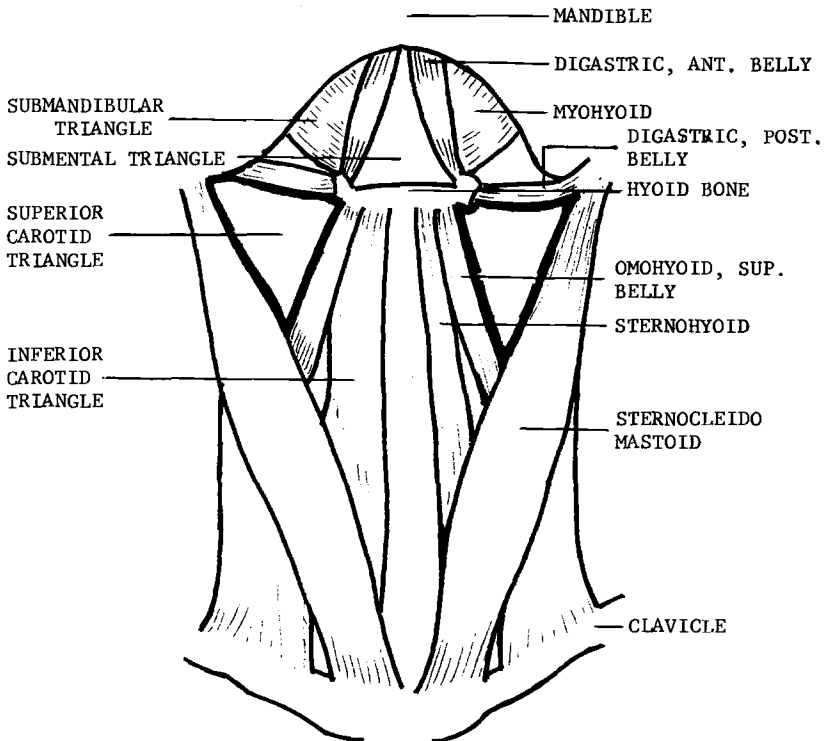


FIG. 3—Anterior triangle of the neck. The right or left superior carotid triangles are the areas where maximum pressure is applied. (From W. H. Hollinshead, Textbook of Anatomy, 3rd ed., Harper & Row, Philadelphia, p. 756).

jaw to the sternal notch. Within the anterior cervical triangle there are three smaller triangles:

- (1) submandibular (submaxillary or digastric),
- (2) superior carotid, and
- (3) inferior carotid (muscular).

In the technique of choking, the most important triangle is the superior carotid which contains important structures. This triangle is bordered by the stylohyoid and the posterior belly of the digastric muscle above, the anterior border of the sternocleidomastoid muscle medially. Within the superior carotid triangle are the common carotid artery and branches, the carotid bodies, internal jugular vein, vagus nerve and branches, superior laryngeal nerve, and the cervical sympathetic trunk (Fig. 4).

Overlying this superior carotid triangle is only skin, superficial fascia which usually are thin although there may be an appreciable amount of subcutaneous fat. Within the superficial fascia is an exceedingly thin (paper-thin) muscle, platysma muscle, which begins in the tela subcutaneous over the upper part of the thorax, passes over the clavicle (collar bone), and runs upward and somewhat medially in the neck and across the mandible to blend with superficially located facial muscles. The platysma muscle has no very important action, but will wrinkle transversely the skin of the neck and help to open the mouth [9]. This muscle does not protect the underlying vital structures.

Consequently, the amount of pressure directed to the superior carotid triangle needs to be no more than 300 mm Hg to cause unconsciousness in an adult. A female can, if the choke is properly performed, without great strength "choke out" a male twice her size (Fig. 5).

The state of unconsciousness, according to the investigators of the Society for Scientific Study in Judo, Kodokan, is caused by a temporary hypoxic condition of the cerebral cortex.

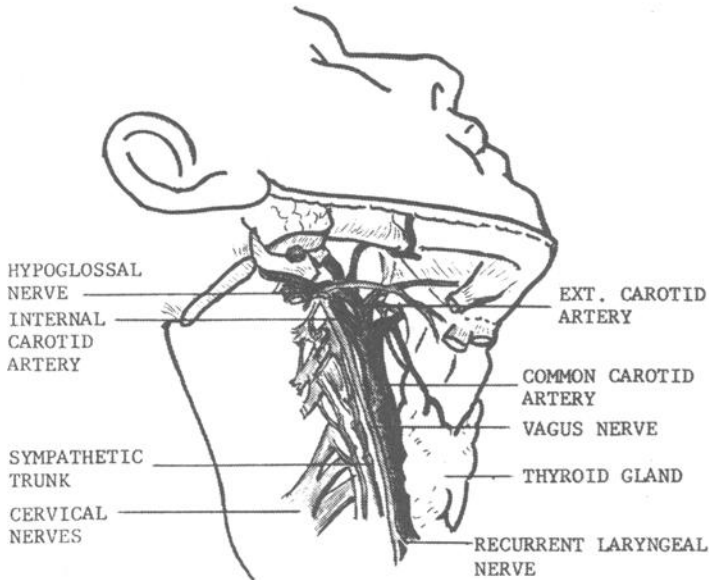


FIG. 4—Contents of anterior triangle of the neck. Structure in a deeper dissection of the neck exposing the carotid artery and its branches and the vagus nerve in the superior carotid triangle where pressure is applied for maximum effect. (From W. H. Hollinshead, *Textbook of Anatomy*, 3rd ed., Harper & Row, Philadelphia, p. 756).

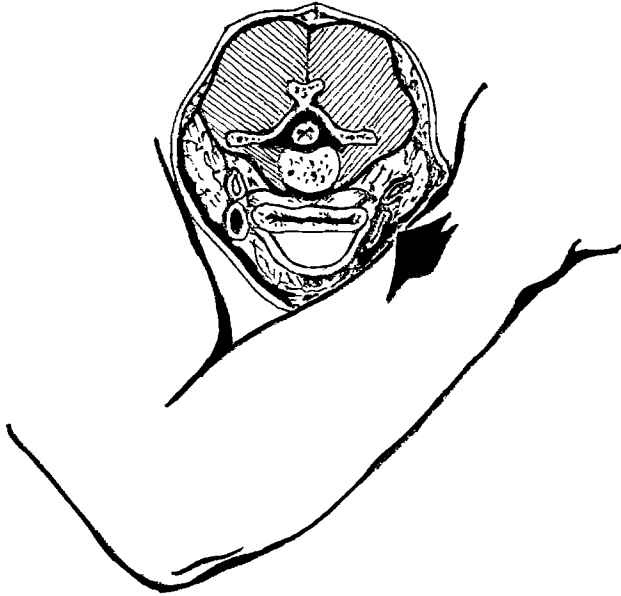


FIG. 5—Pressure on the superior carotid triangle. The pressure is applied against the neck structures of the superior carotid triangle by an into and upward motion by the forearm and wrist. (Modified by permission from Reay, D. T. and Eisele, J. W., "Death from Law Enforcement Neck Holds," The Journal of Forensic Medicine & Pathology, Vol. 3, No. 3, Sept. 1982, pp. 255-256).

In judo, the player holds the opponent's neck by his hands (forearm) or judogi, *the blood flow of the common carotid artery* is obstructed, but the vertebral artery is not obstructed. It has been confirmed that 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 often results in death. While unconsciousness (ochi) caused by choking (shime) in judo is a temporary reaction which incapacitates the opponent for a short while, its execution is quite harmless [10].

Experiments with human subjects and animals show the following effects from "choking":

1. Unconsciousness is due to lack of oxygen and by the metabolites created in the brain as a result of [10]:
 - a. Acute cerebral anemia by pressure on:
 - (1) common carotid artery
 - (2) occipital artery
 - (3) jugular vein
 - b. Shock, reflex action initiated on the receptor organ in the carotid sinus.
2. The appearance of flushing of the face because of the disturbances in pressure in the carotid arteries and jugular veins.
 - a. Decrease blood flow of the face shown by ultrasonic and laser-Doppler blood flow monitoring devices. The mean value is 89.4% with the lowest point in 6 s; after release return normal in 13.7 s [11].
 - b. Decrease oxygen saturation in blood in the helix of the ear by using an ear oximeter. Down from 95 to 86% and reach a minimum of 82% in 2 to 4 s. After regaining consciousness return to 90 to 92%. Sixty percent oxygen saturation in the brain causes unconsciousness [11].

3. Tachycardia, hypertension, and mydriasis (dilated pupils) are caused by stimulation of the sympathetic nervous system (vagus nerve). The systemic pressure rises 30 to 40 mm of Hg. After release the blood pressure returns to normal in 3 to 4 min [12].

4. In some cases bradycardia and hypotension occur while other cases show tachycardia and hypertension depending on the hypersensitivity of the carotid sinus and where the pressure was applied [12].

5. Cardiac volume decreases but the volume recovers in 10 s after awakening [13].

6. The peripheral blood vessels are also involved: dilatation of muscle vessels and constriction of skin vessels. In shock, accompanied by unconsciousness, bradycardia and hypotension are observed with dilatation of muscle vessels.

7. Choking acts as a stressor on the circulatory and hypophysio-adrenocortical system [14]:

- a. Decreased blood volume and increased plasma proteins as a result of increased permeability of blood vessels. This is similar to unconscious state following electric shock.
- b. No change in the hematocrit value or albumin/globulin.
- c. A temporary increase in eosinophiles, then after awakening, there is a decrease in number after 4 h.
- d. The 17-ketosteroids in the urine: 2 h after recovery, the amount is very much increased then gradually decreased (lasts 6 to 8 h).

8. The electroencephalogram (EEG): convulsions that appear in the unconscious stage are very similar to those of petit mal of epilepsy. No deleterious effects remained after the use of the choke hold. It is considerably less dangerous than a knockout in boxing [15].

Conclusion

The effects of carotid artery hold or shime-waza have been studied extensively. However, the use of this hold by law enforcement officers has resulted in deaths. The police department training manuals emphasize that control hold should be used only when necessary to stop a suspect's resistance and not necessarily to cause unconsciousness [7].

The enforcement officers, although trained, have great difficulty in subduing violent and uncooperative suspects [14]. Some suspects are under the influence of drugs: Case 3, acute heroin-morphine intoxication; Case 4, phencyclidine (PCP); and Case 9, acute ethanol and cocaine intoxication. These suspects may have had greater tolerance for pain, thus, making it more difficult to restrain them and to recognize whether the state of unconsciousness is due to drugs rather than to the restraining holds. In other words, these suspects were not cooperative.

In judo, the participants are taught to “choke” properly and in turn have been “choked” and have the ability to realize its effects before unconsciousness ensues. The officials, referee, judges, and coaches can recognize the player when he is “choked out” (becomes unconscious) [16]. If enforcement officers are to use the choke holds to subdue violent suspects as a last resort, they should be properly trained and supervised by trained certified judo instructors [17]. Then possibly there will be less misuse or abuse of the techniques of choking which when used improperly results in fatalities.

The number of fatalities resulting from the use of choke holds will decrease if the following procedures are followed:

1. Choke holds to be taught by trained and certified instructors:
 - a. to be familiar with the anatomical structures of the neck and where the pressure is to be applied (carotid triangle);
 - b. to know that physiology of choking, that only a small amount of pressure is needed to cause unconsciousness;

- c. to recognize immediately the state of unconsciousness and to release the pressure immediately;
 - d. to learn proper resuscitation methods if unconsciousness is prolonged; and
 - e. to prevent aspiration of vomitus and not to place the restrained suspect face down. Keep the subject under constant observation.
2. To revise police training manuals to emphasize the above procedures. These are the procedures and principles taught by judo instructors which have prevented deaths caused by shime-waza in the sport of judo for over 100 years.

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