

■ Review

Anatomi Eğitiminde Diseksiyon ve Güncel Yaklaşımlar

Dissection and Current Approaches in Anatomy Education

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Abstract

In the field of anatomy education, body donation varies considerably in different geographical regions of the world. Some countries, particularly in many parts of Europe and North America, have well-established and successful cadaver donation programs. These programs provide an adequate number of cadavers for medical students and researchers. This creates a continuous learning environment. However, in other regions, particularly in Asia, Africa and the Middle East, there are significant deficiencies in body donation. Several factors cause these disparities. First and foremost, cultural and religious factors influence donation rates. While the importance attached to bodily integrity in some societies may reduce the willingness to donate, in others donation is a cultural norm. While some countries have effective legal frameworks to promote donation, others have inadequate or incomplete regulations.

The importance of body donation for anatomy education is increasingly recognized. In this context, several steps need to be taken to develop and sustain donation programs. These may include improving legislation, establishing ethical guidelines and conducting awareness campaigns. It is also important to identify donor profiles and maintain relationships of trust. Through national and international research, a successful foundation can be established, taking into account local factors and community needs.

Keywords: cadaver, body donation, dissection, anatomy education

Öz

Anatomi eğitiminde vücut bağıışı, dünya genelinde çeşitli coğrafi bölgelerde önemli farklılıklar göstermektedir. Bazı ülkelerde, özellikle Avrupa ve Amerika'nın çoğu bölgesinde, köklü ve başarılı bağıış programları bulunmaktadır. Bu programlar, tıp öğrencilerine ve araştırmacılara yeterli sayıda kadavra sağlamak ve sürekli bir eğitim ortamı oluşturmaktadır. Ancak, diğer bölgelerde, özellikle Asya, Afrika ve Orta Doğu'da, vücut bağıışı konusunda belirgin eksiklikler yaşanmaktadır. Bu farklılıkların birçok nedeni vardır. Öncelikle, kültürel ve dini faktörler bağıış oranlarını etkilemektedir. Bazı toplumlarda vücudun bütünlüğüne verilen önem, bağıış yapma isteğini azaltabilirken, diğer toplumlarda ise bağıış yapma kültürel bir norm haline gelmiştir. Bazı ülkelerde, bağıış teşvik etmek için etkin yasal çerçeveler bulunurken, diğerlerinde bu düzenlemeler yetersiz veya eksiktir.

Anatomi eğitimi için vücut bağıışının önemi giderek daha anlaşılır hale gelmektedir. Bu çerçevede, bağıış programlarının geliştirilmesi ve sürdürülmesi için çeşitli adımlar atılmalıdır. Bunlar arasında, yasal düzenlemelerin iyileştirilmesi, etik yönergelerin oluşturulması ve farkındalık kampanyaları yer alabilir. Ayrıca, bağıışçıların profillerinin belirlenmesi ve güven ilişkisinin sürdürülmesi de büyük önem taşımaktadır. Yerel faktörler ve toplumların ihtiyaçlarını göz önünde bulunduran ulusal ve uluslararası araştırmalar, başarılı bir sürecin temelini oluşturabilir.

Anahtar kelimeler: kadavra, vücut bağıışı, diseksiyon, anatomi eğitimi

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Introduction

One of the cornerstones of medical education is the study of human gross anatomy. Education in this area consists of a process called dissection, which involves the use of human cadavers for educational purposes. Dissection is recognized as an important learning experience for medical students. It offers many benefits and learning outcomes, including the acquisition and integration of three-dimensional anatomical knowledge, development of manual skills, promotion of peer communication, enhancement of teamwork skills, and a broad understanding of 'normality' and 'variability' [1,2].

Cadaver dissection also provides students with an emotional confrontation with human mortality [3,4]. However, some researchers have pointed out the disadvantages of dissection. These disadvantages include high cost, health and safety risks, emotional distress and anxiety in students, and inability to keep up with modern imaging techniques [5,6]. Therefore, alternative teaching methods, such as imaging techniques, digital software, and 3D printers, have been used in recent years [7-9]. Despite the controversy, many authors emphasise that dissection has additional learning outcomes such as respect for the human body, introducing students to different pathologies and promoting professionalism and leadership [10-12].

In the light of these developments, it has been suggested in the last decade that old and new teaching methods should be combined in anatomy education and that their advantages should complement each other [4,13,14]. Anatomy is a fundamental discipline that every student or professional entering the medical or biomedical sciences should learn [15].

A study by Moxham and Plaisant [2014], which examined the history of macroscopic anatomy education, summarised how the dissection of the human body has evolved [16]. Although in recent years some universities in the US and UK have moved away from dissection to cadaveric anatomy teaching, some authors [15] defend the importance of dissection courses in the medical curriculum. For these authors, dissection is a central tool for teaching macroscopic anatomy to future physicians in the light of respect and honour for each donor [15].

Some authors [17] have argued against plastination, the procedure performed on cadavers in preparation for dissection, and against the long-term preservation of prepared specimens. However, these arguments seem to have been made mainly in the

context of plastination replacing traditional cadaver dissection. Despite these arguments, plastination is an additional teaching tool that allows the use of body parts in conjunction with cadaver dissection and serves as a complementary approach to the acquisition of anatomical knowledge [17]. Therefore, plastination should be seen as an additional teaching tool that mobilises as many senses as possible to promote the acquisition of anatomical knowledge [15].

According to Korf et al, the importance of dissection in the teaching of anatomy is explained as follows [15]:

- The macroscopic anatomy laboratory provides a unique opportunity to learn and practice analytical skills [required for manual touch].
- It leads to a hypothetical process of seeing and thinking. If I cut this area with a scalpel, I should normally see this or that. It creates the anatomical mental image necessary for surgical practice.
- Information acquisition is most efficient when it involves as many senses as possible. Active knowledge acquisition [moving, discussing, building, dissecting] is much more efficient than passive knowledge acquisition [reading, listening, observing]. This principle is fully exploited in dissection.
- Medicine requires a certain orientation towards the patient, with impartial observation and compassionate help, and maintaining an objective point of view. It is important that students learn this role of impartial observer and compassionate helper well. In this context, the cadaver is initially perceived as an object. However, as the dissection progresses, the mind begins to unravel the history of the cadaver, which may include osteoporosis, muscle atrophy or calcified arteries, allowing students to develop their clinical skills.

Historical and cultural background of cadaver use

The combination of educational, emotional and professional benefits of dissection places the procurement of the human body for anatomy teaching and medical education at the centre of anatomical practice [12,18-20]. The methods of obtaining human bodies have varied throughout history [21]. The first systematic dissection of human cadavers was carried out by Herophilus and Erasistratus in Alexandria, and continued when Andreas Vesalius made dissection an important tool



in anatomy teaching. The bodies of executed criminals were used as the main source for anatomical dissection [21, 22].

By the mid-18th century, medical schools needed more cadavers, which led to a market for cadavers fuelled by grave robbery or slavery. The situation led to a process of dismemberment of the weaker members of society, usually the poor. In an attempt to end grave robbery, the British government and the Commonwealth of Massachusetts passed the Warburton Anatomy Act in 1832, which allowed the use of unclaimed bodies of people who had died in hospitals for the teaching of anatomy. These bodies were obtained from institutions such as mental hospitals, prisons and nursing homes [21, 23, 24].

In ancient India, the Vedic Indians made significant advances in medicine and anatomy. Their ability to regenerate body parts using rejuvenated stem cells made them recognized as pioneers of voluntary body and organ donation [25,26]. For example, ancient texts like the Ramayana and the Ravana Samhita describe the legendary king Ravana's wisdom, highlighting his ability to use his arm muscles to create a musical instrument called 'Ravahattha'. This instrument produced music so beautiful that it could soothe and calm his master Shiva on Mount Kailash [25-27].

The Sushruta Samhita, written around 500 BC, is recognized as an ancient Vedic treatise on surgery and medicine [25-27]. This work emphasises the importance of dissection, in which the famous Indian surgeon Sushruta obtained voluntarily donated cadavers and used them as a source of in-depth knowledge of surgery [26,27]. It is also noted that many of the ancient techniques used in plastic surgery are still valid [26,27]. Sushruta emphasises that a good clinician is possible with strong determination and anatomical knowledge [27,28].

The anatomist Andreas Vesalius, who performed the first scientific human dissections between 1514 and 1564, challenged existing Galenic views and made it possible to learn medicine through anatomy [21,29-32]. He is therefore considered the 'father of modern anatomy' [21,30]. As a result of Vesalius' work, medical dissection schools were established and this led to an increase in the demand for cadavers and the existence of body thieves in Europe [30,31]. These people were defined as criminal gangs who killed the poor and destitute and sold the bodies to medical schools [21,30-32]. The reason for this rapid increase in body theft was that the

laws in Europe at the time allowed cadavers to be treated only as commodities. This situation provided body thieves with an easy way to get away with their crimes [31-34].

Body resources in global medical education

The Uniform Anatomical Gift Act [UAGA] of 1968 in the USA and the Anatomy Act of 1984 in the UK secured body donation as an individual right and contributed to the development of successful body donation programs [21,23,24]. These successful donation programs have been followed in Thailand [35,36], Japan [37], New Zealand [38,39], Korea [40], Brazil [41,42], China [43], South Africa [44], Sri Lanka [45] and many countries in Europe [20,46,47].

Despite generally using unclaimed bodies, these countries have enacted legislation to develop and maintain donation programs [48-52]. The literature review and questionnaires provided comprehensive information on the cadaver resources used for anatomical teaching in a significant number of medical schools around the world. Despite significant advancements, data remains scarce in numerous regions, especially in Africa, Eastern and South-Eastern Europe, the Middle East, and Central Asia [53].

Within the Oceania region, three countries [Fiji, Samoa, and the Solomon Islands], anatomical dissection is not taught at all in medical schools, according to survey responses [53]. Four countries, Malaysia, Saudi Arabia, Singapore and Turkey, were found to import cadavers from the USA when the local supply was insufficient. This shows a similar trend, particularly in the Caribbean. However, most of these countries have adopted the US method of obtaining cadavers and therefore cannot reflect their own unique methods [53].

In Libya, cadaver importation from India was the only source according to 2010 reports. However, given the political uncertainty in Libya, it is questionable whether this information is still valid [49]. Although body donation is not possible in Nigeria [54,55], some sources suggest that a significant proportion of bodies are 'murdered' criminals handed over by the police [49,50,56]. However, this information is inconclusive and needs careful verification [54].

In countries where body donation has been available for 50-80 years, including Europe and the USA, there are now well-defined ethical and legal frameworks for body donation programs. As a natural consequence, the use of bodies for medical education

and research is increasing [or has increased] [17,23,54]. In countries without a legal framework for body donation and cultural traditions of honouring the dead, change may not be easy. Change can only be achieved through the development and promotion of guidelines that set out ethical and legal principles. It can be achieved by recognising the importance of body donation for medical progress and education [20].

Many European nations, including Austria, France, Germany, the Netherlands, Portugal, Spain, Switzerland, and the United Kingdom, have established body donation programs. However, some countries such as Italy, Romania, Serbia and Turkey have difficulties in finding enough donors [17]. In Turkey, there are cultural restrictions on donation and the number of available cadavers is insufficient for effective gross anatomy teaching [57].

In Italy, free admission to medical school in 1970 led to a significant increase in enrolment and important changes in anatomy teaching. However, as a consequence of these changes, dissecting rooms were closed and the number of donation programs decreased [58]. Today, there are attempts to revive some organ donation programs in Italy, but donations remain limited. This is because public opinion believes that unclaimed bodies are mostly used [17].

In Nigeria, more than 94% of schools do not have enough cadavers for macroscopic anatomy studies. Most of the available cadavers belong to criminals who have been shot, which is insufficient for medical education [50]. In China, the lack of cadavers for teaching and research is a serious problem. Barriers to this problem include traditional views, lack of legislation and lack of donation channels. New legislation and public education are considered necessary to encourage body donation and overcome cultural barriers in China [40,43].

Some cultural, legal and educational barriers make it difficult to establish and maintain body donation programs in China. However, it is believed that establishing successful donation programs and raising awareness in society through these programs will bring success by focusing on factors such as strengthening ethical education and respect for donors [43].

Various studies provide important information about the profile of donors and their reasons for donating [59]. This information can be used to target potential donors, to overcome difficulties in recruiting donors or to monitor changes in donor profiles

when setting up donation programs. In the Netherlands, there has been a large increase in body donation in recent years [47]. A study investigating the motivations and backgrounds of donors found that a quarter of donors were health professionals and 11% were in education. Donors' motivations included a desire to be useful after death, a negative attitude towards funerals and an expression of gratitude. Only 8% of donors said they donated for financial reasons. Most of these people have a supportive social network, contradicting the notion that donations are made out of loneliness.

An international study conducted in New Zealand, Ireland and South Africa found that education level, ethnicity and national identity influenced giving and that a significant proportion of donors had no religious affiliation [60]. In this study, donors were generally over 60 years of age and it was noted that the positive effects of public debates, television and newspapers can increase donations [61]. Information about donation programs came from a variety of sources, and many donors discussed their decisions with friends and family. The main motivation for donation was the desire to benefit medical science [61].

Research conducted in South Africa from 1921 to 2013 revealed a notable decline in donations by Black men during the period from 2000 to 2013, reflecting shifts in the political landscape and the socio-economic conditions of the population [44]. This on going trend could have lasting impacts on education and research, potentially jeopardizing the viability of dissection-based courses in South Africa unless proactive measures are implemented to mitigate the problem. In Greece, cadaver donation rates remain low, with the elderly showing less inclination to donate and individuals with strong religious beliefs often hesitant to participate. Consequently, studies have been proposed to promote and encourage donation efforts [62].

In conclusion, these data on body resources used in anatomy education worldwide are an important resource for understanding the different strategies of medical schools in different geographical regions towards body resources and the factors behind these strategies.

Societal views on body donation and legal regulations

Voluntary body donation plays an important role in anatomy education, and studies conducted in different countries on this topic provide an important resource for understanding societal attitudes towards body donation and legal



regulations. A study conducted in Maryland revealed that 49% of participants expressed willingness to consider whole body donation [63]. However, this does not necessarily indicate that they would commit to enrolling in a program. Similarly, research in the canton of Vaud, Switzerland, found 1,933 registered donors [0.38%] and 86 actual donors [0.011%] annually out of a population of 750,000 in the region [17]. These donations are sufficient for anatomy teaching and research, and support continuing education.

Studies show that medical students are more supportive of donation than their family members [64]. It is highlighted that students should undergo mental preparation and set appropriate expectations before entering the dissection room.

In a study conducted in the Netherlands, a quarter of participants said they would consider donating a body [47]. Similarly, the majority of medical trainees in Ireland encourage donation and recommend donation to family members [65]. International studies have shown that teachers consider dissection to be an important tool in the education of students [66]. These studies also show that willingness to donate organs and whole bodies increases with teaching experience.

Studies conducted in different regions of the world show that cultural and ethnic differences influence voluntary donation practices [43]. In this context, national legislation and societal attitudes differ. Research on body donation is an important resource for medical education and scientific research. Sharing these studies at an international level can contribute to the development of more effective legislation on body donation.

Conclusion

In conclusion, this analysis highlights the critical role of body donation in anatomy education in different geographical regions. Successful body donation programs are well established in many parts of Europe and North America, and similar initiatives are emerging in other regions. However, dependence on unclaimed bodies and imported cadavers remains an issue in many countries.

Key factors influencing body donation include cultural, religious and legal frameworks. Addressing these factors through targeted legislation, ethical guidelines and awareness campaigns is essential. Encouraging donation requires understanding donors' motivations and fostering trust and gratitude within communities.

Future efforts should focus on overcoming barriers to donation, promoting ethical practices and integrating local cultural and religious contexts into donation programs. By strengthening these aspects, we can support and improve anatomical education worldwide.

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