IMPLANTS AND TECHNOLOGICAL AUGMENTATIONS: NEW CHALLENGES FOR FUNDAMENTAL HUMAN RIGHTS

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Abstract: *Technological progress in recent decades has marked a significant transition from the simple use of technology as an external tool to its direct integration into the human body. Neural implants, biomechanical augmentations and brain-computer interfaces are no longer mere marginal innovations, but are becoming realities with applicability in medicine, work, the military and even in the entertainment sphere. This evolution generates a series of profound legal challenges regarding the applicability and interpretation of fundamental rights, especially in the constitutional, European and international context. At the heart of this new technological framework is the dilemma between individual autonomy and systemic control. On the one hand, implants can represent a form of realization of the right to health, to a dignified life and to bodily autonomy. On the other hand, they can become an instrument of surveillance, manipulation or even discrimination, in the absence of solid legal guarantees.*

Keywords: *progress; technology; fundamental rights; autonomy*

1. Introduction

In recent decades, technological development has crossed a significant threshold, going beyond the sphere of external objects and penetrating the very bodily structure of the human being. If in the past the border between man and machine seemed clearly delimited, today, through neural implants, intelligent prostheses, brain-computer interfaces or genetic and biomechanical augmentations, this border

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is becoming increasingly porous. Humanity is entering a new era - that of the "augmented man" - in which the biological body is modified, optimized or extended by means of technology. This transformation is not without profound implications, especially with regard to fundamental human rights.

Against the backdrop of this accelerated technological progress, an essential question arises: Is the law prepared to respond to the challenges brought about by human augmentation? Traditionally, modern legal systems have developed starting from a biological and fixed understanding of the human person – a being with physical integrity, psychological autonomy and intrinsic dignity. But technological implants call into question precisely these landmarks, raising questions such as: what does bodily integrity mean when the body can be artificially modified? What does free consent mean in a context where augmentation becomes a condition for economic or social participation? How do we protect privacy and intimacy when internal devices can continuously record and transmit data?

These questions are not just philosophical or ethical, but have an urgent legal dimension. Legal systems must react coherently and proactively to regulate the use of bodily technologies in a way that respects constitutional principles, international human rights treaties and the fundamental values of the rule of law. In particular, a critical rereading of established rights - such as the right to privacy (Article 8 ECHR), the right to physical and mental integrity (Article 3 EU Charter), the right to self-determination - is needed in the light of new augmentative realities.

At the same time, emerging rights are emerging: the right to cognitive integrity, the right not to be augmented, the right to neuroprotection or even a potential digital habeas corpus, which would protect the person from external manipulation of his or her own conscience. International jurisprudence is only at the beginning of exploring these territories. Examples such as the Big Brother Watch v. UK (ECHR) judgment or the opinions of the Bioethics Committee of the Council of Europe show, however, that an interpretative evolution is not only possible, but necessary.

Moreover, in the absence of firm and equitable regulation, augmentations can accentuate social inequalities, lead to subtle forms of technological discrimination and create a new type of pressure on personal freedom. Thus, the issue of implants is not just one of individual choice, but becomes a subject of public interest and democratic regulation.

Therefore, this paper aims to systematically analyze, from a legal and interdisciplinary perspective, to what extent technological implants and

augmentations pose real challenges to the architecture of fundamental rights. We will examine how current norms can or cannot respond to these challenges, and we will propose directions for normative evolution to protect the human person in the emerging bio-digital context.

2. The Right to Autonomy and Informed Consent in the Context of Augmentative Technologies

One of the ethical and legal foundations of interventions on the human body is the principle of personal autonomy, which implies the freedom of each person to decide consciously and voluntarily on their own body, without external constraints. In European law, this principle is explicitly enshrined in Article 5 of the Convention on Human Rights and Biomedicine (Oviedo Convention), according to which any intervention in the field of health can only be carried out with the free and informed consent of the person concerned (Oviedo Convention).

However, in the context of technological implants and body augmentations, the concrete application of informed consent becomes significantly more complex. While in the case of traditional medical interventions the risks, benefits and effects are generally known, in the case of technological augmentations, individuals may consent to procedures whose cognitive, legal and social implications are not fully known, neither by specialists nor by the recipients.

In addition, the power relationship between the individual and the entities that develop and provide these technologies (corporations, defense institutions, employers) can distort the truly free nature of consent. Thus, there is a risk that personal autonomy is emptied of content, and consent becomes a procedural formality, without a genuine understanding of the implications.

In the doctrine, it is argued that in order to be valid, informed consent must meet four cumulative conditions: adequate information, decision-making capacity, voluntariness and comprehension (Beauchamp & Childress, 2019, pp. 120–130). In the case of cognitive implants (for example, neural interfaces), meeting these conditions is problematic, especially when the effects on mental processes are partially unpredictable. Thus, we can speak of a "gray area of consent", in which the individual consents to something that neither he nor the technological provider fully understands.

Moreover, augmentations can indirectly become implicit conditions for participation in society – whether for obtaining a job or for maintaining academic or

sporting competitiveness. In these conditions, consent is no longer a free choice, but an act imposed by the social and economic context. The so-called "augmentation pressure" is already present in areas such as security, the military or performance sports, where bodily technologies can create structural asymmetries between augmented and "natural" individuals (Coady, 2009, pp. 17–19).

In an evolving interpretation of Art. 8 of the European Convention on Human Rights (right to private life), the European Court has stated that bodily autonomy is part of the protected core of this right (ECtHR, Pretty v. the United Kingdom, 2002). This view is also supported by the case law of the Court of Justice of the European Union on data protection, which has developed the concept of "control over one's own person", including biological and neurological data (CJEU, Schrems II (C-311/18), 2020). In this context, informed consent is not just a tool for procedural validation, but a means of asserting personal sovereignty.

The need for a consolidated legal approach is thus outlined, which should include:

- minimum standards of understanding regarding experimental implants;
- the right to revoke consent and to request the deactivation or removal of the augmentation, without socio-professional losses;
- protection against indirect augmentation pressure;
- and, perhaps most importantly, the recognition of a fundamental right to mental integrity, as a natural extension of bodily autonomy.

In conclusion, in the era of human augmentation, the right to autonomy and informed consent must be re-conceived, not just as a simple formal agreement, but as an active guarantee of inner freedom, sovereignty over one's own corporeality and resistance to any form of instrumentalization of the person. This desideratum requires a regulation that is not only technical, but fundamentally axiological, in which the center remains the human person, not technology. At the same time, the prospects for essential development in the activity of the Community institutions and the European states were also opened up (Corsei, Zisu & Toncu S., 2023, p. 54)

3. Human Dignity and Personal Identity in the Age of Technological Augmentation

The concept of human dignity constitutes the cornerstone of the architecture of fundamental rights in all modern legal systems. Beyond a moral or philosophical value, dignity also has a normative function: it requires the treatment of the human person as an end in itself and not as a simple instrument of technological, economic or political interests (Waldron and Dignity, 2012, p. 21). However, in the age of technological implants and augmentations, this fundamental principle is subject to unprecedented tensions.

Traditionally, dignity has been associated with the inalienability of the body and the uniqueness of the human being, but new technologies tend to "decompose" the body and reconstruct it, either for recovery (in medical cases) or for the enhancement of natural capacities (elective augmentations). This is why it is rightly stated that human rights issues are of international concern and do not fall under the internal jurisdiction of states, which legitimizes not only the right of intervention of international bodies, but also their obligation to intervene whenever violations of human rights, which characterize any human community, are discussed (Corsei & Ştefănoaia, 2022, p. 73).

This technological reconstruction of the body risks transforming the person into an object of functional engineering, which runs counter to the spirit of Article 1 of the Charter of Fundamental Rights of the European Union: "Human dignity is inviolable. It must be respected and protected."(Charter of Fundamental Rights of the European Union).

Moreover, smart implants and cognitive augmentations can affect not only the body, but also personal identity — that psychological, emotional and moral core that gives coherence to the person over time. If a neural implant modifies the way an individual thinks, reacts or even constructs his or her memory, the question arises whether we can still talk about the continuity of the self, and, implicitly, about responsibility, autonomy and legal personality (Bublitz & Merkel, 2014, pp. 51-77).

This issue is also relevant from the perspective of criminal and civil law: can a person be considered legally responsible for actions determined, in part or in whole, by an implant that affects reason or will? Who is responsible in case of errors in the implant: the person wearing it, the manufacturer or the software developer? The lack of clear answers to these questions reflects the normative gap in the face of the new technological anthropology (Yadin, 2021, pp. 155–170).

In the doctrine, the idea that personal identity should become an object of direct legal protection, alongside privacy, bodily integrity and mental autonomy (Floridi, 2011, pp. 253–258), is increasingly emerging. Such an approach would allow the state to intervene when technological augmentations (voluntary or imposed) substantially alter the core of a person's identity or expose them to risks of manipulation, dehumanization or deindividuation.

The case law of the European Court of Human Rights provides clues in this direction. In the case of Mikulić v. Croatia (2002), the Court emphasized that the right to personal identity is an integral part of the right to private life, and in S. and Marper v. the United Kingdom (2008), it was reaffirmed that the retention of biological data without consent profoundly affects self-perception and dignity (ECHR, Mikulić v. Croatia, 2002, and Marper v. the United Kingdom, 2008). Although these cases do not directly concern augmentation, they establish a doctrine that can be extended in the context of technological implants.

At the same time, dignity should not be interpreted only as a negative principle — a shield against external attacks — but also as an affirmative force, which obliges the state to create conditions of respect and effective protection of augmented personal identity. Thus, the need arises to regulate:

- the right to freely choose technological implants without economic or social constraints;
- the right not to be augmented against one's will;
- and, very importantly, the right to maintain one's personal identity in the face of technological changes imposed by third parties.

In conclusion, human dignity and personal identity cannot be secondary concepts in the normative architecture of the bio-digital age. They must be placed at the center of public policies and legislation, as the ultimate guarantees of humanity in the face of a technology that risks becoming autonomous from human will and conscience. In this sense, the regulation of augmentation is not just a matter of law, but a civilizational decision: whether we will build a society of autonomy and dignity or one of human manipulation and instrumentalization.

4. Equality and Non-Discrimination in the age of Technological Augmentation

The principle of equality and the prohibition of discrimination are fundamental elements of international human rights law and the European legal order. These principles are enshrined in Article 14 of the European Convention on Human Rights (ECHR) and Article 21 of the Charter of Fundamental Rights of the European Union, which prohibit any form of discrimination, including on implicit or emergent grounds (ECHR, art. 14; EU Charter of Fundamental Rights, art. 21). In the context of technological implants and augmentation, these rules take on a profoundly new dimension, given the potential of technology to create forms of structural inequality and social exclusion.

Traditionally, legal equality presupposes equal treatment of individuals in similar situations and the protection of those in vulnerable situations. However, technological augmentation - especially non-therapeutic ones - risks creating new classes of citizens, depending on access to technologies that enhance individuals' cognitive, physical or sensory capacities (Brownsword, 2011, pp. 35–54). Those who have the resources to "enhance" their bodies and minds will benefit from substantial competitive advantages in education, work, or even political life, while others may become "naturalized" in an inferior sense, excluded from the arenas of social performance.

This trend is reflected in the specialized literature through the concept of the "augmentation gap" - the difference in opportunity and social status created between the augmented and the non-augmented (Coeckelbergh, 2012, pp. 273–281). Thus, an augmented world risks replacing the idea of individual merit with a logic of technological performance, in which equality of opportunity becomes a fiction. Moreover, social pressure to adopt such technologies could force individuals to submit to invasive or risky procedures, just to maintain their social position, indirectly violating freedom and equality of choice.

From a legal perspective, this reality may constitute a form of indirect discrimination. According to the case law of the European Court of Human Rights, indirect discrimination occurs when an apparently neutral measure disproportionately affects a category of persons (ECtHR, D.H. and Others v. Czech Republic, 2007). If access to augmentations is limited by economic, geographical or cultural factors, and this access becomes a condition for participation in public or professional life, we can speak of an emerging form of augmentative discrimination, which must be regulated accordingly.

An illustrative example could be the military or highly skilled work field, where candidates with performance implants would be systematically preferred. In the absence of ethical and legal regulations, selection based on augmentation may lead to the silent exclusion of people who choose not to undergo body modifications or do not have the financial means to access them (Liao & Roache, 2012, pp. 398–404). Thus, a reinterpretation of the concept of "substantial equality" is required, which means not only the absence of direct discrimination, but also ensuring real conditions for equal participation in society, regardless of personal technological level.

Another critical aspect is discrimination based on the criterion of physical appearance. In a future where augmentations become the norm, "non-augmented" people may be stigmatized as "outdated," "inadequate," or "uncompetitive." This reverse stigmatization poses a new challenge for legal systems, which will need to expand anti-discrimination protections to include technological status as a potential criterion for exclusion or marginalization.

The European Union, through Directive 2000/78/EC, establishes the general framework for equal treatment in employment and occupation, prohibiting discrimination on the grounds of disability, age, religion or sexual orientation (Council Directive 2000/78/EC of 27 November 2000). It is debatable whether augmentative discrimination could be subsumed under the concept of reverse disability (i.e., the disadvantage of not being augmented), but it is clear that current legislation is inadequate to respond to these emerging realities.

In conclusion, technological implants and augmentations require a reconceptualization of equality and non-discrimination in the sense of a new social contract, which explicitly includes the right of each individual to be different without being disadvantaged. Democratic societies will have to decide whether to allow the emergence of new technological castes or whether to regulate the development of augmentation in such a way that progress is inclusive, equitable and respectful of human diversity.

5. Conclusion

Implants and technological augmentations mark a paradigmatic transformation of the relationship between man, technology and law. In an era in which the distinction between the biological body and its cybernetic extensions is becoming increasingly fluid, law is called upon to respond to fundamental challenges regarding the

definition of the person, the guarantee of individual freedoms and the maintenance of social equity.

Augmentative technologies do not always fall within the traditional boundaries of established legal norms. They no longer only target "physical integrity" in the classical sense (art. 3 EU Charter, art. 8 ECHR), but penetrate areas such as thought, will, emotion or even the intentionality of the individual. Thus, concepts such as mental freedom, cognitive sovereignty or the right to neuroprotection become essential in the new normative framework. These dimensions should be interpreted extensively in the current light of the evolving interpretation of fundamental rights, as enshrined by the European Court of Human Rights.

Although technology promises to emancipate the individual by overcoming biological limits, in the absence of adequate legal control, augmentation can lead to new forms of domination and control, either of an economic nature (e.g. pressure to augment oneself for professional competitiveness) or institutional (e.g. use for surveillance or behavioral manipulation purposes). It is necessary to protect freedom of choice and guarantee real and revocable informed consent, according to international bioethical standards (Oviedo Convention, Helsinki Declaration).

Faced with a possible "instrumentalization of the augmented body", human dignity must remain the fundamental criterion of any regulation. Both European legislation and the constitutions of democratic states recognize dignity not only as a symbolic value, but as an operational norm for the protection of the person against degradation, standardization and dehumanization (see art. 1 of the EU Charter and art. 1 paragraph (3) of the Romanian Constitution). Thus, any use of bodily technology must respect the uniqueness, autonomy and psychosomatic integrity of the human being.

Last but not least, technological implants and augmentations risk accentuating social and biological inequalities, creating a division between "technologically advanced" individuals and "natural" or excluded ones. Without fair access measures and a firm prohibition of discrimination on the basis of body modification, the principle of equality (Art. 14 ECHR, Art. 21 EU Charter) will be emptied of its content. Law must act not only as a defense mechanism, but also as an instrument of social cohesion in an augmented society.

In conclusion, technological implants and augmentations require a profound reassessment of fundamental rights, in the sense of a bio-digital-constitutional jurisprudence. They challenge the right to redefine its borders and to build a proactive normative framework, capable of protecting the human person in his or

her physical, mental and identity totality. It is time for human rights to be not just a reaction to abuses, but a strategy to guarantee freedom, equality and dignity in the world to come.

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