Chapter 23
Methods of Ascertainment of Personal Damage in China

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Abstract This chapter illustrates the historical, judicial, and juridical framework of personal injury assessment and compensation in China, describing the expert's qualification and competences and detailing the ascertainment methodology and criteria of evaluation utilized for identifying, describing, and estimating any personal injury, its temporary and permanent consequences, and the causal value/link between the event and the injury and between the injury and the impairment/disability.

23.1 History and Outline of Forensic Medical Examination of Human Injury and Damage

China has a long history of forensic science. According to the existing literature, Chinese forensics can be traced back to more than 2200 years ago, and China was one of the first countries in the world to develop forensic medical examinations of human injury. In books dated 262–217 BC, there are descriptions on the examination methods of cadavers and living bodies and detailed field investigations, damage characteristics, and inferences of trauma-causing weapons; thus, it was during that time that forensic damage examinations began to take shape.

During the Han and Tang Dynasties (206 BC–907 AD), the ancient Chinese legal system was developed and improved. The provision made it clear that the forensic medical examination subjects were the sick, the dead, and the injured, which remained true up to the Qing Dynasty (1636–1912 AD). During the Song Dynasty (960–1279 AD), clear provisions were issued concerning the application of the examination, preliminary examination, reexamination, and exemption of examination based on the inherited examination system of the Tang Dynasty. At the time of the Song Dynasty, relevant official autopsy documents were issued,

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including an examination record form and the conclusion of the cause of death. In the Song Dynasty, injury examinations were taken very seriously, which was an important reason for the publication of "Collected Cases of Injustice Rectified." The Chinese forensic medical examination system during this period was the most advanced and comprehensive system in the medieval world, taking a leading position in world history.

The forensic medical examination systems of the Yuan, Ming, and Qing Dynasties basically inherited the provisions of the Tang and Song Dynasties, without adding any new measures that went beyond the scope of visual examination of cadavers. Due to the long-standing prohibition of doctors performing autopsies, the development of China's forensic medicine after the Song Dynasty was very slow and lagged behind that of the rest of the world in the nineteenth century. During the era of the Republic of China, physicians were allowed to perform examinations of cadavers and autopsies as well. In 1932, the Nationalist government established the "Forensic Institute of Justice and Administration" in Shanghai, the first forensic medical examination entity set up by the government in Chinese history; it is responsible for the forensic medical examination of difficult cases nationwide, the training of graduates from medical schools, and the appointment of medicolegal physicians to provinces and cities. In 1946, forensic offices were established in some police departments, such as the Shanghai City Police Department.

After the founding of the People's Republic of China, forensic institutions were gradually established in some of the medical schools and in the Public Security Organs (PSO), prosecution, and court systems. After 1958, most of these forensic institutions were managed by their respective system. After the Cultural Revolution, the PSO, prosecution, court, justice, public health, and university systems reestablished the forensic institutions based on the demand, in which four levels of examination institutions (central, provincial, municipal, and county levels) were established by the PSO, prosecution, and court systems and formed the present pattern of multilevel, multisystem, and independent institutions. From October 1, 2005 on, provisioned by the "Decisions on the management of justice examinations" issued by the National People's Congress, the court system stopped the forensic medical examination work. The PSO, prosecution department, and justice administration department managed the respective examination institutions and the examiners and conducted the qualification evaluation, annual assessment, and training of the examination institutions and the examiners within their respective departments. Over the last 20 years, there has been a rapid development at the examination level and research level of Chinese forensics examination and the forensic medical examination system, as well as the adoption of international standards.

23.2 Conditions, Qualifications, and Training of Forensic Medical Examiners

23.2.1 Conditions and Qualifications of Forensic Medical Examiners

In China, the forensic medical examiners are mainly classified as follows: (1) the personnel of the internal examination office established by the PSO and prosecution departments, who usually do not engage in external examination work but only service internal examinations within the department and (2) the professionals from the judicial examination institutions (e.g., hospitals, research institutes, and universities) who have been granted the accreditation of judicial forensic medical examination by the Ministry of Justice. Chinese laws and regulations also provide the qualification requirements of the examiners of forensic injuries.

Forensic medical examiner applicants should have a senior professional title that is related to the applied examination matters. For this type of examiner, there is no requirement of specific work experience because the prerequisite of obtaining a senior professional title ensures that the applicant must have significant work experience and solid theoretical knowledge and research ability; furthermore, as the senior expert in a certain field, the applicant's knowledge and prestige already adequately qualify them as an examiner.

Forensic medical examiner applicants should have the professional certified qualification that is related to the applied examination matters or at least a Bachelor's degree for the relevant specialties and must have engaged in related work for more than 5 years.

Those forensic medical examiners who have committed a crime, been criminally punished for a duty negligence crime, or been punished with expulsion from the public service and revocation of their registration are all banned from engaging in judicial forensic medical examination businesses.

23.2.2 Training of Forensic Examiners

23.2.2.1 Job Training

Job training refers to the learning and training activities that purport to enable the trainees to meet the requirements of the post of injury and disability examinations and the certification and to adapt to the demand of the job qualifications. The subjects of the job training are those who apply for the certification of injury and disability examinations and those who have obtained the certificate, but have still not independently practiced. The job training contents include the relevant governmental policies and guidelines, professional knowledge, relevant legal knowledge, professional ethics, professional discipline, and practice rules. The job training is

divided into preservice training and training for job transfers. Preservice training refers to the training of those who have not obtained the examiner's certificate and those who have obtained the examiner's certificate but have still not independently practiced. The training for job transfers refers to the training of those who have already obtained the examiner's certificate and have practiced and those who have not independently practiced. The trainees are mostly doctors from related fields or university teachers from the department of forensic medicine. The preservice training programs are formulated and implemented by the PSO, the Procuratorate, and the Ministry of Justice. The preservice training is conducted with the standardized training content, training requirements, training time, examination form, and certificate.

23.2.2.2 Continuing Education

Continuing education refers to academic education and nonacademic education of forensic medical examination practitioners to further improve their knowledge structure and ability to conduct their practice. The purpose of continuing education is to continuously improve the quality of expert services and professional and moral qualities and to achieve sustainable development. Continuing education is primarily aimed at new theories, new knowledge, new technology, and new methods in forensic medical examination. The continuing education implements the annual study hour system, which requires the examiner to participate in the continuing education program for not less than 40 h per year. The examination institution needs to submit the relevant evidence related to participation in the continuing education activities by examiners within the institution to the administrative department within the prescribed time annually; furthermore, they must record the study hours and store the data in the archive.

23.3 Techniques and Methods of Clinical Forensic Judicial Examinations of Human Injury and Damage

The techniques and methods of clinical forensic judicial examinations include the investigation of the case, the investigation of the injury, in vivo inspections, and laboratory tests. The problems to be solved by the clinical forensic judicial examinations are as follows: determination of the presence or absence of injuries, determination of the type of injury, inference of the trauma-causing weapon, determination of the time of the injury, determination of the consequences of the injury, in vivo skin scarring inspections, determination of the causal relationship between the injury and disease, and determination of the nature of personal injury and the formation mechanism.

23.3.1 Investigation of the Case

The main contents of the investigation of the case include the time, location, cause, involved people, injury-causing weapon, or substance. The main purpose of the investigation of the case is to clarify the nature of the injury (self-injury or injury by others) and the injury-causing mode (direct violence injury or indirect violence injury), which are critical to the clarification of the examination items and the legitimacy of the purpose of the examination items. In special circumstances, the forensic examiner can apply to authorized agencies, such as the PSO, prosecution, and court departments, to conduct an investigation on issues related to the examination and generate investigative records. Records of onsite investigation and other documents of the case provide important evidence to prove the incident and also the objective basis to indicate the feature exhibits, environment, timeline, and clinical manifestations of the examinee of the investigating case; furthermore, these records can provide valuable information to analyze the case and other specific issues combining the forensic medicinal in vivo inspection results.

23.3.2 Medical Records Collection

The injury investigation process is the process of collecting medical records. Medical records are also referred to as medical documents and provide the primary evidence for the clinical forensic medical examination with the following evidentiary values.

First, objective, timely medical records can prove the facts of the case. (1) The involved party seeks timely treatment at the time of the injury, which continuously and completely reflects the human injury case or traumatic incident. Although the nature of the case or the incident cannot be determined, the approximate time of the case (incident), injured body part, injury extent, and severity of injury can be clearly recorded. If, after the injury, medical help is not sought in a timely manner, even several days after the injury, the question of whether the injured party has secondary injuries derived from other circumstances is often raised in trauma cases and is prone to generate controversy. (2) The medical records document the facts of the injury, which is not only a part of the case but also provides an important scientific basis of the description of the facts by third-party professionals who have neutral, impartial legal efficiency; additionally, the records supply standardized, detailed, timely, and long-term storage of the facts.

Second, comprehensive and detailed medical records can indicate the degree of the injury. Medical records document the diagnosis and treatment processes and contain the detailed interrogation records (the family history, medical history, personal history, drug history, allergies, and other social relations of the examinee), physical examination, auxiliary examination, differential diagnosis, and treatment of trauma (e.g., treatment plan and surgical records). Many injuries have

contemporariness and non-repeatability and cannot be reproduced afterwards, such as the degree of injury-induced hemorrhagic shock, breathing difficulties, and non-missing injuries of internal tissues and organs. Therefore, the record on the degree of the injury in the medical records is sometimes the only evidence to determine the final result of the examination conclusion. In addition, the medical records of the hospitalization and the medical records from multiple hospitals can be used to determine changes in the degree of the injury in the examinee through dynamic analysis and help analyze the causal relationship between the traumatic incident and the consequences of the injury.

Third, accurate, intact medical records can be used to determine the consequences of the injury. In China, whether it is judicial examination institutes at various levels, forensic medical examination entities sponsored by universities, or privately run forensic medical examination organizations, the vast majority do not have the specialized equipment to complete the relevant tests on the examinees. Thus, when assessing the extent of the injury, especially in grading the disability level, the forensic medical examination organization needs to combine the records in the medical documents and delegate the examinees to qualified, competent physicians to conduct the specialist examination. The inspection report is issued by the hospital, and the current consequences of the injury are drawn by the forensic examiner by comprehensively considering the medical history and the current status of the examinee. Next, the degree of the injury and the level of the disability are evaluated according to the provisions of the relevant standards. Therefore, medical documents are critical to forensic medical examination practice.

23.3.3 Identification Time of Human Injury and Damage

Forensic medical identification should be based on the original damage inspection, and records should be completed as soon as possible in relation to the damage. It should test after clinical medical treatment; forensic medical identification could be applied in 3–6 months after injury in principle. In China, the statute of limitation time of the compensation of personal injury is about 1 year. Therefore, the duration of forensic medical identification is generally not more than 1 year. Of course, special injuries, which have been treated, but still not healed, such as treated limb fractures that do not heal within a 1 year or that are combined with other complications (chronic osteomyelitis, bone nonunion, etc.) should be exempted.

In general, identification time of brain and spinal cord injuries should be completed between 6 and 12 months after injury; identification time of appearance effect or damage should be completed between 3 and 6 months after injury; identification time of spine and pelvis damage should be completed between 3 and 6 months after injury; identification time of eye and ear damage should be completed between 3 and 6 months after injury; identification time of limb fracture should be completed between 4 and 6 months after injury. If the internal fixation is still present in relation to limb fracture and influences the functioning of the limbs,

the identification should be completed 1 month after the internal fixation has been removed.

23.3.4 In Vivo Inspection

The main purpose of in vivo inspection is to verify the injury of the examinee through the processes of the investigations of the case and the medical history and to assess whether the medical treatment of the injured examinee should be terminated; furthermore, the inspection aims to examine and evaluate the tissue and organ dysfunctions derived from the traumatic incident in the examinee. In contrast to clinical patients, due to the psychology of revenge or compensation claims, the examinee sometimes intentionally exaggerates the injury or fakes dysfunctions in their limbs and organs in the in vivo inspection process. This situation requires the examiner not only to have rich experience to seek the truth and discard the falsehoods but also to identify fraud and malingering through special detection tools or methods when necessary.

23.3.4.1 Requirements of In Vivo Clinical Forensic Inspections

Following the principle of seeking truth from facts, the subjective and objective physical signs derived from the primary injury to the human body and the surface injury, limb deformity, defect or dysfunction and other complications caused by the injury or sequelae are subjected to comprehensive, careful inspection to provide evidence analysis for the examination conclusions; typically, local photographs are taken to fix the evidence. The measurement instruments used in the inspection must be tested and calibrated in accordance with the state standards. When inspecting the body of a female subject, the examination should be performed by a female forensic examiner; if a female forensic examiner is not available, it can be performed by a male forensic examiner, but the procedure must be attended by female staff and a family member of the examinee. Examinations based on the consequences of the injury should be conducted after completing the clinical treatment, in principle, 3–6 months after the injury is inflicted.

23.3.4.2 Clinical Forensic In Vivo Inspection Items

In China, a comprehensive clinical forensic in vivo inspection includes: (1) general aspects, such as height, weight, and secondary sexual characteristics; (2) a surface inspection with descriptions of the location, shape, size, color, and texture and other characteristics of abrasions, contusions, and skin scarring; (3) a brain examination that includes the cranial nerve, sensory function, motor function, reflex, skull fracture, brain injury, and brain injury-derived sequelae; (4) inspections of eye

and ear injuries; (5) inspections of neck injuries, such as larynx, trachea, and esophagus injuries; (6) inspections of the chest, such as rib fractures, lung injury, and cardiac insufficiency; (7) closed and open abdominal injuries and injury-derived sequelae; (8) inspections of pelvic and perineal areas for pelvic fracture, pelvic vital organ damage, and reproductive system damage; (9) spinal fracture and dislocation; and (10) fractures, dislocations, damage to important nerves, and vasculature of the limbs and joint dysfunction.

The above described clinical forensic in vivo inspection items can be selectively assessed in focus according to the case, the examination item, and the site and nature of the injury, but items that impact the examination conclusions should not be omitted. When performing the inspection on the examinee, the examiner can invite a specialist physician with a senior professional title to assist, but the examiner must be responsible for the inspection results that serve as the basis for the examination.

23.3.4.3 Forensic Clinical In Vivo Inspection and Record

The human body damage inspection and record is an important process of forensic medical identification. It involves the inspection of damage to patients by a legal medical expert in order to find the nature, the location and degree of damage, the cause and mode of the damage, as well as other important information. An effective record of this valuable information is attained by reviewing the appraisal opinions.

Skin Damage

Skin damage is divided into skin abrasions, contusions, sharp device, and scalp avulsion injury. For the different skin damage, the damage location, shape, color, area, injury, bleeding, blood loss evaluation, local swelling, presence of foreign bodies, and presence of combined fracture should be inspected and recorded. For the formation of damage, the important features of location, shape, length, width, depth, the edge shape, wall, horn, bottom, and cavity of wound should be observed upon inspection and recorded.

Skin Scar

Skin scar includes superficial scar, hyperplasia scar, keloid scar, atrophic scar, and cupped scar. The legal medical expert should pay more attention to the location, length, width, area, shape of scar, subcutaneous tissue adhesion, presence of pigmentation, the effect on adjacent tissues and organs function, etc. during the inspection of the body surface. Meanwhile, during the inspection, it should be ascertained whether the wound has been stitched and whether there is a presence of secondary infection during scar healing. For irregular scar measurement,

transparent film records can be utilized and then the irregular skin scar area can be calculated with computer software.

Skin Pigment Change

Skin pigmentation is mainly due to the skin melanin cell activity increase or melanin cell populations. Skin pigment loss is mainly due to the decreased melanin cell activity or melanin cells caused by reducing the number. As for skin pigment changes, both in pigmentation and pigment loss, the position and size of such changes should be inspected and recorded. If necessary, transparent film records can be utilized and then the irregular skin scar area can be calculated with computer software..

Nervous System Inspection and Record

The nervous system inspection and record mainly relate to sensory function, motor function, and nerve reflex.

Sensory function mainly includes light touch, light pain, temperature sense, deep feeling, and the cerebral cortex. The above sensory function evaluation utilizes cotton swabs, pins, a cold and hot water tube, and a tuning fork. The patient undergoes a series of tests and is questioned concerning his/her related reactions and perceptions.

Motor function examination is performed mainly through the test of muscle strength, muscle tension, muscle atrophy, and coordinated movements. According to the range of motion of limbs and gravity resistance, muscle strength is divided into six levels (0–5), according to the paralyzed parts can be recorded as: monoplegia, hemiplegia, paraplegia, quadriparesis, and crossed paralysis.

Nerve reflex examination includes shallow reflex, deep reflex, pathological reflex, and autonomic nervous function. Abdominal wall reflex, testosterone reflex, anus reflex, and plantar reflex belong to light reflex. Biceps reflex, triceps reflex, radial reflex, knee reflex, and the achilles tendon are deep reflex. The inspection results of shallow and deep reflex are recorded as follows: normal, weaken, or disappear. For the central nervous system damage, the legal medical expert should pay special attention to check the Babinski sign, Oppenheim sign, Chaddock sign, Gordon sign, and Hoffmann sign. The inspection results are recorded as follows: negative, positive, or weakly positive.

Autonomic nerve function mainly includes the skin scratch test, the sphincter function test, the starch iodine test, and the ninhydrin test. The skin scratch test evaluates vasomotor reflex and can be used to position the reference of nerve injury. The sphincter function test mainly includes the test of bladder sphincter function and anal sphincter function, mainly used to determine early spinal shock or the degree and scope of horsetail nerve damage. The starch iodine test and ninhydrin test are used to evaluate the sweat function of the skin

Important Parameters of Limb Measurement and Record

After the healing of limb fractures, in the process of forensic medical identification, the legal medical expert should measure and compare limbs' length on both sides, including the length of upper arm, forearm, leg, thigh, and calf, which must be measured using in the same method. The length of corresponding limbs can differ by about 1.0 cm.

Nerve injury patients usually have nerve muscle atrophy and, therefore, it is also necessary to pay attention to the diameter of corresponding limbs.

After extensive damage to the soft tissue, different degrees and ranges of skin scars are usually present. In the process of damage identification or disability rating, it is necessary to measure the surface skin scar as the percentage of total body surface area. At this time, an accurate measurement of surface skin scar area is very important. Usually, the scar area can be calculated using computer software. The Chinese adult body surface area calculation formula is as follows: surface area (m^2) $= 0.0061 \times$ height (cm) $+ 0.0128 \times$ weight (kg) $- 0.1529$. The body surface area calculation formula for Chinese children is as follows: surface area of child's weight 30 kg(m^2 = weight(kg) $\times 0.035 + 0.1$, surface area of child's weight $\leq$30 kg(m^2) = 1.05+(weight-30) $\times$ 0.02.

23.3.4.4 Evaluation Method of Dysfunction After Injury

In China, the evaluation of dysfunction of human body injury or damage mainly focuses on the visual and auditory functions, men's sexual function, and body movement function, and in these research fields, there are several designated laboratories in the Institute of Forensic Science, Ministry of Justice, P.R. China.

Evaluation of Visual Function

In damage identification and disability rating, the degree of visual dysfunction often needs to be evaluated, and according to the visual dysfunction, the degree of damage and level of disability are determined. Therefore, it is necessary to ensure that the results of the visual function test are reliable and give objective, accurate, and reliable results concerning the identification of visual dysfunction.

In China, the evaluation of routine visual function inspection includes central vision, far vision, near vision inspection, diopter inspection, vision detection, and false blind test. Evaluation of visual function via electrophysiological testing mainly includes the electro-retinogram and the visual-evoked cortical potentials. These detection methods are mainly used to evaluate the structure and function of the visual system. In particular, the visual cortex-evoked potential is not only used to evaluate the visual system structure and function but can also be used to check visual acuity test results.

Evaluation of Auditory Function

In damage identification and disability rating, the degree of auditory dysfunction often needs to be evaluated, according to the auditory dysfunction, so as to determine the damage degree and level of disability. Therefore, it is important to ensure that the results of the scientific auditory function test give objective, accurate, and reliable results in relation to the identification of visual dysfunction.

In China, the evaluation of detection methods mainly include pure tone hearing threshold measurement, acoustic immittance test, auditory-evoked potential test, and distortion product otoacoustic emissions. The pure tone hearing threshold measurement requires to pass through more than two times after testing according to the results of comprehensive evaluation; acoustic immittance test, including drumtype immittance testing, acoustic reflex threshold (stapes muscle acoustic reflex threshold) test, and acoustic attenuation measurement test. The test report should include at least tympanum figure type, middle ear function evaluation, and acoustic reflex threshold. The auditory-evoked potential test includes auditory brainstem response, 40 Hz auditory event-related potential, an electrocochleography test, and auditory steady-state response; distortion product otoacoustic emissions due to pure tone hearing threshold changes have forecast the effect of hearing changes and is of great significance for the differential diagnosis of after cochlear deafness.

Evaluation of Male Sexual Function

Penile erectile dysfunction (ED) of males is not uncommon in forensic medical identification. In China, there are forensic medicine appraisal standards in relation to male sexual dysfunction. ED detection methods contain pudendal nerve-evoked potential, corpus cavernosum hemodynamic examination, endocrine function test, and penile erection test. The pudendal nerve-evoked potential test includes sacral reflex latency, spinal pudendal-evoked potential, cortical pudendal-evoked potential, cortical motor-evoked potential, spinal motor-evoked potential, and penile sympathetic skin response. The corpus cavernosum hemodynamic examination includes sponge injected vasoactive drugs test, Doppler Ultrasound examination, after injection of vascular active drugs using doppler ultrasound detection of blood flow to the penis, color Duplex Ultrasonography, and performance (perfusion) sponge imaging. The endocrine function test is mainly used to measure blood testosterone, shortness of follicular hormone and luteinizing hormone, prolactin, and to determine hormone estradiol levels. The penis erection scanning and audiovisual sexual stimulation test determine penis hardness and change in size.

In China, the forensic identification of ED within the knowledge of neurological ED, vascular ED, secretory ED, drugs, sex ED, psychogenic ED, and the differential diagnosis of mixed ED. Neurological ED and vascular ED are mostly types in forensic medical identification.

Evaluation of Body Movement Function

Measurement of neck and waist motion activity is a basic examination in forensic medical identification, because these measurement results correspond to the degree of damage and the specific clauses in the disability grade appraisal standard, and it will directly affect the scientific and objective identification. The angles of neck and waist motion measurement include six directions of movement, respectively: forward bends, after stretching, left and right bend, and the left and right side rotation. Usually, by comparing the measured results with normal results, the loss percentage of neck and waist motion measurement could be calculated.

The measurement of limbs joint movement activity includes shoulder, elbow, wrist, hip, knee, and ankle. By measuring the activities of the damaged joint, divided by the motion of the normal results, then multiplied by the weight coefficient (the weight coefficient of shoulder, elbow, and wrist are 0.7, 0.12, and 0.18, respectively; the weight coefficient of hip, knee, and ankle are 0.6, 0.28, and 0.12, respectively). Finally, the function loss of single limb movement can be calculated. But the degree of limb movement function loss is not completely equal to limb joint function. Peripheral nerve injury can cause body muscle loss, but does not effect the passive joints movement activity. Based on this, joint movement activity and muscle strength are used as indexes to evaluate the joint function. At the same time, they are used in order to make up for reliance on computing loss of mobility of joint function, and the method of scoring according to the calculated results directly is adopted to evaluate joint function loss ratio.

23.3.5 Laboratory Tests

Laboratory tests are part of the in vivo inspection to examine and evaluate the examinee's organ function through special techniques or equipment in the in vivo inspection process. In China, common forensic clinical laboratory test items include radiographic examinations (e.g., X-ray, CT, and MRI), ultrasound imaging tests (e.g., B-mode ultrasound and color ultrasonography), and neuron-evoked electromyograms (e.g., visual-evoked potentials, auditory-evoked potentials, somatosensory-evoked potentials, and motor-evoked potentials), based on which the examiner makes an objective assessment of the visual, hearing, male sexual, and physical functions after the traumatic incident in combination with the primary injury in the examinee.

Because the reliability of the inspection results of visual and hearing functions relies on the technical proficiency of the examiner and the level of cooperativeness of the examinee, the examiner should be very careful to use the inspection report provided by the medical institution; furthermore, it is usually required that the inspection performer, who is specialized in the aforementioned professional field, has the basic proficiency of analyzing the inspection report. In examination practices, in addition to the fact that medical institutions with a high technical level

should be selected to perform the test, it is also encouraged to appropriately increase the number of repeated tests when necessary to ensure the accuracy and reliability of the test results.

23.4 Standards of the Clinical Forensic Judicial Examination of Human Injury and Damage

23.4.1 Overview of the Assessment of the Extent of Human Injury and Disability Level

In China, the extent of human injury and disability level assessments are two important components of the clinical forensic judicial examination.

Here, the extent of injury includes major injuries, minor injuries, and slight injuries, the assessment of which provides evidence for the trial of criminal cases. At present, the assessment of the degree of injury in the clinical forensic judicial examination is conducted in accordance with "The appraisal standards of the degree of human injuries" jointly promulgated on January 1, 2014 by the Supreme People's Court, the Supreme People's Procuratorate, the Ministry of Public Security, the National Security Agency, and the Ministry of Justice of the People's Republic of China.

In China, the examination in civil cases of the injury incident is mainly based on the forensic assessment of the level of disability and the work loss period, rehabilitation period, and nutrition period (the "three-period" examination). The disability level examination provides the basis for the court to decide the civil liability and civil compensation. The contents of the examination include the assessment of the disability grade of road traffic accidents, work injuries, medical malpractice, and the "three-period" examination after the injury. At present, the standards of the examination of the disability grade and the "three-period" examination include (1) GB 18667–2002 "Assessment of the disability grade of injuries from road traffic accident" (national standards); (2) GB/T 16180–2014 "Assessment of the work ability—Assessment of the grade of work injuries and occupational diseases" (national standards); (3) "Assessment of the disability grade from medical injury (malpractice)" (ministerial standards); and (4) GA/T 1193–2014 "Provisions of the assessment of the loss of work period, rehabilitation period and nutrition period after personal injury" (the industry standard). In addition to the assessment of the common anatomical structure and physiological dysfunction of the injured party, the examiner also needs to evaluate the causal relationship between the disability grade and the primary injury based on the standard "Provision of forensic medical examination of injuries and diseases" (SJB-C-6-2009, ministerial provision) compiled by the Institute of Forensic Science of the Ministry of Justice.

23.4.2 Assessment of the Grade of Disability of the Injured in Road Traffic Accidents

In China, road traffic accidents refer to injuries that happen to vehicle drivers, pedestrians, passengers, and other persons in the road and road traffic activity-related persons. The standard of the grade of disability assessment of the injured is based on "Assessment of the disability grade of injuries from road traffic accident" (national standard), which consists of five chapters. Chapters 1–3 are mainly about the scope, definition, and general principle of the assessment, Chapter 4 covers specific items of the grade of disability, and Chapter 5 discusses supplementary provisions, which are the supplementary remarks on the relevant issues in the assessment process to facilitate the implementation of the standard.

"Assessment of the disability grade of injuries from road traffic accident" is the standard that is specifically applicable to disability evaluation of the injured from road traffic accidents and divides the degree of the injury into 10 levels, from level 1 (100 %) to level 10 (10 %), based on the condition of the injuries from road traffic accidents. Each of the levels is arranged based on the order of brain, spinal cord, and peripheral nerve injuries, head and facial injuries, spinal injuries, neck injuries, abdominal injuries, pelvic injuries, perineal injuries, and whole body skin injuries. The standard has two appendices, of which Appendix A explains in detail the grading basis of disability in each of the injury levels and Appendix B provisions the comprehensive calculation methods and specific formulas of the compensation for multiple disabilities. The calculation method calculates the actual amount of compensation for the victim based on the total amount of disability compensation, the liability coefficient, and the compensation index. For those who are injured with multiple injuries, the disability level of the most severe injury is used as the basis of the compensation, with each additional disability injury, a certain compensation proportion is also added, but the total compensation proportion of the additional compensation cannot exceed 10 %. Therefore, in the evaluation of the disability derived from road traffic accidents in China, it is necessary to assess the disability level of each of the injuries on the victim's body.

23.4.3 Examination of the Work Ability, Disability Grading of Work-Related Injuries, and Occupational Diseases

In China, the evaluation of disability from work-related accidents requires the forensic medical examiner's judgment of the loss of work ability (disability degree) and the degree of self-care impediment (care level) after the worker suffers from a work-related injury or occupational disease based on the relevant medical examination and the national standards. The assessment of the disability level of work-related accidents is conducted based on the four aspects of organ damage, dysfunction, medical dependency, and care dependency, which are divided into five

categories by "Standard for identifying work ability—gradation of disability caused by work-related injuries and occupational diseases" according to the relationship between the clinical specialties and disciplines: (1) neurology, neurosurgery, and psychiatry; (2) orthopedics, plastic surgery, and burn unit; (3) ophthalmology, otolaryngology, and dentistry; (4) general surgery, thoracic surgery, and genitourinary unit; and (5) occupational medicine. According to the above five categories, the disability levels of work-related accidents are divided into 572 terms of the 10 levels based on "organ damage, dysfunction, medical dependency, care dependency, and mental disorder," with level 1 as the most severe and level 10 as the mildest. Victims with disability levels 1–4 have entirely lost the ability to work, those with disability levels 5–6 have lost most of their work ability, and disability levels 7–10 have partially lost their work ability. Work-related disability assessments should be performed after the completion of the medical treatment; in the case of multiple injuries or the coexistence of injury and disability, the injuries and the disabilities should be individually assessed based on the examination standards. When the levels of the multiple disabilities are different, the most severe level of disability is used to grade, and the level can be upgraded when there are more than two disabilities that have the same grade; however, this upgrade is limited to one level above. The assessments of the medical and care dependencies are performed based on the circumstances after the level of disability is determined. The evaluation of the mental disorders needs to be performed by qualified professionals of forensic psychiatrics. When assessing the level of disability, the effect of the original injuries and diseases on the consequences of the new injury and the causation should be taken into account.

23.4.4 Assessment of the Disability Level of Medical Injuries (Malpractice)

In China, assessments of disabilities derived from medical mistakes must first assess the medical malpractice, in which the forensic or medical doctors determine the liability after the investigation of the case, the autopsy (in mortal cases) or physical examination, laboratory equipment inspections, inspection of the medical history documents, and listening to the testimony of witnesses and the statements of the involved parties and family members. The relevant clinical medicine experts in the medical malpractice related field are consulted; combining the opinion of the clinical experts, the forensic doctor (examiner) assesses the facts regarding whether there is medical malpractice and whether a causal relationship between the medical malpractice and the consequence of the damage exists. In some cases, the court may require the forensic doctor to provide the contribution proportion of the medical malpractice-caused damage in the total consequences of the injury.

At present, there is a lack of a nationally unified assessment standard for injuries and disabilities caused by medical malpractice in China; therefore, in civil cases of

medical injury, the damage and disability caused by medical malpractice should be assessed according to the standards "Standard for identifying work ability—gradation of disability caused by work-related injuries and occupational diseases" and "Assessment of the disability grade of injuries from road traffic accident."

23.4.5 Assessment of the Work Loss, Rehabilitation, and Nutrition Periods

The rest period refers to the time period that is required for the injured to be cured (clinical symptoms and physical signs disappear), generally recognized by clinical medicine after treatment, also known as the work loss period in China. During the rest period, the injured cannot engage in normal work, study, and other activities. The rest period includes the treatment period and rehabilitation period. The treatment period refers to the time the victim spends in hospital for clinical treatment until being clinically cured, which is generally based on the time of hospitalization. The rehabilitation period refers to the time period for which the injured needs the care of others, as required by the needs of treatment and rehabilitation after the injury, which generally starts from the time of injury to the time the injured acquires self-care capability. The nutrition period refers to the time period after the injury when a normal daily diet cannot fully meet the requirements of the body's recovery, and special diet and proper nutrient supplements must be supplied. After the injured party is clinically stable, the nutrition supplement can be stopped.

23.4.6 Analysis of Causal Relationship Between Injury and Disease

In damage appraisal and disability grade appraisal, the analysis of the causal relationship between injury and disease is usually required. Actually, it is the analysis of the causal force between external injury factors and the consequence of the damage. In accordance with the "classification of the international function and diseases," in the course of forensic clinical identification, the casual force is divided into six kinds of circumstances, namely, no effect, slight effect, secondary effect, same effect, primary effect, and complete effect, and use degree of participation to quantify casual force. The specific methods are: (1) No effect: there is no causal relationship between external injury factors and damage consequence, the degree of participation lies 0–4 %, the average value is 0 %. (2) Slight effect: there is an indirect causal relationship (incentive form) between external injury factors and damage consequence, the degree of participation lies between 5 and 15 %, the average value is 12.5 %. (3) Secondary effect: there is an indirect causal relationship (auxiliary form) between external injury factors and damage consequence, the

degree of participation lies between 16 %~44 %, the average value is 25 %. (4) The same effect: there is critical relationship between external injury factors and damage consequence, the degree of participation lies between 45 and 55 %, the average value is 50 %. (5) Primary effect: there is a direct causal relationship between (primary form) external injury factors and damage consequence, the degree of participation lies between 56 and 95 %, the average value is 75 %. (6) Complete effect: there is a direct causal relationship between external injury factors and damage consequence, the degree of participation lies between 96 and 100 % and the average value is 100 %.

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Below are listed some general bibliographic sources useful to deepen the issue. They are not reported within the text as they are no cited references.

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