## How Italy has moved from anatomical studies in the sixteenth century to body donation in the twenty-first century



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# How Italy has moved from anatomical studies in the sixteenth century, to body donation in the twenty-first century

INTRODUCTION: The anatomical dissection plays a fundamental role in the students' formation as well as in the specialists' updating. In contrast to what happened in the sixteenth century, when medical students and professors from all over the Europe were used to come in Italy, today Italian surgeons have to go abroad to attend training courses, with inevitable economic costs and personal inconveniences. The reason for this circumstance lies in the existence of obsolete and even ethically unacceptable legal rules. The recent unanimous approval by the Italian Senate of the bill on postmortem body donation opens important perspectives.

MATERALS AND METHODS: The authors, after having reviewed the main historical stages in anatomical dissection, examine the above mentioned recent bill n. 733 (XVIII Legislature) concerning the disposition of one's body and post-mortem tissues for the purposes of study, training and scientific research, taking into consideration also the international context. Discussion: The bill aims to fill the serious legislative gap, not only offering the possibility of satisfying the noble needs of human solidarity, but also giving to future doctors a contact with death capable of promoting human and ethical values such as the respect for life.

CONCLUSIONS: The Italian legal system presents - right now - serious operational gaps which make body donation practically unapplied. While waiting for the bill to finally see light, it is necessary to engage in educational activities that can promote the culture of this "gift" and, at the same time, that of respect for the body of the deceased person.

KEY WORDS: Anatomical dissection, Body donation, Study and research

#### Introduction

Italy has a glorious past regarding the theme of dissection on dead bodies carried out for the study of medicine. Without neglecting the contributions of Greek thought it is, in fact, modern anatomy born in medieval and Renaissance times <sup>1</sup>.

Already in the 13th century the dissection of corpses was practiced, first for the autoptic examination of the body of those who had died in doubtful circumstances and then for educational purposes, to learn more about the architecture of the human body <sup>2</sup>.

Bologna was the first university that, with Mondino dei Liuzzi, resumed the practice of dissections of the human body, started by Erofilo in the 3rd century BC and abandoned by its immediate successors <sup>3</sup>. The lectures of Mondino were accompanied with a practical demonstration on the corpse which took place over four days, according to some testimonies. On the first day he examined the abdominal viscera, on the second day the neck and thoracic cavity, on the third the skull, brain and nerves, and finally the four limbs. The work of

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Mondino, which did not contain great novelties of observation with respect to tradition, was very popular and towards the end of the fifteenth century the teaching of anatomy was generally imparted according to this now classic text <sup>4</sup>.

Guy de Chauliac, considered the founder of French surgery and, like so many, a disciple of the Bolognese university, will quote him in his Magna Surgery recognizing him as a master of anatomy.

The Anathomia Mundini of 1316 constitutes, after the text of surgery of the cleric Guglielmo da Saliceto (1270), the most important treatise of medieval anatomy used by entire generations of students, to whom he addresses explaining the times and the ways of autopsy dissection. The purpose of the anatomical dissections practiced by Mondino which openly refers to the school of Galen was much more didactic than research. This fact explains the delay with which some incorrect anatomical conceptions of Galen were overcome in the following centuries. In some cases, however, he points out areas of disagreement with the ancient authorities, by starting that work of critical review in the following centuries it overthrew some postulates of the Greek-Roman physician.

In Anathomia Mundini, a fundamental text for the study of anatomy, graphic representations and drawings were missing. Guido da Vigevano (1280-1349), a student of Mondino included in his manuscript "Anothomia designated for figuras" six tables representing the head, the brain and the spine. His volume, published in 1345 and preserved in Chantilli, was the milestone for the beginning of a new custom that spread widely over the following centuries: the use of anatomical illustrations in books.

During the fourteenth century the practice of cadaveric dissection extended to the universities of Montpellier (1340), Padua (1341), Florence (1388) and, later, Paris (1478), whose university was, at the time, very conservative.

Already in the fifteenth century, the practice of dissection became part of the teaching of anatomy. Due to the difficulty of finding the corpses, dissection was not performed very often.

The custom of dismembering the dead bodies of the crusaders to bring them back to their homeland, generally opposed by the population and religious factors, led to the issuing of measures that hindered the anatomical sections. It must however be considered that from the 15th century the interventions of the Roman pontiffs, first Sixtus IV and later Clement VII, made the anatomical dissection legitimate, recognizing that it was useful for medical and artistic practice. The dissection is almost always performed with corpses of foreigners or the executed, but there are cases in which students steal a recently buried corpse to perform anatomy. Before Vesalius (1514-1564), public dissection involved a division of tasks between the anatomist doc-

tor, who reads the texts and discusses them, and the surgeon who has the task of cutting up the body. The importance of dissection is supported by the medicalhumanist Alessandro Benedetti (Legnago, 1450 circa -Venezia, 31 ottobre 1512) with scientific and ethicalreligious arguments: it reveals "the admirable divine work of God" and leads to meditation on the transience of human life. Berengario da Carpi (pseudonimo di "Jacopo Barigazzi"; 1466 - Ferrara, 24 novembre 1530), surgeon and professor of anatomy in Bologna, personally performs dissections and writes about anatomy, supporting the importance of direct observation of the human body and the need for a critical attitude towards the ancients. Berengario is among the first to use the tools offered by the press to produce works with anatomical illustrations.

At the turn of the fifteenth and sixteenth centuries the fervor of new scientific approaches developed the field of anatomical studies.

The public demonstrations of dissection, that the anatomists practiced with precise and periodic rituals using the corpses of the condemned to death, were an opportunity to teach. This unprecedented development of anatomical studies also involved fifteenth-century painters who practiced dissection, sometimes collaborating with doctors. Through the flourishing of so many direct experiences, the revision of the knowledge that had remained tied to the tradition of literature and essentially to the dictates of Galen was gradually fed.

The most illustrious of anatomists was Leonardo da Vinci who devoted himself to these studies with observations made in the work on the corpse.

During the sixteenth century the Universities of Padua, Bologna and Ferrara attracted many undergraduates and recent medical graduates from different European countries. They were attracted by the desire to perfect themselves in anatomy and in the practice of dissections 5. Even the Flemish Andreas van Wesel (Andrea Vesalio, Vesalius, Brussels, 31st December 1514 - Zante, 15th October 1564), after having studied in Paris and Louvain and before being appointed personal physician to the Emperor Charles V, he moved to Padua and remained for some years (1537-1542). He was eventually awarded the title of Doctor of Medicine and so began his career. Already, immediately after his graduation, Vesalio held his first public lecture, dissecting a corpse and explaining both the composition of the organs and the technique used. The Senate of Venice (which governed Padua) immediately assigned him the chair of anatomy and surgery. Vesalio also deserves credit for having first understood the didactic importance of illustrations in the field of anatomy and, thanks to him, art had reached medicine 6-8.

During the century, surgery emancipated itself from the subordinate role towards medicine and acquired a growing intellectual and social prestige.

In his work, Vesalio was the first to disprove the infal-

libility of Galen's theories and noted over two hundred errors of the Anatomicae administrationes, and claimed to have been able to detect them thanks to the wide possibility reserved only in Italy to dissect corpses. However, this activity was confronted with the very tough opposition of several fellow scientists. Among the most hostile adversaries of Vesalio, there was also one of his teacher's, Jacobus Sylvius, a professor of classical languages and translator of the disputed work of Galen who could not admit that there were errors at the origin. Together with other followers of Galen, he tried in every way to discredit the scientific activity of Vesalius with the Emperor, accusing him of making sacrilegious art. The theologians of the University of Salamanca, interrogated by Charles V, considered the dissections useful and lawful. In 1556, when Charles V abdicated, he granted him a life pension and appointed him count. Precisely the possibility of performing exercises on dead bodies on a continuous basis constituted a strong cause of appeal for students and medical professors from different European countries. It is worth remembering how in Germany or England the teaching of anatomy on human corpses remained exceptional at least until the mid-sixteenth century.

In Italy, dissections could take place in teachers' homes or in public places, both religious and secular, in student colleges and in pharmacies. The importance assumed by the sectorial practice in the training and improvement of doctors led to the construction of temporary anatomical theaters, set up during the periods in which lessons were held and for practical reasons that took place in winter.

In 1594 the construction of the first stable anatomical theater was completed in Padua, according to the architectural model of the amphitheater; it had to allow the students, who were arranged in tiers that–surrounded, in an elevated position, the sectoral table, to observe carefully the interventions and maneuvers of the professor. This same architectural structure will then be re-proposed in other anatomical theaters built in Europe, starting with that of Leiden.

Even the doctor Leonardo Fioravanti in his volume "Dello Specchio di scientia universale" criticized the surgeons for their faith in anatomy and denounced them for treating patients as anatomical objects, stating "But for me I have always seen, that the surgeons, who are good anatomists, when they treat plague, always want to do their anatomy with iron cutting the poor humane meat, as if they were pig braziers, they want to scrape the bones, set fire 8. After all, Galen had never dissected human bodies and "the absolute unreliability of the anatomy of the dead had already been overshadowed by Aristotle (De partibus animalium, 640b-641a) and by Celsus (proemio al De medicina)", both pagan intellectuals, and then taken up by the Renaissance Paracelso. The recovery of the bodies for the dissections was expressly regulated by the Venetian Republic, which every year

was to provide two bodies of executed, of a man and a woman, which were not to be neither Paduan nor Venetian. In case of a lack of bodies to meet the educational needs of anatomists, the students themselves, so-called "massari", undertook to otherwise procure the bodies.

The bodies were also the result of purchases from families in conditions of great poverty that unfortunately were forced to sell the body of a deceased relative. In some cases the body of the deceased was the victim of violent actions that minority communities, such as that of the Jews, were often subjected to.

It is even more interesting to remember the testimony of a distinguished student, Francesco di Sales (Thorens-Glières, 21<sup>st</sup> August 1567 - Lyons, 28<sup>th</sup> December 1622), the future Saint Francis of Sales, a little more than twenty years old student of law and theology in Padua, who having fallen seriously ill in 1591 following an epidemic, expressed to the priest that he was given the last rites of the desire that his body be given post-mortem to the anatomical school of the faculty of medicine of the Padua university so that "since it could not have been no use in this world during life, it can at least serve something after death". Through this modern advanced application of treatment, the young Francesco wanted to avoid future disputes about the use of his body and prevent any violent actions by medical students 9. The story went differently though, there seemed to be no hope left but Francesco slowly started to recover. The brilliant young student now understood the importance of donating his own body for study, research and medical-surgical training. He died in 1622 at the age of 55. Another story recalls the most recent gesture of the pastor emeritus of Girona, Camprodon i Rovira, who decided to donate his body and gave it to the dissecting room of the Faculty of Medicine of Barcelona, at the service of the students of anatomy 10.

These brief historical references show that, particularly in the sixteenth century, Italy was the cradle of anatomical studies for the awareness of the indispensability of anatomical dissection exercises for the advancement of research and the training of future doctors, from both technical and diagnostic purposes <sup>11,12</sup>.

#### THE HEAVY LEGACY OF THE 1933 RD

Current legislation dates back to the Fascist period (Royal decree n. 1592/1933. This legislation legitimizes, on the part of the community, a logic of exploitation of the dead body of people who are totally unknown or whose parental and friendship relations have dissolved. In fact, this discipline foresees that "the corpses [...] whose carriage belongs to the relatives or the forensic group medicine laboratory (except suicides), and that are not required by the relatives included in the aforesaid family group, are reserved for education and scientific surveys".

The Italian National Bioethics Committee (NBC), on 19<sup>th</sup> April 2013, criticizes this regulation emphasizing the non-ethical acceptability of its provisions <sup>13</sup>. In particular, NBC underlines that a free and informed decision of the donor is a fundamental key for the implementation of the principle of solidarity towards others, underlying the post mortem body donation <sup>14</sup>.

In other countries too, failure to claim the body of the deceased family member resulted in its use for research and educational purposes. For example, according to the Transplantation and Anatomy Act of Australian Capital Territory it is possible to utilize for research and medical education the body of people whose relatives cannot be traced in spite of being reasonable <sup>15</sup>. Also, in India, in the absence of near relatives, permission was given for the use of the unclaimed body for study and research purposes <sup>14</sup>.

The significant need to encourage an act of high moral solidarity towards one's fellow human beings should therefore be based on the awareness of the relevance of the altruistic act that is performed and on the absolute freedom of the gift.

The need to promote an act of elevated moral solidarity towards others should therefore be based on the awareness of the relevance of an altruistic act, based on the absolute freedom of the gift.

The application of an ambiguous rule of the presumed consent of the individual, however, seems even more unacceptable compared to people for whom, in the absence of a family and friends network, it is not possible to reconstruct their will and which alone would require a principle of forced solidarity. As also underlined by the NBC, the donation generates important links between donor and recipient that are based on the awareness of the common precariousness of life, on the principle of solidarity, on the sense of continuity of life with respect to one's death, on the spirit of common brotherhood, on recognition of the gift and on the recognition of the existence of the other. But this bond, which can be a harbinger of further growth of responsibility and solidarity towards the other, requires freedom and awareness towards this philanthropic act.

On the other hand, the human body, after the death of the person, is not comparable to any object <sup>16</sup>. At least, even having to access the opinion that human remains are a res, it is believed that in any case they are a res sui generis in relation to the link with the person to whom they refer and to the trace of humanity that every human find preserves beyond the mere boundaries of a person's life <sup>17,18</sup>.

The criterion of continuity between the living human body and the corpse requires that the protection of dignity and respect for the corpse constitute the guiding criteria for each procedure of its use in research and teaching.

In addition to the considerations expressed on the mechanism of silence - the current legislation does not

address the multiple problems that the donation of the corpse poses, a guarantee of an efficient organizational structure in the treatment of bodies, in their conservation, in their didactic use and in the recomposition of the body charges concerning the procedures to be implemented, identification of the regional research centers, etc. Nor are the methods of possible consent in the life of the donor, the binding nature of this, the prevalence or otherwise of the privatistic conception over the publicity, relevance of the will of the family members and the subsequent return of the body to family members.

A further legislative reference is represented by the Mortuary Police Regulations (Presidential Decree 285/1990): which, after an adequate period of observation, can be used for scientific studies.

This legislation limits itself to imposing on the directors of the university anatomical rooms the obligation to record in the appropriate register the details of the deceased, placed at their disposal according to the provisions of the 1933 Royal Decree, and to indicate, for each of them, the skeleton, the parts and organs that are eventually taken to be kept for demonstration, study and research purposes both in anatomical institutions and in anatomical museums, duly authorized, and at other university and hospital institutions that request them in writing at anatomical institutes.

The heavy limits of the current regulation make it de facto (rightly) obsolete and not applied. Furthermore, the absence of educational programs on the importance of this procedure means that in Italy, unlike what happens abroad, the choice towards donation is still almost unknown.

Currently in Italy, the gaps in the regulatory system on this issue, with particular regard to the protection of the principle of self-determination of the individual, do not allow adequate development policies for this procedure of high moral value. The number of donations is therefore very limited, blocked by the creation of the logistic network and the planning of studies and research on cadaveric organs

Recently, the Lombardy Region regulated the funeral, cemetery and cremation activities with a wide-ranging discipline contemplating, among other things, the possibility of a post-mortem donation for study, research and teaching purposes and foreseeing that in such hypotheses "... the relatives or cohabitants communicate it to the municipality that authorizes the transport, upon approval and at the expense of the receiving institution". About such regional legislation, however, the State Attorney's Office asked to declare the constitutional illegitimacy of the law due to intrusiveness to the exclusive state jurisdiction in the matter of the civil ordering of such norms 19. It also emerges from this law, as well as from other regional laws that have contemplated the hypothesis of voluntary donation, the intention to fill a legislative gap of which, obviously, the negative consequences are felt.

#### THE NEW ITALIAN LAW PROPOSAL

To fill these serious lacks of the Italian normative system and promote an adequate policy to enhance this procedure, the Chamber of Deputies has recently approved the text of the bill n. 733 (XVIII Legislature) "Regulations concerning the disposition of one's body and post-mortem tissues for the purposes of study, training and scientific research".

This bill provides for the possibility of allocating health facilities their own body, after death, both for study and research activities and for educational activities, regulating the procedures.

The aim of the law is to increase dissection on the human body for the correct learning of the anatomy of the human species which, even if it has known a glorious past in our country, has for many years become a practically absent, extremely rare and extreme practice in many Italian university centers.

In the parliamentary acts to the bill it is evident that the unanimous scientific recognizing of the fundamental character of the study of the corpse both in the surgical field, both for the current practice for the development of particularly complex interventions, and, again, for the experimentation of new medical approaches and new surgical techniques <sup>20</sup>.

In fact, for medical and surgical students it is very important, and in some cases indispensable, to practice dissection, especially as regards the study of anatomy, as well as for doctors in specialized training, mainly in surgical branches. This procedure allows to experiment directly on the living only after having experimented on the dead corpse. This procedure also achieves an important ethical objective that concerns the elimination or, at least, the reduction of experimentation on animals, sacrificed on purpose <sup>21-23</sup>. The legislation will therefore allow us to become more prepared and trained directly on human anatomy, rather than on another species.

The text in question consists of nine articles.

Article 1 clarifies that its object is the use for the purposes of study and scientific research of the human body and tissues of people who have expressed their consent with life. Their death must have been verified in the forms of law.

On this law citizens can have the opportunity to donate their bodies so that they can be used for high ethical and human value, thus contributing to the improvement of medical science through research and training on a human model.

The rule emphasizes that the use of the human body and post-mortem tissues is based on the ethical and solidarity principles and is regulated in such a way as to ensure respect for the human body. However, unfortunately, there are no provisions that promote the training of students in respect for the body of the deceased and the awareness of the importance of an altruistic choice that can be very demanding for the person and the family both in

relation to irrational fears regarding the certainty of death and the symbolic and emotional values that revolve around the body even after one's death.

Article 2 establishes the commitment of the Ministry of Health to adequately inform citizens about the possibility of expressing consent to donate their post mortem body. Information and even education on the subject of death can in fact play a key role in the process of deciding an act that, even if ethically connoted, it can be perceived as a form of external violence of one's own integrity and identity. In addition, a recent study in China has shown that conducting commemorations of body donors is a feature of many successful donor programs <sup>24</sup>. Equally important is the awareness of the value of the self-determination of this choice. In the Netherlands, requests for body donations are so high that many anatomical institutes have stopped registering new donors to prevent a surplus of bodies 25. The Department of Anatomy advises body donors to maintain their funeral insurance, because the final acceptance of the body is not guaranteed.

The new discipline, involving the confrontation with death, also involves significant aspects of healthcare training. This procedure, in fact, offers the possibility of increasing, in addition to the clinical and technical skills, the ethical skills that are expressed in the continuity of respect for those who no longer exist and with the family that becomes the holder of a significant relationship. In fact, the whole bill is built around the respect of the person who died and who, in that comment, continues to be in front of us. The formation of the doctor is thus enriched by the complexity and completeness of all the aspects that revolve around the precariousness of human existence and at the same time the respect that this deserves.

The absence of communication programs with the persons assisted by this possibility on the part of doctors and health workers constitutes a critical aspect of the bill. A recent survey on the student population of Italian medicine has revealed a great lack of information on this issue which is particularly relevant in view of the important educational role that health workers can play 26. Even the information campaigns regarding the recent approval of the Italian law on the advance provisions for the treatment of the body can represent an important formative tool towards this theme <sup>27, 28</sup>. The will of the donor could also possibly be included in the anticipated treatment provisions (DAT) whose validity today has been fully recognized. Also in this case, as in the case of DAT, the involvement of family members could be appropriate due to the repercussions on the emotional and psychological level that this choice may have for the family members, provided that the respect of their will cannot be subordinated to the consent or the non-opposition of family members. The role of family members such as the trustee may still be important to make the donor's will enforce.

Article 3 establishes the forms and methods of the choice to donate one's own body. These will have to be expressed in a clear and unambiguous subject and in writing in the form of a public act or authenticated private writing. Such will should always be considered revocable and renewable in time. For minors it is necessary to have the consent of both parents. The use of a national database is also envisaged. Article 4 establishes the identification by the Ministry of Health of university facilities and high specialty hospital companies to be used as reference centers for the conservation and utilization of the bodies subject to donation. Article 5 determines the methods and times for returning the body. The relationship of the subject with his family is another important aspect for which a remarkable value is attributed to the ritual of death and burial, so that the body must be returned as much as possible in its integrity. The text of the bill provides that the body's return for burial must take place, in dignified conditions, within 2 years. Article 6 states that the donation of the post mortem body cannot take place for profit. Any donations of money made by private individuals for the purpose of study and scientific research through the use of corpses or deriving from the completion of research projects are intended for the management of the reference centers. This provision is in harmony with the principles of gift ethics, in which the donor takes care of another, in a sense of solidarity and altruism, without any reciprocity. Article 7 provides for the regulation implementing the law to establish the methods and times for the storage, the request, the transport, the use and the return of the body. However, time must not exceed two years. The regulation must stipulate that it is possible to proceed to the burial of the bodies for which the family to which they belong does not require restitution; must indicate the reasons for the exclusion of the use of remains for research purposes; and must identify the application methods aimed at ensuring compliance with the spending limit established by law. The regulation is adopted, by decree of the Minister of Health, in agreement with the Minister of the Interior and with the Minister of Education, after agreement in the State-Regions Conference. Article 8 provides for financial coverage. Article 9 repeals the current provision (article 32 of the Royal Decree 31 August 1933, N. 1592) on the subject.

### Conclusion

After a memorable past in the anatomical dissection of the human body for the purposes of study and research, today the Italian legal system presents serious operational gaps which, due to a backward and ethically unacceptable law, make this procedure poorly applied. Certainly, the human body belonging to a dead person has ethical relevance that cannot be reduced to freely usable *res*, as far as public interest purposes are concer-

ned. An ethically acceptable regulation has indeed the duty to base the study and research procedure on the human body of the deceased on the correct information and on the expression of a valid informed consent, foreseeing adequate and exhaustive dispositions regarding the respect of the corpse.

The recently discussed bill offers the possibility of overcoming these serious shortcomings by offering not only the possibility of satisfying noble needs of human solidarity, but also offering future doctors a contact with death capable of promoting human and ethical values of respect towards life.

While waiting for the bill to finally see light, it is necessary to engage in educational activities that can promote the culture of this "gift" as a meaning to life and death and, at the same time, that of respect for the body of the deceased person.

#### Riassunto

INTRODUZIONE: La dissezione anatomica riveste un ruolo fondamentale nella formazione degli studenti nonché nel costante aggiornamento degli specialisti. Tale pratica consente, infatti, non solo una conoscenza approfondita del corpo umano, ma anche di sperimentare interventi di particolare difficoltà e di utilizzare gli ultimi ritrovati in campo tecnologico. L'Italia, pur vantando una importante tradizione negli studi anatomici nel Cinquecento, sperimenta importati ostacoli nella possibilità di attuare tale pratica a fini di studio e ricerca. Invero, in contrasto con quanto accadeva nel Cinquecento, allorché studenti in medicina e professori provenienti da tutta Europa si recavano in Italia ad apprendere le tecniche di questa procedura, oggi sono spesso i chirurghi italiani a doversi recare all'estero per frequentare corsi di formazione ed esercitazioni, con inevitabili costi economici e disagi personali. La ragione di tale circostanza risiede nella sussistenza di riferimenti giuridici obsoleti e, per certi versi, eticamente inaccettabili. La recente approvazione, all'unanimità, da parte del Senato italiano, del disegno di legge in tema di donazione post mortem apre, finalmente, nuovi e interessanti scenari.

MATERALI E METODI: Gli autori, dopo aver ripercorso le principali tappe storiche conseguite in Italia nello studio della dissezione anatomica, esaminano il disegno di legge n. 733 (XVIII Legislatura) "Regolamento concernente la disposizione del proprio corpo e dei tessuti post mortem a fini di studio, formazione e ricerca scientifica", recentemente approvato dal Senato, anche alla luce del quadro internazionale.

DISCUSSIONE: La proposta di legge intende colmare le gravi lacune legislative, offrendo non solo la possibilità di soddisfare i nobili bisogni della solidarietà umana, ma offrendo ai futuri medici un contatto con la morte in grado di promuovere valori umani ed etici di rispetto per la vita.

Conclusioni: Dopo un autorevole passato nella dissezione anatomica del corpo umano a fini di studio e ricerca, il sistema giuridico italiano presenta - oggi - gravi lacune operative che, a causa di una legge arretrata ed eticamente inaccettabile, rendono questa procedura poco applicata. Nell'attesa che il disegno di legge veda finalmente la luce, è necessario impegnarsi in attività educative che possano promuovere la cultura di questo dono come significato per la vita e per la morte e, allo stesso tempo, che valorizzino il rispetto per il corpo della persona deceduta.

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