

## Chapter 2

# The Holistic and Systematic Approach in Legal Medicine

Santo Davide Ferrara, Gian Aristide Norelli, and Riccardo Zoia

**Abstract** After an overview of the subdisciplines and topics pertaining to bio-medicolegal sciences at an international level, the chapter illustrates the need for a systematic and holistic approach for the ascertainment and evaluation of personal injury and damage.

Modern evidence-based medicine is moving toward a preventive, predictive, participatory, and personalized model of diagnosis and therapy. Bio-medicolegal sciences, following that trend, must increase precision, objectivity, and reproducibility in data/evidence collection procedures, consider the injured and damage person as a “unique” entity, and personalize the description and evaluation of any impairment, disability, handicap, and other nonpecuniary losses causally related to the damaging event. The medicolegal contribution to compensation for personal damage must look for the deepest and most complete representation of the components of a person. A holistic view does not consider the person as a sum of parts but rather a complex ensemble requiring interpretation and medicolegal representation for forensic application purposes. The challenge to face is thrilling and involves drawing maps of a new geography of knowledge, to identify the pathways and destinations to restore order, aware that the coming evolution must preserve the medicolegal tradition, while rebuilding a new system of quality and values.

---

S.D. Ferrara (✉)

Department of Legal and Occupational Medicine, Toxicology and Public Health, University-Hospital of Padova, Via Falloppio 50, 35128 Padova, Italy  
e-mail: [santodavide.ferrara@unipd.it](mailto:santodavide.ferrara@unipd.it)

G.A. Norelli

Department of Health Sciences, Forensic Sciences Section, Institute of Legal Medicine, University of Florence, Largo Brambilla 3, 50134 Florence, Italy  
e-mail: [ganorelli@unifi.it](mailto:ganorelli@unifi.it)

R. Zoia

Department of Health and Biomedical Sciences, Section of Legal Medicine, University of Milan, Via Luigi Mangiagalli 37, 20133 Milano, Italy  
e-mail: [riccardo.zoia@unimi.it](mailto:riccardo.zoia@unimi.it)

The strange flirtation between “reality and the impossible,” precisely that of the postmodern era, brings us back to the celebrated phrases of two thinkers who have considerably influenced Western culture.

One, circular, incontestable, and insidious, is from Hegel: “what is real is rational, what is rational is real.” The other, ineffable as it is elusive, is from Lacan: “The real is the impossible.” Taken individually they leave one perplexed. In relation to the first, an attempt has been made and continues to be made to fashion a “sense” of life and events that is mirrored in a solidity that appertains to time and its securities—with tradition and with common sense. It answers a deep need for harmonization, both individual and collective.

The other gives voice to the unexpected that manifests itself continuously in our lives, which can render life a marvel, although this is not often the case.

In particular, in recent years, one has been subjected to the dual pressure of a rationalized world reduced to manageable and imaginable figures, in programmatic plans on the one hand, and, on the other, to a continuous form of “impossible bubbles” that rupture such plans. The unexpected is around the corner, but, as such, we know neither how nor when it will manifest itself, on the condition that it will do so in the end. The “real is the impossible” even when it is institutionalized, following the figure of the inexplicable. As if to say that one does not understand that such an occurrence is perhaps unacceptable, and yet it occurs, shuffling the cards of a game which is in itself “real.”

Rationality and the impossible are involved in a continuous flirtation with one another. Thus, the rational impossible will give place to the irrational impossible that is life itself, of which in the end one knows very little. We know that it is and we traverse it with love and apprehension, as in a dream. What is required of us, in the challenge of accelerating events, is a great degree of elasticity between rationality and openness to the new, without defending the first at all costs or fearing the second. It is up to us to interpret the patterns which make up the kaleidoscope of the world, with common sense and the ability to invent new solutions to new problems, which is after all the weapon that over the millennia man has used in the face of every impossible challenge.

Real and impossible, never a fatal “flirtation” in which the systematic and holistic approach of the bio-medicolegal sciences is included, in the scientific search for innovation and education, as well as in the assessment and evaluation of personal injury and the related damage.

The growing need to resort to medicolegal services, both in relation to issues of harmfulness regarding individuals or the community and those related to medical malpractice, confirms the shared opportunity for the recognition of an international dimension (and not only) of legal medicine, to be pursued through a process of unification of the characteristics specific to its specialization; for this reason it is necessary to carry out a critical review of the operational model adopted so far, on the basis that the increasing complexity of the tasks and functions of legal medicine implies the need to restrict medicolegal activity to those who provide proof of specific skills and competencies.

To this end a common model of specialist expertise must be sought, with a common characterization in each country, analogously to that of forensic pathology, toxicology, genetics, or psychopathology.

The reference is to what might be termed general legal medicine, including that area defined by many as clinical legal medicine, which should be aimed at the consideration of personal injury in the various juridical areas (criminal, civil, public health) as well as the most specific aspects of those circumstances that the damage itself may determine (such as professional liability) in addition to the assessment of causality. Belonging essentially to that part of the forensic disciplines that, in the absence of a precise systematization and specialized denomination useful for identifying the content with precision, comes to be considered as a sort of “no man’s land,” which everyone, therefore, for various reasons, can sometimes inappropriately, represent.

Considering the national legislation, by way of example and thus incompletely, although in a manner sufficient to grasp the dimension of the issue within which it is called to operate, one observes straightaway how the organizational model is distorted in each individual country, thereby conditioning, in fact, the diversity that seems to permeate the medicolegal component of culture and activity. This diversity, however, is perhaps more apparent than real, since one can find, at the international level, a kind of common denominator for every specialized expertise of a medicolegal nature, aimed at the expression of a final product (as it is for pathology, toxicology, psychopathology, the odontology/forensics), applicable to every level and adaptable to the persistent evaluative differences that emanate from individual international laws.

This, moreover, is what has largely already been achieved and continues to be achieved ever more effectively, for other forensic disciplines of a more strictly biological matrix: for which the search for shared organizational and operational methods in general is the rule and has permitted the promotion of methodological guidelines which have provided a substantial unity to the subject, although maintaining, in the individual operating models, the diversity and individuality that emanate from the different national laws. Such an experience, moreover, cannot be considered foreign to the intentions of the International Academy of Legal Medicine (IALM), which has already moved in this direction by developing guidelines regarding the approach to cases of malpractice, in the same way as for medicolegal ascertainment in injuries, also due to distortion trauma of the cervical spine, and for psychic and existential damages.

A synoptic table (Table 2.1), partial and for merely illustrative purposes, however, seems useful in order to define the aforementioned preconditions in some European countries.

There can be no doubt that the scientific and cultural base of those more closely biological disciplines of the forensic matrix has for a long time been, in the broadest sense, the expression of the same language, inspired by guidelines and international protocols and supported by common and shared intentions. This is a demonstration of the fact that in each medicolegal discipline there can exist a unitary model, derived from the characteristics of the datum and the methodology useful for

**Table 2.1** Synoptic preconditions

France	United Kingdom	Germany	Spain
<p><u>Permanent functional deficit</u> (<i>déficit fonctionnel permanent</i>)</p> <p>“the reduction of stability of physical, psycho-sensorial or intellectual potential deriving from damage to anatomical-physiological integrity, medically objectifiable and appreciable from an adequate clinical examination completed by appropriate additional studies, in addition to painful phenomena and the psychological impact normally associated and described in everyday life”</p> <p>It is expressed as a percentage on a scale from 1 to 100% in which each appeal court assigns a monetary value as an increasing function of the rate of disability and a decreasing one according to the age of the victim</p> <p>– <u>Damage to the quality of life</u> (<i>préjudices d'agrément</i>) compensates the suffering arising from the inability to practice specific future activities/sports, arising from the loss of smell and the ability to walk, to procreate, to carry weights, etc.</p> <p>– <u>Permanent aesthetic damage</u> (<i>préjudices esthétique</i>)</p>	<p><i>General Damages</i> represent the main item of nonpecuniary losses and include damage relating to pain/suffering (“<i>pain and suffering</i>”) and impaired quality of life (“<i>loss of amenity</i>”).</p> <p>They are expressed in a lump sum, without categorization, on the basis of the previous judgments</p> <p>For the calculation various factors are considered, such as the age of the injured party, sex, preexisting health condition, and effects on social life, such as the inability to play sports or engage in other pastimes, the loss of one of the five senses, the impairment of sex life, marriage prospects, vacations, etc.</p> <p>[The Judicial Studies Board Guidelines for each injury report a specific range of compensatory amounts for reference purposes, including both “pain and suffering” (“moral damage” in its broadest sense) as well as any other potential item of “nonpecuniary” damage]</p> <p>– <u>Loss of congenial employment</u></p> <p>Specific item of damage constituted by the possibility that the injured loses, as a</p>	<p><i>Schmerzensgeld</i> comprehensive figure of the “nonpecuniary” damage, to which are traced all the consequences, in terms of loss of income, of the accident</p> <p>In quantifying the <i>Schmerzensgeld</i>, the judge must take into account the followings.</p> <ul style="list-style-type: none"> <li>– The severity of the injuries</li> <li>– The age of the victim</li> <li>– The intensity of the pain</li> <li>– The loss of the possibility to practice hobbies or recreational activities</li> <li>– Possible changes in personality</li> <li>– The loss of a sense</li> <li>– Psychological consequences (anxiety, depression, etc.)</li> <li>– Loss of marriage prospects or sentimental relationships</li> <li>– Loss of the professional possibilities and earning capacity (further to the effective pecuniary loss)</li> <li>– The possibility, unpredictable at the time of the sentence, of future aftereffects</li> <li>– The significance of a preexisting damage</li> <li>– Factors dependent on those responsible for the damage</li> </ul> <p>(a) The degree of fault or intent (ordinary negligence involves a lower amount of</p>	<p>Permanent invalidity (<i>Incapacidad permanente</i>), with reference to <i>daño corporal</i> or “any impairment of the psychophysical integrity of the individual that interferes or threatens the health of the injured party, both organically and functionally”</p> <p>This is evaluated on the basis of the Baremo: it provides, firstly, the establishment of a <u>base point</u>, defined as <i>Indemnización básica</i>, which considers</p> <ul style="list-style-type: none"> <li>– Physical or functional sequelae of injury, such as limited mobility, loss of function, amputations, persistent pain, etc., together with the connected psychological-moral consequences (the table provides a scale of 0–100 invalidity points for each impairment with a range of possible oscillation of about 8 points)</li> <li>– Aesthetic damage, specifically assessed on its own with a scale of 1–50 points</li> </ul> <p>The quantification of the economic base point will depend on the number of points of invalidity and the age of the injured</p>

(continued)

**Table 2.1** (continued)

France	United Kingdom	Germany	Spain
<p>– <u>Damage to sexual function</u> (<i>préjudice sexuel</i>)</p> <p>– <u>Damage to the possibility of establishing a family</u> (<i>préjudice d'établissement</i>) loss of hope and the opportunity to practice a normal project of family life (get married, start a family, raise children, etc.) due to the severity of the disability</p> <p>– <u>Damage connected to evolving pathologies</u> (<i>préjudices liés à des pathologies é volutives</i>) such as the reduction in life expectancy of a person infected by HIV</p> <p>– <u>Permanent exceptional disability</u> (<i>préjudices permanents exceptionnels</i>)</p>	<p>result of the accident, rewarding and fulfilling employment</p> <p>– <u>Loss of marriage prospects</u></p> <p>This is not an item of damage in its own right but is evaluated as an increment the compensation of general damages (for impaired quality of life), and damage to the reproductive organs has a specific item in the JSB guidelines</p>	<p>compensation than that involving malicious intent)</p> <p>(b) His/her economic level (a civil lawsuit must not compromise excessively the economic state of the responsible party)</p> <p>(c) The potential degree of kinship between tortfeasor and the injured party (a wife suing her husband will see a reduction of compensation)</p> <p>(d) Delayed payment (e.g., by promoting useless legal actions and remedies)</p> <p>The social condition of the injured party has no significance</p>	<p>Besides the base point, a further item of damage to be calculated in the compensation of the <i>daño corporal</i> are the so-called <u>factors of correction</u> (<i>Factores de corrección</i>): additional amounts of damage are established (encroaching into pecuniary compensation) based on the net loss of income of the injured party and of particular circumstances related to impairments (e.g., the need for assistance from a third person, transportation costs, costs for medicine and rehabilitation, moral damages suffered by the relatives, cost of adapting homes or vehicles, etc.)</p>

acquiring it, diversifying only its model of application, which must necessarily take its inspiration from the single national precept.

And it is in such a sense, in our view, that the term “holistic” should be interpreted, for a methodology to be shared at the international level and also to be pursued for general legal medicine, not only in terms of professionalism but also in terms of research and teaching, so as to arrive at a body of subjects on which it can develop the comparison, in full respect of the rules that guide scientific research; and for postgraduate training, a highly individualized professional specialization is outlined for general legal medicine, as has long been the case for other bio-medicolegal and forensic disciplines.

In considering the complex issue of the medical approach to factors of damage in humans, only at the beginning of the discussion on some essential aspects of this topic, it is very important to point out that the concept of personal damage is a reason for further investigation and medical research in every field of scientific study on individuality; the study of humans, in all their conditions as single individuals, is a type of analysis that, in addition to the specialized aspects of

clinics, conceives of a person as a psychologically and physically unitary and inseparable entity, with their components and within their cultural and social context. This is a prevalent object of medical science derived from the contemporary orientation of research and widely shared by the scientific community.

The concept of prognosis itself (“*quoad vitam*” or “*quoad valetudinem*”) clearly represents a technical parameter that constantly shapes, even and particularly at the present time, the methods of analysis and the meaning of the results of applied biomedical science studies, the issues of clinical indication for medical treatment, and all scientific studies aimed at human biological knowledge required to deal with human health and to preserve it as much as possible, in addition to every line of research assessing the cost-benefit ratio of different treatments.

These concepts represent, when considered in the specialized study of forensic medicine (analysis of a person as a complex but unitary psychological and physical entity by the law), an essential foundation of the bio-medicolegal disciplines since their earliest origin and are constantly emphasized in the present time.

In different systems, “legal and forensic medicine” research and the study of personal damage have always considered, of course, the point of view of civil law; in all its utterances, the law provides traces of a path that becomes due reference for forensic medicine; nonetheless, medicolegal studies have sometimes inspired jurisprudence in critical steps of its history. They have always considered as an essential line of their complicated evolution the aspiration to obtain a representation of human reality as complete as possible while being aware that neither constant reproducibility nor unconditioned predictability belongs to human reality. These assumptions, today shaping many directions of applied research within the whole of contemporary medicine, have always been valid, even in the medicolegal sciences.

In damage analysis, the holistic view of a person represents the awareness for which a unit does not simply derive from the sum of parts but is, rather, a complex ensemble requiring interpretation and medical representation for legal application purposes.

According to a purely medical view, compensation for personal damage could be defined as a factually unattainable goal; the field linking biomedical knowledge and law is “legal and forensic medicine,” whose tasks are the identification of benchmarks in the dynamics of scientific knowledge and the supply of representational tools to better approach the target.

Thus, the field of scientific medicolegal research in its section related to the assessment of personal damage needs to be enhanced, restarted, and supported to find more appropriate and comparable assessment tools (Table 2.2).

Regardless of any legal systems of reference, the conceptually difficult, but essential, problem for a medicolegal consideration is the object of medical appreciation of personal damage. This means the identification of the fields of research and study that must be addressed in order to obtain necessary parameters for the detection of personal damage. An issue predominantly qualifying this cultural and technical theme, it requires a definite clarification and is even, in medical terms, independent from legal jurisdictions. Namely, it is a medical problem that then must contribute and adapt itself to different legal systems. In fact, in a holistic

**Table 2.2** Scientific medicolegal research assessment and personal damage

Personal damage as the focus of contemporary medical research			
EBM			
A person as a complex and unitary system		A person in the holistic concept	
Prognosis	Clinical indications	Benefit-cost ratio	Treatment of non-amendable conditions
Medicolegal research			

approach to the assessment of personal damage, it firstly becomes important to identify components and methods for understanding a person in their individuality in the deepest and most complete way.

Evidence-based medicine provided a systemic cultural contribution that, on the one hand, dramatically transformed the categories of certainty and probability in human biology and, on the other hand, allowed us to go into the investigation of the components of a person that, though not completely unexplored, had been surveyed with a criteria of analysis not functional to a medicolegal application, i.e., search for evidence and degree of data reliability. Further, it allowed a better definition of the external components and factors influencing a person considered as an anatomical and physiological entity in their life context.

The medical contribution to compensation for personal damage cannot pursue a different direction from that of the scientific approach and the related tools typical of general medicine investigation. This means that medicolegal studies have no technical and cultural alternatives to those of looking for the deepest and most complete representation of the components of a person.

It is a central orientation, representing the foundation of developing medicolegal research guidelines on personal damage: historically, they could also influence law and jurisprudence, and in the future they must play an increasingly central role in keeping pace with the times and in enhancing the lines of scientific research on personal damage (Table 2.3).

Thus, in the field of medicolegal research about personal damage and the tools for its evaluation and representation, dignity and autonomy do exist: it can be said they go beyond and are independent of the issues of legal systems.

The first consequence of these fundamental considerations is the incompatibility of a model on indemnity for all parameters concerning the medical assessment of personal damage in civil reimbursement. Each indemnity system is based on parameters of medical quantification and of representation of human functions, as well as of the measurement of anatomical and physiological components, which are conventional, fixed, preordained, and invariable, i.e., in contrast with the definition itself of “personal damage” in its broadest and harmonious medical meaning. In any case, although the purpose of a medical ascertainment is to arrive at a correct diagnosis, the medicolegal aim, unlike that of clinical medicine, focuses on distinguishing, among the infirmities, those of a spontaneous nature from others that are not. Within the latter, regarding the component of damage that is relevant for our purposes, it is sometimes necessary to emphasize infirmities that would be

**Table 2.3** Components of personal damage

Components of personal damage
Highlighted data from general medical research
↓
Person/environment relation
Medicolegal research
Application of significance and quality of data as a proof
Integral perception of a person

marginal in clinical terms (e.g., modest aesthetic impairments) or to consider, in addition to the need to take into account the possible competition of the infirmities (spontaneous or not), the significance of the resulting impairment on the various activities of the person (lucrative and non-lucrative).

In the ascertainment methodology lies the “core” of what was defined as the holistic perspective of medicolegal action, in the sense that the methodology of the ascertainment must move from the consideration that each type of injury deserves to be collected and defined, not limiting itself to the evaluative contingency in which one finds oneself operating. In other words, and without limitation, any medicolegal report should include a detailed description of the injury and disability including data on, their potential usefulness and characteristics of pain (measured according to a defined scale) or discomfort that come with injury or the quality of life, irrespective of the consideration that the single legislation reserves to them, as elements of damage deserving of a specific value (as is the case, e.g., in France) or to be considered within other predictions of a compensatory valence (as is the case, e.g., in Italy), where the moral component and the existential are not equipped with autonomous characteristics of damage but are to be encompassed within extra-patrimonial biological damage.

The expression of an ascertainment methodology shared at the international level appears to be, furthermore, the interpretive key for a unique model of culture and scientificity that gives life to the medicolegal tradition, redirecting it toward a typified specialist profession, which does not only have to compete as a very professional operation but also where education and scientific research are the appropriate apex, like any other discipline within science, reserving for them a supranational level in terms of role and interest.

The maximum objectivization in the collection of the data and the highest reproducibility in its utilization ensure the scientific nature of the subject as an essential prerequisite to systematic research on the subject and the ability to define rules, necessary for a correct diagnosis as well as for the educational standardization of practices; having as its final aim the closing of a complex circle, for which one arrives at the training of professionals through the definition of a common methodology, the application defines and qualifies the expertise of the one who is required to apply it.

This line of reasoning, then, can only tend toward the definition of the expert, to be considered as the professional who, beyond self-referentiality or demonstrations of experience, is both the bearer of the recognized title which recognizes him/her as



possessor of the method that, based on standardized rules of acquisition of evidence, renders the model of reasoning objective, interpretable according to the scientific definition. The expert, in other words, is so at the time when he/she is able to proceed with the acquisition of the data, according to an ascertainment criteriology that is subject to the shared methodology, in addition to, obviously, being able to proceed to the definitive summary (evaluation of damage). It seems clear that (and this is embodied in one of the major difficulties regarding the transfer from theory to practice of the above premise), according to the indications arising from national regulations, the expert must be formed in reference to the need to translate into the practice of the country of origin that which stems from indications of a supranational character (think, e.g., as regards Italy, the complexity of assessment that is derived, for the same claim, by the intersection of the compensatory regulations of civil liability with that of private insurances and social security).

What is necessary to the state, therefore, is to strive to determine whether there is a common pathway in the training of the expert in general legal medicine, equipped with cultural characteristics, of a scientific and professional nature, helpful in the fulfillment of his/her requisite duties.

The situation, as is known, is quite varied at the international level. Just looking at Europe, one notes that while there is a substantial identity for the forensic disciplines in terms of training elements and programs as regards the most typically biological characterization, one cannot say the same for general legal medicine. In Spain, for example, the preparation on the subject of assessment of personal damage is reserved to an intensification (*Valoracion of dano corporal*) of the specialization in general legal medicine oriented toward “clinical forensic medicine”; in France there exists a university degree with theoretical course and practical work (120 and 30 h, respectively) in “*Réparation juridique du dommage corporel*,” with diversified paths depending on the activities that should be provided as part of the assessment; in the UK it lies with the individual clinical specialist to draw up the certification, according to which the attorney will measure the claim; in Italy any doctor-surgeon or dentist can prepare certification evaluations, with priority given to the specialist in legal/forensic medicine who follows, moreover, a 4-year course which should render him/her an expert in all forensic disciplines.

It would be appropriate, therefore, for legal medicine to move toward a substantial uniqueness of training and scientific programs, so that, at least at the European level, specialists could be trained who have the quality and qualification of truly professional “experts” in the field of general legal medicine, that is, bearers of that apparatus, complex and structured, of culture, experience, and scientificity that must everywhere be requested of the “Qualified Expert” for each medical discipline.

General legal medicine, then, will finally be able to provide a culture of “evidence,” like any other sister discipline, specifically to be understood as the ability to render objective any given particular, acquired according to a specific ascertainment methodology, subject to unambiguous interpretation on the level of causality, measurable in terms of statistical occurrence and, on that of evaluation,

with or without the provision, for the latter, of the application of barèmes of reference.

The prevalence of technical guidelines, inspiring the evolution of medical thought in the contemporary age and radically marking the cultural development of sciences applied to the protection of human health (evidence-based medicine), has witnessed the emergence of a prevailing direction: acquisition of data that aims, in a prospective and controlled way, at exploring and verifying what operational direction, for each case with its own characteristics, is more correct so as to preserve the utmost individual integrity, prevent factors of damage, and assess the quality of life in consideration of every personal physiological and pathological aspect.

Awareness of the complexity of a system such as a “person,” i.e., an entity with no possible comparison in nature, has more and more increased. On this basis, the holistic view confirms itself as the very essence of the principles to be proposed so that the study of any person by “legal and forensic medicine” be complete and responsive to contemporary demands; these have shown that sectoralization can only be a step aimed at contributing to global value acquisitions, which can then be referred to people according to their individual characteristics.

It is not coincidental that all multidisciplinary scientific production of medical clinical research continuously urges us to understand the biological and psychological interconnections of the human being in the diagnostic, therapeutic, rehabilitative, and prognostic aspects in each sector of study and investigation, on the lookout for “evidence” in medicine. Evidence constantly refers to principles such as “quality of life index,” “social relations,” “impairing impact,” “functional disability,” and so on, which urgently demand objects of directed study and of medicolegal assessment and research. The bio-medicolegal sciences themselves require a deep commitment toward innovation. If we accept as an applicative tool the standardization of preestablished parameters (as occurs in most indemnity fields) that includes a line of demarcation and evaluation limits as well as detailed elements of representation, the need to represent a strictly individual reality, as unique and complex as the aims of the general clinician studies in a holistic perspective are, will fail.

There is no doubt that orienting the system of compensation for personal damage in public liability toward parameters similar to those of indemnity expresses the will to make social systems as predictable and controlled as possible, especially from the economic perspective. Though being admissible parameters with valid reasons, they should not influence medical thinking, both in its research profiles and its way of self-development and practical application.

Distinctly, notwithstanding the need for a description of the elements defining the idea of personal damage in due public liability, even the etymology of the term expresses its more typical meaning starting from the medical lexicon [*sarcio* (latin) = heal, get back in shape; and in the broadest sense = compensation, mending; “*etenim sarcire est integrum facere,*” S.P. Festo in *De verborum significatione*].

In a medical and, in particular, medicolegal perspective, this premise is essential as a basis of the meaning of research, the praxis regarding personal damage, and the objective of its assessment. We are witnesses to the justifiable fact that, in many

legal systems, in terms of a cash settlement for damage, there is an attempt to consider fixed parameters that are capable of interpreting a medical assessment in a predictable and consistent way; however, this aspect should not affect any medical configuration of the assessment, i.e., the object of medicolegal research and the evaluation of an individual for compensation.

When, as in any compensation, the different aspects of human pathology are beforehand established in their method of quantification, the perspective of personal and individual reality no doubt acquires a subordinate value, and even its study is limited within determined boundaries. On the contrary, when the objectives of medical study and assessment are issues such as reparative compensation and the restoration of a preexisting reality, albeit evolutionary, then the perspectives of scientific analysis completely overlap those of all biological and clinical research that cannot compromise on invariably considering human reality as primarily unique and individual. This is the only fundamental medical principle that can support the concept of assessing personal damage in relation to compensation.

The scientific content of the analysis, object of a specific professionalism, should include and describe: (a) the content and purpose of the ascertainment; (b) the methodology useful and necessary for the performance of said ascertainment.

As regards the first aspect, in general terms it can be said that in every country, regardless of the relevant legislation, general legal medicine, in particular regarding the model of damage assessment, identifies itself through conditions not dissimilar from one another, although combined according to different modalities that are essentially represented by the functional-anatomical basis of the infirmity, the consequences of which reverberate on the various aspects of everyday life understood both in terms of the expressivity common to everybody and of that of the individual or, finally, in the context of interpersonal relationships. Everywhere, in fact, the damage to be assessed seems to express itself in similar categories, which can be more or less emphasized according to the relevant regulations, admitted to or excluded from compensation or indemnity, however, in a model of professional practice, which is uniquely connoted. Whether it is called *Déficit Fonctionnel Permanent*, *General Damage*, *Schmerzensgeld*, *Incapacidad Permanente*, or *Danno Biologico* or considered in a descriptive form or anchored to barèmes of reference, the model is always inspired by a “biological” component of damage (extra-patrimonial or, however, denominated) to which must correspond an economic service (indemnity and/or compensation) supplemented by expressions characterizing the individuality of the particular case (existential component, moral component, etc.) and in relation to which no implication concerning the ability of the injured party to produce income is considered. Alongside this form of damage, the other component is identified, by contrast measured in relation to the earning capacity of the person and the past and future costs, the need for which has been induced by the injury (pecuniary or, however, denominated).

It seems implicit, then, that the forensic pathologist, by necessity equipped with a profound knowledge of the doctrinal bases of the discipline, must be able to move within the ascertainment of causality between the harmful event and the relevant

antecedent (human or work related) provided that the consideration of the infirmity and its corresponding assessment cannot be separated from its etiopathogenesis. This is true regardless of the evaluation system in which one operates, given that, whether it is a system of subjective liability or no fault, the traceability or lack thereof of the event and of the consequent damage to a specific genesis must always and everywhere be ascertained. The nature of the bodily damage, has to be demonstrated in medico-legal terms for the proper conclusion of the ascertainment. This is what makes and marks the difference between the medicolegal and the clinical ascertainment.

The idea of personalization of damage is stated in different legal systems in an approximately schematic way. In numerous systems it is considered as an asset, i.e., related to criteria of adapting a compensation amount to the peculiarities of a person. Clinically, it is the concept that undoubtedly shapes the medical approach toward a deep understanding of how and to what extent a person changed, or more precisely that *particular* person, on account of an unfair event. The medical assessment of personal damage as part of compensation in public liability can only be based on the complex personal and individual analysis. This analysis must derive from a repeatable method and use shared and motivated parameters while being based on the need to understand a reality that is individual and therefore unique.

These are criteria of medicolegal clinics to be established just before considering their practical application.

In this field, independence of medical knowledge and action is certainly not a simple issue, considering that in this area different legal elements are implied: it is no coincidence that it is always important to declare if there is a principal or any interest at stake in relation to one's work in the field of personal damage. However, true scientific research on the inspection and evaluation of damage can only be wide ranging in order to obtain substantive knowledge of all clinical aspects that may affect the injured person; it is essential to further identify the methods implied in formulating judgments, which may depend on legal or political elements external to medical research (Table 2.4).

From the history of medicolegal doctrine, we clearly derive the categories describing individual offense: the factors determining personal damage. They are the outline for progressive study in the field of legal medicine: (1) *cause of injury*, (2) *injury*, and (3) *impairment*, requiring a qualitative specification.

Preliminary elements are cause of damage (external etiological factor capable of acting in a non-purposive way on human biological structure) and injury (detritmental modification of human physical and mental state expressed by the effects of the damaging cause); the study of these factors can be considered methodologically comparable to the general parameters of medicolegal research and assessment.

In the logic of compensation, the study of "impairment"—temporary and permanent—represents the most difficult field because it involves, unlike all indemnity systems, dealing with each single case for the systematic representation of a person as an individual damaged entity.

**Table 2.4** Damage indemnification and compensation

Indemnification	Compensation
Indemnity and private insurance	Assessment of personal damage
Fixed parameters	Personalization
System rigidity	Individual evaluation
Impairment TABLES	Indicative barèmes

In the context of the biomedical sciences, the paramount goal of legal medicine is “to discover the truth and state the justice,” this being achieved by applying proper, particular “systematics.” This, defined as “methodology of ascertainment” and “criteriology of evaluation,” aims at acquisition of the objectivity of the datum and its translation into proof, if possessing the characteristics of evidence and irrefutability; epi-critical interpretation, aiming for evaluative conclusions of a diverse nature; and finality. “Systematics” capable of encompassing and unifying multiple budding, whose gradual innovation and sometimes pervasive extension has led to the generation, development, and definitive consolidation of disciplines such as forensic pathology, forensic genetics, forensic toxicology, forensic psychopathology, criminology, and forensic anthropology, as well as that of many other sectors of study, to in-depth investigation, which have yet to be consolidated in further disciplines. This tumultuous disciplinary budding process has led to a loss of unitariness in medicolegal knowledge, with an incurrent risk of a fall into an irreversible fragmentation and the impoverishment of the said knowledge, no longer nourished by cultural products of high interdisciplinary value. It is evident, in fact, that knowledge is enriched not through highly specialized sophistication but also, and above all, through interdisciplinarity.

The preservation of unitariness and the enhancement of the value of evidence in bio-medicolegal knowledge depend upon the implementation of quality systems, based on continuous education, shared guidelines and protocols, internal quality control, and proficiency testing systems, which, in turn, aim at the certification and the accreditation of institutions and individual professionals. The realization of this long-standing process finds a rational foundation in a context of a broad “critical mass,” such as that existing in the international medicolegal community and, in particular, in the European one, characterized by a cultural affinity, yet differentiated in its structural, organizational, functional, and operative features, where interdisciplinary and supranational innovations may lead to a wide methodological and criteriological harmony.

Observing some of the main general fields of applied research in biomedical sciences, we can find a perfect accord with the areas required in relation to medicolegal research when studying personal damage.

Briefly, we can identify research on (1) biological and clinical aspects relating to the causes of damage (e.g., cellular changes following external stimuli, effects of traumatic factors on the anatomical components under all possible conditions, etc.); (2) clinical circumstances that require mastery of biometric knowledge (e.g., duration of survival related to an impaired context, aspects of deterioration in

**Table 2.5** Determinants of personal damage

Determinants of personal damage		
Cause of injury	Injury	Impairment
		Temporary and/or permanent
Personalization research		
Identify categories representative of a person	Optimize medical examination	Study for standardization and repeatability of criteria of medical assessment

respect to a therapy, etc.); and (3) relevant factors of the detrimental individual changes, static or developing (link between psyche and soma, individual pathological changes compared to a preexisting personal condition, etc.).

All these areas should adopt scientific work for the evaluation of a person's impairment in a more pragmatic way than ever before (Table 2.5).

Therefore, there is an essential reason for clarification, which is an unequivocal prerequisite to any further introductory consideration.

Which personal categories can interest the medicolegal activity and are to be studied in order to obtain an assessment on impairment with the purpose of repairing damages? This is a key element for which medicine has a triple role. (a) Identify what, according to its knowledge, is of essential importance in the representation of a person: this has a further function of social and political contribution and is a source of inspiration for legal development. (b) Identify, understand, and update the methods of investigation on humans. (c) Search for shared methods and criteria to make consistent and repeatable assessments.

It is obvious that all possible medical components of personal damage provide a perspective of research and assessment. It is also true that the patrimonial aspects of a negative personal impact of an injury and impairment, according to the medicolegal point of view, necessarily originate from an assessment based on the comparison between a biological reality detrimentally changed and monetary consequences.

A principle of the medicolegal assessment of emerging damage consists in considering the necessity and justification of costs (individual, institutional, or social) already incurred or to be incurred in the future, in agreement with a clinical judgment of adequacy with respect to market parameters or to the political and social criteria of healthcare organization.

The damage due to loss of profit also needs a clinical assessment customized according to a real and present business activity, comparable to concrete economic parameters and current income paradigms; this is accomplished according to legal principles common in most national laws whose greater or minor evolution of social systems of compensation is the variable resource for a complete consideration for compensation. In this area, the medicolegal task is an extremely delicate issue even for those aspects that can be defined as "prospective." It coincides with the importance of assessing from a medico-legal point of view the limitation of future resources rather than of current ones, an assessment which is particularly difficult but fundamental in the case of young (i.e. unemployed subjects), of permanent

limitations in the attitude to profitable activities different from the actual practice carried out according to a biological and cultural individual reality. This is because such an assessment is expressed according to concrete employment prospects of a socioeconomic reality, to the reduction or loss of a prospective increased income even in the same productive sector, due to biomedical interruption or limitation of applicable physiological resources.

All aspects are based on the solely medicolegal perception and assessment of the individual reality of a person in their patrimonial components.

But the most complex field in terms of scientific and applicative structures relates to nonpecuniary damage. And the interest and paroxysm from most political and legal systems do confirm it. All these functions and categories have an evident impact on present and future legal, political, and social systems. In fact, as already mentioned, one of the most acute problems constantly posed by the law on the international scene of the Western world is precisely that concerning the “totality” of indemnity in relation to personal damage in case of offense, a problem that can even have macroeconomic implications and for which medicolegal involvement plays a necessary and indispensable scientific role.

The route traced within the last 50 years of Western world history by nonpecuniary damage, especially in some countries, is precisely represented by the following evolutionary line: the attempt to identify points of convergence between legal configuration and the increment in knowledge proposed by biological sciences in the understanding of a person as a system.

As for the Italian experience, “biological damage”—in the meaning of devaluing a person in their integrity, i.e., as a global and unique entirety in their static and dynamic components—was at first a disturbing concept, problematic to implement, but certainly carrying developments which consider a concept of human beings more appropriate to a medical vision related to current and future occurrences.

Medicolegal research and its deriving thought are marked and associated with such a development in a qualifying and unquestionable way. In this scientific and cultural dynamic, the most relevant issue was the real medical forensic function assumed by the medicolegal acquisitions: a progressive improvement in knowledge and principles adding to and pushing for jurisprudential orientations that may be more consistent and relevant to a reality and that may increase the basics of legal dynamism as a parameter of representation and of social organization.

It is possible, to all intents and purposes, to define the scientific-legal progress as well as the applicable results of biomedical and anthropological social research as a collective improvement. And there is evidence of the parallel evolution of general scientific aspects, medicolegal contribution, and jurisprudence development, namely, in the fact that most Western legal systems have recognized human physical and psychological integrity itself as an indemnifiable category. It is a fact accepted by the majority. Finding ways to standardize assessment is an important objective. However, one principle is essential: the fundamental aspect of personal damage is, first, to identify how and to what extent an individuals’ anatomical, physiological, psychological, and physical reality has changed temporarily and permanently, considered in itself, even irrespective of all aspects of its

relationship with the world, i.e., in a static aspect. This is the first nucleus expressing the need for a holistic conception. Its roots originated from the history of medicolegal research and reached us: a person should not be considered as a collection of separate parts but as a complex unit that cannot be partitioned and that is the result of articulated components. All barèmes for indemnity purposes oriented to this result show a clear approach for which a unit is a set of interactive features that go beyond mathematical boundaries and that must always be modulated by a competent medical contribution: they can never have absolute value (as it could be in a compensation) but can be the basis of an assessment of the static and average reduction of psychophysical integrity as an expression of general medical knowledge. For this reason they are but guidelines and should be considered in dynamic terms over time (in parallel with changes in medical knowledge); it is a task of medicolegal research to establish reference values which are variable, with clinical knowledge, scientific acquisition, and evolution of human sciences.

The objective of medicolegal research is to find some common points on the basis of controlled observational results to identify levels of *static reduction* of various human components working as starting points for an assessment. Aiming at an international homogeneous reference points is surely correct, although, in a comprehensive and holistic vision of a person, absolute indications of graduation whose scientific justification is not recognizable are clearly inadequate. Therefore, the analysis must be based on wide, compared, and flexible epidemiological and ergonomic evaluations in order to understand what reference in the quantification of a psychophysical reduction can work as the most relevant and shared assessment indicator. This is certainly based on parameters that can be proposed in a repeatable manner, influenced by the analysis of all anatomical, functional, mechanical, metabolic, and physical variables, in full analogy with criteria of research in any field of medical sciences.

Further, there occurs the most delicate problem regarding *dynamic components* for which an even more individual expression is needed. On this aspect the most complex conceptual differences are observed, which are often influenced by legal reasons and by what is implied in economic terms while asserting them. This is inevitably relevant because it is linked to social and economic contexts, to the organization of the collective welfare system, and to the value of money and its purchasing power, but it should not paradoxically affect the principle of representation of the biological reality of a person.

If the components actually affecting the personalization of an impairment of mental and physical integrity are considered from a medicolegal point of view, it becomes evident that, from the clinical side, all preconditions for their detection are given. Legal and forensic medicine must reaffirm and always bear them in mind while approaching the assessment of personal damage. The particular political and legal systems of different nations may decide to make them subjects of compensation, or not, as well as to vary their criteria: what concerns medicine is recalling their existence, studying their methods of assessment and quantification standards, and always considering them as methodical principles and obligations of a correct and complete clinical assessment.



The first concerns modifying the static aspects according to age, gender, and preexisting conditions. This is part of the “biological component” of a person in terms of everything pertaining to their being. It is the first real moment of customization compared to quantifying directions based on a static arrangement. What matters here are all individual physiological and pathological variables, the essential foundation of a global vision of a person from the clinical-functional perspective. One of the goals of making the international systems of assessment homogeneous is to understand whether the reproductive and sexual functions and the aesthetic component of a given impairment are to be considered as separate domains of quantification rather than components of a medical assessment always included in the biological psychophysical integrity of a person.

When a holistic orientation is accepted as the foundation of the medicolegal approach in personal damage, both sexual and aesthetic components are no doubt regarded as full components of the biological reality of humans and thus evaluated with respect to their integrity and with full rights as components of a complex unit. Therefore, they undergo all of the peculiarities of each single component that needs to be varied according to the person.

The second are the existential, i.e., dynamic relational, components specific of a person derived from psychophysical impairment. Research on nonpecuniary components of humans, which goes beyond the static or dynamic psychophysical impairment and their role in compensation, has prompted important areas of investigation. In history, limitations in personal fulfillment within the extra-employment environment were considered even in nonmedical studies, and it is an issue that for the purposes of compensation clearly represents the need to consider a person in global terms. Soon a principle was set by which, when negative effects on these functions are determined by an unfair anatomic-physiological lesion, forensic skills are called upon to express themselves and are required for data acquisition, modulation of judgment, qualification, and quantification of the phenomenon. This is a matter in complete harmony with the cited epistemological and cognitive orientations of medicine. It is a complicated theme with potential fragile elements. For this reason certain systems may not accept it or subject it only to certain requirements.

The problem concerning proof, economic consideration, and areas of application can also be beyond medical competence. However, it is important to note that when an impairment of the psychophysical integrity gives rise to these circumstances, the role of a medicolegal assessment is unavoidable. Even this sector of medicolegal research should be enhanced, as it is a task of forensic medicine to identify cases in which it truly realizes itself, the best tools of description and graduation as well as shared benchmarks. Similarly, it can be said of the study of pain, suffering, and adaptation to new conditions as components of a harmful pathological route. These are categories of study and representation in broad areas of algological, pain management and subjective variation research that, deepening its individual psychobiological mechanisms, proposes ways of inquiry that go through the interactions among metabolic processes, psychodynamic changes, cultural and historical, as well as those linked to relational subjects.

The result is a scenario that seems to consist of several components of a person, but they are all connected by a common denominator: human health. This is the central value that medicine protects and that “legal and forensic medicine” should help to affirm as a key element in personal damage indemnification while constantly studying the tools for a repeatable evaluation of impairment due to an unfair act.

All of the above confirms that, among all medical sciences, forensic medicine is the proper and specific field of analysis, research, and operations of the sector. The indisputable interface with law and jurisprudence (in terms of mutual influence) shows what knowledge and training are specific and indispensable for this purpose. Therefore, “legal and forensic medicine” is the essential specialized field that can guarantee complete knowledge, scientific assumptions, methodological analysis, and foundations for comparability of data and social justice.

The fundamentals of any national positive law of reference are clearly an insuperable standard. In international comparison and knowledge exchange, this has long been a limit. Modern medicine must make knowledge a public good and be a leader of a progressive unity of paths whose central need is deep knowledge of human psychobiological reality. For the abovementioned reasons, forensic medicine is the field of choice for this route that is mainly scientific and whose aim is to stimulate and contribute to the legal intent of compensation.

The peculiarity of medicolegal training, culture, and research derives from the systematic framework of realization of the paths directed to the modulation of biological knowledge with concepts of positive law in the field of compensation to personal damage.

This is an important reason to consider and to which direct aims of training, international harmonization, exchange, and discussion are essential to an adequate future of biomedical forensic sciences and their role as social contributors.

All this goes together with the most rigorous independence of biomedical forensic research in fields of study that, due to their articulation, characteristics and effects are inevitably destined to include relevant interests, clearly involving organizational and economic-sensitive structures that are qualifying and of a strategic nature in a complex and developing political and social reality.

Namely the modern era, the territory of progress, in which the result is measured objectively on a scale of numerically expressed values. As in the case of the semantic destiny of “talent,” from when the balancing weight of the dish of experience appeared in order to measure it, to when it served to express the exchange *value*, becoming legal tender, before becoming a metaphor and indication of the quality of the invention and the creation. An impervious problem, beginning with the adjudication of who is to provide the definition of quality and competence, is always questionable and evasive of comparative and “imitative” models, rather than “ideological” and “prescriptive” of the goal pursued.

By now the adventure of modernity has ended, and at the beginning of the millennium, one becomes a worried and anxious witness of the transforming world, in which the yearning of the remote past, irredeemably more ideological than ideal,

and the dissolution of the peculiarities of each society render the duration of canons and educational programs ephemeral.

The challenge to face is certainly thrilling, since among the mists of a present so confusing and difficult to interpret, it involves drawing maps of a new geography of knowledge, in order to identify the pathways and their destinations, to restore order, aware that there are not, nor can there be glimpsed, prophets of the future, and that, therefore, the coming evolution will be strenuous and exciting. The heir of the tradition is not restorable but it is capable of being rebuilt in renewed value systems, through the foundation of a solid and balanced culture and civilization, of which books will retain the memory of what is destined to be preserved.

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.

## Bibliography

1. Airey CM, Chell SM, Rigby AS, Tennant A, Connelly JB (2001) The epidemiology of disability and occupation handicap resulting from major traumatic injury. *Disabil Rehabil* 23:509–515
2. Cazzaniga A (1928) *Le basi medico-legali per la stima del danno alla persona da delitto a quasi delitto*. SA Istituto Editoriale Scientifico, Milan
3. Fabra M, Stevens A, Merten T (2009) Recommendations for independent medical examinations of PTSD claimants. *Versicherungsmedizin* 61:111–117
4. Ferrara SD, Baccino E, Bajanowski T, Boscolo-Berto R, Castellano M, De Angel R, Pauliukevičius A, Ricci P, Vanezis P, Vieira DN, Viel G, Villanueva E, EALM Working Group on Medical Malpractice (2013) Malpractice and medical liability. European guidelines on methods of ascertainment and criteria of evaluation. *Int J Leg Med* 127(3):545–557
5. Ferrara SD, Bajanowski T, Cecchi R, Snenghi R, Case C, Viel G (2010) Bio-medicolegal guidelines and protocols: survey and future perspectives in Europe. *Int J Leg Med* 124(4):345–350
6. Ferrara SD, Boscolo Berto R, Viel G (eds) (2013) *Malpractice and medical liability—European state of the art and guidelines*. Springer, Berlin
7. Ferrara SD, Pfeiffer H (2010) Unitariness, evidence and quality in bio-medicolegal sciences. *Int J Leg Med* 124(4):343–344
8. Ferrara SD (2013) Medical malpractice and legal medicine. *Int J Leg Med* 127(3):541–543
9. Gerin C (1953) Medicolegal evaluation of personal physical damage in civil liability. *Riv Infort Mal Prof* 40:371–424
10. Hureau J (2006) Harmonisation of personal injury compensation in the European Union. Application to medical liability case law. *Bull Acad Natl Med* 190:725–746
11. Jafari S, Abdollahi M, Saeidnia S (2014) Personalized medicine: a confluence of traditional and contemporary medicine. *Altern Ther Health Med* 20(5):31–40
12. Newmann S, Collie A, Vogel AP, Kelehr H (2014) The impacts of injury at the individual, community and societal levels: a systematic meta-review. *Public Health* 128:587–618
13. Norelli GA, Focardi M (2007) La medicina legale e la valutazione olistica del danno alla persona. *Riv It Med Leg* 2:379–404
14. Tomljenovic A (2014) Holistic approach to human health and disease: life circumstances and inner processing. *Coll Antropol* 38:787–792
15. Wright BW (2007) The evolution of Rogers' science of unitary beings: 21st century reflections. *Nurs Sci Q* 20:64–67