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To all those who have suffered an atrocious practice that no
human being should ever be made to endure

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1. Introduction

1.1. Context

Torture is among the most abhorrent crimes that can be committed against a human being and one of the most egregious human rights violations. Given that it is an especially grave crime,¹ torture, as well as other cruel, inhuman or degrading treatment, is prohibited in numerous international and regional human rights instruments, including the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights (ICCPR), the Convention on the Rights of the Child, the Convention on the Rights of Persons with Disabilities, the European Convention on Human Rights (ECHR), the American Convention on Human Rights, and the African Charter on Human and Peoples' Rights.² Three legally binding human rights instruments are specifically focused on torture and ill-treatment, the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT), the Inter-American Convention to Prevent and Punish Torture (IACPPT) and the European Convention for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment, although the scope of the latter is limited to preventive visits to States Parties to the Convention.³ Torture and other forms of ill-treatment are also prohibited under international humanitarian law by the four Geneva Conventions of 1949, both in international⁴ and non-international armed conflicts.⁵ The Rome Statute of the International Criminal Court (ICC) includes torture among the crimes against humanity and war crimes.⁶ Torture is, therefore, not only a human rights violation, but also an international crime.

¹ UN Committee Against Torture, General Comment No. 2: Implementation of Article 2 by States parties (2008) para 11.

² Universal Declaration of Human Rights (adopted 10 December 1948) GA Res 217A (III) (UDHR) art 5; International Covenant on Civil and Political Rights (adopted 16 December 1966, entered into force 23 March 1976) UNGA Res 2200A (XXI) (ICCPR) art 7; Convention on the Rights of the Child (adopted 20 November 1989, entered into force 2 September 1990) UNGA Res 44/25 art 37(a); Convention on the Rights of Persons with Disabilities (adopted 13 December 2006, entered into force 3 May 2008) A/RES/61/106 art 15; Convention for the Protection of Human Rights and Fundamental Freedoms (European Convention on Human Rights, as amended) (ECHR) art 3; American Convention on Human Rights (adopted 22 November 1969) art 5.2; African Charter on Human and Peoples' Rights (adopted 27 June 1981, entered into force 21 October 1986) 21 ILM 58 art 5.

³ Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (adopted 10 December 1984, entered into force 26 June 1987) UNGA Res 39/46 (CAT); Inter-American Convention to Prevent and Punish Torture (adopted 9 December 1985, entered into force 28 February 1987) OAS Treaty Series No. 67 (IACPPT); European Convention for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment (adopted 26 November 1987, entered into force 1 February 1989) ETS No126.

⁴ I Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field of 12 August 1949 (adopted 12 August 1949, entered into force 21 October 1950) art 12; II Geneva Convention for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea of 12 August 1949 (adopted 12 August 1949, entered into force 21 October 1950) art 12; III Geneva Convention relative to the Treatment of Prisoners of War of 12 August 1949 (adopted 12 August 1949, entered into force 21 October 1950) arts 17, 87; IV Geneva Convention relative to the Protection of Civilian Persons in Time of War of 12 August 1949 (adopted 12 August 1949, entered into force 21 October 1950) art 32.

⁵ Geneva Conventions I-IV (n 4), common article 3(1)(a), (c).

⁶ Rome Statute of the International Criminal Court (adopted 17 July 1998, entered into force 1 July 2002, last amended 29 November 2010) 2187 UNTS 90 (Rome Statute) arts 7.1(f), 8.2(a)(ii), 8.2(c)(i).

The prohibition of torture is absolute, cannot be derogated and is now considered customary international law.⁷ It has the character of a *jus cogens* norm, universally binding at all times.⁸ Despite the fact that it is outlawed in most states,⁹ torture is among the most frequent forms of human rights violations.¹⁰ During the last five decades, torturers have moved from brutal forms of physical violence to forms of torture that hardly leave any mark in the body.¹¹ As a result, many torture survivors have little to show to support their claims that they have been tortured. This hampers prosecution of perpetrators and leaves victims with scant possibilities to get justice, reparation and redress. It is therefore of paramount importance to find ways to prove torture when it leaves no visible signs in the body.

This dissertation starts with an analysis of the definition of torture in legal and medical terms, followed by an analysis of the meaning of 'severe pain or suffering', an essential element in the notion of torture as defined in the CAT¹² (Chapter 2). Then, it moves on to present forms of torture, namely clean and psychological torture, that are increasingly being used and do not leave physical marks in the body. Chapter 3 also explains that all types of torture have psychological effects and cause stress and trauma. When torture leaves no visible physical marks, or marks disappear before medical examination, it can be difficult to prove that the survivor has been tortured and that the severity of the abuse amounts to torture. Chapter 4 explains the necessity to find biological markers of these types of torture in order to document and prove torture cases. Chapter 5 analyses the potential of novel scientific methods to identify biological markers associated to torture.

1.2. Aim

Methods to analyse certain biological marks present in the DNA, called epigenetic marks, have been developed in recent years.¹³ Changes in epigenetic marks have been correlated with traumatic stress.¹⁴ Given that torture is an extreme form of trauma, it is possible that it is also associated with epigenetic changes. The aim of this dissertation is to analyse the potential of epigenetic methods to

⁷ UN Committee Against Torture (n 1) para 1. See also John T. Parry, *Understanding Torture: Law, Violence and Political Identity* (The University of Michigan Press 2010) 15; William F. Schulz, 'Torture' in Michael E. Goodhart (ed), *Human Rights: Politics and Practice* (3rd edn, OUP 2016) 259.

⁸ UN Committee Against Torture (n 1) para 1. See also Parry (n 7) 15.

⁹ Schulz (n 7) 268.

¹⁰ *Ibid* 257.

¹¹ Tobias Kelly, 'What We Talk about When We Talk about Torture' (2011) 2 *Humanity: An International Journal of Human Rights, Humanitarianism, and Development* 327, 331.

¹² CAT art 1.

¹³ Rudolf Jaenisch and Adrian Bird, 'Epigenetic Regulation of Gene Expression: How the Genome Integrates Intrinsic and Environmental Signals' (2003) 33 *Nature Genetics* 245.

¹⁴ Christiaan H. Vinkers and others, 'Traumatic Stress and Human DNA Methylation: A Critical Review' (2015) 7 *Epigenomics* 593.

provide evidence of torture and contribute to determine its severity. Furthermore, whether these methods have been used for this purpose will be explored.

1.3. Research methodology

This work is based on analyses of primary sources, mostly international and regional human rights instruments that define torture and legal cases, as well as secondary sources, such as books and academic articles that deal with the topics addressed in the different chapters. Due to space constraints, it is not possible to offer a worldwide overview and, therefore, the analyses of case law will be focused mostly on Europe because of the relevance of European jurisprudence for the interpretation of the severity of physical and mental suffering. However, references to non-European countries will be made when relevant. Chapter 5 analyses scientific evidence supporting that modifications of the DNA that do not affect the genetic information contained in it (epigenetic changes) are associated with traumatic events. Searches for scientific articles that analyse epigenetic changes in torture victims have been performed in the scientific bibliographic databases PubMed (<https://www.ncbi.nlm.nih.gov/pubmed>) and Google Scholar (<https://scholar.google.com/>).

2. The Definition of torture

2.1. The definition of torture

2.1.1. Legal definition

Among the human rights instruments that prohibit torture mentioned in section 1.1, only two, the CAT and the IACPPT, provide a definition.¹⁵ In addition, the Rome Statute defines torture as a crime against humanity and as a war crime.¹⁶ The main international reference for the prohibition of torture, the CAT, defines torture as:

[A]ny act by which severe pain or suffering, whether physical or mental, is intentionally inflicted on a person for such purposes as obtaining from him or a third person information or a confession, punishing him for an act he or a third person has committed or is suspected of having committed, or intimidating or coercing him or a third person, or for any reason

¹⁵ CAT art 1.1; IACPPT arts 2, 3.

¹⁶ Rome Statute arts 7.1(f), 8.2(a)(ii), 8.2(c)(i).

based on discrimination of any kind, when such pain or suffering is inflicted by or at the instigation of or with the consent or acquiescence of a public official or other person acting in an official capacity. It does not include pain or suffering arising only from, inherent in or incidental to lawful sanctions.¹⁷

Currently, 166 states are parties to the CAT¹⁸. However, the definition of torture in domestic legislation is not always aligned to that in the CAT,¹⁹ despite the request of the Committee against Torture that each state party to the CAT 'ensure that all parts of its Government adhere to the definition set forth in the Convention for the purpose of defining the obligations of the State.'²⁰

There are several elements in the CAT definition of torture: 1) the intentional infliction of physical or mental pain or suffering; 2) the severity of suffering; 3) that the act has a purpose; and 4) that the perpetrator is a public official, or a person acting on their behalf or with their consent or acquiescence.²¹ The first element is common to all instruments that define torture, as it excludes the accidental infliction of pain or suffering. The other elements show differences between instruments.²²

The IACPPT defines torture in a broader way than the CAT:

[T]orture shall be understood to be any act intentionally performed whereby physical or mental pain or suffering is inflicted on a person for purposes of criminal investigation, as a means of intimidation, as personal punishment, as a preventive measure, as a penalty, or for any other purpose. Torture shall also be understood to be the use of methods upon a person intended to obliterate the personality of the victim or to diminish his physical or mental capacities, even if they do not cause physical pain or mental anguish.

The concept of torture shall not include physical or mental pain or suffering that is inherent in or solely the consequence of lawful measures, provided that they do not include the performance of the acts or use of the methods referred to in this article.²³

¹⁷ CAT art 1.1.

¹⁸ United Nations Treaty Collection <https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=IV-9&chapter=4&clang=en> accessed 20 July 2019.

¹⁹ Pau Pérez-Sales, *Psychological Torture: Definition, Evaluation and Measurement* (Routledge 2017) 3.

²⁰ UN Committee Against Torture (n 1) para 9.

²¹ Nigel S. Rodley, 'The Definition(s) of Torture in International Law' (2002) 55 *Current Legal Problems* 467, 468; Louise Doswald-Beck, *Human Rights in Times of Conflict and Terrorism* (OUP 2011) 200; Elena Maculan, 'Judicial Definition of Torture as a Paradigm of Cross-fertilisation: Combining Harmonisation and Expansion' (2015) 84 *Nordic Journal of International Law* 456, 459-460.

²² Maculan (n 21) 459.

²³ ICPPT art 2.

This definition does not include the second element of the CAT definition, that is, it does not require that the suffering is severe, while the Rome Statute, in its definition of torture as a crime against humanity, does.²⁴ The third element is present in the CAT and the IACPPT and in both cases the list of purposes is representative, not exhaustive. The Rome Statute, referring to torture as a war crime, requires a purpose, whereas it does not require it when referring to torture as a crime against humanity.²⁵ Regarding the fourth element, the CAT and the IACPPT include it,²⁶ but it is not a requirement for torture as a crime against humanity in the Rome Statute.²⁷ The importance of the IACPPT definition resides in that it expands the notion of torture by omitting the word “severe” and by including methods that do not inflict physical or mental suffering, but that affect the psychological integrity or the physical capacities of the person.²⁸ Neither the European Convention of Human Rights, nor the European Convention for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment includes a definition of torture.

None of these instruments provides a definition of cruel, inhuman or degrading treatment and, therefore, it is not clear where the boundary between this treatment and torture is. The Committee Against Torture recognises that this boundary is not clear.²⁹ Regardless of where the distinction is, both are absolutely prohibited by international human rights law and thus constitute a human rights violation.³⁰ For example, the ICCPR and the ECHR prohibit both without distinction between them.³¹ The first definition of torture in a human rights instrument, the Declaration on the Protection of All Persons from Being Subjected to Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment, stated that ‘[t]orture constitutes an aggravated and deliberate form of cruel, inhuman or degrading treatment or punishment’.³² This distinction in severity between torture and other ill-treatments disappeared in later instruments and, nevertheless, does not define what cruel, inhuman or degrading treatment or punishment is. The jurisprudence of the European Court of Human Rights

²⁴ The Rome Statute defines torture, as a crime against humanity, as ‘the intentional infliction of severe pain or suffering, whether physical or mental, upon a person in the custody or under the control of the accused; except that torture shall not include pain or suffering arising only from, inherent in or incidental to, lawful sanctions’ [art 7.2(e)]. See also Maculan (n 21) 459.

²⁵ Rodley (n 21) 469; Maculan (n 21) 459-460.

²⁶ The IACPPT includes the public official requirement in article 3.

²⁷ Maculan (n 21) 459.

²⁸ Pérez-Sales (n 19) 3.

²⁹ UN Committee Against Torture (n 1) para 3.

³⁰ UN Human Rights Committee, General Comment No. 20: Article 7 (Prohibition of Torture, or Other Cruel, Inhuman or Degrading Treatment or Punishment) (1992) para 3; UN Committee Against Torture (n 1) para 3; UN Committee against Torture, *General Comment No. 4 (2017) on the Implementation of Article 3 of the Convention in the Context of Article 22 (2017)* para 8. See also Schulz (n 7) 267.

³¹ ECHR art 3; ICCPR art 7.

³² Declaration on the Protection of All Persons from Being Subjected to Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (adopted 9 December 1975) UNGA Res 3452 (XXX) art 1.2. See also Rodley (n 21) 468.

(ECtHR) has given some hints about the difference between the two types of treatment although, as we will see in section 2.2.1, its approach to this issue has not always been consistent.³³ In *Ireland v The United Kingdom*, this Court dealt with a case of detainees who had been subjected to forced standing, hooding, continuous loud noise, sleep deprivation, and food and drink deprivation by British officials in Northern Ireland.³⁴ The ECtHR reasoned that the term torture in the ECHR 'should ... attach a special stigma to deliberate inhuman treatment causing very serious and cruel suffering' and concluded that '[a]lthough the five techniques, as applied in combination, undoubtedly amounted to inhuman and degrading treatment, ... they did not occasion suffering of the particular intensity and cruelty implied by the word torture'.³⁵ The ECtHR, therefore, established the distinction between inhuman and degrading treatment and torture in 'a difference in the intensity of the suffering inflicted'.³⁶ However, it is not clear how to measure the intensity of suffering or where the intensity threshold is. In addition to the intensity, the ECtHR argued, in *Dikme v Turkey* and in *Aktaş v Turkey*, that the existence of a specific purpose distinguishes torture from other forms of ill-treatment.³⁷ The Committee Against Torture has adopted a similar view, stating that '[i]n comparison to torture, ill-treatment may differ in the severity of pain and suffering and does not require proof of impermissible purposes'.³⁸ The Human Rights Committee and the Inter-American Court of Human Rights, however, have generally avoided establishing a boundary between them, but the Human Rights Committee has affirmed that the 'nature, purpose and severity' of the acts have to be taken into account.³⁹

Some scholars argue that the prohibition of torture is not absolute. By establishing a difference between torture and cruel, inhuman and degrading treatment based on the severity of suffering, which is a relative concept, it becomes difficult to determine whether a particular act amounts to torture or not.⁴⁰ The decision in *Ireland v UK* clearly illustrates this complexity. Nowadays, it is less clear to which extent the distinction between torture and other forms of ill-treatment is important. It has been argued that the obligation to extradite, prescribed in article 8 of the CAT, as well as other provisions of this convention, only applies to torture⁴¹ and, therefore, in cases that may involve extradition, it is

³³ Doswald-Beck (n 21) 201.

³⁴ *Ireland v the United Kingdom* (1978) (European Court of Human Rights, ECtHR) 5310/71 (Ireland v UK).

³⁵ *Ibid* para 167.

³⁶ *Ibid* 167.

³⁷ *Dikme v Turkey* (2000) (ECtHR) 20869/92 para 96; *Aktaş v Turkey* (2003) (ECtHR) 24351/94 paras 313, 319. See also Doswald-Beck (n 21) 201-202; Maculan (n 21) 464.

³⁸ UN Committee Against Torture, General Comment No. 2 para 10.

³⁹ UN Human Rights Committee (n 30) para 4. See also Rodley (n 21) 472-473; Maculan (n 21) 465, 475.

⁴⁰ Parry (n 7) 34-40; Kelly (n 11) 333.

⁴¹ Doswald-Beck (n 21) 201; Maculan (n 21) 463; Pérez-Sales (n 19) 4.

crucial to determine whether the acts committed amount to torture or constitute cruel, inhuman or degrading treatment. However, although articles 2-9, 14 and 15 of the CAT refer only to torture, the Committee Against Torture and the Human Rights Committee have clarified that their provisions also apply to cruel, inhuman or degrading treatment,⁴² making the legal distinction between them less relevant. It has been proposed that a common severity threshold should apply to both torture and cruel or inhuman treatment and that the distinction between them should be the existence of a purpose in the case of torture.⁴³

The Committee Against Torture has stressed the importance of the principle of non-discrimination in the definition of torture. When assessing whether an act constitutes torture, it has to be taken into account whether physical or mental violence has been used in a discriminatory manner.⁴⁴ This importance derives from the central position of non-discrimination in international human rights law. Both the International Covenant on Economic, Social and Cultural Rights and the ICCPR include this principle.⁴⁵ Human rights, including the prohibition against torture, have to be guaranteed to all human beings without distinction of any kind.

As mentioned above, human rights instruments limit torture to acts committed, instigated or consented by state actors or persons acting in official capacity. Different voices argue that practices of the same severity committed by non-state actors, as well as gross domestic violence and child abuse should also be considered torture.⁴⁶ States have the obligation to refrain from committing torture, prohibit, punish and prevent it. This includes preventing acts committed by private actors.⁴⁷ The European Court of Human Rights case law has established that there can be violations of the prohibition against torture even in cases in which no public official is involved.⁴⁸ For instance, in *HLR v France*, the Court 'does not rule out the possibility that Article 3 of the Convention (art. 3) may also apply where the danger emanates from persons or groups of persons who are not public officials'.⁴⁹ The Committee Against Torture affirms that states can be held accountable for 'gender-based

⁴² UN Committee Against Torture, General Comment No. 2 (n 1) paras 3-6; UN Human Rights Committee (n 30) paras 3, 8, 9, 14.

⁴³ Nigel Rodley and Matt Pollard, *The Treatment of Prisoners under International Law* (3rd edn, OUP 2009) 123-124.

⁴⁴ UN Committee Against Torture, General Comment No. 2 (n 1) para 20.

⁴⁵ International Covenant on Economic, Social and Cultural Rights (adopted 16 December 1966, entered into force 3 January 1976) UNGA Res 2200A (XXI) (ICESCR) art 2.2; ICCPR art 2.1.

⁴⁶ Rhonda Copelon, 'Recognizing the Egregious in the Everyday: Domestic Violence as Torture' (1994) 25 Columbia Human Rights Law Review 291; Schulz (n 7) 267.

⁴⁷ UN Human Rights Committee (n 30) para 2; UN Committee Against Torture, *General Comment No. 2* (n 1) para 11. See also Maculan (n 21) 462.

⁴⁸ Maculan (n 21) 461-462.

⁴⁹ *HLR v France* (1997) (ECtHR) 24573/94 para 40.

violence, such as rape, domestic violence, female genital mutilation, and trafficking' when they fail to prevent, investigate and prosecute these acts.⁵⁰

The ECtHR case law has significantly influenced the understanding of torture, in terms of its definition and scope, by other judicial bodies, including *ad hoc* International Criminal Tribunals.⁵¹ This has had the effect of reducing, in their practical application, the differences existing between different legal norms. It has also broadened the scope of the prohibition, by removing the public official requirement and including rape as an act that can constitute torture.⁵² This influence derives mostly from the fact that the ECtHR has dealt with these issues 'more often and more thoroughly' than other courts or quasi-judicial bodies.⁵³

2.1.2. Medical definition

The World Medical Association (WMA) defines torture, in the Declaration of Tokyo, as 'the deliberate, systematic or wanton infliction of physical or mental suffering by one or more persons acting alone or on the orders of any authority, to force another person to yield information, to make a confession, or for any other reason'.⁵⁴ The first element of the CAT definition, the intentional infliction of suffering, is also included here in the word 'deliberate', although it is not an essential requisite, as 'wanton' does not necessarily imply intentionality. Contrary to the CAT definition, the WMA does not refer to the severity of suffering and therefore avoids the problems associated to this term. Although the definition itself does not limit the perpetrators to public officials, the title of the Declaration of Tokyo refers to 'Detention and Imprisonment' and, therefore seems to exclude acts committed without the participation, consent or acquiescence of non-state actors. Although this definition mentions two possible purposes, it does not require that the act has a specific purpose, only that there is a reason. Altogether, the WMA definition of torture is broader than those of the CAT and the IACPPT in several respects. However, it does not include methods that do not cause suffering and in this sense it is more restrictive than the IACPPT definition.

The fact that the WMA definition is, in general, broader than the legal definitions means that healthcare professionals that follow the medical definition may sometimes document as torture cases

⁵⁰ UN Committee Against Torture, *General Comment No. 2* (n 1) para 18.

⁵¹ *Maculan* (n 21) 472.

⁵² *Ibid* 473.

⁵³ *Ibid* 476.

⁵⁴ World Medical Association, *Declaration of Tokyo – Guidelines for Physicians Concerning Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment in Relation to Detention and Imprisonment* (2016) preamble.

that do not reach the requirements of the legal standards. This can be perplexing for torture survivors who are recognised as such from a medical, but not from a legal perspective. Rasmussen *et al* developed a Torture Screening Checklist to analyse narratives from alleged torture survivors according to the different criteria from three definitions of torture (WMA, CAT and United States' Torture Victims Relief Act definition, which is more restrictive).⁵⁵ They studied whether a sample of alleged victims meets the criteria for torture according to the three definitions. As expected, they found that more cases meet the criteria for the broader definitions than for the narrower definition, and that all the cases meeting the latter also meet the former.⁵⁶ This means that whether a particular case is considered torture or not may depend on the definition of torture that is used. The difference found between WMA and CAT is small,⁵⁷ but it has to be taken into account that they did not consider the severity of suffering as distinctive between WMA and CAT.

The majority of the medical and psychological research reports that deal with torture do not define it, and most of the remainder refer to the definition in legal standards or to the WMA definition.⁵⁸ Very few try to reach an unambiguous definition. This leads to a lack of clarity and consistency in the understanding of what constitutes torture, which in turn affects the documentation of cases by clinicians and the decisions taken by policy makers.⁵⁹

2.2. The meaning of severe pain or suffering

The importance of understanding the meaning of the term “severity” resides in that the degree of severity is a major criteria used in judicial decisions to determine whether the treatment suffered by a person amounts to torture or not. However, the term “severe” is subjective and relative.

2.2.1. Legal meaning

There is no legal definition of severity. An absolute degree of pain or suffering that sets the threshold to consider an act as torturous has not been established.⁶⁰ It is doubtful whether it can be established, given the subjectivity of the meaning of severe pain or suffering.⁶¹ We can only try to understand the legal meaning of severity by analysing the interpretation that judicial bodies make of this term. The

⁵⁵ Andrew Rasmussen and others, 'Screening for Torture: A Narrative Checklist Comparing Legal Definitions in a Torture Treatment Clinic' (2011) 219 *Journal of Psychology* 143.

⁵⁶ *Ibid* 146.

⁵⁷ *Ibid* 147.

⁵⁸ *Ibid* 143.

⁵⁹ *Ibid* 143.

⁶⁰ Maculan (n 21) 468.

⁶¹ Kelly (n 11) 333.

jurisprudence of the ECtHR illustrates the evolution of the meaning of torture, of the use of the term severe and of the distinction between torture and cruel or inhuman treatment. In *Ireland v UK*, the ECtHR admitted that the severity threshold is relative and 'depends on all the circumstances of the case, such as the duration of the treatment, its physical or mental effects and, in some cases, the sex, age and state of health of the victim, etc.'⁶² This means that both objective and subjective criteria must be taken into account.⁶³ As already mentioned in section 2.1.1, the ECtHR ruled that in *Ireland v UK* there had been inhuman and degrading treatment, but not torture.⁶⁴ In *Selmouni v France*, the ECtHR reiterated that the term 'severity' is relative and stated that acts that had previously been considered inhuman and degrading treatment 'could be classified differently in future'.⁶⁵ The Court found that the 'physical and mental violence' committed against Mr. Selmouni, which included repeated beatings and sexual assault, 'caused "severe" pain and suffering and was particularly serious and cruel' and therefore amounted to torture.⁶⁶ In *Dikme v Turkey*, a case that involved several methods of physical and psychological torture, the ECtHR followed a similar reasoning regarding the severity of the treatment to rule that the victim had been tortured.⁶⁷ In *Aktaş v Turkey* the ECtHR concluded that, when the result is death, there is no doubt that ill-treatment is 'particularly serious' and fulfils the criteria of torture.⁶⁸ The case of *Aydin v Turkey* is also relevant because the ECtHR held that rape in custody is 'an especially grave and abhorrent form of ill-treatment' that 'leaves deep psychological scars on the victim'⁶⁹ and, therefore, amounts to torture.⁷⁰ This suggests that some forms of maltreatment, such as those resulting in death or rape by public officials constitute torture *per se*, whereas in other cases it is necessary to evaluate whether the degree of severity reaches the threshold for torture.⁷¹ This evaluation must take into account not only the methods used, but also the general context in which they are applied, the duration and the vulnerability of the victim.⁷² In any case, the understanding of severity by the ECtHR and the Human Rights Committee includes not only the physical, but also the mental effects of the treatment.⁷³

⁶² *Ireland v UK* para 162.

⁶³ Maculan (n 21) 468.

⁶⁴ *Ireland v UK* para 167.

⁶⁵ *Selmouni v France* (1999) (ECtHR) 25803/94 paras 100-101.

⁶⁶ *Ibid* para 105.

⁶⁷ *Dikme v Turkey* para 96.

⁶⁸ *Aktaş v Turkey* para 319.

⁶⁹ *Aydin v Turkey* (1997) (ECtHR) 23178/94 para 83.

⁷⁰ *Ibid* para 86.

⁷¹ Maculan (n 21) 467-468.

⁷² Hernán Reyes, 'The Worst Scars Are in the Mind: Psychological Torture' (2007) 89 *International Review of the Red Cross* 591. 599.

⁷³ *Ireland v UK* para 162; UN Human Rights Committee (n 30) para 5.

2.2.2. Medical and psychological meaning

From a medical point of view, there is no objective method to measure the severity of pain or suffering.⁷⁴ The only way to assess it is by asking the person how severe the pain they are suffering or have suffered is. Although scales of pain can be used, what they measure is the 'subjective experience of pain'.⁷⁵ This is due to the fact that there is an enormous variation in pain sensitivity between different people.⁷⁶ Physical pain perception depends on multiple factors, such as age, gender, ethnicity and health, as well as genetic, psychological, social, cultural and environmental variables.⁷⁷ This means that there is much subjectivity in how pain is experienced; what causes unbearable pain for one person may be perceived as tolerable for another. The physical pain inflicted by a particular torture method can be completely different in different people. For example, while sleep deprivation may not seem to cause particularly severe suffering, as the ECtHR affirmed in *Ireland v UK*,⁷⁸ it can cause excruciating headache to people suffering from migraines.⁷⁹ It also causes cognitive, behavioural and health problems and, when it lasts for weeks, leads to death at least in animals.⁸⁰

If determining the severity of physical pain is particularly difficult, measuring that of mental suffering is even more complicated.⁸¹ How torture affects the victim from a psychological viewpoint depends more on the way the event is experienced than on the event itself.⁸² Many factors influence psychological severity, including preparedness for torture — for example, political activists in repressive regimes are often psychologically prepared for torture —, expectations and mental strength or resilience.⁸³ A combination of torture methods, for instance, beating a person when he or she is blindfolded, can increase the perception of severity because it amplifies the feeling of lack of control of the victim.⁸⁴ From a psychological perspective, the difficulty in defining what constitutes torture derives in part from

⁷⁴ Kelly (n 11) 333.

⁷⁵ Roger B. Fillingim, 'Individual Differences in Pain Responses' (2005) 7 *Current Rheumatology Reports* 342. 342.

⁷⁶ *Ibid* 342-343.

⁷⁷ Reyes (n 72) 596; Fillingim (n 75).

⁷⁸ *Ireland v UK* para 167.

⁷⁹ R. B. Lipton, W. F. Stewart and M. Von Korff, 'Migraine Impact and Functional Disability' (1995) 15 *Suppl Cephalalgia* 4, 4; L. Kelman, 'The Triggers or Precipitants of the Acute Migraine Attack' (2007) 27 *Cephalalgia* 394, 396.

⁸⁰ James E. Jan and others, 'Long-Term Sleep Disturbances in Children: A Cause of Neuronal Loss' (2010) 14 *European Journal of Paediatric Neurology* 380, 381.

⁸¹ Reyes (n 72) 595-598.

⁸² Stuart Turner and Caroline Gorst-Unsworth, 'Psychological Sequelae of Torture: A Descriptive Model' (1990) 157 *The British Journal of Psychiatry* 475. 475; Metin Başoğlu, Maria Livanou and Cvetana Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment: Is the Distinction Real or Apparent?' (2007) 64 *Archives of General Psychiatry* 277. 283.

⁸³ Metin Başoğlu and others, 'Psychological preparedness for trauma as a protective factor in survivors of torture' (1997) 27 *Psychological Medicine* 1421..

⁸⁴ Başoğlu, Livanou and Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82) 283; Pérez-Sales (n 19) 125.

insufficient understanding of '(1) the severity of mental suffering associated with particular stressors during detention or captivity, (2) the psychological mechanisms by which these stressors exert their traumatic impact, and (3) their long-term psychological effects.'⁸⁵ To understand the psychological severity of torture it is necessary to assess not only the subjective perception of the suffering, but also the context leading to torture (ethnic motivations, political persecution, etc), the type of relationship that is established between the torturer and the victim, and to which extent the torture methods disrupt identity.⁸⁶

Often, the severity of torture is measured by counting the different torture methods used and the number of torture events.⁸⁷ This does not take into account the severity of each method or the cruelty with which it has been used, and it does not answer the critical question about the severity of *pain or suffering*. According to Petersen and Morentin, '[t]he perceived severity of torture is determined by the use of combination of methods, the severity of the individual methods, the duration and repetitions of the torture sessions, the living conditions of detainees between the torture sessions and the constitution of the victim'.⁸⁸ This measure is focused mostly on the severity of the treatment, but takes into account how it can affect the victims due to their physical makeup. However, it does not take into consideration the victim's mental strength, resilience or sensitivity to pain, which are important factors in the severity of suffering. In principle, it could be expected that, in general, the harsher the treatment, the more severe the suffering in general, but there are results that challenge this expectation.

Başoğlu, Livanou and Crnobaric have proposed a measure of the 'objective severity of torture' based on the type of torture (physical or non-physical) and the number of torture methods.⁸⁹ This measure takes into account the severity of the treatment, rather than the severity of its effects. They have also measured the 'subjective severity of torture', which assesses the level of distress experienced and the perception of loss of control by the torture survivors, the feeling of being at the mercy of others.⁹⁰ This is a measure of the psychological impact and, therefore, takes into account the subjectivity of the physical and mental suffering. Their results indicate that the level of distress and helplessness caused

⁸⁵ Başoğlu, Livanou and Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82)278.

⁸⁶ Pérez-Sales (n 19) 4.

⁸⁷ Ibid.

⁸⁸ Hans Draminsky Petersen and Benito Morentin, 'Assessing the Level of Credibility of Allegations of Physical Torture' (2019) 301 *Forensic Science International* 263, 268.

⁸⁹ Başoğlu, Livanou and Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82) 282.

⁹⁰ Ibid 279, 282.

by diverse methods of psychological manipulation, humiliation and deprivation of basic needs is similar to that caused by the most distressing forms of physical torture.⁹¹ In addition, there is no clear relationship between the objective severity of torture and its long-term mental health effects, such as the development of post-traumatic stress disorder (PTSD) or depression.⁹² The likelihood that torture that inflicts physical pain causes PTSD is not higher than that of other forms of torture or ill-treatment.⁹³ This work also suggests that what increases the chances of developing PTSD and depression is 'perceived distress and uncontrollability of the torture stressors, rather than mere exposure to them'.⁹⁴ Therefore, long-term mental effects depend mainly on the perception of mental suffering.

A study that used mild versions of three forms of maltreatment — solitary confinement, sleep deprivation and exposure to cold temperature — found that people who are experiencing a mild version of the suffering caused by a particular torture method perceive that the severity of the method is greater than people who are not experiencing it do. The former are also more likely to oppose the practice or to consider it torture than the latter. The study also found that this is due to an underestimation of the suffering by the people who are not subjected to it.⁹⁵ This suggests that those who decide whether a person has been tortured probably underestimate the pain or suffering inflicted and set the severity threshold for torture higher than it should be. This calls for a re-evaluation of the degree of severity required to determine whether a particular treatment amounts to torture. It is certainly difficult to reconcile the difficulty in measuring the severity of pain or suffering with the legal need for certainty in understanding where the threshold for severe pain or suffering is.

Taking into account the complexity of determining the degree of severity and given that cruel, inhuman and degrading treatment is also prohibited by international human rights law, is it necessary or helpful to draw a line separating torture from other forms of ill-treatment?⁹⁶ Could it be counter-productive? On the one hand, as Tobias Kelly argues, establishing a boundary 'invites states to play games over where the line lies, rather than dealing with the issue of ill-treatment more broadly'.⁹⁷ On the other hand, there is a continuum in severity from the mildest forms of ill-treatment to the most

⁹¹ Ibid 279.

⁹² Ibid 279-282.

⁹³ Ibid 283.

⁹⁴ Ibid 283.

⁹⁵ Loran F. Nordgren, Mary-Hunter Morris McDonnell and George Loewenstein, 'What Constitutes Torture? Psychological Impediments to an Objective Evaluation of Enhanced Interrogation Tactics' (2011) 22 *Psychological Science* 689..

⁹⁶ Schulz (n 7) 270.

⁹⁷ Kelly (n 11) 341.

atrocious forms of torture. Would it not be arbitrary, then, to set the threshold at a particular level of severity? As has been mentioned in section 2.1.1, a better distinction between torture and cruel or inhuman treatment may be the existence of a purpose, rather than the level of severity.

3. Torture that leaves no marks

There are many forms of torture that only target the mind, not the body or, despite targeting the body, do not leave in it visible evidence of the violence used. These include white torture, no-touch torture, clean torture and psychological torture.

3.1 White torture, no-touch torture and clean torture

White torture has been defined as torture that deprives the victim of sensory stimuli. At first sight, one might think that this is not a severe treatment, but a person that is isolated from sight, hearing and touch inputs 'present[s] symptoms of confusion after just a few hours, signs of disintegration of personality after twenty-four hours, and hallucinations and psychotic symptoms after about two days'.⁹⁸ These effects can persist for a long time and there can even be permanent mental health consequences.⁹⁹ The term 'no-touch torture' has been used to include both sensory deprivation and sensory overload, as well as techniques that cause 'self-inflicted pain', that is to say, rather than inflicting pain from an external source, such as beatings, the victim has to endure pain from an 'internal source', such as a forced position.¹⁰⁰ Darius Rejali, has coined the term 'clean torture', which is physical torture 'that leave[s] few marks,' in contrast to 'scarring' torture,¹⁰¹ which results in broken bones, extensive bruises, wounds, burns or other physical damage. Despite being less visible and arousing less public opposition because it looks less brutal, clean torture is still a form of violence.¹⁰² There is a vast array of clean torture methods, such as positional stress, exhaustion exercises, sleep deprivation, hooding, sensory deprivation or sensory overload, exposure to cold or hot temperatures, waterboarding, several forms of beating (for example, with rubber hose or sandbags), electro-torture, etc.¹⁰³ Given that clean torture encompasses white and no-touch torture, as well as other torture

⁹⁸ Pérez-Sales (n 19) 8.

⁹⁹ Ibid 8.

¹⁰⁰ Ibid 8, 10.

¹⁰¹ Darius Rejali, *Torture and Democracy* (Princeton University Press 2007) 4.

¹⁰² James Ron, 'Varying Methods of State Violence' (1997) 51 *International Organization* 275. 283-284.

¹⁰³ Rejali (n 101) 553-556.

methods, the term clean torture will be used hereinafter. Many of these techniques produce intense physical pain and sometimes permanent physical damage, but they do not leave permanent marks in the body.¹⁰⁴

Rejali argues that there is a link between clean torture and democracy.¹⁰⁵ We tend to imagine that new torture methods emerge in repressive dictatorships. However, it often happens that dictators, instead of hiding their violent methods, use them openly to intimidate, or that torturers in repressive regimes do not worry about leaving physical evidence of torture because they are not held accountable.¹⁰⁶ Rejali suggests that it is mainly in democratic societies, in which the military, police and prison officers are under the scrutiny of human rights organisations, politicians, the media and the judicial system, where torturers resort to clean torture techniques.¹⁰⁷ When unscrupulous interrogators know they can be monitored, they fear prosecution and tend to turn more easily to methods that do not leave physical traces.¹⁰⁸ This is not only a personal choice, it is often state policy.¹⁰⁹ Rejali sees democracies, including Great Britain, The United States and France, as inventors and innovators in clean torture. From these countries, clean torture methods have expanded to many others.¹¹⁰ An increase in torture monitoring from the 1970s correlates with a shift in the torture methods used towards techniques that leave no visible traces of physical damage and this shift occurred first in democratic states.¹¹¹ For example, in the Basque Country, Spain, there has been a decrease in the use of scarring physical torture during the last four decades, together with a move towards the use of psychological torture, forced standing and forced physical exercise.¹¹² Israel moved from physical torture methods that often led to hospitalisation of the victim to techniques that avoid leaving traceable signs in the early 1990s, towards the end of the first intifada, when Israel and the Occupied Palestinian Territories were monitored by the press and human rights organisations.¹¹³ Torture methods used on Palestinians since then include 'round-the-clock body position abuse, sensory disruption, sudden and drastic temperature changes, isolation, and extended bouts of sleep deprivation,' all of which scarcely leave any physical evidence.¹¹⁴ The use of clean torture methods,

¹⁰⁴ Pérez-Sales (n 19) 190-192.

¹⁰⁵ Rejali (n 101) 3-5.

¹⁰⁶ Ibid 2; Reyes (n 72) 602.

¹⁰⁷ Rejali (n 101) 2-3.

¹⁰⁸ Ibid 9.

¹⁰⁹ Reyes (n 72) 602.

¹¹⁰ Rejali (n 101) 4-5, 406-407.

¹¹¹ Ibid 8-11; Kelly (11) 331.

¹¹² Petersen and Morentin (n 88) 266, 268.

¹¹³ Ron (n 102) 275-276, 282.

¹¹⁴ Ibid 286.

euphemistically called 'enhanced interrogation techniques', by United States' officials after the terrorist attacks of 11 September 2001 is well known.¹¹⁵ Techniques such as waterboarding and sensory deprivation are associated in our collective memory with torturing of detainees in Guantánamo Bay detention camp.

A problem associated with the transition from scarring to clean torture is that, due to the lack of visual impact of the latter, it is relatively easy for governments to try to legitimise it in order to justify its use. The transition to clean torture in Israel in the 1990s was accompanied by measures to make it appear more humane. Although admitting that violence was used in interrogations, state officials presented it as a calculated, restrained form of violence, which was standardised and monitored by the state. A clear hierarchy was established, in which only agents of a certain rank were allowed to use torture methods, chosen in an individual manner for each prisoner. The interrogation process was supervised by doctors and legal experts. The aim was to present the system as efficient, professional and rationalised, in order to legitimise the violence used.¹¹⁶ The change in United States' policies to allow clean torture a few years later has also contributed to change the public perception of at least certain forms of torture.

Torturers prefer low-tech over more sophisticated methods because they go undetected more easily and are cheaper and easier to maintain and transport.¹¹⁷ Many clean techniques, such as forced standing, waterboarding, exhaustion exercises and beating methods do not require any technology at all.

This type of torture is called clean because it does not leave visible marks in the body, but it cannot be considered clean in the sense that it does not have short and long-term effects in the survivors. For example, some forced stress positions, blindfolding and deprivation of some basic needs, such as prevention of urination or defecation cause a considerable level of distress, similar to some forms of physical torture.¹¹⁸ Several sexual torture methods, even without involving rape or physical violence, have been rated among the most distressful forms of torture.¹¹⁹ As already explained in section 2.2.2, the level of distress is linked to increased prevalence of PTSD and depression.¹²⁰ Although we tend to be more horrified by torture involving physical brutality, clean and psychological torture can be equally

¹¹⁵ Kelly (n 11) 327.

¹¹⁶ Ron (n 102) 284-289.

¹¹⁷ Rejali (n 101) 263.

¹¹⁸ Başoğlu, Livanou and Crnobarčić, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82) 280.

¹¹⁹ Ibid 280.

¹²⁰ Ibid 283.

harsh. For instance, torture survivors often describe that witnessing torture of family members, or the threat of torturing them, is worse than being tortured themselves.¹²¹ There is ample evidence in the literature that any type of torture can produce not only physical, but also severe mental health sequelae.¹²²

3.2 Psychological torture

We have seen in Chapter 2 the difficulty in defining torture. It is not easier to define psychological torture and, in fact, there is no agreement on its meaning.¹²³ There is debate on whether the definition should focus on the methods, on the effects or both.¹²⁴ As we will see in section 3.3, all torture methods, physical and non-physical, have psychological effects¹²⁵ and therefore a definition based only on the effects would include all forms of torture. In general terms psychological torture could be defined as torture that does not target the body but the mind. It does not cause physical pain or results in physical marks.¹²⁶ The IACPPT definition of torture, already presented in section 2.1.1, includes ‘the use of methods upon a person intended to obliterate the personality of the victim or to diminish his physical or mental capacities, even if they do not cause physical pain or mental anguish’.¹²⁷ Other definitions include ‘the administration or application, or threatened administration or application, of mind-altering substances or other procedures calculated to disrupt profoundly the senses or the personality’, as well as death threats and threats that another person will be killed or tortured.¹²⁸ Pau Pérez-Sales defines psychological torture as ‘the use of techniques of cognitive, emotional or sensory attacks that target the conscious mind and cause psychological suffering, damage and/or identity breakdown in most subjects subjected to them’.¹²⁹ These definitions take into account, by including the words ‘intended to’, ‘calculated to’ or ‘in most subjects’, that even if the most resilient survivors may not show psychological sequelae, the treatment must still be considered torture. It is the intention of the procedure, rather than the intention of the act itself or its consequences, what counts. Examples of psychological torture methods are humiliation, death threats, mock executions, threats that another person will be killed or tortured, witnessing torture of

¹²¹ Ibid 279; Pérez-Sales (n 19) 33-35.

¹²² Baçoğlu, Livanou and Crnobarić, ‘Torture vs Other Cruel, Inhuman, and Degrading Treatment’; Rasmussen and others (n 55) 143.

¹²³ Reyes (n 72) 595; Pérez-Sales (n 19) 7.

¹²⁴ Reyes (n 72) 594-595; Pérez-Sales (n 19) 7.

¹²⁵ Reyes (n 72) 595; Pérez-Sales (n 19) 7.

¹²⁶ Reyes (n 72) 598.

¹²⁷ ICPPT art 2.

¹²⁸ Physicians for Human Rights, *Break Them Down: Systematic Use of Psychological Torture by US Forces* (Physicians for Human Rights 2005) 19.

¹²⁹ Pérez-Sales (n 19) 8.

others, solitary confinement, violation of taboos and forced betrayal.¹³⁰ Some forms of psychological abuse, such as small humiliations and lack of privacy, may not amount to ill-treatment by themselves, but when combined with others and/or applied repeatedly or over long periods can constitute cruel, inhuman or degrading treatment or torture.¹³¹ Pérez-Sales emphasises the importance of taking into account the torture environment, and the fact that almost invariably several torture methods are used in combination, for understanding the psychological effects of torture.¹³²

There is some overlap between clean and psychological torture. For example, sensory disruption and sleep deprivation can fit in both categories because they have both physical and psychological components. Rejali contends that clean torture is physical, not psychological torture 'at all',¹³³ whereas Pérez-Sales considers that some methods, such as sensory deprivation and conditions of detention (overcrowding, lack of sanitary conditions, insects or vermin in cells), are mixed.¹³⁴ It is clear, as with the distinction between physical and non-physical torture, that there are techniques that fall clearly in the psychological category (threats, witnessing torture of others) or in the clean category (beatings that leave no marks, waterboarding, forced positions), whereas others are more difficult to classify. Sometimes there is confusion between clean and psychological torture and some forms of clean torture are labelled as psychological by torturers to make them appear less brutal.¹³⁵ However, psychological torture is not milder than physical cruelty. Solitary confinement, which clearly falls in the psychological category, is among the worst forms of torture, sometimes even considered the worst of all. A survivor who was held in solitary confinement in Uruguay for several years stated that '[e]lectricity [torture] is mere child's play in comparison to prolonged solitude'.¹³⁶ The critical issue is not setting boundaries between physical and psychological torture, given that all forms of torture affect the mind and some forms of torture cannot be indisputably ascribed to one category versus the other. As Pérez-Sales points out, 'the distinction between body and mind is artificial: the two are inseparably interconnected'.¹³⁷ What is crucial is the recognition of all these abuses as torture. Regardless of whether there is a boundary between clean and psychological torture, they share the important feature that they leave no visible marks in the body.

¹³⁰ Reyes (n 72) 598; Pérez-Sales (n 19) 308-309.

¹³¹ Rejali (n 101) 611-613.

¹³² Pérez-Sales (n 19) 284-285.

¹³³ Rejali (n 101) 381.

¹³⁴ Pérez-Sales (n 19) 76-77, 308.

¹³⁵ Rejali (n 101) 381.

¹³⁶ Reyes (n 72) 607.

¹³⁷ Pérez-Sales (n 19) 8.

In comparison with physical torture, clean and psychological torture have the advantage that they do not usually have severe consequences for the physical health of the survivors. Nevertheless, survivors of these types of torture can experience somatic symptoms, often headaches or pain in other parts of their bodies, which indicates that even psychological torture has physical effects.¹³⁸ In addition, survivors of clean and psychological torture can suffer social consequences, which in turn affect their mental health. When torture survivors have physical marks, it is easy to understand for their families and communities why they surrendered information to the torturers. When torture leaves no visible signs in the body, this is much more difficult to understand for most people. Survivors can then develop feelings of shame and guilt that can result in trauma.¹³⁹ The psychological effects, including trauma, of all types of torture are discussed in the next section.

3.3 Psychological effects of torture

The experience of extreme suffering that represents torture, be it physical or mental, has an emotional and psychological impact on the victim. However, neither all types of torture have the same effects, nor every survivor develops a psychiatric disorder.¹⁴⁰ There is a whole range of variation among survivors, from those experiencing a small impact and showing no difference in mental health relative to the general population to severe psychosis.¹⁴¹ Factors that affect the perception of physical pain and the severity of mental suffering have been presented in section 2.2.2. Similarly, the psychological sequelae of torture depend on the survivor's age, personality, resilience and interpretation of meaning, in addition to social, cultural and political factors.¹⁴² Regardless of whether the torture is physical or psychological, torturers want to cause fear, anxiety, distress and a feeling of helplessness in their victims, which can cause cognitive, behavioural and emotional problems.¹⁴³ They want to 'accomplish the purpose of the torturer against the will of the victim' by breaking the victim psychologically.¹⁴⁴ Torture survivors experience 'feelings of fear, shame, guilt and grief, as well as intense humiliation'.¹⁴⁵ The range of psychological sequelae of torture is extensive.¹⁴⁶ Some of the

¹³⁸ Office of the United Nations High Commissioner for Human Rights (OHCHR), *Istanbul Protocol: Manual on the Effective Investigation and Documentation of Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment*, vol no. 8 (United Nations 2004) para 245.

¹³⁹ Ron (n 102) 294-295.

¹⁴⁰ OHCHR (n 138) paras 234, 236.

¹⁴¹ Kelly (n 11) 333; Pérez-Sales (n 19) 130.

¹⁴² OHCHR (n 138); Metin Başoğlu, 'A Multivariate Contextual Analysis of Torture and Cruel, Inhuman, and Degrading Treatments: Implications for an Evidence-Based Definition of Torture' (2009) 79 *American Journal of Orthopsychiatry* 135, 137.

¹⁴³ OHCHR (n 138) para 235; Başoğlu, Livanou and Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82) 283.

¹⁴⁴ Turner and Gorst-Unsworth (n 82) 475. See also Pérez-Sales (n 19) 60.

¹⁴⁵ Reyes (n 72) 599.

most common symptoms include irritability, sleeplessness, memory and concentration impairment, re-experiencing the trauma, avoidance of anything recalling the torture events, anxiety, mood disorders, depression, suicidal thoughts, mistrust of others, and depersonalisation (feeling detached from one's body), many of which fit in the notion of disruption of the senses and personality.¹⁴⁷

Even if in some survivors torture does not derive in mental health symptoms, it is a traumatic event. As we have seen in section 2.2.2, there is no clear distinction between the severity of the trauma caused by the most brutal methods of physical torture and some forms of psychological torture.¹⁴⁸ The psychiatric symptoms of survivors of solitary confinement, a particularly traumatic form of torture, are especially severe and include, for instance, panic, hallucinations, paranoia, self-mutilation and depression.¹⁴⁹ The most prevalent trauma-related disorders among torture survivors are depression, PTSD and long-term or even permanent personality changes. It is not unusual for a survivor to have more than one disorder or to transition from one to another.¹⁵⁰ Most survivors suffer depression, which can include several of the following symptoms:

- (1) depressed mood;
- (2) markedly diminished interest or pleasure in all or almost all activities;
- (3) weight loss or change of appetite;
- (4) insomnia or hypersomnia;
- (5) psychomotor agitation or retardation;
- (6) fatigue or loss of energy;
- (7) feelings of worthlessness or excessive or inappropriate guilt;
- (8) diminished ability to think or concentrate;
- and (9) recurrent thoughts of death or suicide.¹⁵¹

Depression has been associated to the experience of loss resulting from torture. It can be loss of parts of the body, physical health, bodily functions, family, work or credibility. These losses have an emotional impact on the survivor and add, to the trauma of torture itself, that of being the cause of other distressful events.¹⁵²

Extreme stress, such as that suffered during torture, may lead to 'definite, significant and persistent' personality changes, which include alterations of the way the survivor perceives and relates to the world, others and him or herself, such as showing hostility, mistrust of others and social withdrawal; a feeling of loss of the purpose of existence, emptiness or hopelessness; difficulties in finding personal

¹⁴⁶ OHCHR (n 138) paras 241-259.

¹⁴⁷ Turner and Gorst-Unsworth (n 82) 475-476; OHCHR (n 138) paras 241-247; Reyes (n 72) 598-600, 602.

¹⁴⁸ Başoğlu, Livanou and Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82) 279-282.

¹⁴⁹ Reyes (n 72) 607.

¹⁵⁰ OHCHR (n 138) para 250, 255.

¹⁵¹ *Ibid* para 251.

¹⁵² Turner and Gorst-Unsworth (n 82) 477.

meaning or fulfilment; the constant impression of being under threat; and inflexible and maladaptive behaviours.¹⁵³ The dehumanisation and disintegration of the survivor's personality caused by torture, by affecting self-perception and the perception of others and the world, affects the relationship of the victims with their family and social environment, sometimes leading to disruption of their communities.¹⁵⁴ Moreover, the victim's family and community also suffer the traumatic effects of torture. They experience uncertainty and fear while the victim is tortured and have to face the reality of brutal violence very close to them.¹⁵⁵ The effects of torture are wider than those on the victims themselves.

The most frequent psychiatric disorder in torture survivors is PTSD.¹⁵⁶ The prevalence among survivors varies, in different studies, between 15 and 85 per cent, which is, even considering the lowest value, considerably higher than the prevalence of two per cent in the general population. Other studies have shown that PTSD is between three and six times more prevalent in tortured than non-tortured refugees.¹⁵⁷ PTSD comprises three groups of symptoms: 1) re-experiencing of the torture events, which can include intrusive thoughts, recurrent nightmares, feeling or acting as if the event were happening again, and severe distress when something reminds the event; 2) avoidance of anything that can recall or resemble the torture events, which can include avoidance of feelings, thoughts, conversations, people, places or activities that remind or are associated with the traumatic event; difficulties to recall details or important aspects of the torture experience; reduced interest or participation in significant activities; feelings of detachment or estrangement from others; and foreshortened sense of future; and 3) hyperarousal, which can include sleep disturbances, irritability or aggressiveness, concentration impairment, hypervigilance and exaggerated startle response.¹⁵⁸ It is important to stress that not developing PTSD does not mean that the person has not been tortured.¹⁵⁹ Neither does PTSD reflect the severity of the treatment. Some people subjected to extremely severe torture may not develop PTSD, whereas some people subjected to milder forms of torture may develop it.¹⁶⁰ However, the severity of mental suffering, measured as the distress experienced by the torture survivors and their perception of loss of control of the torture methods,

¹⁵³ OHCHR (n 138) paras 256-257. See also Turner and Gorst-Unsworth (n 82) 477-478.

¹⁵⁴ OHCHR (n 138) para 235; Pérez-Sales (n 19) 15.

¹⁵⁵ Turner and Gorst-Unsworth (n 82) 476, 478.

¹⁵⁶ OHCHR (n 138) para 252.

¹⁵⁷ Pérez-Sales (n 19) 134.

¹⁵⁸ OHCHR (n 138) paras 234-254.

¹⁵⁹ *Ibid* 255; Pérez-Sales (n 19) 145.

¹⁶⁰ Başoğlu, Livanou and Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82) 284.

correlates with greater likelihood of developing PTSD, as well as depression.¹⁶¹ Despite the fact that it is currently impossible to distinguish PTSD associated to torture from PTSD caused by other traumatic events, a PTSD diagnosis in a survivor is consistent with severe mental suffering and, together with other evidence, can be used to support torture claims.¹⁶² Nevertheless, PTSD does not reflect all the symptoms and components of the mental suffering of torture survivors, several of which have already been mentioned.¹⁶³

It has been suggested that the mechanisms by which different types of torture and ill-treatment cause traumatic stress are the same.¹⁶⁴ Both physical and psychological torture cause mental suffering.¹⁶⁵ The work of Başoğlu, Livanou and Crnobaric indicates that many forms of ill-treatment that do not inflict physical pain and leave no marks cause 'severe mental suffering' and, therefore, fall within the CAT definition of torture. These methods include humiliating treatment, deprivation of basic needs, hooding or blindfolding, movement restriction, and diverse psychological manipulations,¹⁶⁶ techniques that would have been classified before as degrading treatment or as cruel or inhuman. Therefore, there is no clear distinction between torture and other cruel, inhuman or degrading treatment in terms of the severity of mental suffering.¹⁶⁷ The severity of trauma does not depend on whether there are physical marks or not, but on the emotional impact it has on the survivor, measured as the degree of distress and feeling of loss of control.¹⁶⁸ Therefore, trauma seems to be mainly the result of distress and uncontrollability, regardless of the type of torture.

Given the effects of torture on the mental, and often physical, health of survivors, torture entails violations of the right to the highest attainable standard of health.¹⁶⁹ The Committee on Economic, Social and Cultural Rights has pointed at the close relationship between the right to health and other human rights, including the right to be free from torture.¹⁷⁰ Overall, any torture method causes severe mental suffering, which often results in long-term psychological and mental health sequelae, with profound effects on the survivor's life.

¹⁶¹ Ibid 279-283.

¹⁶² Reyes (n 72) 597.

¹⁶³ Pérez-Sales (n 19) 136.

¹⁶⁴ Başoğlu, Livanou and Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82) 283.

¹⁶⁵ Ibid 279; Reyes (n 72) 595.

¹⁶⁶ Başoğlu, Livanou and Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82) 284.

¹⁶⁷ Ibid 284.

¹⁶⁸ Ibid 279-283; Reyes (n 72) 600.

¹⁶⁹ ICESCR art 12.1.

¹⁷⁰ Committee on Economic, Social and Cultural Rights, *Substantive Issues Arising in the Implementation of the International Covenant on Economic, Social and Cultural Rights, General Comment No. 14* (2000) E/C.12/2000/4 para 3.

4. The need for biological markers when torture leaves no physical marks

Clean and psychological torture, which produce mental suffering and target the conscious mind, are increasingly being used instead of methods that leave marks.¹⁷¹ The idea behind this transition is to go unnoticed and try to afford impunity to the perpetrators. The view of the torturer and of those responsible for the torturing policies is: if you have no physical marks, it is much more difficult to prove that you have been tortured and therefore we will evade accountability. How can you demonstrate that you have not been allowed to sleep for days or that there was constant loud noise in your cell? How can you provide proofs that you have been threatened with death? In addition to the effect of torture itself, another effect of these torture methods is that the survivor can provide little evidence in order to claim justice, reparation and redress. Torture that leaves no marks often renders the survivor, and the families of those who do not survive the experience, defenceless. As Pérez-Sales explains, 'quite often the survivors lose hope that any credit will be given to their claims'.

This type of torture also has less public impact, resulting in less pressure on states to change their laws, policies and practices. Rejali, referring to the beating and tasing of Rodney King by Los Angeles police officers on 3 March 1991, states:

A democratic public may be outraged by violence it can see, but how likely is it that we will get outraged about violence like this, that may or may not leave traces, violence that we can hardly be sure took place at all? A victim with scars to show to the media will get sympathy or at least attention, but victims without scars do not have much to authorize their complaints to a skeptical public... [W]hat precisely can a trial focus on with electric shocks that leave few marks?¹⁷²

The same problems exist when physical torture leaves marks but they have disappeared by the time the survivor is examined by a health professional. For instance, in *Selmouni v France* the applicant alleged that he had been anally raped with a truncheon.¹⁷³ Although the ECtHR ruled that he had been subjected to other torture methods,¹⁷⁴ rape could not be proven because 'the allegation was

¹⁷¹ Rejali (n 101) 194; Pérez-Sales (n 19) 307.

¹⁷² Rejali (n 101) 2.

¹⁷³ *Selmouni v France* paras 24, 82.

¹⁷⁴ *Ibid* paras 98-105.

made too late for it to be proved or disproved by medical evidence.¹⁷⁵ The allegation of rape was made one year after the abuses took place and the medical examination was performed six months after the allegation. Mr. Selmouni explained that he had not mentioned the rape before because 'he felt ashamed of it'.¹⁷⁶ Had this been the only torture method he had suffered, his allegation of torture would have been dismissed.

It is far more difficult to monitor, detect and prosecute clean and psychological torture than torture that causes physical injuries, despite the fact that all of them can have similarly severe effects on mental health. This leaves survivors of no-marks torture with scarce possibilities of obtaining justice and redress. It is also more likely that perpetrators remain unpunished, reinforcing their belief that their acts are not unlawful. Preventing the use of these coercion methods is also a daunting task. It is, therefore, of paramount importance to find ways to document cases of this type of torture.

The narrative of torture survivors is often 'circuitous, devious and evasive' rather than linear.¹⁷⁷ Torture, as an extremely distressful event, is unspeakable and, therefore, particularly difficult to recount.¹⁷⁸ Survivors' testimonies can at times show inconsistencies and may not be able to provide precise details about the date, location or perpetrators. This can be the result of numerous factors, such as the psychological or neurological sequelae of torture, which can include memory impairment associated to PTSD or due to brain damage; the survivor's coping mechanisms, which include trying to forget, consciously or unconsciously, the torture event; the circumstances of torture, such as if the victim was blindfolded, drugged or lost consciousness; fear of putting themselves or others at risk; mistrust in the interviewer or health professional; and cultural norms that prevent the survivor from revealing a traumatic experience beyond his or her closest circle.¹⁷⁹

The absence of physical signs of torture, together with the inability to provide a clear narrative of the torture events, often puts into question the credibility of torture allegations. Credibility can also be undermined by the fact that, more often than not, torturers avoid the presence of witnesses who could confirm that torture has been committed.¹⁸⁰ To address these problems, in the last two decades there has been an effort to develop tools that can assess the credibility of torture narratives. The Istanbul Protocol, the main reference for the documentation of cases of torture and other forms of ill-treatment,

¹⁷⁵ Ibid para 90.

¹⁷⁶ Ibid paras 24, 31.

¹⁷⁷ Barry Roth, 'How Do You Know when It Is Torture?' (2013) 32 *Medicine and Law* 327, 335.

¹⁷⁸ Pérez-Sales (n 19) 312.

¹⁷⁹ OHCHR (n 138) 142, 241, 254; Reyes (n 72) 601.

¹⁸⁰ Pérez-Sales (n 19) 310.

provides guidelines not only for investigating torture cases and recording physical and psychological sequelae, but also for analysing the credibility of torture allegations.¹⁸¹ In this case, credibility does not refer to the survivor's honesty, but to the 'credibility of an individual's report of torture', that is, the credibility of the main facts of the torture event and its consequences for the survivor's health.¹⁸² The Istanbul Protocol states that in survivors that develop PTSD, difficulties in remembering specific details should be seen as supporting the credibility of torture allegations, rather than undermining it, given that the inability to recall details of the torture event is one of the symptoms of PTSD.¹⁸³ Tools to improve the credibility assessment of the Istanbul Protocol have recently been proposed.¹⁸⁴ However, despite the fact that credibility assessments can be the only evidence that many survivors have to support their legal cases,¹⁸⁵ judges can refuse to accept credibility assessments in legal proceedings because they consider that only the court can decide on this.¹⁸⁶ In addition, it has to be taken into account that there can be considerable variation in the level of credibility determined by different observers and this can be the case even when there is physical evidence of torture.¹⁸⁷ Credibility assessments, then, are relevant to support torture allegations, but often are not sufficient by themselves.

Psychological assessments are of paramount importance in evaluating the severity of suffering caused by torture.¹⁸⁸ However, there is always an element of subjectivity in this type of assessments and they can be manipulated, especially if the expert is not independent. An example of this is the case of *Olivier Acuña Barba v Mexico*, a journalist arbitrarily arrested in Culiacán, State of Sinaloa, Mexico and subjected to physical and psychological torture by police officers.¹⁸⁹ A medical report issued by Dr. Rolando González Altamirano, adviser of the Human Rights Commission of the State of Sinaloa, observed that Mr. Acuña Barba, who talked about killing himself, presented anxiety and depression symptoms. This report concluded that Mr. Acuña Barba had been subjected to torture.¹⁹⁰ There was disagreement between this report and several medical-psychological assessments performed by experts appointed by different state agencies that were not independent of the

¹⁸¹ OHCHR (n 138).

¹⁸² Ibid para 264. See also Pérez-Sales (n 19) 310-311.

¹⁸³ OHCHR (n 138) para 253.

¹⁸⁴ Pérez-Sales (n 19) 314-316.

¹⁸⁵ Ibid 313.

¹⁸⁶ Anthony Good, "Undoubtedly an Expert"? Anthropologists in British Asylum Courts' (2004) 10 The Journal of the Royal Anthropological Institute 113, 119-122..

¹⁸⁷ Petersen and Morentin (n 88) 266.

¹⁸⁸ OHCHR (n 138) 260-261.

¹⁸⁹ *Olivier Acuña Barba v Mexico - Updated petition* (1 May 2018) (Inter-American Commission on Human Rights) Petition P463-05/Case 13.432.

¹⁹⁰ Ibid para 40.

institution charged with torture.¹⁹¹ However, on the basis of the latter reports, the *Procuraduría General de Justicia* (Attorney General Office) of the State of Sinaloa concluded that Mr. Acuña Barba had not been subjected to torture.¹⁹² This case has not been decided yet, but a recent independent medical report concludes that Mr. Acuña Barba shows severe psychological symptoms resulting from the torture events and that only the report issued by Dr. Rolando González Altamirano has the independence and objectivity required in this type of reports.¹⁹³

In the light of all of the above, an important challenge is to obtain additional evidence of torture, especially when there are no physical marks. Pérez-Sales points to the necessity of finding biological markers associated with psychological torture and that can discriminate, if possible, torture from other types of trauma. The idea is to find specific and objective evidence of torture and of the severity of its effects.¹⁹⁴ Given that torture affects brain functioning, methods that analyse neural activity have the potential to provide relevant information. Neuroimaging techniques (such as functional magnetic resonance imaging and computed tomography scans), analyses of neural activity using electroencephalograms, analyses of neuroendocrine substances (especially cortisol), and neuropsychological tests that evaluate memory, attention and cognition could be useful. There is research, using neuroimaging procedures, that suggests that the size of certain brain areas (the hippocampus, the amigdala and the pre-frontal cortex) related to memory, attention, control of cognitive actions, and emotional learning is different in people with PTSD from that in traumatised people without PTSD or non-traumatised controls. However, it is not clear whether these results are conclusive. In other studies, analyses of neural activity suggest that individuals with PTSD or torture survivors show specific activation patterns in response to disturbing stimuli. Although these results are promising, sometimes they are difficult to interpret.¹⁹⁵ Moreover, neuroimaging procedures are expensive and require specialised equipment and, therefore, depending on the context, torture survivors may not have access to them.

The levels of cortisol, a steroid hormone involved in stress responses, are altered in people who have suffered trauma. Several studies have shown increased cortisol levels in PTSD patients compared to

¹⁹¹ Ibid para 213.

¹⁹² Ibid para 225.

¹⁹³ Ibid paras 6, 67, 110-112.

¹⁹⁴ Pérez-Sales (n 19) 125-126.

¹⁹⁵ Ibid 125-128.

non-traumatised people, while other studies have shown reduced levels.¹⁹⁶ These apparently inconsistent results have been merged into a model that proposes that, following a traumatic event, there is an initial phase of cortisol increase followed by a long-term decrease. The model also proposes that lower cortisol levels increase the risk of developing PTSD when a person is exposed again to trauma.¹⁹⁷ A study that included torture survivors did not find a difference in the response of cortisol levels to trauma reminders between the tortured and non-tortured groups, both of which had PTSD.¹⁹⁸ Therefore, changes in cortisol levels are associated to trauma, but cannot be used to distinguish torture from other types of trauma. Altogether, it can be concluded that, despite the need to find physical evidence of torture when there are no visible signs in the body, so far no specific biological markers of torture have been found. In the next chapter, the potential of state-of-the-art molecular biology techniques, in particular epigenetic methods, to provide evidence of torture will be analysed.

5. The potential of epigenetic marks as biological markers of torture

5.1 What are epigenetic marks?

To understand what epigenetics is, first we need to understand genetics. Our genetic information is contained in our DNA, which is present in all the cells of our body. The DNA can be understood as containing a language (the genetic code) and the set of genes of an organism can be understood as a handbook of life written in this language. The DNA contains the instructions to make a living being. Your genetic information carries the instructions to make you and not any other person or any other living being. But you are not only what your genes determine; you are the result of the interaction between your genes and the environment, between your genes and your experiences.¹⁹⁹ We can understand a gene as an instruction. For example, we have a gene with the instruction to make insulin, which is involved in sugar metabolism and the control of blood sugar levels.²⁰⁰ A genetic change — what is called a mutation, that is, a change that affects the information contained in the

¹⁹⁶ Susann Steudte-Schmiedgen and others, 'An Integrative Model Linking Traumatization, Cortisol Dysregulation and Posttraumatic Stress Disorder: Insight from Recent Hair Cortisol Findings' (2016) 69 *Neuroscience & Biobehavioral Reviews* 124, 125.

¹⁹⁷ *Ibid* 130.

¹⁹⁸ Hannah Gola and others, 'Victims of Rape Show Increased Cortisol Responses to Trauma Reminders: A Study in Individuals with War- and Torture-Related PTSD' (2012) 37 *Psychoneuroendocrinology* 213, 216-217.

¹⁹⁹ William S. Klug and others, *Concepts of Genetics* (12th edn, Pearson 2019) 85.

²⁰⁰ Harvey Lodish and others, *Molecular Cell Biology* (6th edn, WH Freeman and Company 2008) 17.

gene²⁰¹ — in the insulin gene can render insulin inactive, leading to diabetes.²⁰² There are instructions, those that are absolutely essential for life, that are given constantly. Other instructions are given at a particular moment, under particular circumstances or at particular places. For example, the genes responsible for the production of prolactin, involved in the production of milk, are activated during pregnancy;²⁰³ some genes responsible for fighting against infections are activated when we contract an infectious disease;²⁰⁴ and the insulin gene is only active in certain pancreatic cells.²⁰⁵ The instructions can be given in many different ways: suddenly, gradually, urgently, shouting, whispering, etc. This means that genes can be active or inactive and their activity levels can be fine-tuned in a very dynamic way. When a gene is active we say that it is expressed because, as the DNA contains a language, it can be “spoken”. Gene expression is the technical term to refer to gene activity.

Epigenetics refers to features of the DNA that affect gene activity without changing the genetic information contained in it.²⁰⁶ The prefix “epi” means “on”, “over”, “upon”, “above” or “on top of”. For example, the epidermis is the outer layer that is on top of the other skin layers. Epigenetic marks are elements that sit on the DNA, that are bound to the DNA and can be added or removed in a very dynamic way. We can understand epigenetic marks as tags that are attached to the DNA and give orders to modulate gene expression.²⁰⁷ There are several types of tags; some of them make genes more active, whereas others reduce their activity or turn them silent. The type, number and position of tags in a gene determine its activity.²⁰⁸ Epigenetic change, that is, the addition or removal of epigenetic marks from a gene, is a natural process that contributes to the regulation of gene expression.²⁰⁹ There is clear evidence that gene expression can change in response to the environment, for example, in response to temperature or nutrition.²¹⁰ The environment affects gene expression in part through epigenetic changes.²¹¹

There are several types of epigenetic marks. Some of them bind directly to the DNA, whereas others bind to components associated to the DNA called histones.²¹² The main mark directly bound to the

²⁰¹ Klug and others (n 199) 5.

²⁰² Lodish and others (n 200) 660.

²⁰³ Ibid 672.

²⁰⁴ Ibid 1075-1076.

²⁰⁵ Ibid 17.

²⁰⁶ Klug and others (n 199) 434.

²⁰⁷ Ibid 434.

²⁰⁸ Ibid 439.

²⁰⁹ Ibid 434.

²¹⁰ Ibid 82, 446.

²¹¹ Ibid 446.

²¹² Ibid 434-436.

DNA is called DNA methylation, which is a stable epigenetic mark that reduces or silences gene expression.²¹³ For example, expression of the insulin gene is regulated by DNA methylation and this determines that this gene is expressed only in specific pancreatic cells, those in which the gene is not methylated, allowing the gene to be active.²¹⁴

5.2 Stress and trauma are associated with epigenetic changes

Numerous studies have found that epigenetic changes, in particular DNA methylation, are associated to stress and trauma. Some of these investigations have analysed methylation in the whole set of genes, whereas others have analysed methylation in specific genes that are involved in responses to stress or trauma.²¹⁵ The main candidate genes analysed so far in relation with traumatic stress are those with the instructions to produce the glucocorticoid receptor and the serotonin transporter. The glucocorticoid receptor binds steroid hormones, mainly cortisol, and is involved in responses to stress and, in mice, in the regulation of anxiety, aggression and cognitive performance.²¹⁶ The serotonin transporter is involved in the function of serotonin, a neurotransmitter, which has been related with depressive disorders.

There are a number of studies showing correlation between certain epigenetic marks in adults and childhood trauma, including early parental loss, physical and sexual abuse.²¹⁷ Not only does this indicate that traumatic stress is associated with epigenetic changes, it also shows that these changes persist for years, at least when the traumatic events take place in early life. In a study of DNA methylation levels in the glucocorticoid receptor gene, higher methylation levels were found in adult persons that had been sexually abused during childhood than in non-sexually abused persons. Similarly, physical abuse, physical neglect, emotional abuse and emotional neglect during childhood were associated with high methylation levels in this gene.²¹⁸ Interestingly, this study also found a correlation between increased severity of sexual abuse²¹⁹ and increased DNA methylation in the glucocorticoid receptor gene, and between higher number of abuses and increased methylation in this

²¹³ Jaenisch and Bird (n 13) 245.

²¹⁴ Akio Kuroda and others, 'Insulin Gene Expression is Regulated by DNA Methylation' (2009) 4 PLOS ONE e6953.

²¹⁵ Vinkers and others (n 14) 1.

²¹⁶ E. Ron de Kloet, Marian Joëls and Florian Holsboer, 'Stress and the brain: from adaptation to disease' (2005) 6 Nature Reviews Neuroscience 463, 464, 470.

²¹⁷ Vinkers and others (n 14) 3-4.

²¹⁸ N. Perroud and others, 'Increased Methylation of Glucocorticoid Receptor Gene (NR3C1) in Adults with a History of Childhood Maltreatment: A Link with the Severity and Type of Trauma' (2011) 1 Translational Psychiatry e59. 5-7.

²¹⁹ For example, sexual abuse with penetration compared with sexual abuse without penetration. Ibid. 5.

gene,²²⁰ suggesting that high levels of certain epigenetic marks might be used not only as biological markers of trauma, but also as indicators of the objective severity of the abuse, at least when the traumatic experience takes place in early life. It would be interesting to investigate whether these epigenetic changes also correlate with the mental severity of trauma. These results, which were obtained using blood samples, extend previous work done with brain samples of suicide victims with a history of childhood abuse, which also showed higher methylation levels in the glucocorticoid receptor gene than those of non-abused suicide victims.²²¹ As blood samples show similar results to brain samples, it is not necessary to use brain samples for this type of research, and, therefore, it is possible to study epigenetic changes in living persons. Increased methylation of the glucocorticoid receptor gene is associated with reduced expression of this gene in the brain, which strongly suggests that these epigenetic changes result in changes in gene activity that can affect the response to stress.²²² Research from a different group has found that higher methylation levels of the glucocorticoid receptor gene are associated with clinical severity in borderline personality disorder patients with a history of childhood trauma.²²³ Therefore, at least two studies have found correlations between methylation of this gene and severity, although in one case severity refers to the treatment and, in the other, it refers to clinical symptoms. It is not clear yet whether there is association with the severity of suffering.

Studies of epigenetic marks in other genes, including the serotonin transporter gene, have also shown an association of epigenetic changes with childhood trauma, although a few studies have not found such correlation.²²⁴ Several studies have performed global analyses of DNA methylation in the whole set of human genes and have found changes in DNA methylation levels in numerous genes in individuals who had suffered childhood abuse. In these cases, the epigenetic changes can be higher or lower levels of marks relative to control individuals who had not experienced trauma.²²⁵ In addition to all these studies with people exposed to trauma in early life, a few studies have suggested

²²⁰ Ibid 5-7.

²²¹ Patrick O. McGowan and others, 'Epigenetic Regulation of the Glucocorticoid Receptor in Human Brain Associates with Childhood Abuse' (2009) 12 *Nature Neuroscience* 342. 343-344.

²²² Ibid 343.

²²³ Ana Martín-Blanco and others, 'Association Between Methylation of the Glucocorticoid Receptor Gene, Childhood Maltreatment, and Clinical Severity in Borderline Personality Disorder' (2014) 57 *Journal of Psychiatric Research* 34.

²²⁴ Vinkers and others (n 14) 4.

²²⁵ Ibid 2-3.

associations between lower methylation of the glucocorticoid receptor gene and war-related trauma in veterans with PTSD, although further controls would be necessary to reach sound conclusions.²²⁶

Different types of trauma or stress can share certain epigenetic changes. For example, higher levels of methylation in the glucocorticoid receptor gene have consistently been associated with childhood trauma, including sexual, physical and emotional abuse. In some cases, epigenetic marks change in different parts of the same gene. However, it has to be taken into account that the methods used differ between studies and therefore the results are not directly comparable, which might explain some of the differences found between them.²²⁷ Although not all studies have found correlations between changes in DNA methylation and traumatic stress, and not always there is consistency between studies (for instance, regarding the position in the gene where the epigenetic changes are found), there is increasing evidence supporting this type of correlation. The field of epigenetics is young and rapidly evolving. Although many findings need further confirmation or development, it is a field with a very promising future.

5.3 Have epigenetic methods been used to provide evidence of torture?

The association of epigenetic changes with traumatic and stressful events has led to naming these changes 'molecular scars'.²²⁸ Given that torture is an extreme form of trauma, it is conceivable that it is also associated with this type of scars in the victim's DNA. It would be feasible, then, to test whether torture survivors show stress- or trauma-related epigenetic changes and, if this were the case, whether the changes associated with torture can be distinguished from those associated with other types of trauma. It would also be possible to test whether more traumatic forms of torture correlate with higher or lower levels of epigenetic marks. The fact that changes in epigenetic marks, such as DNA methylation, can persist into adulthood after a history of childhood trauma,²²⁹ suggest that traumatic events may be traced in the DNA after several decades. Therefore, if such marks were associated with torture, it might be possible to detect them years after the torture event took place. Molecular scars might persist for a longer time than some physical scars and might be present even in survivors of torture that leaves no other visible marks. If this were the case, torture survivors would

²²⁶ Ibid 4.

²²⁷ Ibid 5-6.

²²⁸ Nadia M. Tsankova and others, 'Sustained hippocampal chromatin regulation in a mouse model of depression and antidepressant action' (2006) 9 *Nature Neuroscience* 519, 523.

²²⁹ McGowan and others (n 221); Perroud and others (n 218).

have the possibility of providing scientific evidence consistent with torture even if years have passed and physical marks have disappeared or never existed.

Despite the potential of epigenetic methods to provide evidence of torture, a bibliographic search of the PubMed database, one of the most extensive databases of biomedical and life sciences references, using the combined terms “torture” and “epigenetics” or “torture” and “DNA methylation” retrieved only two references, none of which addressed an epigenetic analysis in torture victims. Searches using the terms “torture” and “histone mark”, “histone modification” or other specific terms for histone marks²³⁰ did not retrieve any reference. Similar searches were performed using the search engine Google Scholar. “Torture” and “DNA methylation” retrieved 1520 results, of which the first 70 (sorted by relevance) were checked. “Torture” and “DNA methylation” retrieved 531 results, of which the first 70 (sorted by relevance) were checked. The other combinations of terms retrieved a total of 156 results, all of which were checked. The only relevant reference found among all the checked references retrieved using Google Scholar is a study of Holocaust survivors and their adult offspring. This study shows that Holocaust survivors have increased DNA methylation levels in a gene called *FKBP5*, whereas their offspring show reduced levels.²³¹ Holocaust survivors witnessed or experienced torture, but it is impossible to separate the effects of torture from those of the complex traumatic experiences suffered in the Nazi concentration camps. Therefore, this study cannot be considered an analysis of epigenetic marks in torture survivors. From the analyses of the references retrieved using PubMed and Google Scholar, it seems unlikely that there is any published report on the use of epigenetic methods to provide evidence of torture.

5.4 Advantages and limitations of epigenetic methods and ethical considerations

The use of DNA analyses has meant a remarkable improvement for forensic genetics not only in criminal, but also in human rights investigations.²³² Forensic epigenetics is an emerging area of forensics that is already being used to try to determine, using biological samples, the age of a person

²³⁰ The following terms, which refer to the known types of histone modifications, were used in combination with “torture”: histone methylation, histone acetylation, histone ubiquitination or ubiquitylation, histone sumoylation and histone phosphorylation (e.g. “torture” and “histone methylation”).

²³¹ Rachel Yehuda and others, ‘Holocaust Exposure Induced Intergenerational Effects on *FKBP5* Methylation’ (2016) 80 *Biological Psychiatry* 372.

²³² Robert H. Kirschner and Karl E. Hannibal, ‘The Application of the Forensic Sciences to Human Rights Investigations’ (1994) 13 *Medicine and Law* 451.; Robin Williams and Matthias Wienroth, ‘Social and ethical aspects of forensic genetics: A critical review’ (2017) 29 *Forensic Science Review* 146.

and to differentiate between identical twins.²³³ It would be worth testing whether this area can be extended to the documentation of torture. The idea would not be to replace other forms of evidence already available, but to provide additional proofs consistent with the torture suffered, especially when there is no other physical evidence. If epigenetic methods were useful to provide evidence of torture, they might be considered in the future for inclusion in the Istanbul Protocol.

Taking into account that different environmental factors result in epigenetic changes in different genes,²³⁴ it can be speculated that different types of torture might be associated with epigenetic changes in different sets of genes. For example, sleep deprivation might affect genes involved in the regulation of sleep/wake cycles, positional stress might affect genes involved in muscle function, and death or torture threats might affect genes involved in fear responses. Perhaps, then, certain epigenetic changes might be diagnostic of particular torture methods, whereas changes in genes responsible for general responses to trauma would not be distinctive of torture. Given the effect of epigenetic changes on gene expression,²³⁵ if torture were associated with this type of changes, it might also be interesting to analyse gene expression in torture survivors, especially for genes that show torture- or trauma-associated epigenetic changes. Although we are still far from understanding the effect of trauma-associated epigenetic changes on health, physiology and behaviour, future research may shed light on this and therefore open avenues to help mitigate the effects of trauma in torture survivors, contributing to their rehabilitation.

Higher levels of DNA methylation have been associated with the severity of trauma-related clinical symptoms. Perhaps epigenetic methods might help determine the severity of torture. However, even if epigenetic methods could give a measure of the severity of suffering, it would not be easy to establish a severity threshold. There is a continuous gradation of severity, measured as the level of distress and perceived uncontrollability of the torture methods, from the mildest forms of degrading treatment to the cruellest forms of psychological and physical torture²³⁶. The work of Başıoğlu, Livanou and Crnobaric indicates that there is no clear distinction, in terms of severity of suffering, between torture and cruel, inhuman or degrading treatment.²³⁷ For example, some forms of degrading treatment, such

²³³ Athina Vidaki and Manfred Kayser, 'Recent progress, methods and perspectives in forensic epigenetics' (2018) 37 *Forensic Science International Genetics* 180.

²³⁴ Klug and others (n 199) 446-447.

²³⁵ *Ibid* 434.

²³⁶ Başıoğlu, Livanou and Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82) 280.

²³⁷ *Ibid* 279.

as throwing urine or faeces at the victim, cause as much distress as physical abuses clearly recognised as forms of torture, such as inserting needles under fingernails.²³⁸

An important limitation of the epigenetic analyses of trauma performed so far is that only correlations have been found. It has not been established yet whether there is a causal relationship between trauma and epigenetic changes.²³⁹ Given that it is not possible to perform trauma experiments for obvious ethical reasons, it will be very difficult to establish whether the epigenetic changes result from the trauma experienced. In addition, the task of associating epigenetic marks specifically with torture, rather than with other traumatic events in a particular survivor, may find the same challenges as associating PTSD with torture. For example, in the case of refugees who have experienced torture, the process of migration very often involves traumatic events and this makes virtually impossible to know whether PTSD is the result of torture or other traumas.²⁴⁰ If this were the case, epigenetic changes would not be diagnostic of torture. Nevertheless, they might still provide evidence consistent with torture, which would be helpful when there is no other physical proof. Another limitation is that epigenetic methods, in principle, cannot determine the time when the epigenetic changes occurred. In addition, some of the methods are expensive and require specialised equipment, but DNA technologies are evolving rapidly and become cheaper in a relatively short time. Another relevant issue is the method used to analyse epigenetic marks. In the case of DNA methylation, several methods are available and the results obtained by more than one method are not always consistent.²⁴¹ It would be necessary to establish laboratory standards in order to ensure the effectiveness of the investigations and the robustness and reliability of the results.

An important question that needs to be answered is whether the epigenetic changes are caused by the traumatic event itself or by the perceived distress caused by the event. In the case of torture, as we have seen in section 2.2.2, traumatic stress is related to subjective severity rather than objective severity and, therefore, is not directly caused by the torture event itself, but by its perceived stressfulness and uncontrollability.²⁴² In this regard, not all torture survivors experience mental disorders.²⁴³ Similarly, it can be hypothesised that epigenetic alterations might not be present in every tortured person. Therefore, if epigenetic changes were not found in some torture survivors, this would

²³⁸ Ibid 280.

²³⁹ Vinkers and others (n 14) 7.

²⁴⁰ Rasmussen and others (n 55) 148.

²⁴¹ Vinkers and others (n 14) 5-6.

²⁴² Başoğlu, Livanou and Crnobaric, 'Torture vs Other Cruel, Inhuman, and Degrading Treatment' (n 82) 279-283.

²⁴³ OHCHR (n 138) para 236.

not mean that they have not experienced torture. As the Istanbul Protocol states, absence of evidence does not mean evidence of absence.²⁴⁴

Epigenetic marks can vary across tissues, but the type of tissue samples that can be obtained from living individuals is limited. Samples that have been used to study trauma-related epigenetic analyses include saliva and buccal epithelial cells, which can be collected by mouth rinse, a non-invasive and painless method, and blood.²⁴⁵ It is not known how the results obtained in these tissues correlate with other tissues, such as the brain, although the results obtained for the glucocorticoid receptor gene in blood seem consistent with those obtained in the brain.²⁴⁶ The type of samples that can be used would not be a limitation when torture results in death, as long as samples can be collected from the victim. There is evidence that epigenetic changes associated with early-life trauma can be detected post-mortem.²⁴⁷

The same ethical concerns as in any scientific research done with human samples have to be taken into account. All the bioethics principles, such as those established in the Declaration of Helsinki and in the Convention on Human Rights and Biomedicine, must be respected.²⁴⁸ These include, for instance, avoiding all unnecessary physical and mental suffering; obtaining free and informed consent; and allowing the subjects to withdraw from the experiments or withdraw their consent when desired. It is essential to bear in mind that torture survivors can be especially vulnerable and, therefore, the highest ethical standards must be observed. Also, re-traumatisation must be avoided. The collection of samples must be done using the least invasive procedure. For example, if saliva samples can be used, it is preferable to blood samples. The methods to analyse some epigenetic marks, such as DNA methylation, involve revealing at least part of the DNA sequence (the genetic information) of the subject. It is well known that insurance companies increase the insurance premium or refuse to insure people with a genetic predisposition to certain diseases. Torture survivors must be protected from the use against them of their genetic and epigenetic information revealed by these methods. It will be crucial to guarantee data privacy and confidentiality of all information collected from torture survivors, including genetic and epigenetic information.

²⁴⁴ Ibid para 161.

²⁴⁵ Vinkers and others (n 14).

²⁴⁶ McGowan and others (n 221); Perroud and others (n 218).

²⁴⁷ McGowan and others (n 221); Benoit Labonté and others, 'Genome-wide Epigenetic Regulation by Early-Life Trauma' (2012) 69 Archives of General Psychiatry 722.

²⁴⁸ Convention for the Protection of Human Rights and Dignity of the Human Being with Regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine (1997) ETS No. 164; World Medical Association, *Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects* (World Medical Association 2013).

Finally, before epigenetic methods can be used to provide evidence of torture, extensive discussions with different experts, including epigenetics scientists, health professionals specialised in the assessment and treatment of torture survivors, forensic scientists, bioethicists, and legal experts must be undertaken. Also, it would be essential to take into account the perspective of torture survivors, as they would be the direct beneficiaries of the application of these scientific methods.

6. Conclusion

The definition of torture is problematic because it includes as an essential element the severity of physical and mental suffering, which is subjective and therefore very difficult to measure. The distinction between torture and cruel, inhuman or degrading treatment or punishment is also problematic because these other forms of ill-treatment have not been defined. Although the jurisprudence of the ECtHR has tried to distinguish between them, studies on the psychological effects of torture and ill-treatment indicate that the severity of their traumatic effects cannot be distinguished. Even if a boundary between torture and other forms of ill-treatment cannot be established, it is still relevant to establish a threshold beyond which a particular treatment falls within these types of acts.

During the last decades there has been a shift from physical torture to clean and psychological torture methods that leave no visible marks in the body. This has been accompanied by attempts to justify that these methods do not constitute torture, but it is increasingly clear that the mental suffering they cause is similar to that caused by physical torture. When a person is subjected to clean or psychological torture, it is often difficult to prove that he or she has suffered torture. Finding biological markers of torture that leaves no visible physical evidence would be key to provide proof of this type of torture. So far, no such markers have been found. The recent development of methods to detect epigenetic changes in the DNA offers a technology that may be tested for this goal. Torture is an extremely traumatic experience and epigenetic changes have been associated with several types of traumatic stress. Using the DNA of torture survivors, it should be possible to determine whether there are differences in epigenetic marks between torture survivors and people who have not been tortured. If this were the case, it could also be tested whether the epigenetic marks found in survivors are different from those found in people who have suffered other types of traumatic stress, that is to say,

whether there are epigenetic marks that are diagnostic of torture. Whether these methods can be used to determine the severity of the traumatic stress associated to torture or other forms of ill-treatment is at least a theoretical possibility. However, there have not been reports of epigenetic analyses of torture survivors published so far. It can be concluded that, despite the potential of epigenetic methods to provide evidence of torture, given the association of changes in epigenetic marks with traumatic stress, this avenue has not been explored yet. There is, therefore, a gap between the availability of methods to determine epigenetic modifications and their use to provide evidence of torture or ill-treatment and try to determine its severity. The use of epigenetic methods for this purpose would have to take into account their limitations and the bioethical principles that regulate scientific research using human samples. Whether the potential of epigenetic methods to provide evidence of torture will be realised is not known, but given the necessity to prove torture, especially when there are no physical marks, it would be worth testing them.

In William F. Schultz's words, 'nothing will hasten [torture] decline more readily than the sure knowledge that the use of such brutality will no longer go unpunished'.²⁴⁹ If torture left marks in the DNA and these marks could be revealed, it would be much more difficult to hide that torture has been inflicted and, therefore, the potential perpetrators would be more likely to refrain from torturing because evading accountability would be much more complicated. Finding biological markers of torture would contribute to make perpetrators accountable and to provide justice, reparation, remedy and redress to survivors and families of victims. The use of forensic epigenetic methods, if they are able to provide evidence of torture, would also contribute to fulfilling the right of torture survivors to enjoy the benefits of scientific progress.²⁵⁰ If epigenetic marks could be used as biological markers of torture, this would show that torture affects our very biological essence, the DNA carrying the genetic information that makes us human. This would lend further support to the absolute prohibition of torture.

²⁴⁹ Schulz (n 7) 269.

²⁵⁰ UDHR art 27; ICESCR art 15.

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