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fbaratto1@gmail.com

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Vetter, Flávia; Torres Pereira, Rodrigo; Lígia Block, Lilian; Menyrval Zaitter, Wellington;
Nogueira de Oliveira, Rogério; Marques Fernandes, Mário

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Literature Review Article

Critical analysis of methodologies for valuation of esthetic damage and the forensic application in Brazil

Flávia Vetter¹
Rodrigo Torres Pereira¹
Lilian Lígia Block¹
Wellington Menyrval Zaitter¹
Rogério Nogueira de Oliveira²
Mário Marques Fernandes^{2, 3}

Corresponding author:

Flávia Vetter
Rua Treze de Maio, n. 18, apto. 502 – Centro
CEP 80020-270 – Curitiba – Paraná – Brasil
E-mail: flaviavetter@yahoo.com.br

¹ Dentistry Department, Positivo University – Curitiba – PR – Brazil.

² Department of Community Dentistry, School of Dentistry, University of São Paulo – São Paulo – SP – Brazil.

³ Biomedical Service, Public Ministry of the State of Rio Grande do Sul – Porto Alegre – RS – Brazil.

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Abstract

Introduction: The esthetic damage is any pejorative modification in static or dynamic expression, perceived by any sense, affecting the image of the person. The esthetic damage repair has legal support in Brazilian legislation. **Objective:** to systematize the different existing methods for valuation of esthetic damages, critically analyze their characteristics, advantages and disadvantages; and evaluate whether these methods would have been validated in any population inside or outside of Brazil. **Literature review:** The adoption of the use of tables, formulas and coefficients was insufficient to overcome the limitations of each method, such as those supported by the measurement of a single scar or by the teeth. **Conclusion:** All available subjective methods, except for AIEL method did not have scientific evidence, lacking validation in any country, and requiring proof of methodology.

Introduction

The reversible or irreversible damage results in the decreasing of moral or material patrimony. The damage to the person can set as: 1) destruction, disablement, or deterioration that a person undergoes in relation to his/her previous state of both on- and off-balance-sheet financial assets; 2) the set of consequences on the person, the injury or condition of his/her psychophysical integrity, which may be of economic, moral, family, criminal, and labor character, among others [15, 19]. The esthetic damage is considered as an off-balance-sheet financial damage, consisting of any pejorative modification in both the static or dynamic expression, perceived by any one of the senses, affecting the image of the person, that is, the individual should uglify after the traumatic event. The esthetic damage is a different dimension from that of the physiological injury and should not be confused with this [13].

Living in society, the human being needs to be accepted by the group. The physical appearance is one of the parameters for this acceptance, so that, the esthetic damage may affect the victim's social life, mainly because she/he can fear of public exposure. Thus, in the current context of the "dictatorship of beauty", it is natural that the damage caused to the appearance of the people be specifically compensated in relation to the social reflexes of injury [2].

The esthetic damage repair is supported in the in items V and X of the article 5th of the Brazilian Federal Constitution [7]. The article 949 of the Brazilian Civil Code states that the person responsible for the injury or other insult to health is obligated to indemnify the victim in relation to the treatment expenses and lost profits until the end of convalescence, in addition to some other prejudice that the victim has suffered [8]. On the other hand, from the criminal's point of view, one needs to verify the permanent deformity, typified as aggravating of the crime of body injury, in the item 2th of the Article 129 of the Brazilian Penal Code [9].

There is no doubt about the constitutional and legal basis for the repair of such damage, noticeable by the senses, especially vision. The problem lies in measuring the importance and severity. All the following steps are subjective: the appreciation of the lesion by the victim, the valuation, and the reparation of the degree of deformity acquired after a harmful fact that generates civil or criminal responsibility [5].

The civil and penal valuation of the damage is complex; despite of the objective characteristics (any observer must be able to perceive it), the valuation is also highly subjective considering the individual circumstances of the injured person and negative feelings experienced by the victim, with also the concept of individual esthetic considering the factors as age, sex and environment [1, 22].

The Law No. 5,081, of August 24th, 1966, states the regulation of the Dentistry practice, the competences of the dentist to perform the dental forensic examination in civil, criminal, labor and administrative forum; and the use of the access routes of the neck and the head (article 6, sections IV and IX) [10].

Accordingly, the Consolidation of Procedure Guidelines, approved by resolution No. 63/2005, of the Brazilian Federal Council of Dentistry, states the areas of competence of the Forensic Dentistry specialist; the articles 63 and 64 includes the preparation of forensic reports aiming at the research of psychic, physical, chemical and biological phenomena that can reach the man (alive, dead or the bones, and even fragments or traces), resulting in reversible or irreversible, partial or full injuries with repercussions on head and neck [11].

Thus, this study aimed to systematize the different existing methods for valuation of esthetic damages, critically analyze their characteristics, advantages and disadvantages; and evaluate whether these methods would have been validated in any population inside or outside of Brazil.

Literature review

Basic principles

The on-and off-balance-sheet asset financial damage involves two types of damage: the esthetic damage and moral damage. The esthetic damage can be defined as a visible and permanent external physical or bodily change, involving marked ugliness to the simple look [31]. Three elements can characterize the esthetic damage: transformation for the worse, permanent or extended damaging effect, and location in the external appearance of the person [23]. Although the transformation for the worse was prior understood as the need of a crippling or teratologic modification to be considered as esthetic damage, currently is determined just by any modification of the external appearance of the victim. However, it is necessary to be a permanent injury of prolonged effect because the opposite would characterize the illicit enrichment

by the part of the victim since, in addition to financial compensation, the victim would correct the deformity naturally [26].

The valuation of the esthetic damage and typification of tooth loss are some of the main difficulties encountered by professionals working in Forensic Dentistry. The lack of parameters for evaluation of the subjective character reinforces the idea that similar lesions are classified into different ways, especially if analyzed by different legal spheres, causing damage to those who suffered the injuries and need to be indemnified [30].

The valuation of a functional impairment (psychophysical) has objective and absolute character, while the esthetic damage has a subjective and relative character. For this reason, the valuation of a functional lesion is similar regardless of the victim's age, sex, and occupation. Notwithstanding, the valuation of the esthetic damage is conditioned by several factors, based on the "Tripod" of subjectivity: the experience of the victim, the forensic expert and the judge [22, 25].

In Brazil, in the civil sphere, the assessment of bodily harm needs standardization in its approach. The standardization of concepts, methods, and language is mandatory to the establishment of fairer forms of indemnification, aiming to full compensation of bodily harm [5, 19].

From the criminal liability point of view, which appears to be based on purely objective aspects of the offence to the physical integrity of others, it is no less difficult to characterize the permanent deformity, an aggravating for the crime of bodily injury [9].

Related legislation

With the advent of the Brazilian Federal Constitution in 1988, the issues relating to the valuation of the damage cause broader debates in the legal field. Currently, the courts tend to identify the moral damage especially by painful effects of injury caused by illicit act, in the personal suffering, pain-feeling, psychic reflexes, and life scheme, with substantial changes, both in professional and simple everyday social relations [21].

Thus, the items V and X of the article 5th of the Brazilian Federal Law states that "it is ensured the right of reply, proportional to the injury, in addition to the compensation for material damage; and that it is inviolable the intimacy, private life, honor and image of people, ensured the right to compensation for material or moral damage resulting from their infringement" [7].

In Criminal Law, the approach of physical damage is limited to the issue of time for recovery from injury, and still it is not free from subjectivity of the judge for setting the aggravation of the crime of bodily injury [9]. In contrast, in Civil Law, the approach of physical damage is not restricted to temporal aspects. The Civil Law considered for the repair of offense to the body integrity, the notion that any marks, defects, scars, though minimal, can mean a grief for the victim (esthetic damage), an "uglification", becoming a cause for exposing to the ridicule or inferiorizing complexes [2, 28].

Indeed, the Brazilian Civil Code of 2002 do not specifically regulate the esthetic damage, which is based on the category of "other losses" of the article 949. However, the Brazilian Civil Code of 2002, in opposite to the Brazilian Civil Code of 1916, states the advantage of eliminating discussions about what is dowry, a woman able to marry, crippling etc. But, in turn, it is undeniable that it presents the inconvenience of leaving enormous subjective to the judge, because the power to fix the compensation is wide [21].

In Brazil, no single formula is available to quantify the extent and limits of the moral and esthetic damage, to discipline the financial settlement, not existing even basic parameters to avoid disparate decisions [19]. The Brazilian jurisprudence has adopted the descriptive method. The repercussions of the damages in a dynamic and static perspective are described, competing the expert to consider the age, gender, employment/social/family factors on the assessment of the esthetic damage [6].

In 2009, the Brazilian Superior Court of Justice stated the summary 387, according to which "it is licit the cumulation of the compensation of esthetic and moral damage", based on the understanding that the moral and aesthetic damage are autonomous and can be verified as a result of the same event. The damages are different and therefore also ate the claims, hence the indemnity claims are cumulative [12].

The rationale for this is that the Brazilian Federal Law grants citizens the right to compensation of damage caused in the event of violation of image, but does not make any distinction if such violation should be necessarily physical or moral.

In the European Union countries, as a rule of thumb, two fundamental principles are covered: all people have the same rights and, in the case of bodily harm, the situation must be restored as near as possible to which that existed without the traumatic event. Based on these aforementioned

principles, the forensic criminal examination guides the fairly and adequately reparation of the damage to the victims of the offence [24].

Specifically, in Spain this question is divided into the investigations by the Law no. 35/2015, which the esthetic damage is evaluated regardless of the existing physiological damage in the victim [13]. In the Special Chapter on table VI of RDL Annex 8/2004, the esthetic injury consists of any esthetic modification that affects the person's image with a diverse dimension of physiological injury and it is valued in six degrees of intensity: mild, medium, moderate, important, much important and very important [6]. The General Council of the Group of Dentists and Stomatologists of Spain considers that all possible esthetic damage to the Stomatognathic system are limited to the first three degrees of the scale [29].

Different methods for valuation of esthetic damage

Usually, the valuation of esthetic damage is based on first describing the characteristics of the lesion(s) demonstrating the true nature of the injury and its importance in the esthetic effects of loss of attraction. The changes are described in a static (anatomic) and dynamic (functional) perspective, but no inclusion of factors such as age, gender, labor activity occurs; thus, not establishing parameters for the valuation of the damage [4]. The description is provided and considered as a part of the forensic dental report, and the forensic expert should perform the *visum et repertum*, where all that was seen and analyzed should be described. After this step, the forensic expert should express on the report discussion the numbers or adjectives included in a gradual numerical or qualified scale to decode the ideas seen into those stated in the Civil Law.

Several methods are described in the literature for attempting to “quantify” esthetic damage in the Civil Law. The method of Esthetic Dental Damage [17] created more than six decades ago, is a quantitative method composed of a framework to evaluate the esthetic damage, involving tooth losses, considering only the oral cavity, with the percentage allocation for group of teeth by hemiarch: Central incisor, Lateral incisor and canine: 6%; First Premolar: 5%; Second Premolar: 2% and Molar 0%. The Esthetic Dental Damage is not validated in any country, that is, the record of application of this method is lacked in a given population not enabling the calculation of a correct or error margin of these percentage indexes [18, 19].

The method so-called Coefficient of Esthetic Damage for Face Scars, or Quantitative Analytical method [16] uses two coefficients for the valuation. The first is calculated from the analysis of 4 issues and considers four factors: shape, size, topography, and pigmentation. The second is defined by the following parameters: topography (the face is divided into four regions), inclusion of holes, relationship with the natural facial folds, and mimic alteration.



Figure 1 – The image shows the numbers between 1 and 4 in the different areas of the face. These numbers are the value to be assigned in the calculation of the Location Coefficient

By assigning values to these issues, the two coefficients (maximum of 10 points each) are calculated. The esthetic damage is then defined by the multiplication of these two coefficients (totaling a maximum of 100 points). The points are converted into a table for obtaining the category of Esthetic Damage. It was proposed considering mainly the analysis of anatomical issues and mathematical calculations to create the scale.

The 7-degree scale [14] is an empirical numeric and qualitative method that classifies the esthetic damage through a table with a growing range of evolutionary order from “very mild” (1) to “very important or very serious (7)”, thus globally valuing all the described esthetic damage. However, the 7-degree scale neither has scientific basis nor has been tested in any population with a repeatable methodology.

Table I – 7-degree scale

Thierry and Nicourt's table	
1.	Very mild
2.	Mild
3.	Moderate
4.	Medium
5.	Considerable
6.	Important
7.	Very important or Very serious

The Thierry and Nicourt's table shows the numbers between 1 and 7. These numbers classifies the esthetic damage through are growing range of evolutionary order from "very mild" (1) to "very important or very serious" (7)

The analytical and quantitative method of perception by the distances of the facial scars [27] is based on the quantification of the degree of involvement of the lesion based on location and distance in relation to the esthetic deformity. This method is divided into two stages. First, in a medical setting exposed to natural light, observations are conducted from two angles of vision (side and frontal) at two distances: -50 cm (close distance) and 3 meters (social distance). The measurement criteria analyzed during the observations are arranged in a table and are based on the visibility of scars, discoloration, surface, changes in key points and deformities in the ulcerations. These characteristics are evaluated and graded on a scale from 0 to 7, corresponding to the following descriptions: absent, very mild, mild, moderate, average, very marked, marked and highly marked. After, the four elements of gravity (gender, age, marital status and occupation) are detailed, so the case can be concretely evaluated. Again, this method has no validation, because the variables blatantly lack scientific rigor.

On the other hand, the analytical and qualitative method of the "Formula for the calculation of the Esthetic Damage caused by scars on any part of the body" [3], values variables such as height and width of the scar, location; establishing five zones ordered from the greatest to the smallest visibility (nose and lips with greater visibility and foot and armpits of lower visibility), the relationship with the folds and wrinkles of the face and also features of the scar: aspect, surface and color, adding other factors as functional repercussion, occupation and previous state. The evaluation of all the parameters involved

in the esthetic damage results in three coefficients: Coefficient of Visibility, Coefficient of Morphology, and Coefficient for Personal Characteristics. The impact of the esthetic damage is a result of the multiplication of the first two coefficients divided by the last coefficient [3]. A clear disadvantage is just focus on the measurement of scars.

The method of Analysis of Impression and the Impact of Esthetic Loss (AIEL), originally proposed in Spain by the forensic doctor of the Institute of Forensic Medicine of Aragón (Spain) Dr. Juan Antonio Cobo Plana, is a subjective method which has objective criteria (psychometric criteria). AIEL is not just a quantitative mathematical method, with the great advantage of allowing the re-evaluation by other professionals in perfectly delineated bases, aiming to quantify the esthetic damage. Primarily used to quantify body injury from traffic accidents, AIEL uses a simplified sequence of steps that the victim causes to her/himself and how is seen by third parties, providing a graduated assessment of the intensity of the esthetic damage. Four tables were developed to evaluate the impact of esthetic loss. The valuation of the esthetic loss must be set through criteria that assess the effect that changing the appearance causes on the victim and the perception by other individuals [6]. In addition to distinguish the difference between physiological substrate changed and ugliness of the image, the examiner should assess the severity of the damage and the esthetic beauty and ugliness are eminently subjective values, although it is undeniable that there are social and cultural factors that define, at every time and in every place, what is beautiful and what is ugly [15, 24]. In the final analysis, the examiner can obtain a maximum of 100 points: 50 points for the esthetic damage and 50 points for the functional injury; then the total score is transformed into monetary values according to the Spanish legislation (Law no. 35/2015) [18, 19].

The first table (AIEL1) follows a guide of questions about how the examiner understands the possible change of the image of the person. In the second table (AIEL 2), using the degrees of intensity according to the tables of the Law 35/2015, the examiner's answers to those questions are registered. In the third table (AIEL 3), the score obtained is detailed. And in the fourth and final table (AIEL 4) the analysis of the more particular esthetic changes is obtained [4].

The method for valuation of esthetic damage caused by a scar [22] has psychometric and analytical features and proposes the use of two tables. In the first, three parameters are measured: the area

(zone) of the body containing the scar (maximum 70 points or 70%), the length of the scar (average in cm-maximum 10 points or 10%) and the distance at which the scar is observed (maximum of 20 points or 20%), which totalizes a maximum of 100 points. In the second, the resulting score is decreased or increased according to two criteria: presence or absence of deformity in the scar and its color. Considering that the maximum value is 100, one can then divide the result obtained by two and this way obtain the valuation of esthetic injury according to the six degrees of classification from the Spanish legislation (Law n. 35/2015), in which the esthetic damage is evaluated regardless of the prejudice that exists in the victim's physiological damage, as well as eventual material damage [13, 18, 19].

The method of valuation of esthetic damage [29] is a psychometric and qualitative method and considers the current Spanish legislation, with the classification of sequels held within the range of 6 degrees (from mild to very important), with independent valuation of functional impairment. Three aspects are the most relevant: changes in the skin (scarring and burns), amputations and loss of substance and dynamic changes (gait, posture, and speech). The calculation of the esthetic damage is done through the same systematic used for the calculation of permanent sequelae, with scores ranging from 0 to 50 (maximum score). The lesions are given a maximum and a minimum score. If there is more than one injury, it is necessary to obtain a total score using a specific formula [29].

Table II – Schematic summary of the methodologies for valuation of esthetic damage

Methods for valuation of esthetic damage	Is it validated in any country?	What is the method's principle? Does it use tables, charts, coefficients, protocols, formulas or scales?	Does it consider the individual as a whole?
Dória (1941)	No	Analysis of the missing tooth and its % described in the table. If more than one tooth loss, percentages are added together.	Exclusive to teeth
Danon <i>et al.</i> (1972)	No	Qualitative analytical.	No
Thierry and Nicourt (1981)	No	Empirical. Scale from 0 to 7 degrees	Body as a whole
Rougé <i>et al.</i> (1996)	No	Qualitative analytical. Table relating different distances and lesions	Facial scars only
Bermúdez (2004)	No	Qualitative analytical 3 coefficients and a formula	Body as a whole
Cobo (2010)	Yes, Brazil.	Psychometric. 4 tables	Body as a whole
Lloret <i>et al.</i> (2013)	No	Psychometric 2 tables	Body as a whole
Valiente and Sasot (2014)	No	Psychometric 1 formula	Body as a whole

Discussion

The valuation of esthetic damage or permanent deformity is one of the main difficulties that the health professionals face in front of a person with damage or bodily injury [6]. The damage suffered by the person must be translated by the forensic

expert for the lawyer, with a proper valuation and using reliable methods to do so.

Thus, the forensic expert must be up to date on the different existing methods; its advantages and disadvantages, their main characteristics and applicability. Any incorrect forensic testimony could lead to the commitment in the search for truth.

As seen in this literature review, the forensic expert must always carry out a detailed description of all the deformities or defects that may be relevant for the valuation of the esthetic injury. Only after that, the forensic expert uses other methodologies. In Brazil, the current Civil Code states that the forensic experts must report the method used, clarifying it and proving the method is predominantly accepted by specialists in the area of knowledge [19].

Except for those used in AIEL method [13], the other tables and scales have no cross-cultural validation [18, 19], which requires checking the standardization of the esthetic damage settlement in the legislation of each country. All damage parameters must be valued for a full compensation of the damage, and the amount of the indemnity is calculated in proportion to the damage. Therefore, the use of tables meets the principles of legal security and equality, unifies medical and clinical criteria, avoiding large disparities in the study of similar cases.

The method of Esthetic Dental Damage [17] does not consider the whole structures of the stomatognathic complex, restricting the analysis exclusively to tooth losses (and yet, through incomplete information, because it does not consider the molars) [19].

Although the method of “Coefficient of Esthetic Damage for Face Scars”, or Quantitative Analytical method [16] evaluates the scars on the face (including the stomatognathic system), using coefficients and a formula, it does not use other parameters for evaluation. Thus, considering the high complexity, the adoption of the aforementioned method in the case of coexistence of various scars is limited [16, 22].

The method of 7-degree scale [14], values both facial and tooth injuries and promotes homogenization of terms adopted by the experts to provide a demonstration of the importance of the victim's loss of attraction, allowing the coincidence between the results from the forensic experts and the technical assistants [28]. It is worth noting the possibility of analysis of static and dynamic damage and inclusion of degree of notoriety and disgust expressed by the victim and the assessment of the victim's age, marital status, and social-professional issues, as well as the possibility of recovery [30]. Despite globally valuing the esthetic damage, the method lacks precision because the subjective values of the scale cannot be measured equally; the method cannot be exclusively used without parameters or reference criteria, characterized, therefore, by strong load of subjectivity and lack of

technical rigor [4]. As cited by Verçosa *et al.* [30], the assessment of the degree of severity of previous tooth losses by physicians and dentists was perceived in a similar manner, demonstrating a “bias” in the methodology applied, given the absence of reliable criteria in different losses generated by different damages, the esthetic perception was relatively high, overestimating the esthetic damage [30].

The method of perception by the distances of the facial scars [27], strongly recommended for patients with injuries from burns (according to the authors), is a simple method that can reduce disagreement between evaluations through a better understanding of the scale, as well as the description of the criteria of severity [20].

The method for valuation of esthetic damage caused by a scar [22] is limited by the valuation of esthetic damage, since the methodology applies exclusively to a single scar. Likely to the 7-degree method, this method does not consider personal aspects of the victim [22].

The method of “Formula for the calculation of the Esthetic Damage caused by scars on any part of the body” [3] and the method of valuation of esthetic damage [29] are based on strongly objective criteria for valuation of the injury, with the least subjectivity as possible, and consider the face as the area of greatest esthetic influence [29]. However, these methods unreasonably and completely disregard factors that should be taken into account, such as age, sex, and state prior to the damage.

Because the esthetic damage in Criminal Law is limited to the notion of permanent deformity, while in the Civil Law the esthetic damage can be analyzed with respect to all of its implications and reflections, it is extremely advantageous that the AIEL method makes possible to standardize procedures because it allows the doctor, dentist or law professional: a) to adopt criteria of intensity or severity on the esthetic injury and on the possible deformity caused; b) to establish matters subject to revaluations by other examiners; and, c) to improve the principles of contradiction and mediation by exposing to the judges of this assessment the basis of these evaluation in obvious and simple way [13]. The validation of this instrument, culturally translated and adapted to Portuguese, aims at greater objectivity of the method [19]. However, the valuation is exclusive to the esthetic damage, in a scenario in which the other damages have already been quantified.

Several factors have contributed to the search for even more effective methods for the valuation

of esthetic damage, due to the increasing of violence in parallel with the cult of the body, i.e. the occurrence of physical injury has grown in proportion to the importance that society gives to the external appearance of the people.

In this context, the “perfect smile” undoubtedly carries undeniable role in facial harmony of the individual, so that injury against the stomatognathic system (only to the teeth or reaching any of its functions – suction, mastication, deglutition, phonation, and breathing) requires a fair repair in relation to civil or criminal accountability, which should be valued according to the moral injury suffered, that is, in the exact proportion of the decreasing in the victim’s self-esteem.

Therefore, it is of fundamental importance the adoption of safe and accurate criteria, which express and quantify the esthetic damage and the corresponding quantum compensation. This literature review observed that many methods are based on truly logical approaches, through mathematical calculations legitimately explained in theory, based on scientific and expert experience of the authors. However, the methods still have a bias of subjectivity inherent to the forensic activity, apart from the lack of validation and statistical verification.

Further studies are necessary in the field of the valuation of esthetic damage, including the permanent deformity, by testing some methods described above. The justification that “the methods are impossible to be tested”; or the argument that “the study of the methods may cause damage” can be no longer scientifically accepted.

Conclusion

Because the valuation of the esthetic damage and the typification of permanent deformity have some degree of subjectivity on the part of forensic experts and legal professionals, it is important to adopt criteria to make the evaluation more homogeneous and uniform, subject to analyze and re-study by everyone involved, through a method that takes into consideration objective aspects of the evaluation, features that accredits AIEL as the only method validated in Brazil [19].

However, the method validation is not important if the professional is not able to use it. So, the Forensic Dentistry is important to train the professional to perform the measurement of the esthetic damages or permanent deformity in the stomatognathic system.

We still noted that the available methods lack scientific evidence because the following items were not available for each of the studies: the sample; the hierarchy of the study type; and the statistical test used. Further studies are necessary to prove the methodologies because except for AIEL, these methods were not validated in any country [19].

The adoption of the use of tables, formulas and coefficients was insufficient to overcome the limitations of each method, such as those supported by the measurement of a single scar or by the teeth. The AIEL method differs from the others, not only by setting parameters to qualify the esthetic damage, both in Criminal and Civil Law, but by establishing objective criteria that contemplates reasonable degree of subjectivity, not limited to the mere application of a mathematical formulas.

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