

ANSIEDAD Y REACCIONES EMOCIONALES EN ALUMNOS DE CIENCIAS DE LA SALUD FRENTE A SU PRIMERA PRACTICA DE DISECCION CON CADAVERES



Tesis Doctoral

Carmen Romo Barrientos

Talavera de la Reina, 2020

ANSIEDAD Y REACCIONES EMOCIONALES EN ALUMNOS DE CIENCIAS DE LAS SALUD FRENTE A SU PRIMERA PRACTICA DE DISECCION CON CADAVERES

Tesis Doctoral que presenta **Dña. Carmen Romo Barrientos** para aspirar al Grado de Doctora

Talavera de la Reina, 1 de junio de 2020

Directores de la Tesis:

Dr. Juan José Criado Álvarez

Profesor Asociado del Departamento de Ciencias Médicas

Universidad de Castilla-La Mancha

Dra. Alicia Mohedano Moriano

Profesora Titular del Departamento de Ciencias Médicas

Universidad de Castilla-La Mancha

Dr. Jaime González González

Profesor Asociado del Departamento de Ciencias Médicas

Universidad de Castilla-La Mancha



Universidad de
Castilla-La Mancha

DON JUAN JOSÉ CRIADO ÁLVAREZ, DOCTOR EN MEDICINA, ESPECIALISTA EN MEDICINA PREVENTIVA Y SALUD PÚBLICA, DIRECTOR GERENTE DEL INSTITUTO DE CIENCIAS DE LA DE SALUD DE CASTILLA-LA MANCHA, Y PROFESOR ASOCIADO DEL DEPARTAMENTO DE CIENCIAS MÉDICAS DE LA UNIVERSIDAD DE CASTILLA-LA MANCHA

INFORMA QUE:

DÑA. CARMEN ROMO BARRIENTOS ha realizado bajo mi dirección el trabajo de investigación titulado **“ANSIEDAD Y REACCIONES EMOCIONALES EN ALUMNOS DE CIENCIAS DE LAS SALUD FRENTE A SU PRIMERA PRACTICA DE DISECCION CON CADAVERES”**. Así mismo, certifico que es un trabajo original, rigurosamente realizado y es apto para ser presentado públicamente con el fin de obtener el GRADO DE DOCTORA.

Y para que conste donde proceda y surta los efectos oportunos, firmo este documento en Talavera de la Reina, a 1 de junio de 2020

Fdo.- DR. DON JUAN JOSÉ CRIADO ÁLVAREZ



Universidad de
Castilla-La Mancha

DON JAIME GONZÁLEZ GONZÁLEZ, DOCTOR EN MEDICINA, ESPECIALISTA EN MEDICINA FAMILIAR Y COMUNITARIA, MÉDICO EAP SERVICIO DE SALUD DE CASTILLA-LA MANCHA, Y PROFESOR ASOCIADO DEL DEPARTAMENTO DE CIENCIAS MÉDICAS DE LA UNIVERSIDAD DE CASTILLA-LA MANCHA

INFORMA QUE:

DÑA. CARMEN ROMO BARRIENTOS ha realizado bajo mi dirección el trabajo de investigación titulado **“ANSIEDAD Y REACCIONES EMOCIONALES EN ALUMNOS DE CIENCIAS DE LAS SALUD FRENTE A SU PRIMERA PRACTICA DE DISECCION CON CADAVERES”**. Así mismo, certifico que es un trabajo original, rigurosamente realizado y es apto para ser presentado públicamente con el fin de obtener el GRADO DE DOCTORA.

Y para que conste donde proceda y surta los efectos oportunos, firmo este documento en Talavera de la Reina, a 1 de junio de 2020

Fdo.- DR. JAIME GONZÁLEZ GONZÁLEZ



Universidad de
Castilla-La Mancha

DOÑA ALICIA MOHEDANO MORIANO, DOCTORA EN BIOLOGÍA, VICEDECANA DE CALIDAD Y LOGOPEDIA DE LA FACULTAD DE CIENCIAS DE LA SALUD, Y PROFESORA TITULAR DEL DEPARTAMENTO DE CIENCIAS MÉDICAS DE LA UNIVERSIDAD DE CASTILLA-LA MANCHA

INFORMA QUE:

DÑA. CARMEN ROMO BARRIENTOS ha realizado bajo mi dirección el trabajo de investigación titulado **“ANSIEDAD Y REACCIONES EMOCIONALES EN ALUMNOS DE CIENCIAS DE LAS SALUD FRENTE A SU PRIMERA PRACTICA DE DISECCION CON CADAVERES”**. Así mismo, certifico que es un trabajo original, rigurosamente realizado y es apto para ser presentado públicamente con el fin de obtener el GRADO DE DOCTORA.

Y para que conste donde proceda y surta los efectos oportunos, firmo este documento en Talavera de la Reina, a 1 de junio de 2020

Fdo.- DRA. ALICIA MOHEDANO MORIANO

“Mira profundamente en la naturaleza y entonces comprenderás todo mejor”

Albert Einstein

Agradecimientos

Al Dr. Juan José Criado Álvarez, director de esta tesis, por su incansable guía, supervisión y apoyo en la realización.

A Dra. Alicia Mohedano Moriano, codirectora y tutora académica de este trabajo, por su absoluta implicación, cariño y trabajo constante en todo el proceso.

Al Dr. Jaime González González, codirector, porque su pregunta “¿cómo llevas la tesis?”, ha supuesto un acicate para culminar este trabajo.

A los tres les debo esta tesis, sin ellos, estoy segura de que no hubiera llegado hasta aquí.

A la Dra. Begoña Polonio López, por la ayuda facilitada desde la Facultad de Ciencias de la Salud, para la realización de las prácticas.

Al Dr. Alino Martínez Marcos y a la Dra. Isabel Úbeda Bañón, que confiaron en nuestra idea, y desde el principio nos facilitaron y proporcionaron los recursos, instalaciones y personal de la Facultad de Medicina de Ciudad Real.

Al Dr. Daniel Saiz Sánchez y la Dra. Alicia Flores Cuadrado por su implicación y colaboración desinteresada en la actividad docente de la sala de disección.

A Dña. María Gema Velasco Muñoz, Técnico de la sala de anatomía de la Facultad de Medicina de Ciudad Real por la preparación de las prácticas, sin las que la tesis no hubiese sido posible.

A mis compañeros de la Unidad de Salud Mental, Dra. Beatriz Lara de Lucas, Doña Ana M^a Hernández Naranjo y Don Fernando Calvo Mauri, por su constante apoyo y comprensión

en la difícil conciliación de la actividad asistencial e investigadora.

A todos los alumnos y alumnas que han participado en las prácticas de disección, por su interés, participación y curiosidad.

A mis padres Carmen y Benjamín, a mi hermana Susana, porque ellos siempre están para lo que necesito, en los buenos y malos momentos.

A mi suegra Aleja, que, con su optimismo y sentido del humor, siempre me aporta dinamismo y ánimo para seguir adelante.

A mis hijos, Irene y Sergio, que son el sentido de mi vida.

A mi marido Juan José, al que admiro por su gran inteligencia y capacidad de trabajo, y con su gran paciencia me ha guiado, animado y apoyado en todo el trabajo y horas dedicadas.

Y a todas esas personas que donan su cuerpo a la ciencia de forma desinteresada, sin las que no se hubiera podido realizar esta tesis y avanzar en el conocimiento médico.

A todos mi más sincero y afectuoso agradecimiento, al fin presento mi tesis, nuestra tesis, vuestra tesis.

Índice

Indice

	Página
1.- INTRODUCCIÓN	19
2.- JUSTIFICACIÓN	25
3.- MANUSCRITOS	29
Manuscrito 1	31
Manuscrito 2	41
Manuscrito 3	53
Manuscrito 4	61
Manuscrito 5	69
4.- CONCLUSIONES	79
5.- REFERENCIAS	83
6.- OTROS ARTÍCULOS	91
7.- OTRAS APORTACIONES DE ESTA TESIS	107

1.- Introducción

Introducción

La anatomía humana es una asignatura obligatoria en la mayoría de los planes de estudios de los grados universitarios relacionados con las ciencias de la salud en sus primeros cursos, teniendo las prácticas de disección con cadáver humano una larga tradición (Cahill, 2009; Ghosh, 2015).

El estudio de las estructuras orgánicas y sistemas del cuerpo humano forma parte de las materias consideradas imprescindibles en la formación de los profesionales de la salud (Arráez-Aybar, 2010; Korf, 2008; Pabst, 2009; Tseng, 2016; Winkelmann, 2006). La anatomía humana es una asignatura básica y obligatoria en la mayoría de los planes de estudios de los grados universitarios de ciencias de la salud en sus primeros cursos, teniendo las prácticas de disección con cadáver humano una larga tradición en medicina (Estai, 2016; Korf, 2008; Tseng, 2016; Druce, 1994; Arráez-Aybar, 2010; Dinsmore, 1999; Ghosh, 2015; Ghosh, 2017; Wilson, 2017). En general, es una asignatura atractiva para la mayoría de los estudiantes de ciencias de la salud ya que les acerca al cuerpo humano (Horne, 1990; Arráez-Aybar, 2004b; Lempp, 2005; Miguel-Pérez, 2007; Bati, 2013; Sandor, 2015).

La práctica de disección suele ser habitual y está encuadrada en los planes de estudios de los grados de medicina, pero no así en otros estudios relacionados con las ciencias humanas (enfermería, fisioterapia, logopedia, terapia ocupacional), donde la posibilidad de realizar las prácticas es difícil por cuestiones técnicas, de medios y humanas (Casado, 2005; Casado, 2012; Charlton, 1994).

Las disecciones con cadáveres humanos pueden suponer una experiencia estresante, por el hecho de ver, tocar y sentir las preparaciones anatómicas, así como las relacionadas con cuestiones morales, religiosas o filosóficas (Arráez-Aybar, 2007; Leboulanger, 2011; Bob 2015). Hasta un 16% de los estudiantes de medicina suele tener pensamientos relacionados con la enfermedad y la muerte al enfrentarse al cadáver (Lempp, 2005; Boeckers, 2010; Mompeó, 2014). Otras veces, existe en los alumnos una cierta inquietud, curiosidad e incluso morbo por el contacto con la muerte; algunos autores hablan del “ritual de transformación”, “socialización con la muerte” y un proceso a veces de deshumanización (Tseng, 2016; Plaisant, 2011; Dosani, 2016; Lempp, 2005; Horne, 1990; Dickinson, 1997; Sandor, 2015; Boeckers, 2016; Goodwin, 2016). Se trata de una de las primeras experiencias del futuro profesional con la muerte (Abu-Hijelh, 1997; Boeckers, 2016; Tschernig, 2000; Goodwin, 2016).

La ansiedad es una reacción emocional adaptativa que surge ante situaciones inciertas o de alarma y que prepara al individuo para actuar y dar una respuesta adecuada frente a ellas. Las reacciones y sentimientos, así como los niveles de ansiedad frente a la sala de disección han sido estudiadas en diferentes países en los estudios de medicina (Horne, 1990; Arráez-Aybar, 2004a; Boeckers, 2010; Leboulanger, 2011; Getachew, 2014; Bob, 2015), otros en odontología y farmacia (Redwood 2011; Bati, 2013) y algunos incluyen también la Terapia Ocupacional (Arráez-Aybar, 2007, 2008). Aún a pesar de las posibles reacciones emocionales, la práctica puede ser satisfactoria y un 76% de los estudiantes cree que su uso no puede ser sustituido por otro tipo de material (Mompeó, 2014; Sandor, 2015); aunque su práctica y utilización no deja de ser un tema de debate y controversia

(McLachlan, 2004; Ellis, 2001; Boeckers, 2010; Winkelmann, 2006; Wilson, 2017). En la actualidad existe cierta controversia entre los anatomistas sobre las mejores metodologías para enseñar anatomía y sobre si el cadáver humano debe seguir siendo el principal objeto de estudio para la enseñanza de la anatomía humana (Biassutto, 2006; Redwood 2011; Mompeó, 2014; Patel, 2015; Sandor, 2015); se ha intentado la enseñanza mediante otros medios, pero en ningún caso han podido sustituir a la disección como pilar básico de la docencia (Lempp, 2005; González-López, 2012; Qamar, 2014; Dissabandara, 2015; Ghosh, 2015).

2.- Justificación

Justificación

La utilidad y pertinencia de esta línea de investigación, puede resumirse en los siguientes puntos:

1º La escasez de estudios en España, sobre las reacciones emocionales previas a la práctica de disección con cadáveres.

2º La inexistencia de estudios que empleen paralelamente, muestras de diferentes especialidades en Ciencias de la Salud (medicina, logopedia, terapia ocupacional y enfermería).

3º Establecimiento de evidencia científica sobre la adaptación y mejor utilización de las prácticas de disección, a lo largo de un curso académico.

4º Establecer con pruebas de evaluación, la utilidad didáctica de las prácticas de disección con cadáveres, para aprender la anatomía humana frente, a otros métodos didácticos más novedosos.

5º Determinar, mediante un cuestionario de opinión, qué aspectos deben ser modificados en la sala de disección, para mejorar el enfrentamiento y aprovechamiento de las prácticas.

3.- Manuscritos

Manuscrito 1

Criado-Álvarez JJ, González González J, Romo Barrientos C, Ubeda-Bañon I, Saiz-Sanchez D, Flores-Cuadrado A, Albertos-Marco JC, Martínez-Marcos A, Mohedano Moriano A. Learning from Human Cadaveric Prosections: Examining Anxiety in Speech Therapy Students. *Anat Sci Educ* 2017; 10:487-94

ANATOMICAL SCIENCES EDUCATION

ISSN: 1935-9780

BLACKWELL SCIENCE PUBLICATION

CATEGORÍA: EDUCATION, SCIENTIFIC DISCIPLINES

FI: 3,114 (JCR 2017, Q1)

FI MEDIO 5 AÑOS: 3,24

POSICIÓN CATEGORÍA: 4/41

DOI: 10.1002/ase.1699

PMID: 28472535

Pubmed: <https://www.ncbi.nlm.nih.gov/pubmed/28472535>

Learning from Human Cadaveric Prosections: Examining Anxiety in Speech Therapy Students

Juan Jose Criado-Álvarez,^{1,2} Jaime González González,^{1,3} Carmen Romo Barrientos,⁴ Isabel Ubeda-Bañon,⁵ Daniel Saiz-Sanchez,⁵ Alicia Flores-Cuadrado,⁵ Juan Carlos Albertos-Marco,⁵ Alino Martinez-Marcos,⁵ Alicia Mohedano-Moriano ^{1*}

¹Department of Medical Sciences, School of Occupational Therapy, Speech Therapy, and Nursing, University of Castilla-La Mancha, Talavera de la Reina, Toledo, Spain

²La Pueblanueva Health Centre, Integrated Care Management at Talavera de la Reina, Castilla-La Mancha Health Services, Talavera de la Reina, Toledo, Spain

³Santa Olalla Health Centre, Integrated Care Management at Talavera de la Reina, Castilla-La Mancha Health Services, Talavera de la Reina, Toledo, Spain

⁴Mental Health Services, Integrated Care Management at Talavera de la Reina, Castilla-La Mancha Health Services, Talavera de la Reina, Toledo, Spain

⁵Department of Medical Sciences, School of Medicine, Regional Centre for Biomedical Research, University of Castilla-La Mancha, Ciudad Real, Spain

Human anatomy education often utilizes the essential practices of cadaver dissection and examination of prosected specimens. However, these exposures to human cadavers and confronting death can be stressful and anxiety-inducing for students. This study aims to understand the attitudes, reactions, fears, and states of anxiety that speech therapy students experience in the dissection room. To that end, a before-and-after cross-sectional analysis was conducted with speech therapy students undertaking a dissection course for the first time. An anonymous questionnaire was administered before and after the exercise to understand students' feelings and emotions. State-Trait Anxiety Inventory questionnaires (STAI-S and STAI-T) were used to evaluate anxiety levels. The results of the study revealed that baseline anxiety levels measured using the STAI-T remained stable and unchanged during the dissection room experience ($P > 0.05$). Levels of emotional anxiety measured using the STAI-S decreased, from 15.3 to 11.1 points ($P < 0.05$). In the initial phase of the study, before any contact with the dissection room environment, 17% of students experienced anxiety, and this rate remained unchanged by end of the session ($P > 0.05$). A total of 63.4% of students described having thoughts about life and death. After the session, 100% of students recommended the dissection exercise, giving it a mean score of 9.1/10 points. Anatomy is an important subject for students in the health sciences, and dissection and prosection exercises frequently involve a series of uncomfortable and stressful experiences. Experiences in the dissection room may challenge some students' emotional equilibria. However, students consider the exercise to be very useful in their education and recommend it. *Anat Sci Educ* 00: 000–000. © 2017 American Association of Anatomists.

Key words: gross anatomy education; undergraduate education; speech therapy education; allied health anatomy courses; cadaveric prosections; anatomy laboratory; anxiety

*Correspondence to: Prof. Alicia Mohedano-Moriano, Department of Health Sciences, Section of Anatomy and Human Embryology, School of Occupational Therapy, Speech Therapy, and Nursing, University of Castilla-La Mancha (UCLM), Avenida Real Fábrica de las Sedas, s/n. 45600 Talavera de la Reina, Toledo, Spain. E-mail: alicia.mohedano@uclm.es

Received 21 July 2016; Revised 4 March 2017; Accepted 8 April 2017.

Published online 00 Month 2017 in Wiley Online Library (wileyonlinelibrary.com). DOI 10.1002/ase.1699

© 2017 American Association of Anatomists

INTRODUCTION

Human anatomy and neurology are often required courses during the first year of most university-level health sciences curricula. Dissection exercises using human cadavers are a long-held tradition in these curricula (Ghosh, 2015), and generally, human anatomy is one of the most important subjects for the majority of health science students due to its relevance in health science and medicine (Ahmed et al., 2010; Naz et al., 2011; Hajj et al., 2015). In many ways, this subject also establishes students' intellectual relationship with the human body (Moore, 1989; Horne et al., 1990; Arráez-Aybar et al., 2004b; Lempp, 2005; Miguel Pérez et al., 2007; Bati et al., 2013; Sandor et al., 2015). Although cadaveric dissection is considered a cornerstone practice in medical training (Mc Garvey et al., 2001; Rizzolo and Stewart, 2006), this can be a stressful experience for students (Dinsmore et al., 2001; Bernhardt et al., 2012; Bob et al., 2015) due to the intimate contact with death that it requires, or because of related moral, religious and philosophical concerns students may have (Arráez-Aybar et al., 2007; Leboulanger, 2011; Bob et al., 2015). Research has shown that up to 16% of medical students experience thoughts related to illness and death when faced with a cadaver (Lempp, 2005; Boeckers et al., 2010; Mompeó-Corredera, 2014). Some reports have shown that stress and negative thinking can be better addressed by either preparatory sessions before initiating contact with cadavers and dissection (Saylam and Coskunol, 2005; Quince et al., 2011; Bati et al., 2013) or through discussion of feelings among peers during the course (Kotzé and Mole, 2013). Dissection of human body is a common and established part of most medical curricula, but not in other areas of study related to the life sciences (nursing, physical therapy, speech and language therapy, occupational therapy), in which use of cadaveric specimens is limited due to technical, resource-related, and staffing issues (González-López and Cuerda-Galindo, 2012; Vidal et al., 2016). Dissection of the human body is usually a student's first experience with death in a professional setting and can occasionally lead to anxiety and stress (Arráez-Aybar et al., 2004b; Miguel Pérez et al., 2007; Leboulanger, 2011; Bernhardt et al., 2012; González-López and Cuerda-Galindo, 2012; Bati et al., 2013; Bob et al., 2015). However, at the same time, dissection can also be very satisfying because the cadaver represents "near-perfection in a model" (Mc Garvey et al., 2001; Ahmed et al., 2010; Vidal et al., 2016), and 76% of students believe that it cannot be replaced with other materials or simulation (Mompeó-Corredera, 2014; Qamar and Osama, 2014; Sandor et al., 2015). Anxiety is an adaptive emotional response that emerges in uncertain or alarming situations, and it prepares an individual to act and respond accordingly. In addition to the anxiety levels that emerge in the dissection room, the reactions and general feelings of students (Horne et al., 1990; Arráez-Aybar et al., 2004a; Boeckers et al., 2010; Leboulanger, 2011; Getachew, 2014; Bob et al., 2015) in dentistry and pharmacology (Redwood and Townsend, 2011; Bati et al., 2013), and, occasionally, in occupational therapy have also been studied in various countries (Arráez-Aybar et al., 2007, 2008).

Although gross anatomy laboratory exercises are often not compulsory in Speech and Language Therapy programs, the importance of interacting directly with a prosected human specimen is recognized as beneficial by speech and language pathology students (Weir, 2008; Skinder-Meredith, 2010;

Martin et al., 2014). Therefore, examining cadaveric prosecutions can be an important adjunct to the academic progress and future clinical knowledge of students taking part in this experience.

This study aimed to understand the attitudes, reactions, fears, and states of anxiety experienced by speech and language therapy students in the dissection room during their first contact with cadaveric specimens.

MATERIALS AND METHODS

This research was a descriptive, epidemiological, cross-sectional before-after study conducted with first-year Speech and Language Therapy students enrolled in anatomy and physiology, and neurology courses ($n = 47$ students) at the School of Occupational Therapy, Speech and Language Therapy, and Nursing (FATOLE), University of Castilla-La Mancha (UCLM), Talavera de la Reina, Toledo, Spain.

The Speech and Language Therapy School at UCLM matriculates 60 students each year. With a student-to-teacher ratio of about 12.5, such small class sizes allow educators to closely monitor each student's progress throughout the curriculum. The early stages of this curriculum include the Biological Foundations of Speech Therapy block course. This block consists of 12 European Credit Transfer and Accumulation System (ECTS) points corresponding to 120 hours of in-person class time and 300 hours of solo work by the student. It also integrates the two courses of General Neurology and Language Anatomy and Physiology. Both courses have a combined total of 6 ECTS points, 4 of which are theoretical (40 in-person hours and 100 hours of solo work by the student) and 2 of which are practical (20 in-person hours and 50 hours of solo work by the student). Coursework focusing on the theoretical aspects of these subjects utilizes lectures, interactive classroom sessions, and problem-based learning. Practical coursework is performed through the study of models in the anatomy laboratory, and reconstruction of models made by students online or from a relevant atlas (Smith-Agreda, 2016) or *Netter's Anatomy Coloring Book* (Hansen, 2015). Students are evaluated using multiple-choice questions in periodic examinations. The student's total score at the end of the course is based on the periodic examinations and a final examination (80%), a practical examination focused on identification of anatomical structures in the laboratory setting (15%), and class participation (5%).

Student participation in the study was voluntary. Only those students who had never previously participated in prosection exercises using human cadavers were recruited.

The study employed the use of cadavers that had been previously dissected by medical students and faculty at the Ciudad Real Medical School at UCLM. All participants utilized the necessary and standard personal protective equipment (gown, mask, and gloves), and they were provided with information on the body donation program which was available on the website of the School of Medicine of Ciudad Real (UCLM, 2017). This was the first time that such an exercise had been conducted in the School of Occupational Therapy, Speech and Language Therapy, and Nursing at the University of Castilla-La Mancha.

This study received ethical approval and was supervised by the Research Commission of the Integrated Management at Talavera de la Reina, Castilla-La Mancha Health Services, Talavera de la Reina, Toledo, Spain.

An “ad hoc,” anonymous, non-validated 12-question survey was developed for the study based on the model presented by Miguel Pérez et al. (2007). This instrument was administered to all participants ($n = 47$) to characterize students’ feelings and emotions regarding the exercise prior to any actual contact with prosected human specimens. To avoid bias, participants were not informed that they would also complete an evaluation at the end.

To evaluate students’ states of anxiety, a State Trait Anxiety Inventory (STAI) questionnaire was used (Spielberger et al., 1983, Spielberger, 1989). The STAI questionnaire is a research instrument intended for the study of anxiety in healthy adults. It is validated in Spanish language (Spielberger et al., 2002), self-administered, and includes scales to measure different but related facets of anxiety, such as state anxiety (SA or STAI-S) and trait anxiety (TA or STAI-T), using 40 questions. In general, trait anxiety reflects a relatively stable emotional state and measures a person’s general tendency to perceive day-to-day situations as threatening, as well as the person’s baseline feelings. In contrast, state anxiety refers to subjective and transitory feelings of tension, apprehension, and fear, which can vary over time and fluctuate in intensity. State anxiety increases in response to various situations and occurrences and may decrease after using relaxation techniques. The SA questionnaire measures how a person feels in a concrete stressful situation. The questionnaires query subjects regarding both types of anxieties by measuring the intensity with which they feel emotions and sensations of anxiety at a particular moment, choosing among four possible responses: nothing, something, a fair amount, and very much (0, 1, 2, and 3 points, respectively). Both questionnaires include 20 questions, with possible scores ranging from 0 to 60 points per question, the highest score indicating the highest level of anxiety. These points give a numerical value for TA and another for SA, and their sum is the STAI Sum (STAI-T + STAI-S). The STAI-Total is the absolute value of the difference between the two values and offers information about whether an event causes anxiety. Prosection exercises are considered anxiety-inducing in those who obtain a value greater than 10 points (STAI-Total > 10) (Spielberger et al., 2002; Arráez-Aybar et al., 2004a; Casado et al., 2012). The STAI are adapted and validated in the Spanish population with a Cronbach’s alpha of 0.93 for STAI-T and 0.92 for STAI-S (Fonseca-Pedrero et al., 2012).

Students’ experiences with prosected specimens lasted four hours per session, and each was divided into two separate two-hour portions, with a break in the middle. Following each session, an anonymous “ad hoc” questionnaire was again given to each participant. This questionnaire was similar to the initial questionnaire given to students prior to the exercise, but it had several additional questions related to students’ satisfaction regarding the learning experience and the educational quality of the session. Each participant scored his or her own questionnaire in order to pair it with the questionnaire completed prior to the exercise. All students were informed of the study’s overall goals.

For the descriptive statistical analysis, the parameters used depended on the scale of the variable; for qualitative variables, simple frequencies were used, and for quantitative variables, the frequency distribution, measures of central tendency, and standard deviation were used. For the variable distribution analysis, the Shapiro–Wilk statistic was calculated using a Lilliefors significance level to study the normal variable distribution, because the sample size did not exceed 50

individuals. In the case of statistical inference analysis of independent variables, if the outcome variable was a dichotomous variable, the student’s t -test was used (the sum of the Wilcoxon signed-rank test or the Mann–Whitney U test was used if the variable was continuous and did not follow a normal distribution). For studying the differences in paired variables, a t -test was used for paired data. A chi-squared test was used to compare nominal and dichotomous variables (or a Mann–Whitney U test or Kruskal–Wallis test if one of the variables was ordinal). A 5% confidence level was established. The SPSS statistical package, version 18.0, was used for data analysis (SPSS Inc., Chicago, IL).

RESULTS

From a total of 48 students in the class, 47 (97.9%) students participated in this study. The mean age was 20.0 ± 2.22 years (median: 19 years; range: 18–25 years). A total of 42 students (89.4%) were women. One-third of the students had previously seen a cadaver ($n = 15$, 31.9%), although no male student ($n = 5$) had seen a cadaver before. With regards to student perceptions and thoughts prior to the exercise, 36 students (76.6%) stated they felt “curiosity” and only 6 (12.8%) and 5 (10.6%) stated they experienced “anxiety” or “fear” respectively (Table 1). Unpleasant “odor” associated with the cadavers was noted as the cause of unpleasant feelings in 22 (46.8%) students, followed by unpleasant feelings associated with touching the cadavers by 21 (44.7%) students. In general, before beginning the exercise, students felt “calm” and “secure” (75.5% and 70.2%, respectively, $P < 0.05$); these percentages matched those students who stated that they were not “afraid.” After the exercise, these percentages rose to 92.7%, with 90.2% of students stating that they felt “at ease” compared with 63.8% before the exercise ($P < 0.05$) (see Fig. 1 for complete results).

Table 1.

Student Perceptions Prior to Gross Anatomy Laboratory Exercise

Statement	Yes N (%)	No N (%)
Thinking about prosection makes me feel...		
Anxiety	6 (12.8)	41 (87.2)
Displeasure	12 (25.5)	35 (74.5)
Curiosity	36 (76.6)	11 (23.4)
Uncertainty	19 (40.4)	28 (59.6)
Fear	5 (10.6)	42 (89.9)
What do you find unpleasant in the dissection room?		
Seeing the face of the cadaver	17 (36.2)	30 (63.8)
The “smell” of the dissection room	22 (46.8)	25 (53.2)
Touching the cadaver	21 (44.7)	26 (55.3)

Number participating students $N = 47$.

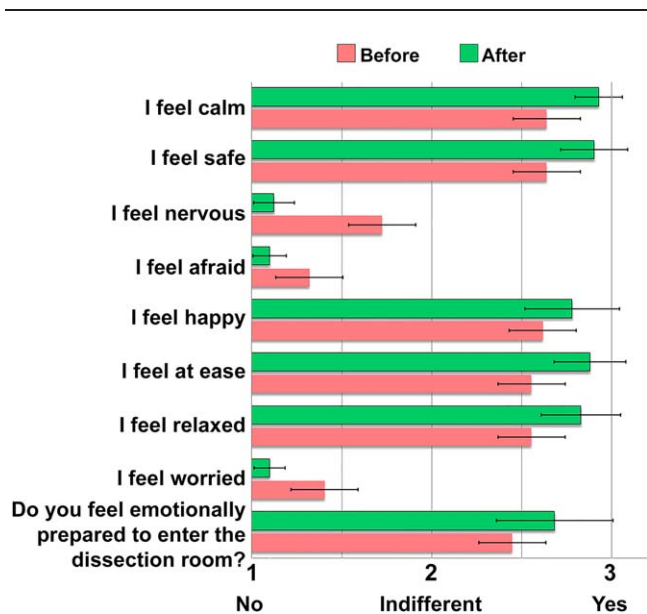


Figure 1.

Students' perceived emotions before and after the exercise in the anatomy laboratory. Data are displayed as means (\pm SD) based on a three point scale where No = 1, Indifferent = 2, and Yes = 3. All data points for "before" versus "after" experience in the gross anatomy laboratory for every statement are statistically significant at $P > 0.05$. There were no significant differences in perceptions based on gender at $P > 0.05$. The number of students' responses "before" ($n = 47$) and "after" ($n = 41$).

Baseline anxiety levels measured using the STAI-T remained stable and unchanged ($P > 0.05$) throughout the exercise (Table 2). In contrast, levels of emotional anxiety measured using the STAI-S significantly decreased from 15.3 to 11.1 points ($P < 0.05$) (Table 2). Before starting the exercise, eight students (17%) displayed signs of anxiety (STAI-Total > 10), and this number remained unchanged at the end of the session ($P > 0.05$). That is, students with anxiety prior to the exercise continued to feel anxiety at the end, although the overall emotional anxiety of the class (STAI-S) was reduced. There were no significant differences related to gender or previous experience seeing a cadaver, either for the group of students overall or for those who felt anxiety

Table 2.

Students' States of Anxiety Before and After the Gross Anatomy Exercise

Instrument	Before		After		P-value
	Mean (\pm SD)	Median	Mean (\pm SD)	Median	
STAI-T	18.8 (± 6.36)	18	17.1 (± 7.8)	17	$P > 0.05$
STAI-S	15.3 (± 8.1)	13	11.1 (± 7.11)	10	$P < 0.05$
STAI-Sum (T+S)	33.9 (± 12.4)	33	28.1 (± 13.38)	28	$P < 0.05$
STAI-Total	7.0 (± 5.79)	7	7.3 (± 5.37)	6	$P > 0.05$

Number participating students $N = 47$; STAI-T, State Trait Anxiety Inventory - Trait Anxiety; STAI-S, State Trait Anxiety Inventory - State Anxiety; STAI-Sum (T + S), Sum of STAI-T and STAI-S; STAI-Total: Total calculation of STAI.

($P > 0.05$) (Table 2). Following the exercise, 26 students (63.4%) expressed having had thoughts about life and death, and 15 (36.6%) had feelings of fear regarding loss of control. There were no significant differences in any of these cases related to gender or previous experience seeing a cadaver.

A total of 100% of the students recommended the exercise for future courses, having been "satisfied" or "very satisfied" in 24.4% and 75.6% of cases, respectively. The mean score of the experience (measured on a scale of 0 to 10 where 10 = the best rating) was 9.1 ± 0.96 (median: 9; range, 6–10). In addition, 91.7% of students considered the exercise very useful as a learning tool after completing their experience with the prosected specimens, compared to 85.4% who perceived it as useful prior to the exercise. Taken together, there was a statistically significant association ($P < 0.05$) between the usefulness of learning and the actual acquisition of knowledge. In addition, students stated they preferred to work with prosected cadavers (89.6%) more than anatomical models and atlases (10.4%). Overall, 93.8% of students found that prosection-based learning was necessary for anatomical training (Table 3).

DISCUSSION

Opinions about the Relevance of Anatomy Teaching

Anatomy tends to be one of the most noteworthy and important experiences for students in the first year of medical school, although exercises in the dissection room are often regarded as a series of uncomfortable or stressful experiences (Horne et al., 1990; Arráez-Aybar et al., 2004a, 2008; Miguel Pérez et al., 2007; Bati et al., 2013; Sandor et al., 2015). To date, few studies have been conducted with health science students outside of medicine (Arráez-Aybar et al., 2007, 2008; Bati et al., 2013), and none have been conducted with students completing a degree in Speech and Language Therapy. The results of the current study are in agreement with previous publications regarding the use of prosection-based learning and dissection for non-medical students. Currently, there is a great deal of discussion among anatomists regarding the best methods for teaching anatomy, such as whether virtual dissection should be incorporated into curricula (Codd and Choudhury, 2011; Chung et al., 2015), or whether the human cadaver should continue to be the primary focus of study in human anatomy education

Table 3.**Student Perceptions After Learning Anatomy with Prosections**

Statement	N (%)	P-value
Prosection utility for learning		
Useful	4 (8.5)	<i>P</i> < 0.05
Very useful	43 (91.5)	
Acquired more knowledge. Prosection versus resources		
Quite	6 (12.8)	<i>P</i> < 0.05
A lot	41 (87.2)	
Usefulness of Anatomical model, atlas versus prosection		
Anatomical model	1 (2.1)	<i>P</i> < 0.05
Atlas	2 (4.3)	
Dissection	44 (93.6)	
Need for cadaver prosection in learning anatomy		
Relatively necessary	1 (2.1)	<i>P</i> < 0.05
Necessary	3 (6.4)	
Very necessary	43 (91.5)	

Number participating students *N* = 47; Significant associations existed between all responses to provided statements (*P* < 0.05).

(Wong and Stewart, 2004; Biasutto et al., 2006; Flores, 2006; Redwood and Townsend 2011; Mompeó-Corredera, 2014; Patel et al., 2015; Sandor et al., 2015). Alternative educational methods have been used and described, but to date, it has been impossible to replace dissection as a basic pillar of anatomy education (Bravo and Inzunza, 1995; Lempp, 2005; González-López and Cuerda-Galindo, 2012; Qamar and Osama, 2014; Dissabandara et al., 2015; Ghosh, 2015). Dissection and prosection allow students to recognize and relate anatomical structures in a unique 3D configuration that cannot be replaced by atlases or virtual resources.

Anxiety, Fear and Apprehension

Although 32% of students participating in the current study had prior contact with cadavers, previous studies have indicated that dissection can still be a source of stress, even for those who have had experience with the process (Miguel Pérez et al., 2007; Boeckers et al., 2010; Le Boulanger, 2011; Bob et al., 2015). Indeed, dissection has been shown to challenge students' emotional equilibrium (Arráez-Aybar et al., 2004b, 2007, 2008; Getachew, 2014), and researchers believe that the varying degrees of anxiety experienced by students may be related to students' coping mechanisms. Indeed, it has been shown that communication between students regarding potentially stressful experiences in the dissection room decreases overall stress responses (Miguel Pérez et al., 2007; Casado et al., 2012). Therefore, in the current study, it was safe to assume that students were able to exchange their impressions, feelings, and perceptions with classmates during the break period between sessions, leading to an overall decrease in anxiety levels regarding the prosection experience. Several scholars have termed this type of stress-reducing communication as a "transformation ritual," or "socialization toward death" (Horne et al., 1990; Lempp, 2005; Sandor et al., 2015). Again, the results of the current study are in agreement with previous research examining this phenomenon, notably with regards to

how STAI Sum numbers were statistically different before and after the first dissection (Arráez-Aybar et al., 2004a, 2007, 2008). In contrast, although other studies have found a trend toward decreasing percentages of anxiety after the first dissection, these were not significant (Le Boulanger, 2011; Bob et al., 2015). The authors of the current study believe that these discrepancies in statistical significance were related to the fact that the latter two studies tested students whose participation in the process was compulsory, while in the current study, participation was voluntary. Additionally, other studies have indicated that anxiety levels decrease when students complete other exercises and dissections, with their total level of anxiety (STAI Sum) decreasing from 26.62 to 14.34 points (Arráez-Aybar et al., 2004a,b). Previous research has also indicated that anatomy instructors support the use of audio-visual material explaining and/or demonstrating the dissection process before entering to the anatomy laboratory (Arráez-Aybar et al., 2004a,b; Casado et al., 2012). Also, presence of senior students (who took dissection course before) with first-year medical students in the same dissection laboratory can have a positive influence as a coping mechanism and can be used as a preventive measure to reduce stress before the dissection process (Houwink et al., 2004).

Data from the current study indicate that students defined their health as good, with a mean value of 80 points on the visual analogue scale (VAS), and the entire cohort displayed low levels of anxiety (17%), which have been in agreement with previous research (Kotzé and Mole, 2013), although the authors did not examine students after the dissection experience. Similarly, Garvey and collaborators found that only 2% of medical students rated their stress levels as high (Mc Garvey et al., 2001), and those levels of anxiety decreased with repeated visits to the dissection room (Mc Garvey et al., 2001; Lee et al., 2011).

With regard to the disadvantages of the use of human cadavers as a teaching tool, 46.8% of students in the current study stated that "odor" could be a drawback, echoing other

studies (Cahill and Ertarh, 2009; Naz et al., 2011; Bati et al., 2013; Qamar and Osama, 2014; Dissabandara et al., 2015), although this was a lower percentage than the 70%–80% obtained in those studies (Miguel Pérez et al., 2007; Arráez-Aybar et al., 2008; Leboulanger, 2011; Mompeó-Corredera, 2014). Furthermore, only 36.3% of students in this study stated that the unpleasantness of seeing a cadaver could cause anxiety, compared with to 43%–56% in other studies (Miguel Pérez et al., 2007; Leboulanger, 2011).

Student Opinions about Prosections in Learning Anatomy

In general, students described their experience with cadaveric dissection as satisfactory or very satisfactory, and they recommended that it be used in future courses (100%), although another study found this rate to be lower at 85.5% (Mompeó-Corredera, 2014). It is interesting that students who participated in this study, having been educated in a technological and/or digital environment, were still satisfied with a hands-on and non-technological style of learning like dissection, and recommended it accordingly, a phenomenon that has been observed by others (Leboulanger, 2011; Mompeó-Corredera, 2014; Qamar and Osama, 2014).

Several studies have previously indicated that students did not feel adequately prepared to deal with illness and death after graduating from college (Horne et al., 1990; Lempp, 2005; Arráez-Aybar et al., 2008; Redwood and Townsend, 2011; Mompeó-Corredera, 2014). This study provided an opportunity to raise awareness among speech and language therapy students regarding the benefits of using cadaveric prosections and to specifically address ideas about illness and death. Overall, 63% of students stated that this exercise accomplished these aforementioned goals. Clearly, cadaveric study is not a substitute for a living patient, but findings from this and other studies demonstrate that it has a positive influence on aspiring speech and language therapists.

Dissection and prosection also improves spatial reasoning skills and aids in relating structures to images. It has also been argued that dissection promotes self-reflection and integration of the cognitive and affective skills necessary for medical practice (Rizzolo and Stewart, 2006; Ahmed et al., 2010). Additionally, other studies have shown that the anatomy dissection room is a positive learning environment for students (Mc Garvey et al., 2001), and some authors consider it as one of the foundations of formal anatomy teaching (Rizzolo and Stewart, 2006; Lee et al., 2011; Somanath et al., 2015). It should be noted that dissection is not a requirement in the Speech and Language Therapy curriculum, but student feedback in the present study suggested that working with prosected cadavers was useful for student learning, and it also stimulated an increased interest in the subjects of neurology and human anatomy. Taken together, the majority of students considered the dissection room experience very satisfactory and valuable for their learning. According to Ahmed and collaborators, the opinion of both students and educators are crucial for the design of a successful anatomy curriculum (Ahmed et al., 2010).

Study Limitations

One of the limitations in the current study was the small sample size (54 students were enrolled in the Speech and Language Therapy curriculum). In addition, this was the first year prosections were used as a complementary methodology for teaching anatomy and neurology. In previous years, students were not formally tested with this methodology in the same manner as described here. Therefore, no previous results are available with which to compare the current findings. In this regard, future studies from FATOLE may produce different results regarding the use of cadaveric specimens. In addition, another limitation of this study is the lack of qualitative reports from students regarding their laboratory experience.

CONCLUSIONS

Based on this study, the authors propose that anatomy laboratory sessions utilizing human prosections should be required as a part of the anatomy and neurology curriculum for Speech and Language Therapy students. These laboratory sessions should complement the preexisting curriculum and account for two practical (ECTS) credits corresponding to 6 hours of teaching time. In addition, psychological coping techniques for anxiety levels should be included both before and after such experiences.

ACKNOWLEDGMENTS

The authors would like to thank Dr. Juan Emilio Felú (Dean of the Medical School at Ciudad Real, Spain) for allowing the use of the necessary facilities, and Dr. Begoña Polonio (Dean of the School of Occupational Therapy, Speech Therapy, and Nursing at Talavera de la Reina, Toledo, Spain) for her collaboration and for financing this activity. The authors would also like to thank the students in their first year of the Speech and Language Therapy degree in the 2015/2016 academic year for their participation in this study. Finally, the authors would like to thank Sofia Martínez Ubeda for her advice on English language usage.

NOTES ON CONTRIBUTORS

JUAN JOSÉ CRIADO-ÁLVAREZ, M.D., Ph.D., is an associate professor in the School of Occupational Therapy, Speech Therapy, and Nursing at the University of Castilla-La Mancha, Talavera de la Reina, Toledo, Spain. He is also a primary care specialist at the Pueblanueva Health Centre, Integrated Care Management at Talavera de la Reina, and Castilla-La Mancha Regional Health Services. He teaches neurology, and his research interest is predominantly in epidemiology and public health.

JAIME GONZÁLEZ GONZÁLEZ, M.D., Ph.D., is an associate professor in the School of Occupational Therapy, Speech Therapy, and Nursing at the University of Castilla-La Mancha in Talavera de la Reina, Toledo, Spain. He is also a primary care specialist at the Santa Olalla Health Centre, Integrated Care Management at Talavera de la Reina, and Castilla-La Mancha Regional Health Services. He teaches the biomechanics of the human body, and his research interest is in fibromyalgia disease.

CARMEN ROMO BARRIENTOS, B.Sc., is a clinical psychologist in the Mental Health Service, at Hospital Universitario “Nuestra Señora del Prado” in Talavera de La Reina, Toledo, Spain. Her research interest is in developmental

psychology, child psychopathology, behavioral disorders, and educational and family therapy guidelines.

ISABEL UBEDA BAÑON, Ph.D., is a professor in the Department of Health Sciences at the Medical School of University of Castilla-La Mancha in Ciudad Real, Spain. She is a collaborator-investigator of the neurodegeneration and neuroplasticity group at the Regional Center for Biomedical Research. She also teaches human anatomy and embryology and her research interest is in Parkinson disease.

DANIEL SAIZ-SANCHEZ, Ph.D., is a professor in the Department of Health Sciences at the Medical School of University of Castilla-La Mancha, Ciudad Real, Spain. He is a collaborator-investigator of the neurodegeneration and neuroplasticity group at the Regional Center for Biomedical Research. He also teaches human anatomy and embryology, and his research interest is in Parkinson disease.

ALICIA FLORES CUADRADO, Ph.D., is a lecturer in the Department of Health Sciences at the Medical School of University of Castilla-La Mancha, Ciudad Real, Spain. She is a collaborator-investigator of the neurodegeneration and neuroplasticity group at the Regional Center for Biomedical Research. She also teaches human anatomy and embryology, and her research interest is in Parkinson disease.

JUAN CARLOS ALBERTOS MARCO, B.Sc., is a technician in the human anatomy and embryology laboratory in the Department of Medical Sciences at the Ciudad Real Medical School of University of Castilla-La Mancha (UCLM), Ciudad Real, Spain.

ALINO MARTINEZ MARCOS, Ph.D., is a full professor and chair of the laboratory of human anatomy and embryology in the Department of Health Sciences at the Medical School of University of Castilla-La Mancha, Ciudad Real, Spain. He is the principal investigator of the neurodegeneration and neuroplasticity group at the Regional Center for Biomedical Research and teaches human anatomy and embryology.

ALICIA MOHEDANO MORIANO, Ph.D., is a professor in the Department of Health Sciences at the School of Occupational Therapy, Speech Therapy and Nursing at the University of Castilla-La Mancha, Talavera de la Reina, Spain. She teaches human anatomy and physiology, and her research interest is in the temporal lobe and memory.

LITERATURE CITED

Ahmed K, Rowland S, Patel V, Khan RS, Ashrafian H, Davies DC, Darzi A, Athanasiou T, Paraskeva PA. 2010. Is the structure of anatomy curriculum adequate for safe medical practice? *Surgeon* 8:318–324.

Arráez-Aybar LA, Casado-Morales MI, Castaño-Collado G. 2004a. Anxiety and dissection of the human cadaver: An unsolvable relationship? *Anat Rec* 279B:16–23.

Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. 2004b. Dissection from the Spanish anatomist's perspective: Aims, attitudes, and related aspects. *Anat Rec* 281:15–20.

Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. 2007. A study of cognitive-affective and physiological-motor reactions to human dissection in Spanish students of human anatomy. *Eur J Anat* 11:67–71.

Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. 2008. Dissection as a modulator of emotional attitudes and reactions of future health professionals. *Med Educ* 42:563–571.

Bati AH, Ozer MA, Govsa F, Pinar Y. 2013. Anxiety of first cadaver demonstration in medical, dentistry and pharmacy faculty students. *Surg Radiol Anat* 35:419–426.

Bernhardt V, Rothkötter HJ, Kasten E. 2012. Psychological stress in first year medical students in response to the dissection of a human corpse. *GMS Z Med Ausbild* 29:12.

Biasutto SN, Caussa LI, Criado del Rio LE. 2006. Teaching anatomy: Cadavers vs. computers? *Ann Anat* 188:187–190.

Bob MH, Popescu CA, Suci SM, Buzoianu AD. 2015. First year medical students' attitude toward anatomical corpse dissection and its relationship with their personality. *Rom J Morphol Embryol* 56:321–324.

Boeckers A, Brinkmann A, Jerg-Bretzke L, Lamp C, Traue HC, Boeckers TM. 2010. How can we deal with mental distress in the dissection room?—An evaluation of the need for psychological support. *Ann Anat* 192: 366–372.

Bravo H, Inzunza OH. 1995. Assessment of some software for anatomy and neuroanatomy teaching at Faculty of Medicine, Pontificia Universidad Católica de Chile. *Rev Chil Anat* 13:79–86.

Cahill KC, Ettarh RR. 2009. Attitudes to anatomy dissection in an Irish medical school. *Clin Anat* 22:386–391.

Casado MI, Castaño G, Arráez-Aybar LA. 2012. Audiovisual material as educational innovation strategy to reduce anxiety response in students of human anatomy. *Adv Health Sci Educ Theory Pract* 17:431–440.

Chung BS, Shin DS, Brown P, Choi J, Chung MS. 2015. Virtual dissection table including the visible Korean images, complemented by free software of the same data. *Int J Morphol* 33:440–445.

Codd AM, Choudhury B. 2011. Virtual reality anatomy: Is it comparable with traditional methods in the teaching of human forearm musculoskeletal anatomy? *Anat Sci Educ* 4:119–125.

Dinsmore CE, Daugherty S, Zeitz HJ. 2001. Student responses to the gross anatomy laboratory in a medical curriculum. *Clin Anat* 14:231–236.

Dissabandara LO, Nirthanan SN, Khoo TK, Tedman R. 2015. Role of cadaveric dissections in modern medical curricula: A study on student perceptions. *Anat Cell Biol* 48:205–212.

Flores BG. 2006. What the dissection meaning for medical students. *Int J Morphol* 24:575–580.

Fonseca-Pedrero E, Paino M, Sierra-Baigrie S, Lemos-Giraldez S, Muñoz J. 2012. Propiedades psicométricas del “Cuestionario de ansiedad estado-rasgo” (STAI) en universitarios. *Behav Psychol* 20:547–561.

Getachew D. 2014. Reaction of medical students to experiences in dissection room. *Ethiop J Health Sci* 24:337–342.

Ghosh SK. 2015. Human cadaveric dissection: A historical account from ancient Greece to the modern era. *Anat Cell Biol* 48:153–169.

González-López E, Cuerda-Galindo E. 2012. The use of corpses and organs in research and medical education. Lessons from history. *Med Clin (Barc)* 138: 441–444.

Hajj I, Dany M, Forbes W, Barremkala M, Thompson BJ, Jurjus A. 2015. Perceptions of human cadaver dissection by medical students: A highly valued experience. *Ital J Anat Embryol* 120:162–171.

Hansen JT. 2015. *Netter Cuaderno de Anatomía Para Colorear*. 2nd Ed. Paris, France: Masson Elsevier Inc. 392 p.

Horne DJ, Tiller JW, Eizenberg N, Tashevskva M, Biddle N. 1990. Reactions of first-year medical students to their initial encounter with a cadaver in the dissecting room. *Acad Med* 65:645–646.

Houwink AP, Kurup AN, Kollars JB, Kral Kollars CA, Carmichael SW, Pawlina W. 2004. Help of third-year medical students decreases first-year medical students' negative psychological reactions on the first day of gross anatomy dissection. *Clin Anat* 17:328–333.

Kotzé SH, Mole CG. 2013. Talking about death: Implementing peer discussion as a coping mechanism to overcome fears about dissection, death, and dying. *Anat Sci Educ* 6:191–198.

Leboulanger N. 2011. First cadaver dissection: Stress, preparation, and emotional experience. *Eur Ann Otorhinolaryngol Head Neck Dis* 128:175–183.

Lee YH, Lee YM, Kwon S, Park SH. 2011. Reactions of first-year medical students to cadaver dissection and their perception on learning methods in anatomy. *Korean J Med Educ* 23:275–283.

Lempp HK. 2005. Perceptions of dissection by students in one medical school: Beyond learning about anatomy. A qualitative study. *Med Educ* 39:318–325.

Martin K, Bessell NJ, Scholten I. 2014. The perceived importance of anatomy and neuroanatomy in the practice of speech-language pathology. *Anat Sci Educ* 7:28–37.

Mc Garvey MA, Farrell T, Conroy RM, Kandiah S, Monkhouse WS. 2001. Dissection: A positive experience. *Clin Anat* 14:227–230.

Miguel Pérez M, Porta Riba N, Ortiz Sagrista JC, Martínez A, Götzens García V. 2007. Human anatomy: Reactions of first year medical students to the dissection room. *Educ Méd* 10:105–113.

Mompeó-Corredera B. 2014. Methodologies and materials in gross human anatomy learning. Perceptions by digital native medical students. *Rev Fund Educ Méd* 17:99–104.

Moore KL. 1989. The course of anatomical terminology. In: *Proceedings of the XIII Federative International Congress of Anatomy; Rio de Janeiro, Brazil, 1989, August 6–11*. p 23. International Federation of Associations of Anatomists (IFFA), Johannesburg, South Africa.

Naz S, Nazir G, Iram S, Mohammad M, Umair Qari IH, Mohammad S. 2011. Perceptions of cadaveric dissection in anatomy teaching. *J Ayub Med Coll Abbottabad* 23:145–148.

Patel SB, Mauro D, Fenn J, Sharkey DR, Jones C. 2015. Is dissection the only way to learn anatomy? Thoughts from students at a non-dissecting based medical school. *Perspect Med Educ* 4:259–260.

Qamar K, Osama M. 2014. Role of dissection in light of students' perceptions. *J Pak Med Assoc* 64:1021–1024.

- Quince TA, Barclay SI, Spear M, Parker RA, Wood DF. 2011. Student attitudes toward cadaveric dissection at a UK medical school. *Anat Sci Educ* 4: 200–207.
- Redwood CJ, Townsend GC. 2011. The dead center of the dental curriculum: Changing attitudes of dental students during dissection. *J Dent Educ* 75:1333–1344.
- Rizzolo LJ, Stewart WB. 2006. Should we continue teaching anatomy by dissection when?. *Anat Rec B New Anat* 289:215–218.
- Sandor I, Birkas E, Gyorffy Z. 2015. The effects of dissection-room experiences and related coping strategies among Hungarian medical students. *BMC Med Educ* 15:73.
- Saylam C, Coskunol H. 2005. Orientation lesson in anatomy education. *Surg Radiol Anat* 27:74–77.
- Skinder-Meredith AE. 2010. Innovative activities for teaching anatomy of speech production. *Anat Sci Educ* 3:234–243.
- Smith-Agreda JM. 2016. *Escolar. Reconstrucciones Humanas por planos de disección*. 6th Ed. Mexico City, Mexico: Editorial Médica Panamericana. 172 p.
- Somanath D, Srivastava S, Rajasekar SS. 2015. Experience in anatomy lab - An analysis in preclinical students. *Int J Healthcare Biomed Res* 3:117–121.
- Spielberger CD. 1989. *State-Trait Anxiety Inventory: Bibliography*. 2nd Ed. Palo Alto, CA: Consulting Psychologists Press. 115 p.
- Spielberger CD, Gorsuch RL, Lushene RE. 2002. *STAI Cuestionario de Ansiedad Estado-Rasgo*. 6th Ed. Madrid, Spain: TEA Ediciones. 36 p.
- Spielberger CD, Gorsuch RL, Lushene R, Vagg PR, Jacobs GA. 1983. *Manual for the State-Trait Anxiety Inventory*. 1st Ed. Palo Alto, CA: Consulting Psychologists Press. 36 p.
- UCLM. 2017. Programa de donación de cuerpos con fines docentes y de investigación, Área de Anatomía y Embriología Humana, Departamento de Ciencias Médicas, Facultad de Medicina de Ciudad Real, Universidad de Castilla La Mancha. University of Castilla-La Mancha, Talavera de la Reina, Spain. URL: https://www.uclm.es/cr/medicina/donacion_cuerpos.html [accessed 5 March 2017].
- Vidal Ó, Ginestà C, Espert JJ, Valentini M, García-Valdecasas JC. 2016. Fresh cadaver, an old surgical model in current general surgery. *Cir Esp* 94:201–202.
- Weir KA. 2008. Thinking outside the (voice) box: A case study of students' perceptions of the relevance of anatomy to speech pathology. *Anat Sci Educ* 1: 166–174.
- Wong K, Stewart F. 2004. Competency-based training of basic trainees using human cadavers. *ANZ J Surg* 74:639–642.

Manuscrito 2

Romo Barrientos C, Criado-Álvarez JJ, González González J, Ubeda-Bañon I, Saiz-Sánchez D, Flores-Cuadrado A, Martín Conty JL, Viñuela A, Martínez-Marcos A, Mohedano Moriano A. Anxiety among Medical Students when Faced with the Practice of Anatomical Dissection. *Anat Sci Educ* 2019; 12:300-9

ANATOMICAL SCIENCES EDUCATION

ISSN: 1935-9780

BLACKWELL SCIENCE PUBLICATION

CATEGORÍA: EDUCATION, SCIENTIFIC DISCIPLINES

FI: 3,759 (JCR 2019, Q1)

FI MEDIO 5 AÑOS: 3,904


POSICIÓN CATEGORÍA: 3/41

DOI: 10.1002/ase.1835

PMID: 30378293

Pubmed: <https://www.ncbi.nlm.nih.gov/pubmed/30378293>

Anxiety among Medical Students when Faced with the Practice of Anatomical Dissection

Carmen Romo Barrientos,¹ Juan José Criado-Álvarez,^{1,2} Jaime González-González,^{1,2} Isabel Ubeda-Bañón,³ Daniel Saiz-Sanchez,³ Alicia Flores-Cuadrado,³ José Luis Martín-Conty,⁴ Antonio Viñuela,⁴ Alino Martínez-Marcos,³ Alicia Mohedano-Moriano^{2*} 

¹Integrated Care Management, Castilla-La Mancha Health Services, Talavera de la Reina, Spain

²Department of Medical Sciences, School of Occupational Therapy, Speech Therapy, and Nursing, University of Castilla-La Mancha, Talavera de la Reina, Spain

³Department of Medical Sciences, Ciudad Real Medical School, Regional Centre for Biomedical Research, University of Castilla-La Mancha, Ciudad Real, Spain

⁴Department of Nursing, Physiotherapy and Occupational Therapy, School of Occupational Therapy, Speech Therapy and Nursing, University of Castilla-La Mancha, Talavera de la Reina, Spain

Practical training in the dissection of human cadavers is a fundamental and traditional component of human anatomy education in medical schools. This practice, however, can be stressful for students and can generate a certain amount of anxiety. The aim of this study is to explore the attitudes, reactions, and anxiety levels of first-year medical students when working in the dissecting room, over a period of one year, and to relate these anxiety levels to the results of our educational program. This is a before and after descriptive study of students at the University of Castilla-La-Mancha. Questionnaires were distributed among them before and after their dissection practices in order to understand their feelings and emotions and their satisfaction about this activity. State-Trait Anxiety Inventory questionnaires were used to assess the students' 'state anxiety' (SA), which dropped significantly from 49.1% to 14% by the end of their first year. Female students started with higher levels of SA than their male counterparts but by the end of the year these had dropped to similar levels. Anxiety and fearful thoughts tended to drop ($P > 0.05$). In contrast, uncertainty levels showed significant changes, falling from 44.4% to 12.3%. Nonetheless, 100% of students would go through the experience again. Indeed, 98.2% considered that dissection practices were useful in reinforcing the theoretical aspects of their education, and 80.7% believed that dissecting was more useful than theoretical models. Although students were satisfied with dissection practices the experience cause stressful responses. Anat Sci Educ 00: 000–000. © 2018 American Association of Anatomists.

Key words: gross anatomy education; medical education; undergraduate education; anxiety; cadaver dissection; experiences in the dissecting room

INTRODUCTION

The study of the organic structures and systems of the human body is fundamental to the training of health professionals

*Correspondence to: Dr. Alicia Mohedano-Moriano, Department of Medical Sciences, Anatomy Area, School of Occupational Therapy, Speech Therapy, and Nursing (FATOLE), University of Castilla-La Mancha. Avenida Real Fábrica de las Sedas, s/n 45600 Talavera de la Reina, Toledo, Spain. E-mail: alicia.mohedano@uclm.es

Received 20 February 2018; Revised 5 September 2018; Accepted 14 September 2018.

Published online in Wiley Online Library (wileyonlinelibrary.com). DOI 10.1002/ase.1835

© 2018 American Association of Anatomists

(Winkelmann, 2007; Korf et al., 2008; Pabst, 2009; Arráez-Aybar et al., 2010; Tseng and Lin, 2016). Human anatomy is a basic and compulsory subject in the first-year programs of most Health Sciences university degrees, with anatomical dissection of cadavers having a long tradition in Medicine (Arráez-Aybar et al., 2010; Ghosh, 2015, 2017; Estai and Bunt, 2016; Tseng and Lin, 2016; Wilson et al., 2018). It is, broadly speaking, an attractive subject for health sciences students, as it gives them a greater understanding of the human body (Arráez-Aybar et al., 2004b; Winkelmann, 2007; Korf et al., 2008; Bati et al., 2013; Sandor et al., 2015).

A number of studies have pointed out the advantages and disadvantages of human cadaver dissection (Ellis, 2001; McLachlan et al., 2004; Böckers et al., 2010; Plaisant et al., 2011). Dissections can provoke both physical and psychological

responses (Tschernig et al., 2000; Cahill and Ettarh, 2009; Plaisant et al., 2011), and they can be stressful in that they require seeing, touching and a general sensorial awareness of the cadaver. They can also bring up moral, religious and philosophical issues (Dinsmore et al., 2001; Houwink et al., 2004; Arráez-Aybar et al., 2007; Miguel Pérez et al., 2007; Bob et al., 2015). Students may occasionally experience apprehension, interest or even a morbid curiosity when physically faced with death. Researchers have described a “rite of passage,” “socializing with death” and sometimes even a process of dehumanization in relation to dissection (Dickinson et al., 1997; Plaisant et al., 2011; Kotzé and Mole, 2013; Sandor et al., 2015; Dosani and Neuberger, 2016). It is one of the first professional contacts with death (Abu-Hijel et al., 1997; Tschernig et al., 2000; Boeckers and Boeckers, 2016; Goodwin et al., 2016), but the experience can be satisfying, with 76% of students stating that they believed it could not be replaced with any alternative material or model (Mompeó Corredera, 2014; Sandor et al., 2015). In addition to being a useful tool to learn anatomy, it improves the students’ spatial reasoning skills and helps them relate structures to their images as they are usually represented. Dissection also promotes self-reflection and integration of the cognitive and affective skills required for medical practice (Rizzolo and Stewart, 2006; Ahmed et al., 2010), and it is a useful tool to encourage teamwork, professional development and leadership among the students (Pawlina et al., 2006; Robbins et al., 2009; Talarico, 2012; Flack and Nicholson, 2018). Some have argued it constitutes the foundation of formal anatomy teaching (Rizzolo and Stewart, 2006; Lee et al., 2011; Somanath et al., 2015).

However, dissection is still the subject of debate and controversy (Ellis, 2001; McLachlan et al., 2004; Winkelmann, 2007; Böckers et al., 2010; Wilson et al., 2018). Around 16% of medical students claimed to have thoughts about diseases and death when faced with a cadaver (McLachlan et al., 2004; Lempp, 2005; Böckers et al., 2010; Plaisant et al., 2011; Goodwin et al., 2016). Anxiety is an emotional adaptive response to uncertain or alarming situations, and it forces us to take action and to find an appropriate response to deal with them. The dissecting room in itself is considered stressful by 30% of students and is placed fifth among their acknowledged sources of stress (Nnodim, 1996). Between 4 and 5% of students can suffer from posttraumatic stress after a dissection (Finkelstein and Mathers, 1990; Evans and Fitzgibbon, 1992). Reactions and feelings in the dissecting room have been studied in different countries (Horne et al., 1990; Dickinson et al., 1997; Dinsmore et al., 2001; Arráez-Aybar et al., 2004a; Bob et al., 2015), but few studies have focused on changes in the students’ perceptions throughout the academic year, with most evaluations being carried out 6–10 weeks after their first dissection (Penney, 1985; Evans and Fitzgibbon, 1992; Snelling et al., 2003; Cahill and Ettarh, 2009; Grochowski et al., 2014).

The aim of this study is to examine the attitudes and levels of anxiety experienced by first-year medical students because of their experiences in the dissecting room over the whole of the academic year.

MATERIALS AND METHODS

Anatomy in the Medical Curriculum

The medical degree program requires the completion of 360 ECTS (European Credit Transfer System) credits, divided over six academic years. Teaching is based on small groups of

students (20–25 students per group), and the practical aspects of education are essential in both basic and clinical subjects. The courses are divided in three-week modules covering different learning objectives (Mohedano-Moriano et al., 2015).

Gross anatomy courses are taught during the first and second years. During the first year, we offer two subjects, Human Anatomy I and Human Anatomy II, comprising 6 ECTS each (1 ECTS credit is equivalent to 25–30 h of total workload, 10 of which are either lectures or gross anatomy laboratory practices. The remaining hours are devoted to private study time, seminar, and essay preparation).

During the second year, human anatomy and embryology are integrated with physiology and histology, totaling 33 ECTS altogether (of which 11.6 ECTS correspond to human anatomy and embryology).

Participants

This is a descriptive study of first-year medical students at Ciudad Real Medical School (University of Castilla-La Mancha, UCLM, Spain), who enrolled in the courses Human Anatomy I and Human Anatomy II ($N = 57$ students) during the academic year 2016/2017. These students had never participated in cadaver dissection before this course. Participation in these dissections is compulsory, as established in the Medical degree curriculum. Before their first visit to the dissecting room, students were informed about the process of donation of bodies and the general rules of conduct and health and safety procedures that had to be observed therein. The dissecting room complies with all the relevant health and safety requirements. The students were told about the general aims of the study, which was approved by the Ethics Committee in Clinical Research from Talavera de la Reina (Toledo, Spain) (File 23/2017).

Procedures

The dissections were organized into 20 sessions throughout the academic year 2016/2017, totaling 50 of the 60 teaching hours established for each of the above-mentioned courses. Students had been divided into two groups of 27/28 students, who were then distributed in six dissection tables (one human cadaver and 4/5 students per table) and were supervised by one of the teachers.

Two anonymous questionnaires (authors’ own and the STAI) were distributed among the students at three different times throughout the year: (the first one before the first dissection (“before October”), the second one immediately after the first dissection (“after October”) and the last one after the last dissection practice in May).

Our before and after questionnaire was designed *ad hoc* for this study, collecting variables regarding the feelings and emotions brought about by dissection. This questionnaire was based on a previous study (Criado-Álvarez et al., 2017), including now additional questions regarding the students’ degree of satisfaction and the quality of this part of the course. The questionnaires were numbered with an eight-digit code selected by the student which was later used to compare questionnaires anonymously.

To evaluate the “state anxiety,” we used the State-Trait Anxiety Inventory (STAI) (Spielberger et al., 2002), which was given to students together with our own questionnaire.

The STAI, which has been validated for use in Spain (Fonseca-Pedrero et al., 2012), is a self-administered test that was developed as a research instrument to assess levels of anxiety in otherwise healthy adults. It consists of 40 questions that measure two different, but interrelated, types of anxiety. Half of the questions examine the so-called “state anxiety” (SA), those subjective and transitory feelings of tension, apprehension and fear that can change and fluctuate in intensity with time; and the remaining 20 questions measure the so-called “trait anxiety” (TA), a relatively stable emotional state that indicates a personal disposition to perceive everyday activities as threatening. Since “trait anxiety” is a stable personal characteristic that reflects feelings that are usual and basal, it was only measured at the start of the course. The “state anxiety,” however, can increase as a response to different kinds of tension, and likewise it can be reduced with the use of relaxation techniques. The “state anxiety” indicates an individual’s response to specific situations of stress (in this case, the cadaver dissection), and therefore, it was important to measure it at different times during the course. In both cases, the questionnaire records the intensity with which certain feelings and sensations of anxiety appear in a given moment, with scaling responses that range between “nothing,” “a bit,” “quite a lot,” and “a lot” (scoring 0, 1, 2, and 3 points, respectively). As each questionnaire (SA or TA) consisted of 20 questions, the scores obtained range between 0 and 60 points per questionnaire. The STAI test provides a score for “state anxiety” and another for ‘trait anxiety’ and converts the results according to sex and age (18 or over years old) on a scale of 0 to 10. Higher scores on STAI questionnaires are correlated with higher levels of anxiety. Since the STAI establishes a cut-off point for scores higher than 6 points, it is considered that dissection creates anxiety for those individuals whose ‘state anxiety’ score is higher than six points ($SA > 6$) (Spielberger et al., 2002; Arráez-Aybar et al., 2004a; Casado et al., 2005; Saylam and Coskumol, 2005). The STAI instrument has been validated for use with a Spanish population and has a Cronbach’s α of 0.93 for TA and of 0.92 for SA (Fonseca-Pedrero et al., 2012).

Statistical Analysis

The descriptive statistical analysis used different parameters according to the scale of the variable (single frequencies, measures of central tendency and standard deviations). For the analysis of the distribution of the variables, Kolmogorov–Smirnov tests were used to study normal distributions. In the case of inferential statistical analysis of independent variables, the ANOVA test was used to study the relationship between a normal continuous variable and a nominal one, or the study of n independent groups (using the Mann–Whitney U test when the continuous variable did not follow a normal distribution). When the outcome variable was dichotomous a t Student test was used (or the Wilcoxon ranges if the continuous variable did not follow a normal). To compare nominal and dichotomous variables a Chi-square test was used. The Wilcoxon rank-sum test (Mann–Whitney U test) is the nonparametric equivalent of the t Student test. To find differences in variables with repeated measures for a single student, a repeated measures ANOVA was used as a general linear model, studying its statistical significance by means of the Greenhouse–Geisser test. When $P > 0.05$ the sphericity hypothesis of the variance of the means was accepted, assuming the sphericity.

A confidence level of 5% was established. The statistical software SPSS, version 15.0 for Windows was used to analyze the data (SPSS Inc., Chicago, IL).

RESULTS

This study included 57 students, who completed questionnaires at three different times (before the first dissection, immediately after the first dissection, and after the last dissection of the course). The mean age \pm SD of the students was 18.0 ± 2.04 years old (median: 18 years; range: 18–32 years), 45 (78.9%) of whom were female. A total of 31 students (54.4%) had previously seen a dead body.

The results of the STAI questionnaires show that the number of students with SA dropped during the course of the academic year, from 49.1% ($N = 28$) at the start of the year to 14% at the end ($N = 8$) (Fig. 1), with no statistically significant differences appreciable in terms of gender ($P > 0.05$). The SA significantly decreased throughout the academic year ($P < 0.05$), dropping from 22 ± 13.01 to 12.2 ± 9.02 (Fig. 2). In this case gender differences could be appreciated, but they were not statistically significant ($P > 0.05$). Female students started the course with higher levels of SA (23.3 ± 12.82) than their male counterparts (17.4 ± 13.21), but they ended the year with similar levels (12.4 ± 9.47 for female students and 11.4 ± 7.34 for male students). This was a drop of 10.9 and 6.0 points, respectively (Fig. 2). The mean TA for the students at the beginning of the academic year was 22.4 ± 11.39 (median: 23; range, 2–47), without statistically significant gender differences ($P > 0.05$). Trait anxiety levels were 22.0 ± 11.34 for male students and 22.5 ± 11.53 for female students (Fig. 2). In none of the three STAI questionnaires there was a statistically significant relationship between the levels of SA and TA ($P > 0.05$).

The presence of thoughts linked to “Anxiety” and “Fear” ahead of the dissection tended to decrease during the academic year, but this was not statistically significant ($P > 0.05$). Instead, the results of the *ad hoc* questionnaire reveal that “Uncertainty” presented a marked contrast, falling from 40.4% ($N = 23$) to 12.3% ($N = 7$) by the end of the year ($P < 0.05$) (Table 1). Some responses, such as the perception of “Curiosity,” remained steady at 84.2% ($N = 48$) at the beginning of the course and 73.7% ($N = 42$) by the end (Table 1). Those aspects of the practice perceived as negative showed more significant changes. For instance, “Sight of the cadaver’s face” dropped to a third of the original number, from 47.4% ($N = 27$) at the beginning of the course to 15.8% ($N = 9$) by the end ($P < 0.05$) (Table 1). However, “Smell of the dissecting room” increased, going from 38.6% ($N = 22$) at the start of the course to 71.9% ($N = 41$) by the end ($P < 0.05$) (Table 1). These perceptions were similar for all students ($P > 0.05$) except in the case of the “smell of the dissecting room,” where there were statistically significant gender differences ($P < 0.05$). Whereas 40% of female students ($N = 18$) remarked on the unpleasant smell at the start of the course and before the first dissection, while they were still inexperienced, once they had already been through the experience this percentage rose to 73.3% ($N = 33$). The percentage of male students, in contrast, remained steady at 66.7% ($N = 8$) throughout the academic year.

The number of students expressing feelings of being more “calm,” “confident,” and “relaxed” at the end of the course than they were at the beginning did not show statistically significant gender differences, with ratings of 89.5% ($N = 51$), 93% ($N = 53$), and 75.4% ($N = 43$), respectively – changes that were statistically significant when compared to levels

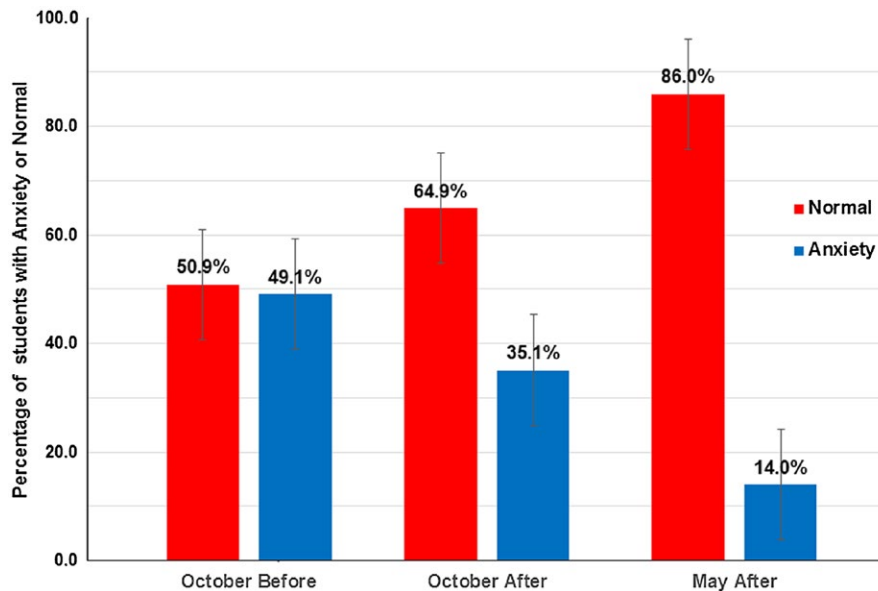


Figure 1.

Evolution of state anxiety levels throughout the academic year. October, immediately before the first dissection; May, after the last dissection practice.

recorded at the start of the course ($P < 0.05$) (Table 2). They also mentioned being less “Nervous,” “Scared,” and “Worried” than at the start of the course, when their records were 35.1% ($N = 20$), 21.1% ($N = 12$) and 29.8% ($N = 17$), with a significant change toward the end of the course ($P < 0.05$) (Table 2). Changes in their perceptions during the academic year reflected statistically significant gender differences, with female students experiencing higher variations in their responses ($P < 0.05$).

By the end of the academic year, 100% of the students ($N = 57$) felt emotionally prepared to enter the dissecting room, in contrast with only 75.4% ($N = 43$) at the beginning of the course ($P < 0.05$) (Table 2). There also were significant

gender differences in their perceived preparedness ($P < 0.05$): at the start of the sessions 41.7% ($N = 5$) of the male students declared themselves to be “more or less prepared,” and 58.3% ($N = 7$) “totally prepared”; whereas 7% ($N = 4$) of the female students did not feel emotionally ready to enter the room, and 11.1% ($N = 5$) only felt “more or less prepared.” The feeling of being emotionally prepared to enter the dissecting room is not related to the degree of anxiety of the students ($P > 0.05$). A total of 59.6% of the students ($N = 34$) mentioned having “Thoughts about life and death” after the dissections in the October and May questionnaires, without significant differences ($P > 0.05$) in terms of gender or degree of anxiety. At

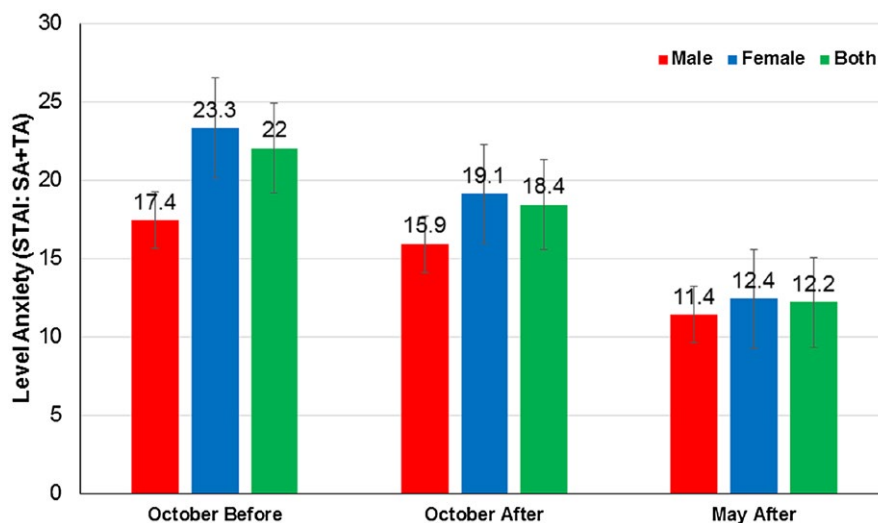


Figure 2.

Anxiety state in terms of gender. October, immediately before the first dissection; May, after the last dissection practice.

Table 1.

Students' Thoughts and Feelings About the Dissection at the Start (October) and at the End of the Academic Year (May)

Perception	Before first dissection (October)		After last dissection (May)	
	Yes	No	Yes	No
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Thinking about dissection evokes...				
Anxiety	5 (8.8)	52 (91.2)	1 (1.8)	56 (98.2)
Displeasure	1 (1.8)	56 (98.2)	1 (1.8)	56 (98.2)
Curiosity	48 (84.2)	9 (15.8)	42 (73.7)	15 (26.3)
Uncertainty	23 (40.4)	34 (59.6)	7 (12.3)	50 (87.7)
Fear	4 (7.0)	53 (93.0)	1 (1.8)	56 (98.2)
Which is the most unpleasant experience in the dissecting room?				
Seeing the cadaver's face	27 (47.4)	30 (52.6)	9 (15.8)	48 (84.2)
The smell of the dissecting room	22 (38.6)	35 (61.4)	41 (71.9)	16 (28.1)
Touching the cadaver	5 (8.8)	52 (91.2)	1 (1.8)	56 (98.2)

For all items the statistical significance is at $P > 0.05$.**Table 2.**

Students' Feelings Before the Dissection at the Start and at the End of the Academic Year

Statement	Before first dissection (October)			After last dissection (May)		
	Yes	Indifferent	No	Yes	Indifferent	No
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
I feel calm	30 (52.6)	18 (31.6)	9 (15.8)	51 (89.5)	1 (5.3)	5 (8.8)
I feel confident	34 (12.3)	16 (28.1)	7 (59.6)	53 (93.0)	3 (5.3)	1 (1.8)
I feel nervous	20 (35.1)	20 (35.1)	17 (29.8)	5 (8.8)	12 (21.1)	40 (70.2)
I feel scared	12 (21.1)	13 (22.8)	32 (56.1)	3 (5.3)	2 (3.5)	52 (91.2)
I feel happy	35 (61.4)	20 (35.1)	2 (3.5)	43 (75.4)	14 (24.6)	0 (0)
I feel comfortable	40 (5.3)	14 (24.6)	3 (70.2)	47 (82.5)	10 (17.5)	0 (0)
I feel relaxed	25 (43.9)	19 (33.3)	13 (22.8)	43 (75.4)	11 (19.3)	3 (5.3)
I feel worried	17 (29.8)	14 (24.6)	26 (45.6)	7 (12.3)	15 (26.3)	35 (61.4)
Do you feel emotionally prepared to enter the dissecting room?	43 (75.4)	10 (17.5)	4 (7.1)	57 (100)	0 (0)	0 (0)

For all items the statistical significance is at $P > 0.05$.

the beginning of the course, immediately after the first dissection, 22.8% ($N = 13$) of the students admitted to having experienced “Fear of losing control in the dissecting room.” This percentage dropped to 12.3% ($N = 7$) by the end of the course, although this change is not statistically significant ($P > 0.05$). These percentages are not significantly related to gender or levels of anxiety ($P > 0.05$).

All of the students (100%, $N = 57$) expressed their willingness to go through the experience again. In total, 98.2% ($N = 56$) of the students considered that the practical experience helped to reinforce the theoretical aspects of their education, and 80.7% ($N = 46$) indicated that the experience of dissecting a cadaver was better than using theoretical models to locate anatomical structures.

A total of 56.1% ($N = 32$) and 52.6% ($N = 30$) of the students felt generally “Satisfied” after their first and last dissections, respectively, and 43.9% ($N = 25$) and 47.4% ($N = 27$) felt “Very satisfied,” illustrating no significant differences ($P > 0.05$). The general level of satisfaction could be appreciated in the scores given for the dissection sessions, with a mean of 8.5 ± 0.96 at the start of the year (median: 9, range: 6–10) and 8.9 ± 0.79 by the end of the year (median: 9; range: 7–10).

DISCUSSION

Anxiety, Feelings and Apprehension

Undertaking practical dissections on human cadavers can be a stressing and uncomfortable experience for Health Sciences students (Arráez-Aybar et al., 2008; Cahill and Ettarh, 2009; Bati et al., 2013; Sandor et al., 2015; Criado-Álvarez et al., 2017). Half of our students suffered anxiety before entering the dissecting room for the first time, but by the end of the academic year their levels of anxiety were down to those published by other researchers (Penney, 1985; Nnodim, 1996; McGarvey et al., 2001; Arráez-Aybar et al., 2007–2008). “State anxiety” levels due to the stress of carrying out anatomical dissections were higher for female students for the duration of the academic year, a fact that has been observed before (Charlton et al., 1994; Arráez-Aybar et al., 2007; Cahill and Ettarh, 2009; Grochowski et al., 2014; Boeckers and Boeckers, 2016). In fact, very few studies have not found significant gender differences (Snelling et al., 2003; Leboulanger, 2011). Basal anxiety levels (measured as “trait anxiety”) are similar independently of gender and are perceived more acutely by female students (Abu-Hijel et al., 1997; Arráez-Aybar et al., 2007, 2008; Plaisant et al., 2011).

For some of the medical students this was not their first experience facing death or a dead human body, in fact 54.4% of our students reported having had previous experiences of this kind. However, even in those cases cadaver dissection could be stressful (Miguel Pérez et al., 2007; Cahill and Ettarh, 2009; Böckers et al., 2010; Leboulanger, 2011; Bob et al., 2015). Some researchers advocate introducing courses to prepare students to face death and the treatment of dying patients, some even encourage ceremonies of gratitude to donors following dissection courses (Tschernig et al., 2000; Aziz et al., 2002; Van Wyk and Rennie, 2015). But even though the experience of the dissecting room can upset some students’ emotional balance (Arráez-Aybar et al., 2007, 2008; Plaisant et al., 2011; Getachew, 2014; Grochowski et al., 2014; Boeckers and Boeckers, 2016), they still consider the experience “satisfactory” or even “very satisfactory,” and, in fact, 100% of our students recommended that it be retained for future courses

(Cahill and Ettarh, 2009; Boeckers and Boeckers, 2016). The decrease in “state anxiety” levels could be due, as some researchers suggest, to a coping mechanism for avoiding adverse reactions. We suggest that students, after overcoming their first experience and with the familiarity brought about by regular exposure to cadavers, feel more comfortable and are able to exchange insights, sensations and perceptions with their peers (McGarvey et al., 2001; McLachlan et al., 2004; Cahill and Ettarh, 2009; Böckers et al., 2010; Casado et al., 2012). The students’ anxiety when facing their first dissection experience is determined by their own position as “students” (i.e., learners), and this can be measured as “trait anxiety.” Only after they have gone through the experience can individual and personal differences arise in their perceptions and thus measuring their “state anxiety” can help predict their reactions (Casado et al., 2005). Some researchers have referred to the perception of the dissection experience as a rite of passage or “socializing with death” (Horne et al., 1990; Druce and Johnson, 1994; Lempp, 2005; Plaisant et al., 2011; Sandor et al., 2015; Tseng and Lin, 2016). Other students assume a “scientific attitude,” repressing their emotions with “emotional silence” (Casado et al., 2005; Goodwin et al., 2016). Our study has found significant differences ($P < 0.05$) in the attitudes of the students before and after experiencing dissection for the first time, as other researchers have also pointed out (O’Carroll et al., 2002; Snelling et al., 2003; Arráez-Aybar et al., 2004a, 2008; Cahill and Ettarh, 2009; Bob et al., 2015). Anxiety levels tend to decrease as students become more experienced, dropping from 26.62 to 14.34 points on the STAI (Arráez-Aybar et al., 2004a, 2007b; Casado et al., 2005), a very similar result to ours. There are studies that have not found any changes in the “state anxiety” levels measured, remaining at around 30 points for the duration of the course, but this is attributed to the fact that student participation is voluntary (Leboulanger, 2011). As is the case with anxiety, thoughts related to “Fear” or “Uncertainty,” and negative feelings such as “Nervous,” “Scared,” and “Worried” tend to decrease with time, as the students become more used to cadavers (Penney, 1985; Arráez-Aybar et al., 2007; Arora and Sharma, 2011; Plaisant et al., 2011; Boeckers and Boeckers, 2016; Dosani and Neuberger, 2016). While some researchers have pointed out levels of “Fear” of around 50.3%–66% at the beginning of the course (Penney, 1985; Druce and Johnson, 1994; Abu-Hijel et al., 1997; Dickinson et al., 1997; Bataineh et al., 2006; Dosani and Neuberger, 2016), in our study the figures remained around 7%, which is consistent with other studies (Dinsmore et al., 2001). However, it is noteworthy that 80% of students remain “Curious” throughout the course, illustrating one of its attractions, as has been mentioned before (Dinsmore et al., 2001; Arráez-Aybar et al., 2007; Plaisant et al., 2011). The “Smell of the dissecting room” is a negative reaction whose perception as unpleasant increases with time. Students, particularly female students, do not seem to get used to it, with figures similar to those indicated by other studies, at between 60% and 90% (Dinsmore et al., 2001; Leboulanger, 2011; Getachew, 2014; Mompeó Corredera, 2014; Wilson et al., 2018). Other studies, however, show considerably lower values, at around 40% (Cahill and Ettarh, 2009; Arora and Sharma, 2011; Bati et al., 2013; Qamar and Osama, 2014; Dissabandara et al., 2015). Some studies regarding the perception of the smell in the dissecting room have not found significant gender differences, although female students tend to mention it more, together with other symptoms, such as nasal and ocular irritation (Takahashi et al., 2007; Mulu and Tegabu, 2012; Mori et al., 2016). Another negative reaction in

the dissecting room is “Sight of the cadaver’s face,” with 47.4% of students in our study stating that seeing the “cadaver’s face” could be a drawback. This echoes other studies where the head is the body part that generates more anxiety (Bernhardt et al., 2012).

Coping Techniques to Reduce Anxiety

Some researchers have advocated the use of audiovisual media or preparatory seminars as a positive influence or precautionary measure to help students cope with dissection and to reduce their stress. Those groups that have used preparatory audiovisuals seem to experience lower levels of “state anxiety” than those that follow more traditional approaches (Abu-Hijel et al., 1997; Arráez-Aybar et al., 2007; Casado et al., 2012; Russa and Mligiliche, 2014; Boeckers and Boeckers, 2016; Dosani and Neuberger, 2016). An alternative could be the use of background music in the dissecting room, which seems to help reduce stress levels by 30% (Anyanwu, 2015). Other researchers have suggested the need to reintegrate humanizing force in the study of macroscopic anatomy (Blackwell et al., 1979; Terry, 1985; Coulehan et al., 1995). For instance, giving a testimony of the so-called “corpse experience” either in written form (Hafferty, 1988; Rizzolo, 2002; Wagoner and Romero-O’Connell, 2009; Lazarus et al., 2017) or through group discussions, could help reduce the anxiety brought about by dissection practices. On the other hand, some students have suggested that a clear description of the smell prior to facing the cadaver could also help in reducing anxiety (Dempster et al., 2006). Around 25% of our students admit to not feeling emotionally prepared for entering the dissecting room at the start of the course, while another study reported 64% (Charlton et al., 1994). By the end of the course, however, 100% of our students felt confident, a figure similar to those published elsewhere (Leboulanger, 2011). We thus highlight the importance of using coping mechanisms to help reduce the stress of students who do not feel prepared for dissection (Abu-Hijel et al., 1997; McLachlan et al., 2004; Javadnia et al., 2006; Böckers et al., 2010; 2012; Boeckers and Boeckers, 2016). Some studies have pointed out that up to 70% of students feel more self-confident after they have spent around half an hour preparing with their tutor before entering the dissecting room (Tschernig et al., 2000; Leboulanger, 2011).

Dissection versus Other Learning Techniques

However, despite the stress that dissections undoubtedly generate among students (almost 50% of the students experienced some degree of anxiety before going into the dissecting room for the first time) and the fact that 25% of the students did not feel initially prepared for it, once the course was finished 100% declared they would go through it again. Some studies have reached values between 85.5% and 90% (Izunya et al., 2010; Mompeó Corredera, 2014) for this measure, and others just 15.8% (Dinsmore et al., 2001). The practice is perceived as satisfactory and students recommend it also as a way of learning anatomy (Robbins et al., 2009; Böckers et al., 2010; Bekele et al., 2011; Oyeyipo and Falana, 2012; Karau et al., 2014; Van Wyk and Rennie, 2015) (even in our case where the students have been trained in a digital environment), which is similar to data published elsewhere

(Elizondo-Omaña et al., 2005; Azer and Eizenberg, 2007; Leboulanger, 2011; Qamar and Osama, 2014; Estai and Bunt, 2016). Also, up to 60% of the students suggested that the dissections offer a good opportunity to raise awareness and made them consider disease and death in more concrete sense, something that may not have happened had they not gone through this experience (Ellis, 2001; Aziz et al., 2002; Redwood and Townsend, 2011; Mompeó Corredera, 2014; Ghosh, 2017).

There is currently some degree of controversy among anatomists regarding what the best methods are for teaching anatomy, and the focus on human cadavers for this purpose is being reevaluated (Saylam and Coskumol, 2005; Biassutto et al., 2006; Patel et al., 2015; Sandor et al., 2015; Estai and Bunt, 2016; Ghosh, 2017). Alternative teaching methods and models have been used, but dissection has remained at the core of the medical educational curriculum (Azer and Eizenberg, 2007; Arráez-Aybar et al., 2010; Qamar and Osama, 2014; Dissabandara et al., 2015; Ghosh, 2015). As well as reinforcing the theoretical aspects of their education, dissection also offers the student the opportunity to gain a better understanding of the human body. Working on a cadaver is undoubtedly a deeply emotional experience, but also one that allows students to develop the competence and coping skills that will be applied later in their professional careers (Marcos et al., 2004; Elizondo-Omaña et al., 2005; Böckers et al., 2010; Van Wyk and Rennie, 2015; Wilson et al., 2018).

Limitations of the Study

One of the limitations of the current study was the small sample size (57 students enrolled in the human anatomy courses). In addition, this was the first year that their anxiety levels were evaluated. Therefore, there are no previous results available with which to compare the findings presented in this article.

CONCLUSION

Although there is some degree of controversy about how anatomy could be taught more effectively, the dissection of cadavers has remained the gold standard for learning anatomy for many centuries and it has been impossible to replace it as a basic pillar of teaching. Cadaver dissection is obviously nothing like dealing with a patient, but we argue that the experience likely plays an important role in the development of the student into a clinician. It is also possible that the experience could have a negative impact on some of the students. In several studies cited above and in our own, it could be observed that this type of practice could be stressful for students and could generate a certain amount of anxiety. Around 25% of our students admitted to not feeling emotionally prepared to enter the dissecting room at the beginning of the course and, although their anxiety levels decreased with time, at the end of the course 14.34% of them still presented some degree of anxiety. However, once the course was finished 100% declared they would go through it again. Therefore, it is important to prepare students (especially female students) with coping mechanisms to help reduce their anxiety before they are introduced to cadaver dissection.

ACKNOWLEDGMENTS

The authors would like to express their gratitude to the first-year medical students during the academic year 2016–2017 for their participation. The authors would also like to thank all the people who generously donated their bodies to science. Without them the advancement of knowledge would not be possible. This work is part of the doctoral thesis of Carmen Romo Barrientos. The authors declare no conflicts of interest.

NOTES ON CONTRIBUTORS

CARMEN ROMO BARRIENTOS, B.Sc., is a clinical psychologist with the Mental Health Service, University Hospital “Nuestra Señora del Prado” in Talavera de La Reina, Toledo, Spain. Her main research interests include developmental psychology, child psychopathology, behavioral disorders, and educational and family therapy guidelines.

JUAN JOSÉ CRIADO-ÁLVAREZ, M.D., Ph.D., is an associate professor at the School of Occupational Therapy, Speech Therapy and Nursing at the University of Castilla-La Mancha, Talavera de la Reina, Toledo, Spain. He is also a primary care specialist at the Pueblanueva Health Centre (Integrated Care Management at Talavera de la Reina, Castilla-La Mancha Regional Health Services). He teaches neurology and his research interests focus predominantly on epidemiology and public health.

JAIME GONZÁLEZ GONZÁLEZ, M.D., Ph.D., is an associate professor at the School of Occupational Therapy, Speech Therapy and Nursing at the University of Castilla-La Mancha, Talavera de la Reina, Toledo, Spain. He is also a primary care specialist at the Santa Olalla Health Centre (Integrated Care Management at Talavera de la Reina, Castilla-La Mancha Regional Health Services). He teaches biomechanics of the human body and his research focuses on fibromyalgia disease.

ISABEL UBEDA BAÑON, Ph.D., is a professor in the Department of Health Sciences at the Ciudad Real Medical School, University of Castilla-La Mancha, Spain. She is a member of the neurodegeneration and neuroplasticity research group at the Regional Center for Biomedical Research. She teaches human anatomy and embryology and her research focuses on Parkinson disease.

DANIEL SAIZ-SANCHEZ, Ph.D., is a professor in the Department of Health Sciences at the Ciudad Real Medical School, University of Castilla-La Mancha, Spain. He is a member of the neurodegeneration and neuroplasticity research group at the Regional Center for Biomedical Research. He teaches human anatomy and embryology and his research focuses on Parkinson disease.

ALICIA FLORES CUADRADO, PhD, is a lecturer in the Department of Health Sciences at the Ciudad Real Medical School, University of Castilla-La Mancha, Spain. She is a member of the neurodegeneration and neuroplasticity research group at the Regional Center for Biomedical Research. She teaches human anatomy and embryology and her research focuses on Parkinson disease.

JOSE LUIS MARTIN CONTY, Ph.D., is a lecturer in the Department of Nursing, Physiotherapy and Occupational Therapy at the School of Occupational Therapy, Speech Therapy and Nursing at the University of Castilla-La Mancha, Talavera de la Reina, Spain. He teaches medical-surgical nursing and his research focuses predominantly on epidemiology and public health.

ANTONIO VIÑUELA SANCHEZ, Ph.D., is a lecturer in the Department of Nursing, Physiotherapy and Occupational Therapy at the School of Occupational Therapy, Speech Therapy and Nursing at the University of Castilla-La Mancha, Talavera de la Reina, Spain. He teaches biochemistry and nutrition and his research interests include biochemistry and molecular genetics.

ALINO MARTINEZ MARCOS, Ph.D., is a professor and head of the Laboratory of Human Anatomy and Embryology in the Department of Health Sciences at the Ciudad Real Medical School, University of Castilla-La Mancha, Spain. He is the principal investigator of the neurodegeneration and neuroplasticity research group at the Regional Center for Biomedical Research and teaches human anatomy and embryology.

ALICIA MOHEDANO MORIANO, Ph.D., is a professor in the Department of Health Sciences at the School of Occupational Therapy, Speech Therapy and Nursing at the University of Castilla-La Mancha, Talavera de la Reina, Spain. She teaches human anatomy and physiology and her research focuses on the temporal lobe and memory.

LITERATURE CITED

- Abu-Hijleh MF, Hamdi NA, Moqattash ST, Harris PF, Heseltine GF. 1997. Attitudes and reactions of Arab medical students to the dissecting room. *Clin Anat* 10:272–278.
- Ahmed K, Rowland S, Patel V, Khan RS, Ashrafian H, Davies DC, Darzi A, Athanasiou T, Paraskeva PA. 2010. Is the structure of anatomy curriculum adequate for safe medical practice? *Surgeon* 8:318–324.
- Anyanwu EG. 2015. Background music in the dissection laboratory: Impact on stress associated with the dissection experience. *Adv Physiol Educ* 39:96–101.
- Arora L, Sharma BR. 2011. Role of dissection; Anatomy teaching from perspectives of undergraduate – A qualitative study. *Ibnosina J Med Biomed Sci*, 3:59–65.
- Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. 2004a. Dissection from the Spanish anatomist’s perspective: Aims, attitudes, and related aspects. *Anat Rec* 281B:15–20.
- Arráez-Aybar LA, Casado-Morales MI, Castaño-Collado G. 2004b. Anxiety and dissection of the human cadaver: An unsolvable relationship? *Anat Rec* 279:16–23.
- Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. 2007. A study of cognitive-affective and physiological-motor reactions to human dissection in Spanish students of human anatomy. *Eur J Anat* 11:67–71.
- Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. 2008. Dissection as a modulator of emotional attitudes and reactions of future health professionals. *Med Educ* 42:563–571.
- Arráez-Aybar LA, Sánchez-Montesinos I, Mirapeix RM, Mompeo-Corredera B, Sañudo-Tejero JR. 2010. Relevance of human anatomy in daily clinical practice. *Ann Anat* 192:341–348.
- Azer SA, Eizenberg N. 2007. Do we need dissection in an integrated problem-based learning medical course? Perceptions of first- and second-year students. *Surg Radiol Anat* 29:173–180.
- Aziz MA, McKenzie JC, Wilson JS, Cowie RJ, Ayeni SA, Dunn BK. 2002. The human cadaver in the age of biomedical informatics. *Anat Rec* 269:20–32.
- Bataineh ZM, Hijazi TA, Hijleh MF. 2006. Attitudes and reactions of Jordanian medical students to the dissecting room. *Surg Radiol Anat* 28:416–421.
- Bati AH, Ozer MA, Govsa F, Pinar Y. 2013. Anxiety of first cadaver demonstration in medical, dentistry and pharmacy faculty students. *Surg Radiol Anat* 35:419–426.
- Bekele A, Reissig D, Löffler S, Hinz A. 2011. Experiences with dissection courses in human anatomy: A comparison between Germany and Ethiopia. *Ann Anat* 193:163–167.
- Bernhardt V, Rothkötter HJ, Kasten E. 2012. Psychological stress in first year medical students in response to the dissection of a human corpse. *GMS Z Med Ausbild* 29:12.
- Biassutto SN, Causa LI, Criado del Rio LE. 2006. Teaching anatomy cadavers vs computers? *Ann Anat* 188:187–190.
- Blackwell B, Rodin AE, Nagy F, Reece RD. 1979. Humanizing the student-cadaver encounter. *Gen Hosp Psychiatr* 1:315–321.
- Bob MH, Popescu CA, Suci SM, Buzoianu AD. 2015. First year medical students’ toward anatomical corpse dissection and its relationship with their personality. *Rom J Morphol Embryol* 56:321–324.
- Böckers A, Jerg-Bretzke L, Lamp C, Brinkmann A, Traue HC, Böckers TM. 2010. The gross anatomy course: An analysis of its importance. *Anat Sci Educ* 3:3–11.

- Böckers A, Baader C, Fassnacht UK, Ochsner W, Böckers TM. 2012. Reduction of mental distress in the dissection course by introducing the body donor experience through anatomical demonstrations of organ systems. *Anat Sci Educ* 5:321–329.
- Boeckers A, Boeckers TM. 2016. The dissection course – A psychological burden or an opportunity to reach core medical competencies: A narrative review of the literature. *Eur J Anat* 20:287–298.
- Cahill KC, Ertarr RR. 2009. Attitudes to anatomy dissection in an Irish medical school. *Clin Anat* 22:386–391.
- Casado MI, Castaño G, Arráez-Aybar LA. 2005. Individual differences and anxiety reactions to dissection of human corpses in first year students of medicine. *Anxiety Stress* 11:75–85.
- Casado MI, Castaño G, Arráez-Aybar LA. 2012. Audiovisual material as educational innovation strategy to reduce anxiety response in students of human anatomy. *Adv Health Sci Educ Theory Pract* 17:431–440.
- Charlton R, Dovey SM, Jones DG, Blunt A. 1994. Effects of cadaver dissection on the attitudes of medical students. *Med Educ* 28:290–295.
- Couhehan JL, Williams PC, Landis D, Naser C. 1995. The first patient: Reflections and stories about the anatomy cadaver. *Teach Learn Med* 7:61–66.
- Criado-Álvarez JJ, González González J, Romo Barrientos C, Ubeda-Bañón I, Saiz-Sánchez D, Flores-Cuadrado A, Albertos-Marco JC, Martínez-Marcos A, Mohedano-Moriano A. 2017. Learning from human cadaveric prosections: Examining anxiety in speech therapy students. *Anat Sci Educ* 10:487–494.
- Dempster M, Black A, McCorry N, Wilson D. 2006. Appraisal and consequences of cadaver dissection. *Med Educ Online* 11:4592.
- Dickinson GE, Lancaster CJ, Winfield IC, Reece EF, Colthorpe CA. 1997. Detached concern and death anxiety of first-year medical students: Before and after the gross anatomy course. *Clin Anat* 10:201–207.
- Dinsmore CE, Daugherty S, Zeitz HJ. 2001. Student responses to the gross anatomy laboratory in a medical curriculum. *Clin Anat* 14:231–236.
- Dissabandara LO, Nirthanan SN, Khoo TK, Tedman R. 2015. Role of cadaveric dissections in modern medical curricula: A study on student perceptions. *Anat Cell Biol* 48:205–222.
- Dosani F, Neuberger L. 2016. Anatomy and humanity: Examining the effects of a short documentary film and first anatomy laboratory experience on medical students. *Anat Sci Educ* 9:28–39.
- Druce M, Johnson MH. 1994. Human dissection and attitudes of preclinical students to death and bereavement. *Clin Anat* 7:42–49.
- Elizondo-Omaña RE, Guzmán-López S, García-Rodríguez Mde L. 2005. Dissection as a teaching tool: Past, present and future. *Anat Rec* 285B:11–15.
- Ellis H. 2001. Teaching in the dissecting room. *Clin Anat* 14:149–151.
- Estai M, Bunt S. 2016. Best teaching practices in anatomy education: A critical review. *Ann Anat* 208:151–157.
- Evans EJ, Fitzgibbon GH. 1992. The dissecting room: Reactions of first year medical students. *Clin Anat* 5:311–320.
- Finkelstein P, Mathers L. 1990. Post-traumatic stress among medical students in the anatomy dissection laboratory. *Clin Anat* 3:219–226.
- Flack NA, Nicholson HD. 2018. What do medical students learn from dissection? *Anat Sci Educ* 11:325–335.
- Fonseca-Pedrero E, Paino M, Sierra-Baigrie S, Lemos-Giráldez S, Muñiz J. 2012. Propiedades psicométricas del “Cuestionario de Ansiedad Estado-Rasgo” (STAI) en Universitarios. *Behav Psychol* 20:547–561.
- Getachew D. 2014. Reaction of medical students to experiences in dissection room. *Ethiop J Health Sci* 24:337–342.
- Ghosh SK. 2015. Human cadaveric dissection: A historical account from ancient Greece to the modern era. *Anat Cell Biol* 48:153–169.
- Ghosh SK. 2017. Cadaveric dissection as an educational tool for anatomical sciences in the 21st century. *Anat Sci Educ* 10:286–299.
- Goodwin D, Machin L, Taylor A. 2016. The social life of dead: The role of post-mortem examinations in medical student socialisation. *Soc Sci Med* 161:100–108.
- Grochowski CO, Cartmill M, Reiter J, Spaulding J, Haviland J, Valea F, Thibodeau PL, McCorison S, Halperin EC. 2014. Anxiety in first year medical students taking gross anatomy. *Clin Anat* 27:835–838.
- Hafferty FW. 1988. Cadaver stories and the emotional socialization of medical students. *J Health Soc Behav* 29:344–356.
- Horne DJ, Tiller JW, Eizenberg N, Tashevskva M, Biddle N. 1990. Reactions of first-year medical students to their initial encounter with a cadaver in the dissecting room. *Acad Med* 65:645–646.
- Houwink AP, Kurup AN, Kollars JP, Kral-Kollars CA, Carmichael SW, Pawlina W. 2004. Help of third-year medical students decreases first-year medical students' negative psychological reactions on the first day of gross anatomy dissection. *Clin Anat* 17:328–333.
- Izunya AM, Oaikhena GA, Nwaopara AO. 2010. Attitudes to cadaver dissection in a Nigerian medical school. *Asian J Med Sci* 2:89–94.
- Javandnia F, Hashemitabar M, Kalantarmahdavi SR, Khajehmoghahi N. 2006. How to decrease the emotional impact of cadaver dissection in medical students. *Pak J Med Sci* 22:200–203.
- Karau PB, Wamachi A, Ndede K, Mwamisi J, Ndege P. 2014. Perception to cadaver dissection and views on anatomy as a subject between two pioneer cohorts in a Kenyan medical school. *Anat J Afr* 3:318–323.
- Korf HW, Wicht H, Snipes RL, Timmermans JP, Paulsen F, Rune G, Baumgart-Vogt E. 2008. The dissection course – Necessary and indispensable for teaching anatomy to medical students. *Ann Anat* 190:16–22.
- Kotzé SH, Mole CG. 2013. Talking about death: Implementing peer discussion as a coping mechanism to overcome fears about dissection, death, and dying. *Anat Sci Educ* 6:191–198.
- Lazarus L, Sookraj R, Satyapal KS. 2017. Reflective journals: Unmasking student perceptions of anatomical education. *Folia Morphol (Warsz)* 76:506–518.
- Leboulanger N. 2011. First cadaver dissection: Stress, preparation, and emotional experience. *Eur Ann Otorhinolaryngol Head Neck Dis* 128:175–183.
- Lee YH, Lee YM, Kwon S, Park SH. 2011. Reactions of first-year medical students to cadaver dissection and their perception on learning methods in anatomy. *Korean J Med Educ* 23:275–283.
- Lempp HK. 2005. Perceptions of dissection by students in one medical school: Beyond learning about anatomy. A qualitative study. *Med Educ* 39:318–325.
- Marcos P, Arroyo-Jiménez MM, Artacho-Perula E, Martínez-Marcos A, Blaizot X, Alfonso-Roca MT, Branda L, Insausti R. 2004. Self-directed learning in the gross anatomy medical curriculum. *Eur J Anat* 8:147–153.
- McGarvey MA, Farrell T, Conroy RM, Kandiah S, Monkhouse WS. 2001. Dissection: A positive experience. *Clin Anat* 14:227–230.
- McLachlan JC, Bligh J, Bradley P, Searle J. 2004. Teaching anatomy without cadavers. *Med Educ* 38:418–424.
- Miguel Pérez M, Porta-Riba N, Ortiz-Sagrístá JC, Martínez A, Götzens-García V. 2007. Human anatomy: Reactions of first year medical students to the dissection room. *Educ Méd* 10:105–113.
- Mohedano-Moriano A, Insausti R, Muñoz-López M, Llorens S, Arroyo-Jiménez MM, Marcos P, Legidos-García MM, Delgado JC, Cebada-Sánchez S, Córcoles-Parada M, Viñuela A, Domingo B, Arribas E, Vaquero CF, Fernandez M, Galindo MF, Jordan J, Nájera A, Carmona M, Nava E, Artacho-Pérua E. 2015. Teaching anatomy and embryology by the inclusion of team-works as an interactive lecture. In: Gómez Chova L, López Martínez A, Candel Torres I (Editors). Proceedings of 9th International Technology, Education and Development Conference (INTED2015); Madrid, Spain, 2015 March 2–4. p 7121–7126. International Academy of Technology, Education and Development (IATED), Valencia, Spain.
- Mompeó CB. 2014. Methodologies and materials in gross human anatomy learning. Perceptions by digital native medical students. *Rev Fund Educ Méd* 17:99–104.
- Mori M, Matsumoto Y, Kushino N, Morimatsu Y, Hoshiko M, Saga T, Yamaki K, Ishitake T. 2016. Comparison of subjective symptoms associated with exposure to low levels of formaldehyde between students enrolled and not enrolled in a gross anatomy course. *Environ Health Prev Med*, 21:34–41.
- Mulu A, Tegabu D. 2012. Medical students' attitudinal changes towards cadaver dissection: A longitudinal study. *Ethiop J Health Sci* 22:51–58.
- Nnodim JO. 1996. Preclinical student reactions to dissection, death, and dying. *Clin Anat* 9:175–182.
- O'Carroll RE, Whiten S, Jackson D, Sinclair DW. 2002. Assessing the emotional impact of cadaver dissection on medical students. *Med Educ* 36:550–554.
- Oyeyipo IP, Falana BA. 2012. Attitude of preclinical students to cadaver dissection in a South West Nigerian medical school. *Int J Trop Med* 7:1–5.
- Pabst R. 2009. Anatomy curriculum for medical students. What can be learned for future curricula from evaluations and questionnaires completed by students, anatomists and clinicians in different countries? *Ann Anat* 191:541–546.
- Patel SB, Mauro D, Fenn J, Sharkey DR, Jones C. 2015. Is dissection the only way to learn anatomy? Thoughts from students at a non-dissecting based medical school. *Perspect Med Educ*, 4:259–260.
- Pawlina W, Hromanik MJ, Milanese TR, Dierkhising R, Viggiano TR, Carmichael SW. 2006. Leadership and professionalism curriculum in the Gross Anatomy course. *Ann Acad Med Singapore* 35:609–614.
- Penney JC. 1985. Reactions of medical students to dissection. *J Med Educ* 60:58–60.
- Plaisant O, Courtois R, Toussaint PJ, Mendelsohn GA, John OP, Delmas V, Moxham BJ. 2011. Medical students' attitudes toward the anatomy dissection room in relation to personality. *Anat Sci Educ* 4:305–310.
- Qamar K, Osama M. 2014. Role of dissection in light of students' perceptions. *J Pak Med Assoc* 64:1021–1024.
- Redwood CJ, Townsend GC. 2011. The dead center of the dental curriculum: Changing attitudes of dental students during dissection. *J Dent Educ* 75:1333–1344.
- Rizzolo LJ. 2002. Human dissection: An approach to interweaving the traditional and humanistic goals of medical education. *Anat Rec* 269:242–248.
- Rizzolo LJ, Stewart WB. 2006. Should we continue teaching anatomy by dissection when ...? *Anat Rec* 289B:215–218.
- Robbins BD, Tomaka A, Innus C, Patterson J, Styn G. 2009. Lessons from the dead: The experiences of undergraduates working with cadavers. *OMEGA J Death Dying* 58:177–192.
- Russa AD, Mligiliche NL. 2014. Inspiring Tanzanian medical students into the profession: Appraisal of cadaveric dissection stress and coping strategies. *Ital J Anat Embryol* 119:268–276.
- Sandor I, Birkas E, Györfy Z. 2015. The effects of dissection-room experiences and related coping strategies among Hungarian medical students. *BMC Med Educ* 15:73.

- Saylam C, Coskumol H. 2005. Orientation lesson in anatomy education. *Surg Radiol Anat* 27:74–77.
- Snelling J, Sahai A, Ellis H. 2003. Attitudes of medical and dental students to dissection. *Clin Anat* 16:165–172.
- Somanath D, Srivastava S, Rajasekar SS. 2015. Experience in anatomy lab – An analysis in preclinical students. *Int J Healthcare Biomed Res* 3:117–121.
- Spielberger CD, Gorsuch RL, Lushene RE. 2002. *STAI Cuestionario de Ansiedad Estado-Rasgo*. 6th Ed. Madrid, Spain: TEA Ediciones. 36 p.
- Takahashi S, Tsuji K, Fujii K, Okazaki F, Takigawa T, Ohtsuka A, Iwatsuki K. 2007. Prospective study of clinical symptoms and skin test reactions in medical students exposed to formaldehyde gas. *J Dermatol* 24:283–290.
- Talarico EF Jr. 2012. A change in paradigm: Giving back identity to donors in the anatomy laboratory. *Clin Anat* 26:161–172.
- Terry JS. 1985. The humanities and gross anatomy: Forgotten alternatives. *J Med Humanit Bioeth* 6:90–98.
- Tschernig T, Schlaud M, Pabst R. 2000. Emotional reactions of medical students to dissecting human bodies: A conceptual approach and its evaluation. *Anat Rec* 261:11–13.
- Tseng WT, Lin YP. 2016. “Detached concern” of medical students in a cadaver dissection course: A phenomenological study. *Anat Sci Educ* 9:265–271.
- Van Wyk J, Rennie CO. 2015. Learning anatomy through dissection: Perceptions of a diverse medical student cohort. *Int J Morphol* 33:89–95.
- Wagoner NE, Romero-O’Connell JM. 2009. Privileged learning. *Anat Sci Educ* 2:47–48.
- Wilson AB, Miller CH, Klein BA, Taylor MA, Goodwin M, Boyle EK, Brown K, Hoppe C, Lazarus M. 2018. A meta-analysis of anatomy laboratory pedagogies. *Clin Anat* 31:122–133.
- Winkelmann A. 2007. Anatomical dissection as a teaching method in medical school: A review of the evidence. *Med Educ* 41:15–22.

Manuscrito 3

Romo Barrientos C, Criado-Álvarez JJ, Gil Ruiz MT, González González J, Rodríguez Hernández M, Corregidor Sánchez AI, Ubeda-Bañon I, Flores-Cuadrado A, Mohedano Moriano A, Polonio López B. Anatomical prosection practices in the Occupational Therapy degree. Student anxiety levels and academic effectiveness. Ann Anat 2019; 221:135-40

ANNALS OF ANATOMY-ANATOMISCHER ANZEIGER

ISSN: 0940-9602

ELSEVIER GMBH, URBAN & FISCHER VERLAG

CATEGORÍA: ANATOMY & MORPHOLOGY

FI: 2,388 (JCR 2019, Q1)

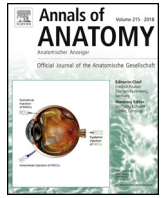
FI MEDIO 5 AÑOS: 2,078

POSICIÓN CATEGORÍA: 4/21

DOI 10.1016/j.aanat.2018.10.003

PMID: 30315912

Pubmed: <https://www.ncbi.nlm.nih.gov/pubmed/30315912>



EDUCATION

Anatomical prosection practices in the Occupational Therapy degree. Student anxiety levels and academic effectiveness^{☆,☆☆}



Carmen Romo-Barrientos^{a,1}, Juan José Criado-Álvarez^{a,b,1}, Maria Teresa Gil-Ruiz^{a,b},
Jaime González-González^{a,b}, Marta Rodríguez-Hernández^b,
Ana Isabel Corregidor-Sánchez^b, Isabel Ubeda-Bañon^c, Alicia Flores-Cuadrado^c,
Alicia Mohedano-Moriano^{b,*}, Begoña Polonio-López^b

^a Integrated Care Management at Talavera de la Reina, Castilla-La Mancha Health Services (Servicio de Salud de Castilla-La Mancha, SESCAM), Talavera de la Reina, Toledo, Spain

^b School of Occupational Therapy, Speech Therapy, and Nursing, University of Castilla-La Mancha (UCLM), Talavera de la Reina, Toledo, Spain

^c Department of Health Sciences, Ciudad Real Medical School, Regional Center for Biomedical Research (CRIB), University of Castilla-La Mancha, Ciudad Real, Spain

ARTICLE INFO

Article history:

Received 9 March 2018

Received in revised form 27 August 2018

Accepted 4 October 2018

Keywords:

Anatomy
Dissection
Prosection
Cadaver
Anxiety
Occupational Therapy

ABSTRACT

Context: The practice of anatomical dissection and/or prosection on human cadavers is an essential component of human anatomy training programmes. However, this activity can be stressful for inexperienced students when exposed to cadavers for the first time, and it may generate high anxiety levels. The aims of this study are threefold: 1) to analyse the thoughts and feelings of first-year students of the Occupational Therapy degree about prosection practices; 2) to examine their anxiety levels in relation to these practices; and 3) to evaluate how useful and effective they are as an educational tool for anatomy training. **Methods:** This is a before-and-after cross-sectional study of first-year students of the Occupational Therapy degree at the Universidad de Castilla-La Mancha, Spain. These students had not previously participated in prosection practices. An anonymous questionnaire was distributed among the students before and after the practice, in order to examine their feelings and perceptions during the practice. To examine their anxiety levels, we used a State-Trait Anxiety Inventory (STAI) questionnaire. To assess their learning outcomes the students had to complete two practical tests of recognition of anatomical structures, one before attending the practice and one immediately afterwards.

Results: Basal anxiety levels, measured as trait anxiety (TA), remained stable and did not show significant differences during the practice ($p > 0.05$). Their emotional anxiety, measured as state anxiety (SA), dropped from 14.7 to 10 points ($p < 0.05$) after the practice. Before the start of the practice 11 students (19%) showed signs of anxiety, and these remained so at the end of the practical session ($p > 0.05$).

As for their academic performance, we observed that the number of students able to pass the test after attending the prosection practice increased notably (by more than 60%). Additionally, 100% of the students recommended that the practice be retained for future courses, giving it an approval rate of 9.1 out of 10.

Conclusion: Although anatomy is usually an attractive subject for Occupational Therapy students and they value prosection practices positively, they remain a potentially complex and stressful experience. Some students find that their experiences in the dissecting room can upset their emotional balance, however, the implementation of coping mechanisms could be a very effective strategy to reduce their anxiety and also to improve their learning outcomes, helping to strengthen their practical knowledge of anatomy as

[☆] This paper belongs to the special issue Medical Education 2018.

^{☆☆} This work is part of the doctoral thesis of Carmen Romo Barrientos.

* Corresponding author at: Department of Medical Sciences, School of Occupational Therapy, Speech Therapy, and Nursing (FATOLE), University of Castilla-La Mancha, Avenida Real Fábrica de las Sedas, s/n, 45600 Talavera de la Reina, Toledo, Spain.

E-mail address: alicia.mohedano@uclm.es (A. Mohedano-Moriano).

¹ They have participated equally in this work.

we have observed in this study. The students not only value positively these practices, they also believe that they are an extremely useful tool for both teaching and learning anatomy, and they recommend their routine use as part of the training process.

© 2018 Published by Elsevier GmbH.

1. Introduction

A good knowledge of anatomy is a fundamental component in all Health Sciences disciplines. Therefore, human anatomy is a scientific subject that sits at the core of all Health Sciences educational programmes, in most cases as a compulsory subject taught during the students' first academic year at university. The current European higher education framework, created as a consequence of the Bologna Process, establishes that in order to gain the skills necessary for the development of their future professional practice students must combine the theoretical aspects of their education (the acquisition of knowledge) with an active participation in the learning process (through the acquisition of practical skills). Therefore, together with the different educational activities intended to foster the achievement of the necessary learning outcomes, it is also crucial to develop training strategies directed at the acquisition of practical skills from the very beginning of the students' university training.

The practice of anatomical dissection on human cadavers has a long tradition in medical school programmes (Ghosh, 2015), but it is not such a frequent part of the training in other Health Sciences disciplines (i.e., Nursing, Physiotherapy, Speech and Language Therapy, or Occupational Therapy). In these cases, access to practices might be limited by technical questions or by lack of materials and human resources (Vidal et al., 2016; González-López and Cuerda-Galindo, 2012). This has been the case with Occupational Therapy, where the recent introduction of prosection has proven very popular with students, who consider that it gives them a better understanding of the human body (Horne et al., 1990; Miguel-Pérez et al., 2007; Bati et al., 2013; Lempp, 2005; Sandor et al., 2015; Arráez-Aybar et al., 2004, 2008). However, and despite their perceived usefulness, dissection and prosection practices can also be stressful for students, in that they imply seeing, touching and general sensorial awareness of a human cadaver, as well as, bringing up religious, moral and philosophical issues (Tschernig and Pabst, 2001; Leboulanger, 2011; Bob et al., 2015; Arráez-Aybar et al., 2007). Up to 16% of medical students claimed to have thoughts about diseases and death when faced with a cadaver (Mompeó-Corredera, 2014; Lempp, 2005; Boeckers et al., 2010).

Practices on human cadavers are one of the students' first professional contacts with death, and therefore they can generate stress and anxiety responses (Miguel-Pérez et al., 2007; González-López and Cuerda-Galindo, 2012; Leboulanger, 2011; Bob et al., 2015; Bati et al., 2013; Arráez-Aybar et al., 2004). However, the experience is perceived as very useful for their training since the cadaver represents an "almost perfect model" (Vidal et al., 2016), better than any alternative material according to 76% of the students (Mompeó-Corredera, 2014; Sandor et al., 2015; Qamar and Osama, 2014). Anxiety is an emotional adaptive response to uncertain or alarming situations, and it forces us to act and to find an appropriate response to deal with them. Reactions, feelings and anxiety levels in the dissecting room have been examined in different countries in the context of Medicine (Horne et al., 1990; Arráez-Aybar et al., 2004; Leboulanger, 2011; Bob et al., 2015; Boeckers et al., 2010; Getachew, 2014), Odontology, Speech and Language Therapy and Pharmacy students (Bati et al., 2013; Redwood and

Townsend, 2011; Criado et al., 2017). Some of these studies also include brief references to Occupational Therapy (Arráez-Aybar et al., 2007, 2008).

The aim of this study is to examine the thoughts, perceptions and anxiety levels of the students in relation to the prosection practices with human cadavers, as well as, to explore the effectiveness of the use of prosection as an educational strategy within the Occupational Therapy degree course.

2. Materials and methods

This is a descriptive epidemiologic cross-sectional before-and-after study of first-year students of the Occupational Therapy degree, who enrolled in the "Human Anatomy and Physiology" course (n = 58 students) at the Occupational Therapy, Speech and Language Therapy and Nursing Faculty at the "Universidad de Castilla-La Mancha" (UCLM) in Talavera de la Reina (Toledo, Spain).

The Human Anatomy and Physiology course with 12 ECTS/120 h, 4 ECTS/40 h of which are practical. These practices are carried out in laboratories where anatomical models, bones and atlases of human reconstructions by dissection plans and microscopes are used.

These students had never previously participated in prosection. The study explores a practical session that took place during the academic year 2016/2017 in the dissecting room of the Faculty of Medicine at Ciudad Real (UCLM), with the participation of lecturers from the Medical Sciences departments of both faculties. Participation in the study was voluntary. Each student was equipped with a personal protection kit (lab coat, mask and gloves). Half an hour before the start of the practice the students received an anonymous questionnaire designed ad hoc for this study, collecting variables regarding their thoughts, emotions and perceptions (Criado et al., 2017). This questionnaire was number-coded by the students themselves, so that it could be paired with a second questionnaire to be completed immediately after the practice (although to avoid possible bias the students were not informed at the time that there would be a second questionnaire).

To evaluate their anxiety levels, we used a State-Trait Anxiety Inventory (STAI) questionnaire. The STAI, which has been validated for use in Spanish, is a self-administered test that was developed as a research instrument to assess levels of anxiety in otherwise healthy adults. It consists of 40 questions that measure two different, but interrelated, types of anxiety: state anxiety (SA) and trait anxiety (TA). Trait anxiety (TA) is a relatively stable emotional state that indicates a personal disposition to perceive everyday activities as threatening. It is an individual characteristic that reflects feelings that are usual and basal. State anxiety (SA), on the other hand, reflects subjective and fleeting feelings of tension, apprehension and fear that can change or fluctuate in intensity with time. It can increase as a response to different kinds of tension, and likewise it can be reduced with the use of relaxation techniques. Therefore, it is a valid indicator of an individual's response to specific situations of stress. In both cases the questionnaire records the intensity with which certain feelings and sensations of anxiety appear in a given moment, with scaling responses that range between 'nothing', 'a bit', 'quite a lot', and 'a lot' (0, 1, 2 and 3 points, respectively). As each one consisted of 20 questions, the scores obtained range between 0 and

Table 1
Student's thoughts before the practical session.

		Yes		No	
		n	%	n	%
Thinking about dissection evokes...	Anxiety	6	10.3	52	89.7
	Displeasure	2	3.4	56	96.6
	Curiosity	51	87.9	7	12.1
	Uncertainty	26	44.8	32	55.2
	Fear	3	5.2	55	94.8
Which is the most unpleasant experience in the dissecting room?	Seeing the cadaver's face	25	43.1	33	56.9
	The smell of the dissecting room	36	62.1	22	37.9
	Touching the cadaver	12	20.7	46	79.3

In none of these cases are there statistically significant gender differences regarding their thoughts ($p > 0.05$).

60 points per questionnaire, with higher scores being correlated with higher levels of anxiety. The STAI test provides a score for SA and another for TA. The absolute value of the difference between the SA and TA scores indicates whether an event creates anxiety. Dissection is considered to create anxiety for those individuals whose score is higher than 10 points (STAI-Total > 10). The sum of the SA and TA scores yields the total STAI-Sum (Spielberger et al., 2002; Arráez-Aybar et al., 2004; Casado et al., 2012). The STAI has been validated for use with a Spanish population and has a Cronbach's α of 0.93 for TA and 0.92 for SA (Fonseca-Pedrero et al., 2012).

A month before the start of the prosection practice, once the students had finished the theoretical and practical section of the module "Locomotor system and Neuroanatomy", the students underwent a practical test of their recognition of ten anatomical structures (Test 1) using illustrations that had to be labelled. The only practical material accessed by the students thus far in this course had been anatomical models.

The prosection practice lasted four hours, divided into two two-hour sessions (Session 1: "Locomotor system and Neuroanatomy"; Session 2: "Splanchnology"). After finishing this practice, and without prior notice, the students had to undergo a practical test to ascertain their Knowledge of the anatomical structures that had been examined during Session 1 of the practice (Test 2), but this time the test was carried out using a human cadaver.

Afterwards the students were given an anonymous questionnaire designed ad hoc to obtain feedback on how useful, effective and satisfactory they perceived this experience to be, and what their thoughts were on the quality of the practice. Again, the questionnaires were number-coded by the students themselves, correlating it to the previous questionnaire, so that they could be paired.

The students were informed about the general aims of this study, which was also approved by the Ethics Committee in Scien-

tific Research from Talavera de la Reina (Toledo, Spain) (File CEIC 23/2017).

The descriptive and inferential statistics analysis used variable-scale parameters. We established a confidence interval of 5%. SPSS (*Statistical Package for the Social Sciences*) 15.0 for Windows was used in data analysis.

3. Results

A total of 63 students enrolled in the first-year Occupational Therapy degree course "Human Anatomy and Physiology". Of these, 58 students volunteered to participate in this study (81%). Their mean age was 20 ± 2.01 years (mean: 20 years; range: 18–28), and 93.1% were female ($N = 54$).

The most common thought among the students before the practice was "Curiosity" (87.9%, $N = 51$), while the most unpleasant sensation while in the dissecting room was the "Smell of the room" (62.1%, $N = 36$). In these responses there were no statistically significant differences in terms of gender ($p > 0.05$) (Table 1).

Generally, the students reported feeling "Calm" and "Confident" before the start of the practice (67.2% and 79.3% respectively) (Table 2). After the practice these percentages rose to 89.6% and 87.5%, respectively, with 85.4% of the students feeling "Comfortable" – as opposed to 86.2% previously ($p < 0.05$). There were no statistically significant gender differences in relation to their different feelings, neither for the whole of the student group nor for those who suffered anxiety ($p > 0.05$) (Table 2).

Basal anxiety levels, measured as TA, were stable and did not show differences after the practice ($p < 0.05$), only dropping from 17.3 to 15.3 points (Table 3). Their levels of state (or emotional) anxiety did show a marked decrease, dropping from 14.3 to 10.0 points ($p < 0.05$) (Table 3). Before the start of the prosection practice 11 students (19%) had shown symptoms of anxiety (STAI-Total > 10), and this number remained stable once the practice was over ($p > 0.05$).

Table 2
Students' feelings during the prosection practice.

	Before						After						Statistical significance
	Yes		Indifferent		No		Yes		Indifferent		No		
	n	%	n	%	n	%	n	%	n	%	n	%	
I feel calm	39	67.2	18	31.0	1	1.7	43	89.6	3	6.3	2	4.2	$p < 0.05$
I feel confident	46	79.3	11	19.0	1	1.7	42	87.5	3	6.3	3	6.3	$p < 0.05$
I feel nervous	7	12.1	27	46.6	24	41.4	3	6.3	9	18.8	36	75.0	$p < 0.05$
I feel scared	3	6.3	6	8.3	49	85.4	3	6.3	4	8.3	41	85.4	$p < 0.05$
I feel happy	25	53.2	0	0	22	46.8	43	89.6	5	10.4	0	0	$p < 0.05$
I feel comfortable	50	86.2	8	13.8	0	0	41	85.4	2	4.2	5	10.4	$p < 0.05$
I feel relaxed	28	48.3	26	44.8	4	6.9	40	83.3	6	12.5	2	4.2	$p < 0.05$
I feel worried	4	6.9	17	29.3	37	63.8	4	8.3	8	16.7	36	75.0	$p < 0.05$
Do you feel emotionally prepared for entering the dissecting room?	34	58.6	20	34.5	4	6.9	38	79.2	5	10.4	5	10.4	$p < 0.05$

In none of these cases are there statistically significant gender differences regarding their feelings ($p > 0.05$).

Table 3
Anxiety levels among the students during the prosection practice.

	Before Mean \pm standard deviation	After Mean \pm standard deviation	Statistical significance
Trait anxiety (TA)	17.3 \pm 7.28 (median: 17.5)	15.3 \pm 7.47 (median: 15.5)	$p > 0.05$
State anxiety (SA)	14.6 \pm 6.56 (median: 13)	10.0 \pm 6.71 (median: 9.5)	$p < 0.05$
STAI-Sum (TA+SA)	32.0 \pm 11.79 (median: 29.5)	25.3 \pm 12.33 (median: 24)	$p < 0.05$

In none of these cases are there statistically significant gender differences regarding their anxiety levels ($p > 0.05$).

Table 4
Results of the anatomical structure recognition tests.

Number of correct answers	Test type			
	Test 1 (before)		Test 2 (after)	
	n	%	n	%
9–10	1	1.8	0	0
7–8	4	7.0	22	48.9
5–6	6	10.5	14	31.1
3–4	18	31.6	0	0
0–2	28	49.1	9	20
	57	100	45	100

This means that those students who experienced anxiety before the practice remained anxious, whereas the levels of state anxiety of the group as a whole decreased.

The results of the assessments indicate an increase in the number of students who passed Test 2 (80%, $N = 36$), as opposed to 19.3% ($N = 11$) that passed Test 1, prior to attending the prosection (Table 4).

Finally, 100% of the students recommended that the prosection practice be maintained for future courses, expressing being “Satisfied” or “Very satisfied” with it (19.1%, $N = 11$ and 78.7%, $N = 45$, respectively). The average rating of the experience was 9.1 ± 1.15 points out of 10 (mean: 9; range: 4–10). Also, 100% of the students considered that the prosection was very useful for their human anatomy training.

4. Discussion

Anatomy is a fundamental subject present in all the academic programmes of the different Health Sciences disciplines, and it is particularly popular with first-year medical students. However, as many studies have previously pointed out, dissection and prosection practices can also be upsetting and stressful for inexperienced students (Horne et al., 1990; Miguel-Pérez et al., 2007; Bati et al., 2013; Sandor et al., 2015; Arráez-Aybar et al., 2004, 2008). There is currently some degree of controversy among anatomists regarding what the best methods are for the teaching–learning process in this discipline, and in particular, about whether human cadavers should remain the main focus of human anatomy training (Patel et al., 2015; Mompeó-Corredera, 2014; Biassutto et al., 2006; Sandor et al., 2015; Redwood and Townsend, 2011). This has led to a search for alternative educational strategies, although the central role of human dissection practices in medical training has remained unchanged (González-López and Cuerda Galindo, 2012; Lempp, 2005; Qamar and Osama, 2014; Dissabandara et al., 2015; Ghosh, 2015).

Both dissection and prosection practices allow students to explore the human body in a real context, enabling them to appreciate even slight individual anatomical variations. These practices also allow them to connect different anatomical structures on a spatial level, paying special attention to their position and relationships to adjacent structures. They also allow students to exercise self-reflection and to internalize the cognitive and emotional skills required for future clinical practice (Ahmed et al., 2010; Rizzolo and Stewart, 2006). However, the increased cost of the materials and the

resources required to prepare, manipulate and preserve cadavers has made it necessary for some Health Sciences disciplines (such as Nursing, Speech and Language Therapy, Occupational Therapy or Physiotherapy) to opt for less costly alternatives, such as the use of anatomical models or computer applications – despite the learning outcomes not being the same.

There have been a few studies that have assessed the impact of hands-on practices (dissections or prosections) on Health Sciences students; however, most have focused on medical students (Pabst, 1993; Pabst et al., 2001; Arráez-Aybar et al., 2007, 2008; Bati et al., 2013; Criado-Álvarez et al., 2017). It is therefore necessary to further examine their effect. It is necessary to carry out evaluations on this subject on both undergraduate and postgraduate students (Pabst, 2002), not only in the Medical degree but also to extend it to all health sciences degrees. This may help to optimize the investment in methodological resources required for human anatomy training in other disciplines. Our study, which has yielded results like those published for other disciplines (Bati et al., 2013; Arráez-Aybar et al., 2007, 2008; Criado-Álvarez et al., 2017), is focused on the impact of prosection practices on the Occupational Therapy students.

For most students prosection practices are their first experience with death and/or physical exposure to cadavers, and some students find them very stressful (Tschernig and Pabst, 2001; Miguel-Pérez et al., 2007; Leboulanger, 2011; Boeckers et al., 2010). However, and although it can upset them emotionally (Arráez-Aybar et al., 2004, 2007, 2008; Getachew, 2014), most students still consider the experience satisfactory or even very satisfactory, and, in fact, 100% of our students recommended that it be retained for future courses – although the rates published by other studies only reach 85.5% (Mompeó-Corredera, 2014). Our result could be attributed to our highly motivated lecturers, who are aware of the importance of these practices as an educational tool and have transmitted their enthusiasm to their students. This has a clear impact both in the positive perception of the practice, with students expressing their satisfaction and happiness with the experience (above 85% in both cases after finishing the session), as well as in terms of learning outcomes, with 80% of students scoring between 5–10 out of 10 after the practice (as opposed to only 19.3% that passed the previous test). It is noteworthy that although our students have been trained in a digital environment (which could make us expect them to be more comfortable and confident working with computer simulations and 3D anatomical models), they remain very satisfied with the practical experience and have no doubts recommending it – a fact observed by other researchers (Mompeó-Corredera, 2014; Leboulanger, 2011; Qamar and Osama, 2014). It is also important to note that the students’ high degree of satisfaction with the practice matches their successful performance in Test 2, where the number of “passes” increased up to 80% (from 19.3% in Test 1). There is sufficient evidence that experiential learning is more effective and satisfactory for students, as it fosters learning from experience, action and interaction, involving their bodies, minds and emotions in the process (Ros and Verdick, 2003; Berkhout et al., 2017). Also, the practical effect of these methodologies has to be taken into account, as they allow the students to examine real anatomical structures,

which makes positioning them and connecting them with adjacent structures easier than using any atlas or anatomical model. As for those aspects of the practice on human cadavers that were perceived as negative, 62.1% of students remarked on “Smell” as an unpleasant factor, in line with the results published by similar studies (Bati et al., 2013; Cahill and Ettarh, 2009; Qamar and Osama, 2014; Dissabandara et al., 2015). This result, however, is still lower than those published elsewhere, which can reach up to 70–80% (Mompeó-Corredera, 2014; Miguel-Pérez et al., 2007; Leboulanger, 2011; Arráez-Aybar et al., 2008). As for “Seeing the cadaver’s face”, our study indicated that 43.1% of students found it unpleasant, like other studies (Miguel-Pérez et al., 2007; Leboulanger, 2011).

In terms of the students’ anxiety levels, the observed drop in state anxiety could be attributed, as some researchers have suggested, to the use of coping mechanisms. We suggest that students, after going through the first session of the practice and during the ensuing break, were able to exchange insights, sensations and perceptions with their peers, with the resulting drop in their collective anxiety levels and fears of the unknown at the end of the practical session (Miguel-Pérez et al., 2007; Casado et al., 2012). This is a phenomenon that some researchers have called “socializing with death” (Lempp, 2005; Horne et al., 1990; Sandor et al., 2015). Other researchers have published similar data results for the STAI-Sum, with scores of 30.3 and 30.1 points ($p > 0.05$) before and after the first dissection practice, respectively (Leboulanger, 2011). Our study yielded scores of 32.0 and 25.3 points (Table 3), which is a statistically significant difference ($p < 0.05$), as has been noted elsewhere (Arráez-Aybar et al., 2004, 2007, 2008). However, the studies of Leboulanger (2011) and Bob et al. (2015) did not find a general drop in SA levels, which they attributed to the compulsory character of the practice (as opposed to ours, where attendance was voluntary).

Anxiety levels tend to drop as students attend more practices, with SA levels falling from 14.6 to 10.0 (Arráez-Aybar et al., 2004, 2008). Some researchers have advocated the use of audio-visual presentations or seminars prior to the practice as a precautionary measure or coping mechanism, believing that it could have a positive emotional influence in helping students cope with the stress caused by exposure to human cadavers (Tschernig and Pabst, 2001; Arráez-Aybar et al., 2004, 2008; Casado et al., 2012).

It might be that future studies offer different results, as this is the first time that this practice has been introduced to Occupational Therapy students, and their lack of experience also reduced the risk of them being biased (Bati et al., 2013; Arráez-Aybar et al., 2007). It would also be interesting to introduce coping strategies prior to practices with future groups, in order to evaluate their impact.

Practices on human cadavers are obviously nothing like dealing with a patient, but they are without doubt an unforgettable experience that will have a positive impact on students’ future professional practice as occupational therapists. The dissecting room fosters a positive learning environment for the students (Mc Garvey et al., 2001). The experiences gained therein are considered pivotal during anatomy training (Rizzolo and Stewart, 2006; Somanath et al., 2015).

Although there is a small percentage of students that are emotionally affected by their exposure to a human cadaver, most consider this kind of educational activity invaluable for their training, giving it a very high approval rate. Dissection and prosection practices improve students’ spatial reasoning skills and help them relate anatomical structures to their images as they are usually depicted, allowing for a better integration of cognitive and emotional skills – which can be appreciated in the results of their assessments.

5. Conclusions

The results presented in this study, together with the feedback expressed by the students themselves, are important factors that should be considered during the design of academic guidelines to improve the success of human anatomy courses – not just in terms of their learning outcomes, but also as a personal experience for the 7 students.

Accordingly, the study plan in Occupational Therapy regarding human anatomy and physiology should be revised and eventually modified.

The authors propose that from the four total practical credits ECTS of the subject, 1.5 ECTS (15 h) should correspond to prosection with cadavers. This should be a mandatory teaching part of human anatomy and physiology in the occupational therapy as a complement pre-existing teaching structures (2.5 ECTS/25 h). This involves changes and modifications in competences, objectives, practical contents and evaluation criteria of human anatomy and physiology, which must be approved by the relevant faculty and university committees and also by the Spanish Agency of Evaluation of Quality and Accreditation.

On the other hand, based on the studies by Pabst (1993, 2002) and Pabst et al. (2001) it is necessary that the anatomy teachers in the health sciences grades use evaluations (at the undergraduate level and also the postgraduate phase). This is necessary to evaluate the effectiveness of the used technologies, teaching hours of anatomy necessary for the curriculum in the health sciences degrees and emotional evaluations before the dissections or prosections to improve teaching.

Funding

No financing.

References

- Ahmed, K., Rowland, S., Patel, V., Khan, R.S., Ashrafiyan, H., Davies, D.C., Darzi, A., Athanasiou, T., Paraskeva, P.A., 2010. *Is the structure of anatomy curriculum adequate for safe medical practice*. *Surgeon* 8, 318–324.
- Arráez-Aybar, L.A., Casado-Morales, M.I., Castaño-Collado, G., 2004. *Anxiety and dissection of the human cadaver: an unsolvable relationship?* *Anat. Rec. B (New Anat.)* 279, 16–23.
- Arráez-Aybar, L.A., Castaño-Collado, G., Casado-Morales, M.I., 2007. *A study of cognitive-affective and physiological-motor reactions to human dissection in Spanish students of human anatomy*. *Eur. J. Anat.* 11 (Suppl. 1), 67–71.
- Arráez-Aybar, L.A., Castaño-Collado, G., Casado-Morales, M.I., 2008. *Dissection as a modulator of emotional attitudes and reactions of future health professionals*. *Med. Educ.* 42, 563–571.
- Bati, A.H., Ozer, M.A., Govsa, F., Pinar, Y., 2013. *Anxiety of first cadaver demonstration in medical, dentistry and pharmacy faculty students*. *Surg. Radiol. Anat.* 35, 419–426.
- Berkhout, J.J., Slootweg, I.A., Helmich, E., Teunissen, P.W., van der Vleuten, C.P.M., Jaarsma, A.D.C., 2017. *How characteristic routines of clinical departments influence students’ self-regulated learning: a grounded theory study*. *Med. Teach.* 39, 1174–1181.
- Biassutto, S.N., Causa, L.I., Criado del Rio, L.E., 2006. *Teaching anatomy cadavers vs computers*. *Ann. Anat.* 188, 187–190.
- Bob, M.H., Popescu, C.A., Suci, S.M., Buzoianu, A.D., 2015. *First year medical students toward anatomical corpse dissection and its relationship with their personality*. *Rom. J. Morphol. Embryol.* 56, 321–324.
- Boeckers, A., Brinkmann, A., Jerg-Bretzke, L., Lamp, C., Trauec, H.C., Boeckers, T.M., 2010. *How can we deal with mental distress in the dissection room: an evaluation of the need for psychological support*. *Ann. Anat.* 192, 366–372.
- Cahill, K.C., Ettarh, R.R., 2009. *Attitudes to anatomy dissection in an Irish medical school*. *Clin. Anat.* 22, 386–391.
- Casado, M.I., Castaño, G., Arráez-Aybar, L.A., 2012. *Audiovisual material as educational innovation strategy to reduce anxiety response in students of human anatomy*. *Adv. Health Sci. Educ.* 14, 431–440.
- Criado-Álvarez, J.J., González González, J., Romo Barrientos, C., Ubeda-Bañón, I., Saiz-Sánchez, D., Flores-Cuadrado, A., Albertos-Marco, J.C., Martínez-Marcos, A., Mohedano-Moriano, A., 2017. *Learning from human cadaveric prosections: examining anxiety in speech therapy students*. *Anat. Sci. Educ.* 10 (5), 487–494.
- Dissabandara, L.O., Nirthanani, S.N., Khoo, T.K., Tedman, R., 2015. *Role of cadaveric dissections in modern medical curricula: a study on student perceptions*. *Anat. Cell Biol.* 48, 205–222.

- Fonseca-Pedrero, E., Paino, M., Sierra-Baigrie, S., Lemos-Giraldez, S., Muñiz, J., 2012. Propiedades psicométricas del "Cuestionario de ansiedad estado-rasgo" (STAI) en universitarios. *Behav. Psychol./Psicología Conductual* 20, 547–561.
- Getachew, D., 2014. Reaction of medical students to experience in dissection room. *Ethiop. J. Health Sci.* 20, 337–342.
- Ghosh, S.K., 2015. Human cadaveric dissection: a historical account from ancient Greece to the modern era. *Anat. Cell Biol.* 48, 153–169.
- González-López, E., Cuerda-Galindo, E., 2012. La utilización de cadáveres y órganos en la investigación y docencia médica. *Lecciones de la historia. Med. Clin. (Barc.)* 138, 441–444.
- Horne, D.J.L., Tiller, J.W.G., Eizenberg, N., Tashevskaja, M., Biddle, N., 1990. Reactions of first-year medical students to their initial encounter with a cadaver in the dissecting room. *Acad. Med.* 65, 645–646.
- Leboulanger, N., 2011. First cadaver dissection: stress, preparation, and emotional experience. *Eur. Ann. Otorhinolaryngol. Head Neck Dis.* 128, 175–183.
- Lempp, H.K., 2005. Perceptions of dissection by students in one medical school: beyond learning about anatomy. A qualitative study. *Med. Educ.* 39, 318–325.
- Mc Garvey, M.A., Farrell, T., Conroy, R.M., Kandiah, S., Monkhouse, W.S., 2001. Dissection: a positive experience. *Clin. Anat.* 14, 227–230.
- Miguel-Pérez, M., Porta-Riba, N., Ortiz-Sagrasta, J.C., Martínez, A., Götzens-García, V., 2007. Anatomía humana: Estudio de las reacciones de los estudiantes de primero de medicina ante la sala de disección. *Educación Médica* 10, 105–113.
- Mompeó-Corredera, B., 2014. Metodologías y materiales para el aprendizaje de la anatomía humana. Percepciones de los estudiantes de medicina "nativos digitales". *Rev. Fund Educ. Med.* 17, 99–104.
- Pabst, R., Nave, H., Rothkötter, H.J., Tschernig, T., 2001. Evaluation of the medical curriculum: why, when, by whom and for whom should questionnaires be used. *Eur. J. Morphol.* 39 (4), 237–239.
- Pabst, R., 1993. Gross anatomy: an outdated subject or an essential part of a modern medical curriculum? Results of a questionnaire circulated to final-year medical students. *Anat. Rec.* 237, 431–433.
- Pabst, R., 2002. Modern macroscopic anatomy-more than just cadaver dissection. *Anat. Rec.* 269, 209.
- Patel, S.B., Mauro, D., Fenn, J., Sharkey, D.R., Jones, C., 2015. Is dissection the only way to learn anatomy? Thoughts from students at a non-dissecting based medical school. *Perspect. Med. Educ.* 4, 259–260.
- Qamar, K., Osama, M., 2014. Role of dissection in light of students' perceptions. *J. Pak. Med. Assoc.* 64, 1021–1024.
- Redwood, C.J., Townsend, G.C., 2011. The dead center of the dental curriculum: changing attitudes of dental students during dissection. *J. Dent. Educ.* 75, 1333–1344.
- Rizzolo, L.J., Stewart, W.B., 2006. Should we continue teaching anatomy by dissection when . . . ? *Anat. Rec. B (New Anat.)* 289, 215–218.
- Sandor, I., Birkas, E., Györfy, Z., 2015. The effects of dissection-room experiences and related coping strategies among Hungarian medical students. *BMC Med. Educ.* 15, 73.
- Somanath, D., Srivastava, S., Rajasekar, S.S., 2015. Experience in anatomy lab: an analysis in preclinical students. *J. Healthc. Biomed. Res.* 3, 117–121.
- Spielberger, C.D., Gorsuch, R.L., Lushene, R.E., 2002. STAI Cuestionario de Ansiedad Estado-Rasgo, 6ª Edición. TEA ediciones, Madrid.
- Tschernig, T., Pabst, R., 2001. Services of thanksgiving at the end of gross anatomy courses: a unique task for anatomists. *Anat. Rec.* 265, 204–205.
- Vidal, O., Ginestá, C., Espert, J.J., Valentini, M., García-Valdecasas, J.C., 2016. Los cadáveres en fresco, un antiguo modelo quirúrgico en la cirugía general actual. *Cir. Esp.* 94, 201–205.

Manuscrito 4

Romo Barrientos C, Criado-Álvarez JJ, Martínez-Lorca A, Viñuela A, Martín-Conty JL, Saiz-Sánchez D, Flores-Cuadrado A, Ubeda-Bañon I, Rodríguez-Martín B, Mohedano Moriano A. Anxiety among nursing students during their first human prosection. Nurse Educ Today 2020; 85:104269

NURSE EDUCATION TODAY

ISSN: 0260-6917

ELSEVIER GMBH, URBAN & FISCHER VERLAG

CATEGORÍA: NURSING

FI: 2,49 (JCR 2019, Q1)

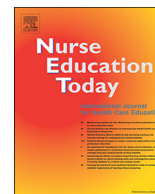
FI MEDIO 5 AÑOS: 3,024

POSICIÓN CATEGORÍA: 7/121

DOI 10.1016/j.nedt.2019.104269

PMID: 31760350

Pubmed: <https://pubmed.ncbi.nlm.nih.gov/31760350>



Anxiety among nursing students during their first human prosection

Carmen Romo-Barrientos^{a,*}, Juan José Criado-Álvarez^{a,b}, Alberto Martínez-Lorca^b, Antonio Viñuela^b, Jose Luis Martin-Conty^b, Daniel Saiz-Sanchez^c, Alicia Flores-Cuadrado^c, Isabel Ubeda-Bañon^c, Beatriz Rodriguez-Martín^b, Alino Martinez-Marcos^c, Alicia Mohedano-Moriano^b

^a Integrated Care Management, Castilla-La Mancha Regional Health Services (Servicio de Salud de Castilla-La Mancha, SESCAM), Talavera de la Reina, Spain

^b School of Health Sciences, University of Castilla-La Mancha, Talavera de la Reina, Spain

^c Department of Medical Sciences, Ciudad Real Medical School, Regional Center for Biomedical Research, University of Castilla-La Mancha, Ciudad Real, Spain

ARTICLE INFO

Keywords:

Anatomy
Dissection
Cadaver
Anxiety
Nursing education

ABSTRACT

Dissection and prosection practices using human cadavers are a key component of macroscopic anatomy education in different Health Sciences university degrees. However, first-hand interaction with cadavers can be distressing for students, generating anxiety on a number of levels. This study aims to shed light on the reactions, fears and different states of anxiety experienced by nursing students in to a single anatomy room experience over a five-hour period, and examined reactions pre and post same.

A descriptive study of these students was designed in order to understand their feelings and emotions, based on the distribution of anonymous “ad hoc” questionnaires before and after the practices. Also, State-Trait Anxiety Inventory (STAI) questionnaires were administered in order to assess their anxiety levels: Trait Anxiety (TA), which measures basal anxiety levels, and State Anxiety (SA), which measures individual emotional responses during a specific event (in this case, the prosection practice). The results of this study indicate that basal anxiety levels, measured as TA, remained stable and unchanged during the practice ($p > 0.05$). SA or emotional anxiety levels, on the other hand, dropped from 21.3 to 17.8 points ($p < 0.05$). Before the start of the practical exercise, 17.6% of the students admitted experiencing some kind of anxiety. Afterwards, however, 90.2% of the students said they would recommend these practices. They considered that prosection practices very useful for their education and recommended that they be retained for future courses. However, our study also showed the relevance of using coping mechanisms before the first contact with the dissecting room, especially for those students who did not feel emotionally prepared for it beforehand.

1. Introduction

Human Anatomy courses are an essential and compulsory component of the first-year educational curriculum for most Health Sciences university degrees (Rizzolo and Stewart, 2006). The use of human cadavers in dissection and prosection practices for macroscopic anatomy education is a common practice, especially in medical schools. However, gross human anatomy practical lessons are not routine in other Health Sciences disciplines, such as Nursing, Physical Therapy, Occupational Therapy, Speech Therapy, Podiatry, or Pharmacy. There are many reasons for this, including lack of adequate equipment, elevated material costs, or lack of the resources necessary for preparing, handling and preserving cadavers (González-López and Cuerda-Galindo,

2012; Lempp, 2005; Vidal et al., 2016), as well as the development of new educational technologies which may have caused them to be perceived as unnecessary (Darras et al., 2018; Morris and Jacques, 2018). However, many researchers still consider hands-on dissection practices as essential for macroscopic anatomy training (Lee et al., 2011; Rizzolo and Stewart, 2006; Somanath et al., 2015). Dissection and prosection practices allow the student to examine real human bodies (as opposed to using models) and to develop an appreciation of the diversity of anatomical structures. It also allows them to establish a basic understanding of these structures on a topographical level, especially regarding their locations and relationships to other structures (Ahmed et al., 2010; Rizzolo and Stewart, 2006; Vidal et al., 2016). Finally, these practices constitute, for many students, their first clinical contact

* Corresponding author at: Department of Medical Sciences, Anatomy Area, School of Health Sciences, University of Castilla-La Mancha, Avenida Real Fábrica de las Sedas, s/n, 45600 Talavera de la Reina, Toledo, Spain.

E-mail address: jjcriado@secam.jccm.es (J.J. Criado-Álvarez).

<https://doi.org/10.1016/j.nedt.2019.104269>

Received 13 March 2019; Received in revised form 16 August 2019; Accepted 9 November 2019

0260-6917/© 2019 Published by Elsevier Ltd.

with death, which is undoubtedly beneficial for their future professional practice (Mc Garvey et al., 2015), as well as for promoting teamwork and leadership (Flack and Nicholson, 2018; Houwink et al., 2004; Pawlina et al., 2006; Robbins et al., 2009; Talarico Jr, 2013). Indeed, 76% of students did not believe any other practice or the use of alternative learning materials would be as effective (Mompeó-Corredera, 2014; Qamar and Osama, 2014; Sándor et al., 2015).

On the other hand, interaction with human cadavers during dissection and prosection practices could cause stressful emotional responses among students – for different reasons, including ethical and/or philosophical (Arráez-Aybar et al., 2019; Bob et al., 2015; Leboulanger, 2011). Occasionally, human cadaver dissections can produce anxiety and stress, both before and during the practice (Arraez-Aybar et al., 2004b; Bati et al., 2013; Bob et al., 2015; Boeckers et al., 2010; González-López and Cuerda-Galindo, 2012; Goodwin et al., 2016; Leboulanger, 2011; Tschernig et al., 2000). Anxiety is an emotional adaptive response to uncertain or alarming situations, preparing us to take action and to respond appropriately. Most published studies exploring anxiety experienced in the dissecting room are based on medical students (Arraez-Aybar et al., 2004b; Bob et al., 2015; Boeckers et al., 2010; Getachew, 2014; Horne et al., 1990; Leboulanger, 2011; Romo et al., 2018), although several have included dentistry, occupational therapy, speech therapy, pharmacology students (Bati et al., 2013; Criado-Álvarez et al., 2017; Redwood and Townsend, 2011; Romo-Barrientos et al., 2019a) and, occasionally, nursing students (Johnston, 2010; Mc Garvey et al., 2015). Evidence suggests that students leave behind these episodes of anxiety as they become more used to the dissecting room, as exposure leads to the development of coping mechanisms (O'Carroll et al., 2002). However, most Health Sciences disciplines, including Nursing, usually need to convey large amounts of information in short periods of time. As a result, students' visits to the dissecting room are limited, and consequently opportunities to develop these mechanisms are also restricted.

2. Aims

The objective of this work is to study the degree of anxiety, emotions and feelings in front of the first gross anatomy practice with human corpses in nursing students, before modifying the competences and the practical contents of the human anatomy in the nursing curriculum.

3. Material and methods

3.1. Sample

This is a descriptive, before-and-after study conducted on first-year nursing students ($N = 42$ of 49 students), who were enrolled in an Anatomy course (with 6 ECTS/60 h, of which 15–20 h are practical) at the University of Castilla-La Mancha School of Health Sciences (UCLM, Talavera de la Reina, Spain) during the academic year 2015–2016. These students had never previously participated in human prosection practices. The study was carried out in a dissecting room at the Ciudad Real Medical School (UCLM, Spain). At the end of the theoretical-practical contents of the anatomy course (in the last days of the anatomy course). Participation in the study was voluntary. Before the practice, students were informed of the overall goals of the study, the process of donating the corpse, the rules of safety and behavior within the room and were equipped with personal protective equipment.

3.2. Measures

An anonymous “ad hoc” questionnaire was designed to explore the feelings and emotions brought about by the prosections (13 questions of closed items, not validated but used in the works: Criado-Álvarez et al., 2017; Romo-Barrientos et al., 2019a; Romo-Barrientos et al., 2019b).

Additionally, a State-Trait Anxiety Inventory (STAI) questionnaire was used in order to determine their anxiety levels. The questionnaires were numbered with an eight-digit code selected by the student which was later used to compare questionnaires anonymously. The STAI questionnaires a research tool that quantifies anxiety levels in healthy adults, and has been validated for use in Spanish (Spielberger et al., 2002). It consists of 40 questions that measure two different, but interrelated, types of anxiety: state anxiety (SA) and trait anxiety (TA). TA measures how a person feels on a day-to-day basis, that is, their baseline feelings; SA measures how a person feels in a specific stressful situation. Each questionnaire provides a numerical value for TA and another for SA, with scaling responses that range between ‘nothing’, ‘a bit’, ‘quite a lot’, and ‘a lot’ (0, 1, 2 and 3 points, respectively). As each one consisted of 20 questions, the scores obtained range between 0 and 60 points per questionnaire, with higher scores being correlated with higher levels of anxiety.

Prosection practices were considered anxiety-inducing in those individuals who obtained a value > 10 (STAI-Total > 10) (Ahmed et al., 2010; Anyanwu, 2015; Arraez-Aybar et al., 2004a; Arráez-Aybar et al., 2008; Casado et al., 2012; Spielberger et al., 2002). The sum of the SA and TA scores yields the total STAI-Sum (TA + SA). The absolute value of the difference between the two values gives an indication of whether an event causes anxiety (STAI-Total). The STAI has been validated for use with a Spanish population and has a Cronbach's α of 0.93 for TA and 0.92 for SA (Fonseca-Pedrero et al., 2012).

4. Procedure

The prosection practice lasted 5 h, with a break halfway through. Around 30–40 min before entering the dissecting room for the first time, participants were given the “ad hoc-before” and STAI (TA and SA) questionnaires (enough time to fill in the questionnaires). Once that the students were equipped with a personal protection kit (lab coat, mask and gloves), were then distributed in seven dissection tables (one human cadaver or human anatomical pieces and 5/6 students per table, the students rotated by each table every 45–50 min) and each table was supervised by a teacher. At each table the students had to identify certain anatomical structures. The teacher was the moderator of each table and clarified the doubts generated. In the last 15 min, a brief explanation was made by the teacher.

The activity in the dissection room was divided into two work sessions: in the morning, with a duration of 2 h and 30 min, the contents to be worked by the students and the teacher: “locomotor system and neuroanatomy”. In the afternoon, “circulatory system and splanchnology” (duration: 2 h and 30 min). At the end of the 5-hour prosection practice, they were given the “ad hoc-after” (similar to the previous one, but with additional questions related to the quality and degree of satisfaction with the exercise) and the STAI questionnaires.

4.1. Ethics

Before the practice, the students were told about the general aims of the study, their anonymity was guaranteed and filled in the consent forms. The students were advised that they could withdraw from the study at any time and that there would be no academic impact because of this withdrawal. Ethical approval for this study was granted by the Ethics Committee for Clinical Research of Talavera de la Reina (Toledo, Spain) (File 23/2017).

4.2. Statistical analysis

The descriptive and inferential statistical analysis used different parameters according to the scale of the variable. A t -test was used to study the differences in paired variables. A chi-squared test was used to compare nominal and dichotomous variables. A 5% confidence level was established. The statistical software SPSS (Statistical Package for

Table 1
Students' anxiety during the exercise.

	Before	After	Statistical significance
	Mean ± standard deviation	Mean ± standard deviation	
TA	16.0 ± 8.02 (Median: 15)	12.01 ± 7.79 (Median: 10)	<i>p</i> > 0.05
SA	21.3 ± 17.76 (Median: 19)	17.8 ± 8.09 (Median: 17)	<i>p</i> < 0.05 *
STAI-Sum	37.7 ± 21.86 (Median: 35.5)	29.8 ± 14.90 (Median: 26.0)	<i>p</i> > 0.05
STAI-Total	6.0 ± 5.04 (Median: 4.5)	7.0 ± 6.30 (Median: 5)	<i>p</i> > 0.05

TA: trait anxiety.

SA: state anxiety.

STAI-Sum: TA + SA.

STAI-total: the absolute value of the difference between values (TA and SA) is considered anxiety-inducing in those individuals who obtained a value > 10 (STAI-total > 10).

the Social Sciences) 15.0 for Windows was used in data analysis.

5. Results

A total of 42 students participated in this study (85.7%). Their mean age was 19.6 ± 1.6 years (median: 19 years; range: 18–23 years), and 37 of them (88.1%) were female. Nearly two-thirds (69.4%) had never previously seen a human cadaver.

The results of the STAI questionnaires indicated a significant drop in the levels of emotional anxiety measured as SA, from 21.3 to 17.8 points, after the practical exercise (*p* < 0.05) (Table 1). Similarly, the levels of emotional anxiety measured as TA (basal anxiety levels) decreased from 16.0 to 12.0 points (*p* > 0.05) (Table 1). Before the start of the exercise, 6 students (17.6%) displayed signs of anxiety (STAI-Total > 10), and this number increased at the end of the session to 9 students (21.4%, *p* > 0.05). This suggests that although some students with anxiety prior to the practice continued to feel anxious afterwards, the overall emotional anxiety of the class (SA) decreased. There were no statistically significant differences in terms of gender, neither for the whole student group nor for those who felt anxiety (*p* > 0.05) (Table 1).

The results of the anonymous “ad hoc” questionnaires reflect the students' subjective perceptions, emotions and thoughts prior to and after the practice. In general, before the practice (Tables 2 and 3), 6 students (14.3%) indicated that they felt “anxious,” and only 2 (5.6%) felt “afraid.” A total of 33 students (91.7%) felt “curious” before entering the dissecting room. Other aspects of the procedure that pre-occupied the nursing students before entering the dissection room were “seeing the cadaver's face” (50%, *N* = 18), “touching the cadaver” (19%, *N* = 7), and “the smell of the dissecting room” (72.2%, *N* = 26) (Table 2). There were no statistically significant differences in any of these instances in terms of gender or having previously seen a cadaver. Overall, 83.3%, 72.2%, 80.6% and 75.0% of the students felt “calm,” “relaxed,” “at ease” and “safe,” respectively (*p* > 0.05), and 27 students declared feeling emotionally prepared to enter the dissecting

Table 2
Students' thoughts prior to the exercise.

		Yes		No	
		n	%	n	%
		Thinking about dissection makes me feel...			
	Anxious	6	14.3	36	85.7
	Displeased	4	11.1	32	88.9
	Curious	33	91.7	3	8.3
	Uncertain	11	30.6	25	69.4
	Afraid	2	5.6	34	94.4
What is unpleasant in the dissecting room?	Seeing the cadaver's face	18	50.0	18	50.0
	The smell of the dissecting room	26	72.2	10	27.8
	Touching the cadaver	7	19.4	29	80.6

room (Table 3). After the practical session these percentages rose. There were no statistically significant differences in terms of gender or in relation to their feelings, except with “secure” and “relaxed” (Table 3). In addition, a total of 32 students (78%) expressed having had thoughts about life and death, with feelings of fear regarding loss of control in 16 cases (39%) (Table 3).

A total of 37 students (90.2%) recommended the exercise be kept for future courses, feeling “satisfied” or “very satisfied” in 36.6% (*N* = 16) and 61% of the cases (*N* = 26), respectively. Finally, 10 students (24.4%) declared that they would donate their bodies for scientific research.

6. Discussion

6.1. Emotional responses in the dissecting room

Dissection and prosection practices can cause uncomfortable or stressful feelings among Health Sciences students (Arraez-Aybar et al., 2004a; Arráez-Aybar et al., 2019; Bati et al., 2013; Horne et al., 1990; Miguel Pérez et al., 2007; Sándor et al., 2015). Few studies have examined the reactions of Health Sciences students other than medical ones (Arráez-Aybar et al., 2019; Bati et al., 2013; Criado-Álvarez et al., 2017; Romo-Barrientos et al., 2019a), and occasionally nursing students, when exploring subjects such as dealing with death and the impact of the anatomy room on students (Mc Garvey et al., 2015). The results of our study indicate that basal anxiety levels (TA) remained stable, and did not change significantly before and after the practice. State anxiety (SA), on the other hand, decreased from 21.3 to 17.8 points after the end of the practice, results which are similar to those published for other Health Sciences disciplines (Criado-Álvarez et al., 2017; Romo-Barrientos et al., 2019a). Other studies have offered STAI-Sum values similar to ours, at around 30.3 and 30.1 points (*p* > 0.05) respectively, before and after the students' first visit to the dissecting room (Leboulanger, 2011). In our study, those values were 37.7 and 29.8 points, respectively. Our results showed significant differences before and after the practice (*p* < 0.05), in line with results published previously (Arraez-Aybar et al., 2004a; Arráez-Aybar et al., 2019). Other studies have suggested that anxiety levels tend to decrease over time as students take part in more practical exercises, with STAI-Sum values dropping from 26.62 to 14.34 (Arraez-Aybar et al., 2004a, 2004b).

One of the most uncomfortable perceptions among the students was that of the “smell of the dissecting room,” which 72.2% of the students considered to be a negative factor. This is in line with results published elsewhere (Bati et al., 2013; Cahill and Ettarh, 2009; Dissabandara et al., 2015; Qamar and Osama, 2014; Romo-Barrientos et al., 2019a). Also, 50% of the students in our study declared that the thought of “seeing the cadaver's face” caused anxiety, which echoes the 43–56% found in similar studies (Leboulanger, 2011; Miguel Pérez et al., 2007; Romo-Barrientos et al., 2019a).

Table 3
Students' feelings during the exercise.

	Before						After						Statistical significance
	Yes		Indifferent		No		Yes		Indifferent		No		
	N	%	n	%	n	%	n	%	n	%	n	%	
I feel calm	30	83.3	6	16.7	0	0.0	39	95.1	2	4.9	0	0.0	$p > 0.05$
I feel safe	27	75.0	9	25.0	0	0.0	39	95.1	2	4.9	0	0.0	$p < 0.05^*$
I feel nervous	7	19.4	9	25.0	20	55.6	0	0.0	3	7.3	38	92.7	$p < 0.05^*$
I feel afraid	3	8.3	4	11.1	29	80.6	0	0.0	4	9.8	37	90.2	$p > 0.05$
I feel happy	25	69.4	10	27.8	1	2.8	30	73.2	9	22.0	2	4.8	$p > 0.05$
I feel at ease	29	80.6	7	16.7	0	0.0	37	90.2	4	9.8	0	0.0	$p > 0.05$
I feel relaxed	26	72.2	8	22.2	2	5.6	39	95.1	2	4.9	0	0.0	$p < 0.05^*$
I feel worried	3	8.3	6	16.7	27	75.0	0	0.0	4	9.8	37	90.2	$p < 0.05^*$
Do you feel emotionally prepared to enter the dissecting room?	27	64.3	8	19.0	1	2.4	34	82.9	2	4.9	5	12.2	$p > 0.05$

6.2. Coping mechanisms

Some researchers have suggested the use of coping mechanisms and/or preparatory seminars in order to help students manage uncomfortable or stressful feelings caused by interactions with human cadavers.

The use of audiovisual aids to explain dissection rules and procedures, familiarization with cadaver donation, reflecting about life and death, or exchanges with more experienced students, could all help in managing the potential stress caused by these practices (Arraez-Aybar et al., 2004a, 2004b; Casado et al., 2012; Houwink et al., 2004; Miguel Pérez et al., 2007). It has also been suggested that the use of background music in the dissecting room could be of help (Anyanwu, 2015). Other researchers have highlighted the importance of humanizing the students' first encounter with a human cadaver (Blackwell et al., 1979; Coulehan et al., 1995; Terry, 1985), or simply describing in advance the smells usually present in the dissecting room (Dempster et al., 2006). Around 64.3% of the students in our study (64% for other studies) (Charlton et al., 1994), admitted to not feeling emotionally prepared for entering the dissecting room, and 17.6% of our students showed signs of anxiety (STAI-Total > 10). These results underscore the importance of using coping strategies before the students' first experience with a human cadaver in the dissecting room, especially for those who indicate previously that they do not feel ready.

6.3. Benefits of dissections and prosections in anatomy training

With the development of new teaching technologies, the role of human cadavers in macroscopic anatomy training has been brought into question (Biasutto et al., 2006; Darras et al., 2018; Morris and Jacques, 2018; Patel et al., 2015; Redwood and Townsend, 2011; Sándor et al., 2015). However, in no case has it been possible to substitute the use of dissection as an elementary component of clinical anatomy training (Dissabandara et al., 2015; Ghosh, 2015; Qamar and Osama, 2014). Indeed, 76% of students do not believe any other practice or the use of alternative learning materials would be as effective in terms of learning outcomes (Mompeó-Corredera, 2014; Qamar and Osama, 2014; Sándor et al., 2015). Dissection and prosection practices allow students to identify and understand the relationship between three-dimensional anatomical structures, as well as teaching them emotional skills and stress-relief techniques, respect for the human body and working as part of a team (Ahmed et al., 2010; Flack and Nicholson, 2018; Houwink et al., 2004; Rizzolo and Stewart, 2006; Robbins et al., 2009; Talarico Jr, 2013; Vidal et al., 2016). Among our students, a total of 32 (78%) admitted having reflected about life and death as a consequence of these practices. We consider that, by exposing students to death and grief, these practices could be beneficial for their future professional clinical practice (Mc Garvey et al., 2015). Also, these experiences contributed to raising awareness among nursing

students about illness and death (Mc Garvey et al., 2015). Overall, 97.6% of nursing students considered these practices useful and would recommend them to other students (the percentage averages 85.5% for other studies (Mompeó-Corredera, 2014), and they declared themselves to be "satisfied" or "very satisfied" with their experience.

7. Conclusion

Human anatomy is a key component of Health Sciences university curricula a good grasp of human anatomy is crucial for nursing students and the success of their future clinical practice: in order to understand the pathologies affecting the body, it is essential to first understand body structures and their specific functions. The prosection practices can help nursing students to develop their cognitive abilities, as well as internalize the emotional skills required for their future professional practice. According to our students' feedback, their interaction with prosected specimens was very useful as a learning tool. Overall, although a small group of students remained affected by their exposure to human cadavers, most of the students considered the experience to be very successful and invaluable in terms of learning outcomes.

Based on the information obtained from the nursing students and other studies carried out in the Faculty of Health Sciences of UCLM in the degrees of speech therapy and occupational therapy (Criado-Álvarez et al., 2017; Romo-Barrientos et al., 2019a); the authors propose that utilizing human prosections should be integrated as a part of the anatomy curriculum for nursing students. These sessions on dissection room should complement the preexisting curriculum of 15–20 h of practice, including 5 h of practices in the dissection room. This study also point out the importance of using coping strategies in order to help students to reduce their stress levels when they do not feel fully prepared for these practices.

Funding source

None.

Declaration of competing interest

The authors declare no conflicts of interest.

References

- Ahmed, K., Rowland, S., Patel, V., Khan, R., Ashrafian, H., Davies, D., Darzi, A., Athanasiou, T., Paraskeva, P., 2010. Is the 24 structure of anatomy curriculum adequate for safe medical practice? *Surg.* 8, 318–324.
- Anyanwu, E., 2015. Background music in the dissection laboratory: impact on stress associated with the dissection experience. *Adv. Physiol. Educ.* 39, 96–101.
- Arraez-Aybar, L., Casado-Morales, M., Castaño-Collado, G., 2004a. Anxiety and dissection of the human cadaver: an unsolvable relationship? *Anat. Rec. Part B* 279, 16–23.
- Arraez-Aybar, L., Castaño-Collado, G., Casado-Morales, M., 2004b. Dissection from the Spanish anatomist's perspective: aims, attitudes, and related aspects. *Anat. Rec. Part*

- B 281, 15–20.
- Arráez-Aybar, L.A., Castaño-Collado, G., Casado-Morales, M., 2008. Dissection as a modulator of emotional attitudes and reactions of future health professionals. *Med. Educ.* 42, 563–571.
- Arráez-Aybar, L., Castaño-Collado, G., Casado-Morales, M., 2019. A study of cognitive-affective and physiological-motor reactions to human dissection in Spanish students of human anatomy. *Eur. J. Anat.* 11, 67–71.
- Bati, A., Ozer, M., Govsa, F., Pinar, Y., 2013. Anxiety of first cadaver demonstration in medical, dentistry and pharmacy faculty students. *Surg. Radiol. Anat.* 35, 419–426.
- Biasutto, S., Caussa, L., del Río, L., 2006. Teaching anatomy: cadavers vs. computers? *Ann. Anat.* 188, 187–190.
- Blackwell, B., Rodin, A., Nagy, F., Reece, R., 1979. Humanizing the student-cadaver encounter. *Gen. Hosp. Psychiatry* 1, 315–321.
- Bob, M., Popescu, C., Suci, S., Buzoianu, A., 2015. First year medical students' attitude toward anatomical corps dissection and its relationship with their personality. *Romanian J. Morphol. Embryol.* 56, 321–324.
- Boeckers, A., Brinkmann, A., Jerg-Bretzke, L., Lamp, C., Traue, H., Boeckers, T., 2010. How can we deal with mental distress in the dissection room?—an evaluation of the need for psychological support. *Ann. Anatomy.* 192, 366–372.
- Cahill, K., Ettarh, R., 2009. Attitudes to anatomy dissection in an Irish medical school. *Clin. Anat.* 22, 386–391.
- Casado, M., Castaño, G., Arráez-Aybar, L., 2012. Audiovisual material as educational innovation strategy to reduce anxiety response in students of human anatomy. *Adv. Heal. Sci. Educ.* 17, 431–440.
- Charlton, R., Dovey, S., Jones, D., Blunt, A., 1994. Effects of cadaver dissection on the attitudes of medical students. *Med. Educ.* 28, 290–295.
- Coulean, J., Williams, P., Landis, D., Naser, C., 1995. The first patient: reflections and stories about the anatomy cadaver. *Teaching and Learning in Medicine* 7, 61–66.
- Criado-Álvarez, J.J., González González, J., Romo Barrientos, C., Ubeda-Bañon, I., Saiz-Sanchez, D., Flores-Cuadrado, A., Albertos-Martos, J., Martínez-Martos, A., Mohedano-Moriano, A., 2017. Learning from human cadaveric prosections: examining anxiety in speech therapy students. *Anat. Sci. Educ.* 10, 487–494.
- Darras, K., De Bruin, A., Nicolaou, S., Dahlström, N., Persson, A., van Merriënboer, J., Forster, B., 2018. Is there a superior simulator for human anatomy education? How virtual dissection can overcome the anatomic and pedagogic limitations of cadaveric dissection. *Med. Teach.* 40, 752–753.
- Dempster, M., Black, A., McCorry, N., Wilson, D., 2006. Appraisal and consequences of cadaver dissection. *Med. Educ.* Online 11, 4592.
- Dissabandara, L., Nirthan, S., Khoo, T., Tedman, R., 2015. Role of cadaveric dissections in modern medical curricula: a study on student perceptions. *Anat. Cell Biol.* 48, 205–212.
- Flack, N., Nicholson, H., 2018. What do medical students learn from dissection? *Anat. Sci. Educ.* 11, 325–335.
- Fonseca-Pedrero, E., Paino, M., Sierra-Baigrie, S., Lemos-Giraldez, S., Muñiz, J., 2012. Propiedades psicométricas del "Cuestionario de ansiedad estado-rasgo" (STAI) en universitarios. *Behavioral Psychology/Psicología Conductual* 20, 547–561.
- Getachew, D., 2014. Reaction of medical students to experiences in dissection room. *Ethiop. J. Health Sci.* 24, 337–342.
- Ghosh, S., 2015. Human cadaveric dissection: a historical account from ancient Greece to the modern era. *Anat. Cell Biol.* 48, 153–169.
- González-López, E., Cuerda-Galindo, E., 2012. The use of corpses and organs in research and medical education. *Lessons from HistORY. Med. Clin. (Barc)* 138, 441–444.
- Goodwin, D., Machin, L., Taylor, A., 2016. The social life of the dead: the role of post-mortem examinations in medical student socialisation. *Soc. Sci. Med.* 161, 100–108.
- Horne, D., Tiller, J., Eizenberg, N., Tashevsk, M., Biddle, N., 1990. Reactions of first-year medical students to their initial encounter with a cadaver in the dissecting room. *Acad. Med.* 65, 645–646.
- Houwink, A., Kurup, A., Kollars, J., Kral Kollars, C., Carmichael, S., Pawlina, W., 2004. Help of third-year medical students decreases first-year medical students' negative psychological reactions on the first day of gross anatomy disse. *Clin. Anat.* 17, 328–333.
- Johnston, A., 2010. Anatomy for nurses: providing students with the best learning experience. *Nurse Educ. Pract.* 10, 222–226.
- Leboulanger, N., 2011. First cadaver dissection: stress, preparation, and emotional experience. *Eur. Ann. Otorhinolaryngol. Head Neck Dis.* 128, 175–183.
- Lee, Y., Lee, Y., Kwon, S., Park, S., 2011. Reactions of first-year medical students to cadaver dissection and their perception on learning methods in anatomy. *Korean J Med Educ* 23, 275–283.
- Lemp, H., 2005. Perceptions of dissection by students in one medical school: beyond learning about anatomy. A qualitative study. *Med. Educ.* 39, 318–325.
- Mc Garvey, A., Hickey, A., Conroy, R., 2015. The anatomy room: a positive learning experience for nursing students. *Nurse Educ. Today* 35, 245–250.
- Miguel Pérez, M., Porta Riba, N., Ortiz Sagristà, J., Martínez, A., Götzens García, V., 2007. Anatomía Humana: estudio de las reacciones de los estudiantes de primero de medicina ante la sala de disección. *Educ. Medica* 10, 105–113.
- Mompeó-Corredera, B., 2014. Metodologías y materiales para el aprendizaje de la anatomía humana: percepciones de los estudiantes de medicina'nativos digitales'. *Educ. Medica* 17, 99–104.
- Morris, H., Jacques, S., 2018. Dissection should remain a key part of medical education. *ANZ. J. Surg.* 88, 10–11.
- O'Carroll, R., Whiten, S., Jackson, D., Sinclair, D., 2002. Assessing the emotional impact of cadaver dissection on medical students. *Med. Educ.* 36, 550–554.
- Patel, S., Mauro, D., Fenn, J., Sharkey, D., Jones, C., 2015. Is dissection the only way to learn anatomy? Thoughts from students at a non-dissecting based medical school. *Perspect. Med. Educ.* 4, 259–260.
- Pawlina, W., Hromanik, M., Milanese, T., Dierkhisig, R., Viggiano, T., Carmichael, S., 2006. Leadership and professionalism curriculum in the gross anatomy course. *Ann. Acad. Med. SINGAPORE* 35, 609.
- Qamar, K., Osama, M., 2014. Role of dissection in light of students' perceptions anxiety. *J. Pak. Med. Assoc.* 1, 1.
- Redwood, C., Townsend, G., 2011. The dead center of the dental curriculum: changing attitudes of dental students during dissection. *J. Dent. Educ.* 75, 1333–1344.
- Rizzolo, L., Stewart, W., 2006. Should we continue teaching anatomy by dissection when...? *Anat. Rec. Part B* 289, 215–218.
- Robbins, B., Tomaka, A., Innus, C., Patterson, J., Styn, G., 2009. Lessons from the dead: the experiences of undergraduates working with cadavers. *OMEGA-Journal of Death and Dying* 58, 177–192.
- Romo-Barrientos, C., Criado-Álvarez, J., González-González, J., Ubeda-Bañon, I., Saiz-Sanchez, D., Flores-Cuadrado, A., Martín-Conty, J., Viñuela, A., Martínez-Marcos, A., Mohedano-Moriano, A., 2019. Anxiety among Medical Students when Faced with the Practice of Anatomical Dissection. *Anat. Sci. Educ.*
- Romo-Barrientos, C., Criado-Álvarez, J.J., Gil-Ruiz, M., González-González, J., Rodríguez-Hernández, M., Corregidor-Sánchez, A., Ubeda-Bañon, I., Flores-Cuadrado, A., Mohedano Moriano, A., Polonio López, B., 2019a. Anatomical prosection practices in the occupational therapy degree. Student anxiety levels and academic effectiveness. *Ann. Anat.* 221, 135–140.
- Romo-Barrientos, C., Criado-Álvarez, J.J., González-González, J., Ubeda-Bañon, I., Saiz-Sanchez, D., Flores-Cuadrado, A., Martín-Conty, J.L., Viñuela, A., Martínez-Marcos, A., Mohedano-Moriano, A., 2019b. Anxiety among Medical Students when Faced with the Practice of Anatomical Dissection. 12. *Anat. Sci. Educ.*, pp. 300–309.
- Sándor, I., Birkás, E., Györfy, Z., 2015. The effects of dissection-room experiences and related coping strategies among Hungarian medical students. *BMC Med. Educ.* 15, 73. <https://doi.org/10.1186/s12909-015-0355-9>.
- Somanath, D., Srivastava, S., Rajasekar, S., 2015. Experience in anatomy lab-an analysis in preclinical students. *Int J Healthc. Biomed Res* 3, 117–121.
- Spielberger, C., Gorsuch, R., Lushene, R., 2002. STAI Cuestionario de Ansiedad Estado-Rasgo, 6^o ed. TEA ediciones, Madrid.
- Talarico Jr., E., 2013. A change in paradigm: giving back identity to donors in the anatomy laboratory. *Clin. Anat.* 26, 161–172.
- Terry, J., 1985. The humanities and gross anatomy: forgotten alternatives. *J Med Humanit Bioeth* 6, 90–98.
- Tschernig, T., Schlaud, M., Pabst, R., 2000. Emotional reactions of medical students to dissecting human bodies: a conceptual approach and its evaluation. *Anat. Rec.* 261, 11–13.
- Vidal, Ó., Ginestà, C., Espert, J., Valentini, M., García-Valdecasas, J., 2016. Fresh cadaver, an old surgical model in current general surgery. *Cir. Esp.* 94, 201.

Manuscrito 5

Romo Barrientos C, Criado-Álvarez JJ, González González J, Ubeda-Bañon I, Flores-Cuadrado A, Saiz-Sánchez D, Viñuela A, Martín-Conty JL, Simón T, Martínez-Marcos A, Mohedano Moriano A. Anxiety levels among Health Sciences students during their first visit to the dissection. BMC Med Educ 20, 109 (2020).

BMC MEDICAL EDUCATION

ISSN: 1472-6920

BIOMED CENTRAL LTD

CATEGORÍA: EDUCATION, SCIENTIFIC DISCIPLINES

FI: 1,831 (JCR 2019, Q2)

FI MEDIO 5 AÑOS: 2,235

POSICIÓN CATEGORÍA: 17/41

DOI 10.1016/j.aanat.2018.10.003

PMID: 32272926

Pubmed: <https://pubmed.ncbi.nlm.nih.gov/32272926/>

RESEARCH ARTICLE

Open Access



Anxiety levels among health sciences students during their first visit to the dissection room

Carmen Romo-Barrientos¹, Juan José Criado-Álvarez^{1,2*}, Jaime González-González^{1,2}, Isabel Ubeda-Bañon³, Alicia Flores-Cuadrado³, Daniel Saiz-Sánchez³, Antonio Viñuela⁴, Jose Luis Martin-Conty⁴, Teresa Simón⁵, Alino Martínez-Marcos³ and Alicia Mohedano-Moriano²

Abstract

Background: The teaching of human anatomy is often based on practices of cadaver dissection and prosected specimens. However, exposure to human cadavers might be stressful and anxiety-inducing for students. The aim of this study is to explore the degree of satisfaction and anxiety among first-year students in the Medicine, Occupational Therapy, Speech Therapy and Nursing programmes at the Universidad de Castilla-La Mancha (Spain) who are experiencing their first dissection/prosection practice to develop stress coping strategies.

Methods: A total of 204 health sciences students participated in this study. The State-Trait Anxiety Inventory was used to evaluate anxiety.

Results: 'State Anxiety' (SA) decreased significantly throughout the course ($p < 0.05$), from 20.7 ± 19.29 to 13.7 ± 11.65 points. Statistical differences ($p < 0.05$) in SA were found between the different health sciences, and pre-practice SA was significantly different from post-practice SA. The students with the highest pre-practice SA levels were nursing students (31.8 ± 33.7 points), but medical students had the highest post-practice SA levels (18.4 ± 12.82 points).

Conclusions: Although students were satisfied with dissection practices (96.8% of them recommended that the practices be retained for future courses), the experience can provoke stressful responses that must be addressed using advanced preparation and coping mechanisms, especially among medical and nursing students.

Keywords: Anatomy education, Dissection, Prosection, Anxiety, Health sciences

* Correspondence: jjcriado@sescam.jccm.es

This work is part of the doctoral thesis of Carmen Romo Barrientos

¹Integrated Care Management at Talavera de la Reina, Castilla-La Mancha Health Services, Talavera de la Reina, Toledo, Spain

²Department of Medical Sciences, School of Health Sciences, University of Castilla-La Mancha, Avenida Real Fábrica de las Sedas, s/n 45600 Talavera de la Reina, Toledo, Spain

Full list of author information is available at the end of the article



© The Author(s). 2020 **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

Background

Human anatomy is an essential component of the educational curriculum in many health sciences university programmes [1–6]. Dissection or prosection practices are usually associated with the teaching of anatomy. The use of cadavers in these practices can be a stressful experience. Indeed, 30% of students believe that the dissecting room is a stressful environment, with 4% of students suffering post-traumatic stress. However, 76% of students agree that this experience is irreplaceable [7, 8]. Medical students prefer practical anatomy sessions (via dissection and prosection) over theoretical classes (via didactic teaching or models) [9]. In the last decade, anatomy teaching in the dissecting room has changed considerably in terms of technology, infrastructure and safety. However, we have not considered how conducting these practices routinely in universities affects anxiety levels among students, specifically at the University of Castilla-La Mancha (UCLM). The reactions and feelings witnessed in dissecting rooms have been studied in different countries and for different health sciences fields [10–19], and researchers have examined anxiety associated with the dissection of the human body [20]. We also need to assess the kinds of reactions and feelings that dissection/prosection could cause before adding this activity to the new curricular design of the Human Anatomy courses in our health sciences programmes, especially in those programmes where these practices have not been standard, e.g., nursing, speech therapy, and occupational therapy. This preliminary research would help in the development of strategies to improve our students' academic and clinical skills [21] and would have a positive impact on their learning. Some studies have shown that using coping strategies can help reduce the anxiety caused by these practices [13, 22–25]. This study explores the levels of anxiety experienced by first-year medicine, occupational therapy, speech therapy and nursing students at UCLM in relation to their first practical dissection/prosection class. This preliminary information will help us design specific strategies to reduce students' stress and improve their academic results.

Methods

This descriptive, cross-sectional study was conducted with first-year medicine (MED), occupational therapy (OT), speech therapy (ST) and nursing (NUR) students who enrolled in human anatomy courses at the UCLM Medical School in Ciudad Real (Spain) and the UCLM School of Health Sciences in Talavera de la Reina (Toledo, Spain) during the 2016–2017 academic year. The MED students had never previously participated in a

practical dissection class with cadavers, and the ST, OT, and NUR students had not participated in a prosection class. The main objective of prosection and dissection was to study anatomical structures and the relationship between them. In particular, NUR students studied the “apparatus and systems, especially the circulatory, nervous and urinary systems”, OT students studied the “locomotor and nervous systems”, ST students studied the “head and neck, respiratory and nervous systems”, and the MED students studied all apparatus and systems.

Participation in the classes was compulsory for MED students and voluntary for ST, OT and NUR students. Before the practice, the students were informed about the general aims of the study, and their anonymity was guaranteed after completing the consent forms. Ethical approval for this study was granted by the Ethical Committee for Clinical Research of Talavera de la Reina (Toledo, Spain) (Code: 23/201/). Prior to entering the dissection room, all students received their corresponding individual protection kits. The students were informed about the general health and safety norms regarding the procedures for cadaver donation.

Two anonymous questionnaires (“ad hoc”, STAI) were carried out before and after the first practice. The “ad hoc” questionnaire assessed each student's feelings, emotions and satisfaction with this practice [15, 17]. These questionnaires were completed by the students themselves so that they could be combined with a second questionnaire that was completed immediately after the practice.

The State-Trait Anxiety Inventory (STAI, adapted to Spanish) [19] was used to evaluate ‘State Anxiety’. The STAI is a self-reported instrument conceived to assess anxiety in healthy adults. It contains two scales that measure two distinct, but related, anxiety types: ‘State Anxiety’ (SA) and ‘Trait Anxiety’ (TA). TA measures an individual's usual or base emotional state. SA, on the other hand, evaluates subjective, variable and transitory feelings of tension, apprehension and fear, thus assessing how a person feels in a given situation (e.g., before a practical dissection class). Each scale contains 20 questions, providing a numerical score for each anxiety type. The results are converted into a numerical scale from 0 to 10 according to gender and age (19 years old or over). An SA score higher than 6 ($SA > 6$) indicated that the practical dissection class caused anxiety in students [10, 19, 26]. The STAI has been validated for use with a Spanish population and has a Cronbach's alpha of 0.93 and 0.92 for TA and SA, respectively [27].

The SA questionnaire was administered to students before and immediately after their first dissection (MED students) or prosection practice (NUR, OT,

and ST students); the TA was only completed before the practice.

Additionally, several questions about the degree of satisfaction with the class and its quality were also included [15, 17, 18].

A 5% confidence level was established. The statistical software SPSS Version 15.0 for Windows was used to analyse the data (SPSS Inc. Released 2006. SPSS for Windows, Version 15.0. Chicago, SPSS Inc.).

Results

A total of 204 (100%) students answered the initial questionnaire, including 42 NUR students (20.6%), 47 ST students (23%), 57 MED students (27.9%) and 58 OT students (28.4%). Sixteen (7.8%) students who did not complete the final questionnaire were excluded from the study (no differences across programmes). The mean age for students was 19 ± 2.43 years (median: 19 years), and 164 (87.7%) were female; the distributions were similar across different programmes.

SA decreased significantly ($p < 0.05$) after the practice, from 20.7 ± 19.29 to 13.7 ± 11.65 points. Male students started with higher SA levels (21.5 ± 26.49 points) than female students (20.1 ± 17.92 points), but after the practice, females had higher SA levels (11.2 ± 11.31 for males and 13.6 ± 11.53 for females); these decreases of 10.4 and 6.83 points, respectively, were not statistically significant ($p > 0.05$).

Statistically significant differences ($p < 0.05$) in both pre-practice and post-practice SA levels were observed between the different programmes (Fig. 1).

NUR students had the highest SA levels before the practice, at 31.8 ± 33.7 points, and MED students had the highest SA levels after the practice, at 18.4 ± 12.82 points (Fig. 1). Students' mean TA at the start of the course was 22.2 ± 17.29 points; no statistically significant difference was observed between genders ($p > 0.05$), with a pre-practice TA of 24.7 ± 25.22 and 21.9 ± 16.51 points in males and females, respectively, and a post-practice TA of 14.3 ± 9.99 and 18.6 ± 10.98 points in males and females, respectively ($p > 0.05$). The percentage of students who reached a cutoff score of 6 on the SA scale and thus had anxiety increased from 19.9% (N: 39) before the practice to 22.3% (N: 42) after the practice, and the SA scores were significantly different across programmes ($p < 0.05$) but not across genders ($p > 0.05$).

A statistically significant correlation was observed between the SA and TA levels before the first practice, with a Pearson's correlation coefficient of 0.716 ($p < 0.05$); the correlation after the practice was 0.763 ($p < 0.05$). The correlation between pre-practice SA and post-practice SA was 0.218 ($p < 0.05$). A total of 96.8% of the students (N: 180) recommended that the practices be retained for future courses; there were no statistically significant differences across genders ($p > 0.05$) or programmes ($p > 0.05$). In general terms, 98.3% (N: 200) of students were "Satisfied" or "Very satisfied", and 85.1% (N: 174) were curious about the practices. The mean overall satisfaction level was 8.8 ± 1.18 points (median: 9) on a 1–10 scale.

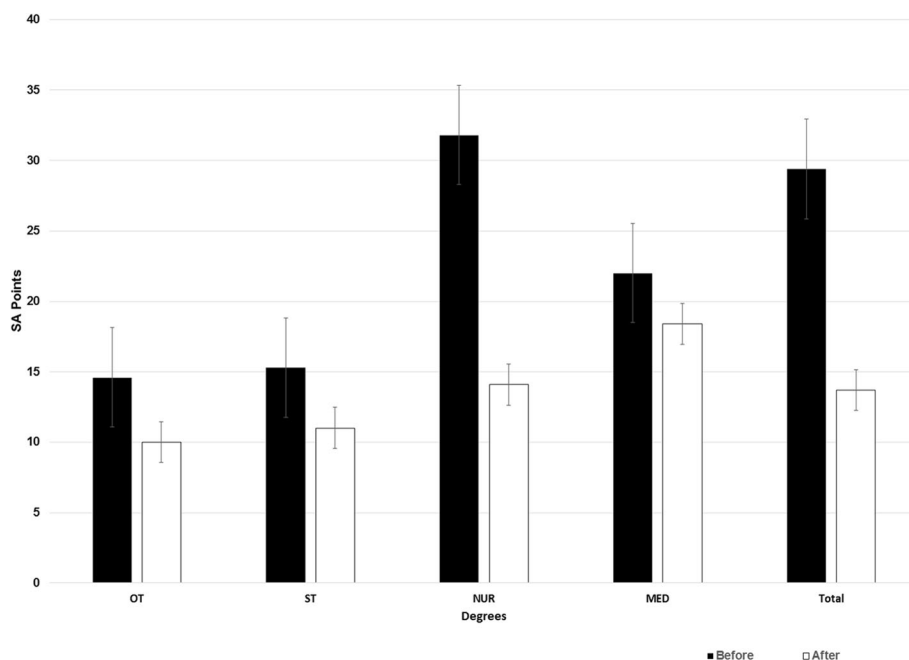


Fig. 1 Percentage of 'State Anxiety' (SA) by degree and total

Discussion

For many medical students, exposure to human bodies in the anatomy lab is their first exposure to death. Practical classes using cadavers can give rise to a series of uncomfortable and stressful experiences for health science students [8, 10, 11, 14, 15, 24, 28]. One-fifth of the students felt anxiety (SA) before they entered the dissecting room at the beginning of the course, and this figure rose slightly after the practice. These data are consistent with previous findings of 14.4% [22] and 17.8% [29]. This situation is the same for all our students, especially NUR students (31.8 points). Students' mean SA decreased significantly ($p < 0.05$) after the session, from 20.7 to 13.7. These data were consistent with the findings of Casado [30], who reported a decrease from 24.7 points to 16.7 points, and the findings of Arraez [10], who reported a decrease from 26.6 points to 14.2 points.

On the other hand, SA was higher in female students after the practice, whereas for male students, it was the opposite. This has been reported by other authors: baseline anxiety levels, measured as TA, are similar for both genders, but the practical dissection class causes anxiety, and this anxiety is slightly higher in females [14, 22, 28]. Other studies that do not use the STAI have reported differences in anxiety between genders [14, 21, 31, 32]. Wisenden [33] indicated that female students experienced greater anxiety than male students when exposed to cadavers. As a consequence, women adapt less quickly to the new situation of the dissection course than men and more frequently request an introductory course [13, 34].

The decrease in SA among our students cannot be due to what some authors have considered to be a coping phenomenon and the avoidance of adverse reactions, as there was no time for such phenomena between the questionnaires; rather, the students had to deal with their preconceived ideas about the practice they were about to face [10, 12, 22, 25, 28, 35]. Arraez-Aybar showed that anxiety levels tend to decrease as medical students perform more practices and dissections, reducing from 26.62 to 14.34 with baseline values of 14.3 to 13.1 [10, 22], consistent with our results. Some studies have not indicated any changes in SA levels, with scores of approximately 30 points throughout the course; this finding was attributed to the students' interest in completing the course [36]. Students' anxiety before their first dissection practice is determined by the student's situation and is measured as TA. Later, the individual and personal differences, measured as SA, allow student reactions to be predicted [26]. The figures for both SA and TA are similar to those published in a study conducted on occupational therapists, with mean figures of 24.1–26.1 points before the start of the course and 12.2–

21.7 points afterwards [26]. These figures differ considerably from the 42.6 points for TA and the 46.7 for SA obtained in a study conducted on medicine, dental and pharmacy students [11]. When faced with a stressful situation such as a practical Human Anatomy lesson, TA and SA are strongly correlated prior to the practice (0.716). Afterwards, however, the correlation drops to 0.207, and anxiety is found only in those students who presented higher levels before the practice. Several studies have found differences in anxiety levels between different programmes, and although they do not suggest any reasons to explain these differences, as in our study, they find that MED students have higher mean SA scores (18.1 ± 12.82) after the practice, while OT students (10 ± 6.71) have the lowest scores [18]. A possible explanation for this pattern could be that MED students assume more responsibility and are more aware of the importance of these practical lessons for their future professional practice [11, 22, 25, 28, 31]. However, ST and OT students only see these practices as a means for learning about anatomical structures. In addition, NUR students have greater training in empathy and emotional intelligence, with their roles being associated with compassion and care [37–40], which could explain their greater empathy towards the cadaver and their greater anxiety both before and after the practice. MED and NUR students may have given greater thought to death and its meaning due to their roles, and the acceptance of these and derived issues, such as concerns about the brevity of life and uncertainty about what happens after death, may increase their anxiety [39, 41–43]. Therefore, the detection of anxiety should also be done beforehand [13, 22–24], especially with MED and NUR students [41]. For these students, it may be necessary to incorporate coping techniques in their dissection and prosection practices [5], such as the use of audio-visual aids to explain dissection rules, procedures and familiarization with cadaver donation [10], the use of background music in the dissecting lab [44], or humanizing the students' encounter with a human cadaver by reflecting about life and death [45]; additionally, understanding the personalities of our students can help those who are anxious about the dissecting room experience [21, 46]. These methods could be extrapolated to other educational environments where students report having feelings of fear and anxiety, such as the surgery room or the autopsy room [47–50].

On the other hand, there is no evidence in the literature suggesting that dissection practices generate more anxiety than prosection practices; however, there is scientific evidence suggesting that there are no significant differences in student evaluations of dissection and prosection of cadavers [51, 52]. The use of dissection practices is more frequent for MED, and prosection practices

are used more in other health sciences programmes. Nnodim [52] showed that prosection was more profitable and required less time to learn the same amount of material. The content and temporality of the anatomy in NUR, TO and ST programmes at our university is much lower than that in MED programmes, which is why NUR, TO and ST programmes choose prosection.

Despite any drawbacks, the students clearly valued this experience highly and showed great curiosity about this activity, with values similar to those published by Arraéz-Aybar (88, 5%) [22, 28]. The experience appeared to effectively support their personal progression as learners with respect to the professional and clinical applications of this knowledge [4, 8, 41], improved their skills and attitudes with regard to their future professions [53], helped them confront death [42], and promoted leadership and teamwork [54–57]. In addition, dissection offers students a unique opportunity to explore the human body in a hands-on manner while also putting into practice the theoretical aspects of their education. Overall, our students indicated that they were satisfied or very satisfied with the experience and would recommend it for future courses, consistent with findings from other studies [14, 41].

Limitations of the study

The limitations to this study were that no previous results were available with which to compare these findings, since this was the first year that students' anxiety levels were evaluated and the first time they worked with a cadaver.

On the other hand, it should be noted that for MED students, these practices were compulsory and took place throughout the course (100–120 h per year), while for other health sciences students (OT, ST, NUR), the practices were occasional (10–15 h per year) and voluntary. In addition, MED students carry out dissections, whereas OT, ST and NUR students use prosected specimens. The findings can be generalized to other Spanish universities, although it is difficult to know if the findings would hold in other countries due to cultural, religious, philosophical and educational differences.

Conclusions

Dissection practices provide many benefits in the teaching of anatomy. Overall, our students positively value this activity and would recommend it for future courses. It should be taken into account that the experience of entering a dissecting room can challenge some students emotionally. It is important that students with higher anxiety levels are armed with coping techniques to help reduce stress, especially with MED and NUR students. Therefore, it is necessary to measure anxiety at the beginning of the anatomy course. Traditionally, MED and

NUR students will have formed greater empathy towards patients, which can explain their greater anxiety in the presence of a cadaver. Additionally, for OT and ST students, prosection may be of minor relevance to their future professional life; however, for MED and NUR students, it is a more meaningful occasion that makes them face up to the realities of their future professional practice.

The possibility of experiencing the death of a human being in a controlled environment is a learning opportunity for health science students.

Abbreviations

MED: Medicine; NUR: Nursing; OT: Occupational Therapy; SA: State Anxiety; ST: Speech Therapy; STAI: State-Trait Anxiety Inventory; TA: Trait Anxiety; UCLM: University of Castilla-La Mancha

Acknowledgments

The authors would like to express their gratitude to the first year medical, occupational therapy, speech therapy and nursing students during the academic year 2016–2017 for their participation. The authors would also like to thank all the people who generously donated their bodies to science.

Authors' contributions

JJC, CRB, AMM2 contributed to Conceptualization, Investigation, and Writing – original draft, and Supervision. JGG, IUB, DSS, AFC, TS and AMM1 contributed to data collection and Investigation. JJC, CRB, AV, JLMC and AMM2 contributed to data analysis. AMM1, AMM2 and JCR Writing – review & editing. AMM1 Alino Martinez Marcos; AMM2 Alicia Mohedano-Moriano. All authors have read and approved the manuscript.

Funding

No Funding was obtained for this study.

Availability of data and materials

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Ethics approval and consent to participate

We obtained ethical approval from the Virgen del Prado Hospital (VPH) institutional in Talavera de la Reina (Toledo, Spain) (File 23/2017) and Participants gave consent (verbal and write) to participate prior to taking the survey described in this study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Integrated Care Management at Talavera de la Reina, Castilla-La Mancha Health Services, Talavera de la Reina, Toledo, Spain. ²Department of Medical Sciences, School of Health Sciences, University of Castilla-La Mancha, Avenida Real Fábrica de las Sedas, s/n 45600 Talavera de la Reina, Toledo, Spain. ³Department of Medical Sciences, School of Medicine, Regional Centre for Biomedical Research, University of Castilla-La Mancha, Ciudad Real, Spain. ⁴Department of Nursing, Physiotherapy and Occupational Therapy, School of Health Sciences, University of Castilla-La Mancha, Talavera de la Reina, Toledo, Spain. ⁵Department of Psychology, School of Health Sciences, University of Castilla-La Mancha, Talavera de la Reina, Toledo, Spain.

Received: 6 June 2019 Accepted: 30 March 2020

Published online: 09 April 2020

References

1. Ghosh SK. Human cadaveric dissection: a historical account from ancient Greece to the modern era. *Anat. Cell Biol.* 2015;48(3):153–69.

2. Ghosh SK. Cadaveric dissection as an educational tool for anatomical sciences in the 21st century. *Anat Cell Biol.* 2017;10(3):286–929.
3. Korf HW, Wicht H, Snipes RL, Timmermans JP, Paulsen F, Rune G, Baumgart Vogt E. The dissection courses. Necessary and indispensable for teaching anatomy to medical students. *Ann. Anat.* 2008;190(1):16–22.
4. Memon I. Cadaver Dissection Is Obsolete in Medical Training! A Misinterpreted Notion. *Med. Princ. Pract.* 2018; 27(3):201–210. doi: <https://doi.org/10.1159/000488320>.
5. Wilson AB, Miller C.H., Klein BA, Taylor MA, Goodwin M, Boyle EK, Brown K, Hoppe C, Lazarus M. A meta-analysis of anatomy laboratory pedagogies. *Clin Anat* 2018; 31(1):122–133.
6. Winkelmann A. Anatomical dissection as a teaching method in medical school: a review of the evidence. *Med Educ.* 2007;41(1):15–22.
7. Mompeó-Corredera B. M Metodologías y materiales para el aprendizaje de la anatomía humana. Percepciones de los estudiantes de medicina “nativos digitales”. *Educ. Med.* 2014;17:99–104.
8. Sandor I, Birkas E, Györfy Z. The effects of dissection-room experiences and related coping strategies among Hungarian medical students. *BMC Med Educ.* 2015;15:73.
9. Moxham BJ, Moxham SA. The relationships between attitudes, course aims and teaching methods for the teaching of Gross Anatomy in the Medical Curriculum. *Eur J Anat.* 2007;11(Supplement 1):19–30.
10. Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. Dissection from the Spanish anatomist's perspective: aims, attitudes, and related aspects. *Anat. Rec. Part B, New anatomist.* 2004;281B:15–20.
11. Bati AH, Ozer MA, Govsa F, Pinar Y. Anxiety of first cadaver demonstration in medical, dentistry and pharmacy school students. *Surg Radiol Anat.* 2013;35: 419–26.
12. Bob MH, Popescu CA, Suci SM, Buzoianu AD. First year medical students toward anatomical corpse dissection and its relationship with their personality. *Romanian J Morphol Embryol.* 2015;56:321–4.
13. Boeckers A, Brinkmann A, Jerg-Bretzke L, Lamp C, Traue HC, Boeckers TM. How can we deal with mental distress in the dissection room? An evaluation of the need for psychological support. *Ann Anat.* 2010;192:366–72.
14. Cahill KC, Ettarh RR. Attitudes to anatomy dissection in an Irish medical school. *Clin. Anat.* 2009;22:386–91.
15. Criado-Álvarez JJ, González González J, Romo Barrientos C, Ubeda-Bañón I, Saiz-Sánchez D, Flores-Cuadrado A, Albertos-Marco JC, Martínez-Marcos A, Mohedano-Moriano A. Learning from human cadaveric prosections: examining anxiety in speech therapy students. *Anat Sci Educ.* 2017;10:487–94.
16. Dinsmore CE, Daugherty S, Zeitz HJ. Student responses to the gross anatomy laboratory in a medical curriculum. *Clin Anat.* 2001;14(3):231–6.
17. Romo Barrientos C, Criado-Álvarez JJ, González González J, Ubeda-Bañón I, Saiz-Sánchez D, Flores-Cuadrado A, Martín Conty JL, Viñuela A, Martínez-Marcos A, Mohedano MA. Anxiety among medical students when faced with the practice of anatomical dissection. *Anat Sci Educ.* 2018. <https://doi.org/10.1002/ase.1835>.
18. Romo-Barrientos C, Criado-Álvarez JJ, Gil Ruiz MT, González González J, Rodríguez Hernández M, Corregidor Sánchez AI, Ubeda-Bañón I, Flores-Cuadrado A, Mohedano Moriano A, Polonio LB. Anatomical prosection practices in the occupational therapy degree. Student anxiety levels and academic effectiveness. *Ann. Anat.* 2019;221:135–40.
19. Spielberger CD, Gorsuch RL, Lushene RE. *STAI Cuestionario de Ansiedad Estado-Rasgo*. 6th ed. Madrid: TEA Ediciones; 2003. 36 p.
20. Moxham BJ, Plaisant O, Lignier B, Morgan S. Attitudes and responses of medical students and professional anatomists to dissecting different regions of the body. *Clin Anat.* 2019;32(2):253–67. <https://doi.org/10.1002/ca.23294>.
21. Plaisant O, Courtois R, Toussaint PJ, Mendelsohn GA, John OP, Delmas V, Moxham BJ. Medical students' attitudes toward the anatomy dissection room in relation to personality. *Anat Sci Educ.* 2011;4(6):305–10.
22. Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. A study of cognitive-affective and physiological-motor reactions to human dissection in Spanish students of human anatomy. *Eur J Anat.* 2007;11:67–71.
23. McLachlan JC, Bligh J, Bradley P, Searle J. Teaching anatomy without cadavers. *Med Educ.* 2004;38(4):418–24.
24. Miguel Pérez M, Porta-Riba N, Ortiz-Sagrístà JC, Martínez A, Götzens-García V. Human anatomy: reactions of first year medical students to the dissection room. *Educ Med.* 2007;10:105–13.
25. Snelling J, Sahai A, Ellis H. Attitudes of medical and dental students to dissection. *Clin. Anat.* 2003;16(2):165–72.
26. Casado MI, Castaño G, Arráez-Aybar LA. Diferencias individuales y reacción de ansiedad de cadáveres humanos en estudiantes universitarios. *Ansiedad y Estrés.* 2005;11:75–85.
27. Fonseca-Pedrero E, Paino M, Sierra-Baigrie S, Lemos-Giráldez S, Muñiz J. Propiedades psicométricas del “Cuestionario de Ansiedad Estado-Rasgo” (STAI) en Universitarios. *Ana Sci Educ.* 2012;20:547–61.
28. Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. Dissection as a modulator of emotional attitudes and reactions of future health professionals. *Med Educ.* 2008;42(6):563–71.
29. Saylam C, Coskunol H. Orientation lesson in anatomy education. *Surg Radiol Anat.* 2005;27(1):74–7. <https://doi.org/10.1007/s00276-004-0285-4>.
30. Casado MI, Castaño G, Arráez-Aybar LA. Audiovisual material as educational innovation strategy to reduce anxiety response in students of human anatomy. *Adv Health Sci Educ Theory Pract.* 2012;17(3):431–40. <https://doi.org/10.1007/s10459-011-9307-2>.
31. Hancock D, Williams M, Taylor A, Dawson B. Impact of cadaver dissection on medical students. *New Zealand Journal of Psychology.* 2004;33:17–25.
32. Houwink AP, Kurup AN, Kollars JP, Kral Kollars CA, Carmichael SW, Pawlina W. Help of third-year medical students decreases first-year medical students' negative psychological reactions on the first day of gross anatomy dissection. *Clin Anat.* 2004;17(4):328–33. <https://doi.org/10.1002/ca.10218>.
33. Wisenden PA, Budke KJ, Klemetson CJ, et al. Emotional response of undergraduates to cadaver dissection. *Clin Anat.* 2018;31(2):224–30. <https://doi.org/10.1002/ca.22992>.
34. Boeckers A, Boeckers TM. The dissection course a psychological burden or an opportunity to teach core medical competencies: A narrative review of the literature. *Eur. J. Anat.* 2016;20(4):287–98.
35. O'Carroll RE, Whiten S, Jackson D, Sinclair DW. Assessing the emotional impact of cadaver dissection on medical students. *Educ. Med.* 2002;36(6):550–4.
36. Leboulanger N. First cadaver dissection: stress, preparation, and emotional experience. *Eur Ann Otorhinolaryngol Head Neck Dis.* 2011;128(4):175–83.
37. Duygulu S, Hicdurmaz D, Akyar I. Nursing students' leadership and emotional intelligence in Turkey. *J Nurs Edu.* 2011;50(5):281–5.
38. Montes Borges B, Augusto JM. Exploring the relationship between perceived emotional intelligence, coping, social support and mental health in nursing students. *J Psych Mental Heal Nurs.* 2007;14(2):163–71.
39. Roso-Bas F, Pades Jiménez A, García-Buades E. Emotional variables, dropout and academic performance in Spanish nursing students. *Nurse Educ Today.* 2016;37:53–8.
40. Štiglic G, Cilar L, Novak Ž, Vrbnjak D, Stenhouse R, Snowden A, Pajnikar M. Emotional intelligence among nursing students: findings from a cross-sectional study. *Nurse Educ Today.* 2018;66:33–8.
41. Johnston ANB. Anatomy for nurses: providing students with the best learning experience. *Nurse Educ Pract.* 2010;10(4):222–6.
42. McGarvey A, Hickey A, Conroy R. The anatomy room: a positive learning experience for nursing students. *Nurse Educ Today.* 2015;35(1):245–50.
43. Theander K, Wilde-Larsson B, Carlsson M, Florin J, Gardulf A, Johansson E, Lindholm C, Nordström G, Nilsson J. Adjusting to future demands in healthcare: curriculum changes and nursing students' self-reported professional competence. *Nurse Educ Today.* 2016;37:178–83.
44. Anyanwu EG. Background noise in the dissection laboratory: impact on stress associated with the dissection experience. *Adv Physiol Educ.* 2015; 39(2):96–101. <https://doi.org/10.1152/advan.00057.2014>.
45. Coulehan JL. Tenderness and steadiness: emotions in medical practice. *Lit Med.* 1995;14(2):222–36. <https://doi.org/10.1353/lm.1995.0027>.
46. Plaisant O, Stephens S, Apaydin N, et al. Medical students' attitudes towards science and gross anatomy, and the relationship to personality. *J Anat.* 2014;224(3):261–9. <https://doi.org/10.1111/joa.12043>.
47. Yavuz van Giersbergen M, Ozsaker E, Dirimese E, Alcan AO. The operating room experiences of nursing students: a focus group study. *J Perianesth Nurs.* 2016;31(2):146–53. <https://doi.org/10.1016/j.jopan.2014.11.017>.
48. Poolton JM, Wilson MR, Malhotra N, Ngo K, Masters RS. A comparison of evaluation, time pressure, and multitasking as stressors of psychomotor operative performance. *Surgery.* 2011;149(6):776–82. <https://doi.org/10.1016/j.surg.2010.12.005>.
49. O'Neill R, Shapiro M, Merchant A. The role of the operating room in medical student education: differing perspectives of learners and educators. *J Surg Educ.* 2018;75(1):14–28. <https://doi.org/10.1016/j.j Surg.2017.06.013>.
50. Flinn JT, Miller A, Pyatka N, Brewer J, Schneider T, Cao CG. The effect of stress on learning in surgical skill acquisition. *Med Teach.* 2016;38(9):897–903. <https://doi.org/10.3109/0142159X.2015.1114597>.

51. Ashdown L, Lewis E, Hincke M, Jalali A. Learning Anatomy: Can Dissection and Peer-Mediated Teaching Offer Added Benefits over Prosection Alone? *ISRN Anat.* 2013;2013:873825. Published 2013 Mar 28. <https://doi.org/10.5402/2013/873825>.
52. Nnodim JO. Learning human anatomy: by dissection or from prosections? *Med Educ.* 1990;24(4):389–95. <https://doi.org/10.1111/j.1365-2923.1990.tb02456.x>.
53. Lempp HK. Perceptions of dissection by students in one medical school: beyond learning about anatomy. A qualitative study. *Med Educ.* 2005;39(3): 318–25. <https://doi.org/10.1111/j.1365-2929.2005.02095.x>.
54. Flack NAMS, Nicholson HD. What do medical students learn from dissection? *Anat Sci Educ.* 2018;11(4):325–35. <https://doi.org/10.1002/ase.1758>.
55. Pawlina W, Hromanik MJ, Milanese TR, Dierkhising R, Viggiano TR, Carmichael SW. Leadership and professionalism curriculum in the gross anatomy course. *Ann Acad Med Singap.* 2006;35(9):609–14.
56. Robbins B, Tomaka A, Innus C, Patterson J, Styn G. Lessons from the dead: the experiences of undergraduates working with cadavers. *OMEGA-J Death Dying.* 2009;58:177–92.
57. Talarico E Jr. A change in paradigm: giving back identity to donors in the anatomy laboratory. *Clin Anat.* 2013;26:161–72.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions



4.- Conclusiones

Conclusiones

1. La ansiedad rasgo se mantiene estable a lo largo de la práctica. La ansiedad estado disminuye en todos los grupos, siendo al menos cuatro puntos más baja tras realizar la práctica.
2. Todos los alumnos presentan un alto nivel de curiosidad previa a la práctica, esta variable se mantiene estable, sin disminuir en los alumnos de medicina, a pesar del número significativo y más repetitivo de práctica con los cadáveres.
3. La experiencia de haber visto previamente un cadáver, no motiva tener un menor nivel de ansiedad previa a la práctica, en ningún grupo de alumnos.
4. Un alto porcentaje de alumnos manifiesta haber tenido pensamientos sobre la vida y la muerte durante la práctica, solo un tercio ha sentido temor a perder el control, dentro de la sala de disección.
5. En el estudio de los cuatro grupos de alumnos encontramos:
 - a. La ansiedad estado disminuye de forma significativa antes y después de la práctica, en todos los grupos.
 - b. Aunque los varones parten de un mayor nivel de ansiedad estado prepráctica, ésta disminuye de forma más drástica que en las mujeres.
 - c. Los estudiantes de enfermería muestran el mayor nivel de ansiedad estado antes de la práctica, y son los alumnos de medicina son los que presentan mayores niveles de ansiedad estado postpráctica.
 - d. Existe en todos los alumnos de diferentes grados una elevada correlación

entre ansiedad rasgo y ansiedad estado, antes y después de la práctica, es decir que los alumnos con un alto nivel de ansiedad como rasgo de personalidad, van a tender a mantener y no disminuye significativamente su nivel de ansiedad estado.

6. Los estudiantes de medicina parten de niveles altos de ansiedad, disminuyendo ésta con el paso del tiempo. Las mujeres parten con un mayor nivel de ansiedad, igualándose a los hombres al final del curso.
7. Al término de la práctica, todos los alumnos de medicina, manifiesta estar emocionalmente preparados para la práctica, independientemente del nivel de ansiedad previo.
8. Los alumnos de logopedia y terapia ocupacional, el mayor porcentaje de desagrado, se da respecto al posible olor en la sala de disección, en el caso de los alumnos de medicina parece darse solo en mujeres un incremento de la sensibilidad frente al olor de la sala.
9. La práctica totalidad de los alumnos, recomiendan la práctica para el futuro y se muestran satisfechos o muy satisfechos con la realización de la práctica.
10. Todos los alumnos consideran las prácticas con cadáver humano muy útiles para el aprendizaje de la anatomía humana.

5.- Referencias Bibliográficas

Referencias bibliográficas

- Abu-Hijelh MF, Hamdi NA, Moqattash ST, Harris PF, Heseltine GFD (1997). Attitudes and reactions of arab medical students to the dissecting room. *Clinical Anatomy* (10), 272-8.
- Arráez-Aybar LA, Casado-Morales MI, Castaño-Collado G (2004b). Anxiety and dissection of the human cadaver: An unsolvable relationship? *Anatomical Record (Part B: New Anat)* (279), 16-23.
- Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI (2007). A study of cognitive-affective and physiological-motor reactions to human dissection in Spanish students of human anatomy. *European Journal Anatomy* (11 suppl 1), 67-71.
- Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI (2008). Dissection as a modulator of emotional attitudes and reactions of future health professionals. *Medical Education* (42), 563–71.
- Arráez-Aybar LA, Sánchez-Montesinos I, Mirapeix RM, Mompeo-Corredera B, Sañudo-Tejero JR (2010). Relevance of human anatomy in daily clinical practice. *Annals of Anatomy* (192), 341-8.
- Bati AH, Ozer MA, Govsa F, Pinar Y (2013). Anxiety of first cadaver demonstration in medical, dentistry and pharmacy faculty students. *Surgical Radiological Anatomy* (35) 419-26.
- Biassutto SN, Caussa LI, Criado del Rio LE (2006). Teaching anatomy cadavers vs computers? *Annals Anatomy* (188), 187-90.

- Bob MH, Popescu CA, Suciu SM, Buzoianu AD (2015). First year medical students' toward anatomical corpse dissection and its relationship with their personality. Romanian Journal of Morphology and Embryology (56), 321-4.
- Boeckers A, Jerg-Bretzke L, Lamp C, Brinkmann A, Traue HC, Boeckers TM (2010). The gross anatomy course: An analysis of its importance. Anatomical Science Education (3), 3-11.
- Boeckers A, Boeckers TM (2016). The dissection course a psychological burden or an opportunity to teach core medical competencies: A narrative review of the literature. European Journal Anatomy (20), 287-98.
- Cahill KC, Ertarh RR (2009). Attitudes to anatomy dissection in an irish medical school. Clinical Anatomy (22), 386-91.
- Casado MI, Castaño G, Arráez-Aybar LA (2005). Diferencias individuales y reacción de ansiedad de cadáveres humanos en estudiantes universitarios. Ansiedad y Estrés, (11), 75-85.
- Casado MI, Castaño G, Arráez-Aybar LA (2012). Audiovisual material as educational innovation strategy to reduce anxiety response in students of human anatomy. Advances in Health Sciences Education (17), 431-40.
- Charlton R, Dovey SM, Jones DG, Blunt A. Effects of cadaver dissection on the attitudes of medical students (1994). Medical Education, (28), 290-5.
- Dickinson GE, Lancaster CJ, Winfield IC, Reece EF, Colthorpe CA (1997). Detached concern and death anxiety of first-year medical students: Before and after the gross anatomy course. Clinical Anatomy (10), 201-7.

- Dinsmore CE, Daugherty S, Zeitz HJ (1999). Teaching and learning gross anatomy: Dissection, prosection, or “both of the above?”. *Clinical Anatomy* (12), 110-4.
- Dissabandara LO, Nirathanan SN, Khoo TK, Tedman R (2015). Role of cadaveric dissections in modern medical curricula: a study on student perceptions. *Anatomy and Cell Biology* (48), 205-22.
- Dosani F, Neuberger L (2016). Anatomy and humanity: Examining the effects of a short documentary film and first anatomy laboratory experience on medical students. *Anatomical Science Education* (9), 28-39.
- Druce M, Johnson MH (1994). Human dissection and attitudes of preclinical students to death and bereavement. *Clinical Anatomy* (7), 42-9.
- Ellis H (2001). Teaching in the dissecting room. *Clinical Anatomy* (14), 149-51.
- Estai M, Bunt S (2016). Best teaching practices in anatomy education: A critical review. *Annals of Anatomy* (208), 151-7.
- Getachew D (2014). Reaction of medical students to experiences in dissection room. *Ethiopian Journal of Health Sciences* (24), 337-42.
- Ghosh SK (2015). Human cadaveric dissection: a historical account from ancient Greece to the modern era. *Anatomy and Cell Biology* (48), 153-69.
- Ghosh SK (2017). Cadaveric dissection as an educational tool for anatomical sciences in the 21st Century. *Anatomical Science Education* (10), 286-99.

- Goodwin D, Machin L, Taylor A (2016). The social life of dead: The role of post-mortem examinations in medical student socialisation. *Social, Science and Medicine* (161), 100-8.
- Horne DJL, Tiller JWG, Eizenberg N, Tashevskaja M, Biddle N (1990). Reactions of first-year medical students to their initial encounter with a cadaver in the dissecting room. *Academic Medicine* (65), 645-6.
- Korf HW, Wicht H, Snipes RL, Timmermans JP, Paulsen F, Rune G, Baumgart-Vogt E (2008). The dissection course- necessary and indispensable for teaching anatomy to medical students. *Annals of Anatomy* (190) 16-22.
- Leboulanger N (2011). First cadaver dissection: Stress, preparation, and emotional experience. *European Annals of Otorhinolaryngology, Head and Neck diseases* (128), 175-83.
- Lempp HK (2005). Perceptions of dissection by students in one medical school: Beyond learning about anatomy. A qualitative study. *Medical Education* (39), 318-25.
- McLachlan JC, Bligh J, Bradley P, Searle J (2004). Teaching anatomy without cadavers. *Medical Education* (38), 418-24.
- Miguel Pérez M, Porta-Riba N, Ortiz-Sagrístà JC, Martínez A, Götzens-García V (2007). Anatomía humana: Estudio de las reacciones de los estudiantes de primero de medicina ante la sala de disección. *Educación Médica* (10), 105-13.
- Mompeó Corredera B (2014). Metodologías y materiales para el aprendizaje de la anatomía humana. Percepciones de los estudiantes de medicina “nativos digitales”. *Fundación Educación Médica* (17), 99-104.

- Pabst R (2009). Anatomy curriculum for medical students. What can be learned for future curricula from evaluations and questionnaires completed by students, anatomists and clinicians in different countries. *Annals of Anatomy* (191), 541-6.
- Patel SB, Mauro D, Fenn J, Sharkey DR, Jones C (2015). Is dissection the only way to learn anatomy? Thoughts from students at a non-dissecting based medical school. *Perspectives Medical Education* (4), 259–60.
- Plaisant O, Courtois R, Toussaint PJ, Mendelsohn GA, John OP, Delmas V, Moxham BJ (2011). Medical students' attitudes toward the anatomy dissection room in relation to personality. *Anatomical Science Education* (4), 305-10.
- Qamar K, Osama M. Role of dissection in ligh of students' perceptions (2014). *Journal Pakistan Medical Association* (64), 1021-4.
- Redwood CJ, Townsend GC (2011). The dead center of the dental curriculum: Changing attitudes of dental students during dissection. *Journal Dental Education* (75), 1333-44.
- Sandor I, Birkas E, Györffy Z (2015). The effects of dissection-room experiences and related coping strategies among Hungarian medical students. *BMC Medical Education* (15), 73. Doi: 10.1186/s12909-015-0355-9.
- Tschernig T, Schlaud M, Pabst R (2000). Emotional reactions of medical students to dissecting human bodies: A conceptual approach and ist evaluation. *Anatomical Record (New Anatomy)* (261), 11-3.
- Tseng WT, Lin YP (2016). “Detached concern” of medical students in a cadaver dissection course: A phenomenological study. *Anatomical Science Education* (9), 265-71.

- Wilson AB, Miller CH, Klein BA, Taylor MA, Goodwin M, Boyle EK, Brown K, Hoppe C, Lazarus M (2017). A meta-analysis of anatomy laboratory pedagogies. *Clinical Anatomy*. doi: 10.1002/ca.22934.

- Winkelmann A (2007). Anatomical dissection as a teaching method in medical school: A review of the evidence. *Medical Education* (41), 15-22.

- Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI (2004a). Dissection from the Spanish anatomist's. Perspective: Aims, attitudes, and related aspects. *Anatomical Record (Part B: New Anat)* (281), 15-20.

6.- Otros artículos

Criado-Álvarez JJ, Mohedano Moriano A, González González J, Romo Barrientos C.
Emociones frente a la disección anatómica en el Grado en Logopedia. Revista de
Investigación en Logopedia 2016; 2:202-14

REVISTA DE INVESTIGACIÓN EN LOGOPEDIA

ISSN: 21745218

UNIVERSIDAD DE CASTILLA-LA MANCHA/ UNIVERSIDAD COMPLUTENSE DE MADRID

CATEGORÍA: HEALTH PROFESSIONS, SPEECH AND HEARING

FI: 0,171 (SCJ 2016, Q4)

Revista de Investigación en Logopedia



revistalogopedia.uclm.es
ISSN - 2174-5218

2 (2016) 203-214

Emociones frente a la disección anatómica en el Grado en Logopedia

Juan José Criado-Álvarez ^{1,2}, Alicia Mohedano ^{1,2}, Jaime González ^{1,2} y Carmen Romo-Barrientos ²

1 Universidad de Castilla la Mancha, España

2 Servicio de Salud de Castilla-La Mancha (SESCAM), España

Resumen

Las prácticas de disección con cadáver humano son una parte básica en la enseñanza de la anatomía humana. Sin embargo, pueden suponer una experiencia estresante para el estudiante, que incrementa su nivel de ansiedad. El objetivo de este trabajo es conocer las actitudes, reacciones y miedos de los estudiantes del primer curso del Grado en Logopedia en la sala de disección anatómica. Se trata de un estudio transversal de tipo antes-después que se ha realizado con los estudiantes del primer curso del Grado en Logopedia de la Universidad Castilla-La Mancha, y que nunca habían participado en una práctica de disección. Se pasó un cuestionario anónimo previo, y otro posterior a la práctica anatómica para conocer las sensaciones y emociones vividas. Han participado 47 alumnos (97,9%) de un total de 48; con una edad media es de $20 \pm 2,22$ años. El 76,6% dicen sentir ante la práctica "Curiosidad". Los alumnos señalan en un alto porcentaje la sensación desagradable del "Olor" de la sala (46,8%). En general, los estudiantes antes de empezar se sienten "Tranquilos" y "Seguros" en un 74,5%, y 70,2% respectivamente. Hay 26 personas (63,4%) que han expresado haber tenido pensamientos sobre la vida y la muerte. El 100% del alumnado recomienda esta práctica para próximos cursos, puntuándola con una nota media de 9,1 puntos. La anatomía suele ser una asignatura atractiva para los estudiantes de Ciencias de la Salud pero las prácticas en la sala de disección pueden suponer una serie de experiencias incómodas y estresantes. Se han obtenido resultados similares a los ya publicados por otros autores nacionales e internacionales. El paso por una sala de disección puede desafiar el equilibrio emocional de algunos alumnos, pero en general consideran útil y recomendable esta práctica.

Palabras clave: Ansiedad; Anatomía; Disección; Cadáver.

Emotions against anatomical dissection in the Degree of Speech and Language Therapy

Abstract

Practices with human cadaver dissection have a long tradition and are a basic part of the teaching of human anatomy. However they can be a stressful experience for the student, which may pose a high level of anxiety. The aim of this study was to determine the attitudes, reactions and fears of students in first degree course of Speech and Language against the dissecting room. This is a cross-sectional study

conducted before-and-after the first students from year Logopedia of Castilla-La Mancha University (Spain) who had never participated in a practice of dissection. Prior and after practice an anonymous questionnaire was administered to understand the feelings and emotions. They have 47 students (97.9%) participated from 48 students, with a mean age is 20 ± 2.22 years. A 76.6% say they feel at the practice "Curiosity". Students have the highest percentage of unpleasant feeling "Odor" room (46.8%). Overall, students feel before starting "Quiet" and "Insurance" in 74.5% and 70.2%. There are 26 students (63.4%) who have expressed have had thoughts about life and death. 100% of students is recommended practice for upcoming courses with an average score of 9.1 points. The anatomy is usually an attractive subject for students and practices in the dissecting room generally involve a series of uncomfortable and stressful experiences. They have obtained similar to published results by others authors national and international. Passing a dissecting room can challenge the emotional balance of some students. Students consider this practice very useful.

Key Words: Anatomy; Anxiety; Dissection; Cadaver.

Correspondencia con los autores: juanjose.criado@uclm.es

Recibido 23 Marzo 2016. Primera revisión 13 Abril 2016. Aceptado 23 Mayo 2016.

Agradecimientos: Al Dr. Juan Emilio Felú (Decano de la Facultad de Medicina de Ciudad Real) y el Dr. Alino Martínez Marcos (responsable de Anatomía Humana) por ofrecer sus instalaciones. A la Dra. Begoña Polonio (Decana de la Facultad de Terapia Ocupacional, Logopedia y Enfermería) por su colaboración y por financiar esta actividad. A los alumnos del primer curso de Logopedia del curso 2015-2016 por su participación y su buen quehacer. Y a todas aquellas que han donado sus cuerpos a la ciencia de forma desinteresada, sin las cuales el avance del conocimiento no sería posible.

Introducción

El aprendizaje de una asignatura no solo es memorizar una serie de puntos de un programa académico, sino que además consiste en integrar y utilizar los recursos necesarios en el mismo, y saberlos evaluar. El correcto equilibrio entre la adquisición de conocimientos y la adquisición de capacidades y habilidades resulta difícil; si además se debe conseguir una visión e imagen tridimensional del cuerpo humano (como es en el caso de la anatomía humana), el método de enseñanza y la adquisición de competencias deben incluir una parte práctica además de la teórica.

La anatomía humana es una asignatura básica y obligatoria en todos los planes de estudios de los grados universitarios de ciencias de la salud (en sus primeros cursos), teniendo las prácticas de disección con cadáver humano una larga tradición en medicina (Ghosh, 2015). Las disecciones con cadáveres humanos pueden suponer una experiencia estresante por el hecho de ver, tocar y sentir las preparaciones anatómicas, así como por cuestiones morales, religiosas o filosóficas (Arráez-Aybar, 2007; Bob, 2015; Leboulanger, 2011; Penney, 1985). Otras veces, existe en los alumnos una cierta inquietud, curiosidad e incluso morbo por el contacto con la muerte; algunos autores hablan del "ritual de transformación" o "socialización con la muerte" (Horne, 1990; Sandor, 2015). La práctica de la disección suele ser habitual y está encuadrada en los planes de estudios de los grados de medicina, pero no así en otros

estudios relacionados con la salud (enfermería, fisioterapia, logopedia, terapia ocupacional), donde la posibilidad de realizar las prácticas es difícil por cuestiones técnicas, de recursos y medios; además de la necesidad de contar con docentes cualificados (González-López, 2012). Se trata de una de las primeras experiencias del futuro profesional con la muerte, sin embargo, la práctica puede ser satisfactoria ya que el cadáver representa la “casi perfección del modelo” (Vidal, 2016), y un 76% de los estudiantes cree que su uso no puede ser sustituido por otro tipo de material (Mompeó, 2014; Sandor, 2015). Las reacciones y sentimientos en a la sala de disección han sido estudiadas en diferentes países en los estudios de medicina (Arráez-Aybar, 2004a; Bob, 2015; Horne, 1990; Leboulanger, 2011;), otros en odontología y farmacia (Bati, 2013; Redwood 2011) y algunos incluyen también la Terapia Ocupacional (Arráez-Aybar, 2007; Arráez-Aybar, 2008), pero no así en Logopedia.

El objetivo de este estudio es conocer las actitudes y reacciones de los estudiantes del primer curso del Grado en Logopedia en relación a las prácticas en la sala de disección, realizado dentro de un proyecto de innovación docente de las asignaturas obligatorias de Anatomía y Neurología.

Material y Método

El presente estudio epidemiológico es descriptivo transversal de tipo antes-después realizado con los estudiantes del primer curso del Grado en Logopedia (matriculados en la asignatura de Anatomía y Fisiología), pertenecientes a la Facultad de Terapia Ocupacional, Logopedia y Enfermería (FATOLE) de la Universidad Castilla-La Mancha (UCLM), situada en la ciudad de Talavera de la Reina (Toledo, España).

Los alumnos nunca habían participado en una práctica de disección con cadáveres humanos. Se trata de la primera vez que se realiza una práctica de este tipo en la FATOLE.

La práctica se realizó el 11 de febrero de 2016, en la sala de disección de la Facultad de Medicina de Ciudad Real de la UCLM, con participación de los profesores del Departamento de Ciencias Médicas de ambas facultades. La participación fue voluntaria, previa inscripción por motivos de cobertura del seguro escolar, con un coste para los estudiantes de 3 euros por gastos de desplazamiento. A todos se les

entregaron los correspondientes equipos de protección individual necesarios (bata, mascarilla y guantes).

Se pasó a todos los participantes un cuestionario anónimo diseñado “ad hoc” (Anexo 1) para el estudio, con recogida de variables sobre sensaciones y emociones frente a la práctica 30 minutos antes de realizar la misma. El cuestionario debía ser codificado por ellos mismos para poderlo aparear con el cuestionario que se entregaría *a posteriori* a la práctica (no se informó en ese momento de que se realizaría una evaluación final para evitar sesgos). La práctica de disección tuvo una duración de 4 horas, repartida en dos sesiones de 2 horas cada una, y un descanso intermedio. Tras la práctica, se volvió a pasar a todos los participantes un cuestionario anónimo diseñado “ad hoc” similar al previo (Anexo 2), al que se añadieron otras preguntas relativas al grado de satisfacción y calidad de la práctica realizada. El cuestionario debía ser codificado por ellos mismos, para poderlo aparear con el cuestionario entregado anteriormente a la práctica. Los estudiantes fueron informados sobre los objetivos generales del estudio.

En el análisis estadístico descriptivo e inferencial se han utilizado los parámetros según las escalas de las variables, utilizando estadística pareada y no paramétrica. Para el análisis de la distribución de la variable, se calcula el estadístico de Shapiro-Wilk con el nivel de significación de Lilliefors para el estudio de la distribución normal de la variable, ya que el tamaño de la muestra no excede de 50. Se establece un nivel de confianza del 5%. Para el análisis de datos se ha utilizado el programa estadístico SPSS para Windows (Statistical Package Social Sciences versión 15.0).

Resultados

La asignatura “Anatomía y Fisiología” del primer curso del Grado en Logopedia de la UCLM tiene un total de 48 estudiantes matriculados, participando en la práctica de disección 47 alumnos (97,9%). El único estudiante que no asistió fue por problemas personales. La edad media es de $20 \pm 2,22$ años (mediana: 19 años; rango: 18-25 años), con 42 (89,4%) de mujeres. Un tercio de los estudiantes había presenciado anteriormente un cadáver ($n=15$, 31,9%), aunque ningún varón ($n=5$) lo había visto previamente. La práctica se desarrolló correctamente y sólo un estudiante sufrió una leve lipotimia. En las Figuras 1 y 2 aparecen los sentimientos y pensamientos

desagradables previos a la práctica, donde hay 36 alumnos (76,6%) que dicen sentir “Curiosidad” y 6 (12,8%) que dicen sentir “Ansiedad”. Los alumnos tienen como mayor porcentaje de sensación desagradable el “Olor” de la sala (46,8%). En general, los estudiantes antes de empezar se sienten “Tranquilos” y “Seguros” en un 74,5%, y 70,2% respectivamente ($p < 0,05$), estos porcentajes coinciden con los que no están “Asustados”. Estos porcentajes tras la práctica suben al 92,7%; con un 90,2% de alumnos que dicen estar “A gusto” frente al 63,8% previo ($p < 0,05$) (Figura 3).

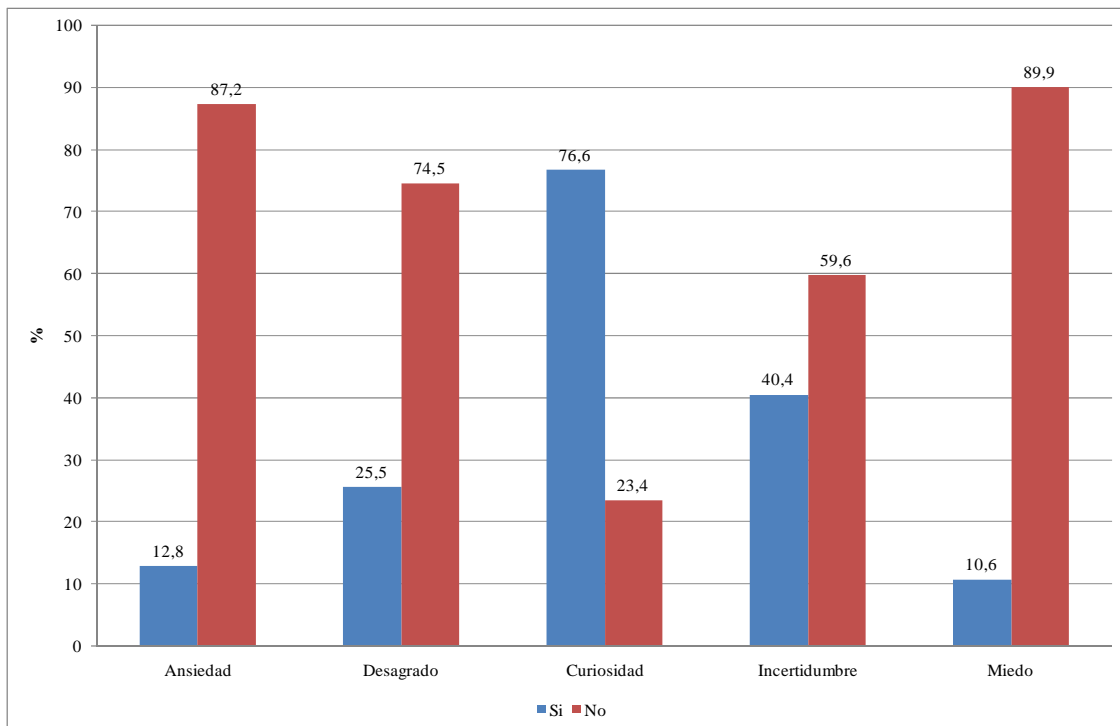


Figura 1. Pensamientos de los estudiantes antes de la práctica. El pensamiento de la disección produce... (%)

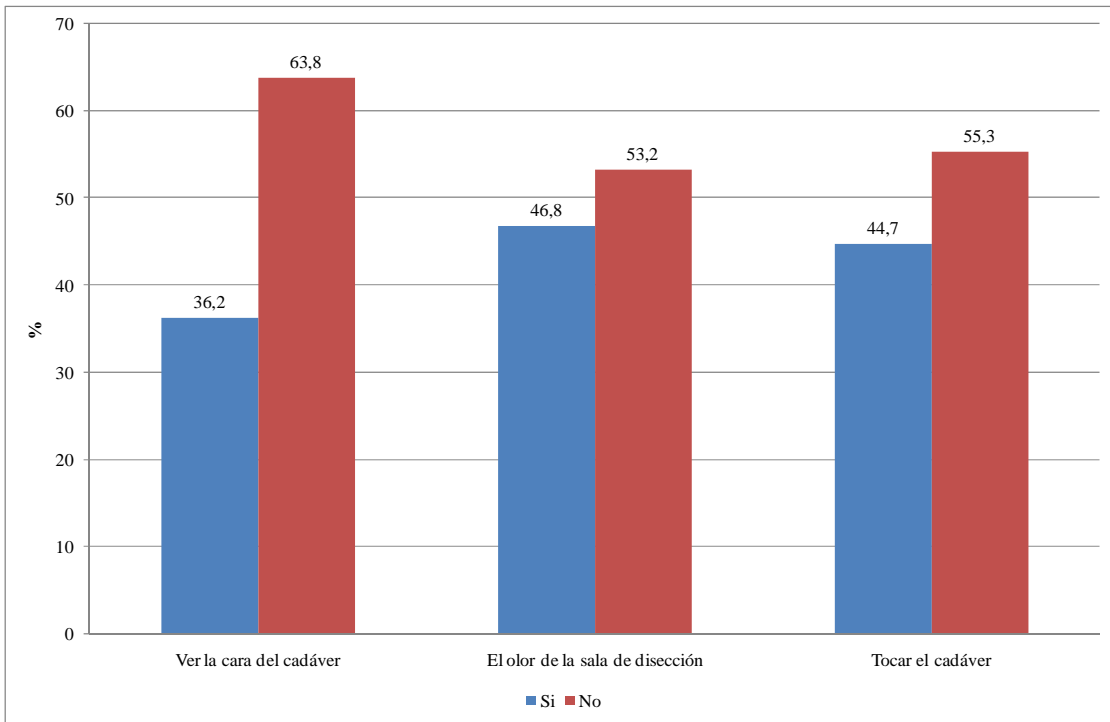


Figura 2. Pensamientos de los estudiantes antes de la práctica (%) ¿Cuál es la parte desagradable de la sala de disección?

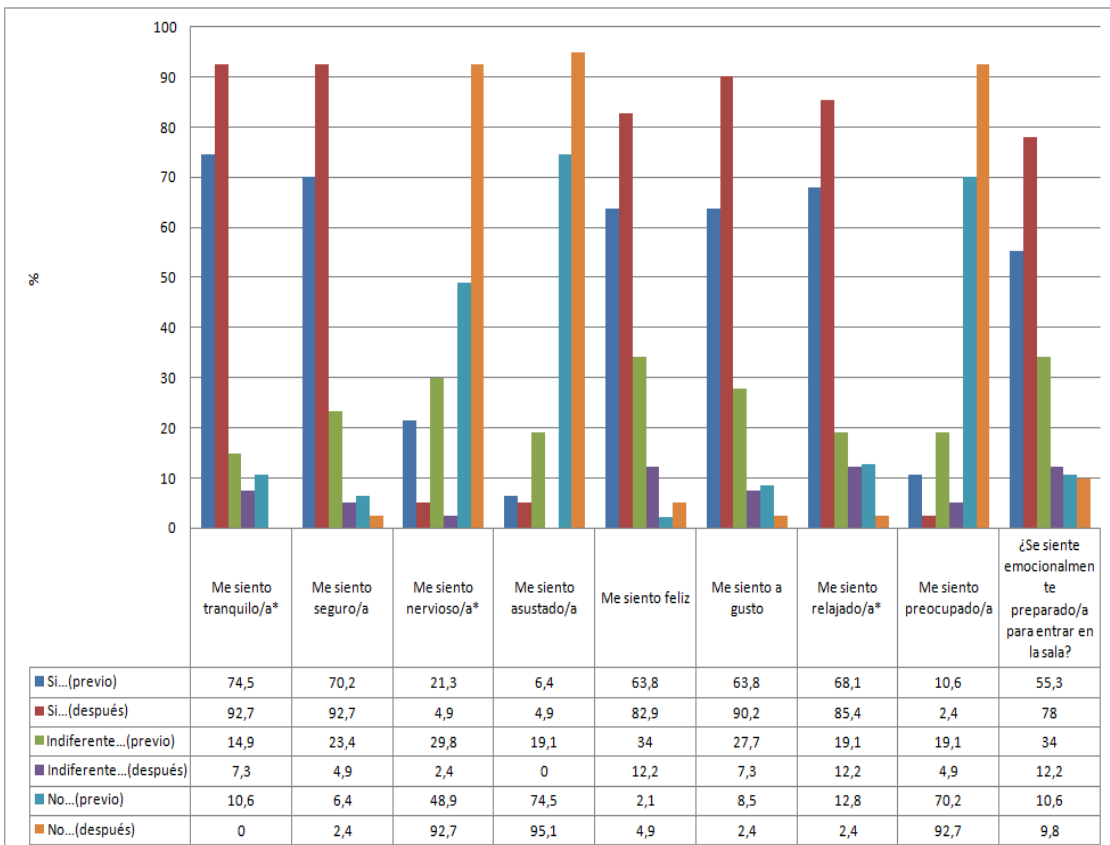


Figura 3. Sentimientos de los estudiantes durante la práctica (%).

Tras la práctica, 26 personas (63,4%) han expresado haber tenido pensamientos sobre la vida y la muerte, con sensación de tener miedo a perder el control en 15 casos (36,6%). En ninguno de estos casos ha habido diferencias estadísticamente significativas entre sexos o entre los que han visto y no un cadáver ($p>0,05$). El 100% del alumnado recomienda esta práctica para próximos cursos, habiendo estado "Satisfecho" o "Muy satisfecho" en el 24,4% y 75,6% de los casos respectivamente. El 51% ($n=25$) de los alumnos no donaría su cuerpo a la ciencia tras la práctica. La nota media de la experiencia (medida de 0 a 10) ha sido de $9,1\pm 0,96$ (Mediana: 9; Rango: 6-10).

Discusión

En general, la anatomía es una asignatura atractiva (Collipal, 2011; Miguel, 2007) para la mayoría de los estudiantes de ciencias de la salud ya que les acerca al conocimiento necesario sobre el cuerpo humano, sin embargo esta asignatura por la carga docente que tiene, y la imagen de materia memorística la hacen parecer dura a los alumnos (Miguel, 2007). Las prácticas en la sala de disección suelen suponer una serie de experiencias incómodas y estresantes (Arráez-Aybar, 2004b; Bati, 2013; Collipal, 2011; Horne, 1990; Miguel, 2007; Sandor, 2015). No existen estudios realizados en el Grado en Logopedia, pero se han obtenido resultados similares a los publicados en Medicina (Arráez-Aybar, 2007; Arráez-Aybar, 2008; Bati, 2013). En la actualidad existe cierta controversia entre los anatomistas sobre las mejores metodologías para enseñar anatomía y sobre si el cadáver humano debe seguir siendo el principal objeto de estudio para la enseñanza de la anatomía humana (Biassutto, 2006; Mompeó, 2014; Patel, 2015; Redwood 2011; Sandor, 2015). La enseñanza de la anatomía con cadáver se ha demostrado como un sistema que contribuye de manera eficiente en la comprensión de la forma, la situación, así como las relaciones entre las estructuras anatómicas (Miguel, 2007). Cuando el alumno puede visualizar las estructuras en el cadáver aumenta su formación (Dissabandara, 2015; Ghosh, 2015; González-López, 2012; Qamar, 2014).

Para algunos estudiantes la disección no es la primera confrontación con la muerte y la presencia de un cadáver, así el 32% de nuestros alumnos habían tenido esta experiencia; sin embargo la práctica de la disección con cadáver humano puede

seguir siendo una experiencia estresante (Leboulanger, 2011). El paso por una sala de disección desafía el equilibrio emocional de algunos alumnos (Arráez-Aybar, 2004a; Arráez-Aybar, 2007; Arráez-Aybar, 2008), no obstante y a pesar de ello, han expresado como satisfactoria o muy satisfactoria la experiencia, recomendándola para futuros cursos. En general, los alumnos consideran útil y beneficiosa esta práctica (en nuestro caso el 100%) pero en otros estudios se llega al 85,5% (Mompeó, 2014). La supuesta impresión del alumno frente al cadáver no es negativa, por el contrario, despierta curiosidad y respeto, lo que influye positivamente en el aprendizaje.

En relación a las desventajas del cadáver humano, el 46,8% de los alumnos señalaron el olor como un factor incómodo, algo similar a lo leído en otros estudios (Bati, 2013; Qamar, 2014; Dissabandara, 2015), o inferior a trabajos donde se obtuvieron valores de un 70-80% (Arráez-Aybar, 2008; Leboulanger, 2011; Miguel, 2007; Mompeó, 2014). En cuanto a la impresión/molestia de ver la cara al cadáver se obtiene un 36,2% frente al 43-56% (Leboulanger, 2011; Miguel, 2007). Es paradójico que los alumnos que han sido educados en un entorno tecnológico o digital hayan quedado satisfechos con la práctica y la recomienden, como también han observado otros autores (Miguel, 2007). Los modelos didácticos con vídeos, softwares, atlas y modelos sintéticos ayudan al alumno en la construcción de la imagen de los órganos, pero no puede sustituir al cadáver (Leboulanger, 2011; Mompeó, 2014; Prados, 2008; Qamar, 2014). Quizás en próximos estudios se obtengan diferentes cifras, ya que ésta era la primera vez que se realizaba la práctica en la FATOLE, y no existía la experiencia previa entre los alumnos, por lo que no existe sesgo o información entre ellos (Arráez-Aybar, 2007; Bati, 2013).

La práctica ha supuesto una oportunidad para sensibilizar a los alumnos de Logopedia, y plantearse ideas sobre la enfermedad y la muerte (hasta en un 63%), reflexiones que quizás no se hubiesen planteado de no haber realizado la práctica (Arráez-Aybar, 2008; Horne, 1990; Mompeó, 2014). Esta práctica ha supuesto una innovación docente dentro del Grado en Logopedia de la UCLM que ha sido favorablemente aceptada. Es evidente que la práctica repercutirá favorablemente en su posterior ejercicio profesional como logopedas.

Bibliografía

- Arráez-Aybar, L.A., Casado-Morales, M.I., y Castaño-Collado, G. (2004). Anxiety and dissection of the human cadaver: An unsolvable relationship? *Anatomical Record*, 279, 16-23.
- Arráez-Aybar, L.A., Castaño-Collado, G., y Casado-Morales, M.I. (2004). Dissection from the Spanish anatomist's. Perspective: Aims, attitudes, and related aspects. *Anatomical Record*, 281, 15-20.
- Arráez-Aybar, L.A., Castaño-Collado, G., y Casado-Morales, M.I. (2007). A study of cognitive-affective and physiological-motor reactions to human dissection in Spanish students of human anatomy. *European Journal Anatomy*, 11, 67-71.
- Arráez-Aybar, L.A., Castaño-Collado, G., y Casado-Morales, M.I. (2008). Dissection as a modulator of emotional attitudes and reactions of future health professionals. *Medical Education*, 42, 563–571.
- Bati, A.H., Ozer, M.A., Govsa, F., y Pinar, Y. (2013). Anxiety of first cadaver demonstration in medical, dentistry and pharmacy faculty students. *Surgical Radiological Anatomy*, 35, 419-426.
- Biassutto, S.N., Causa, L.I., y del Rio, L.E. (2006). Teaching anatomy cadavers vs computers? *Annals of Anatomy*, 188, 187-90.
- Bob, M.H., Popescu, C.A., Suci, S.M., y Buzoianu, A.D. (2015). First year medical students' toward anatomical corpse dissection and its relationship with their personality. *Romanian Journal of Morphology & Embryology*, 56, 321-324.
- Collipal, L.E., y Silva, M.H. (2011). Estudio de la Anatomía en cadáver y modelos anatómicos. Impresión de los estudiantes. *International Journal Morphology*, 29, 1181-1185.
- Dissabandara, L.O., Nirathanan, S.N., Khoo, T.K., y Tedman, R. (2015). Role of cadaveric dissections in modern medical curricula: a study on student perceptions. *Anatomy and Cell Biology*, 48, 205-222.
- Ghosh, S.K. (2015). Human cadaveric dissection: a historical account from ancient Greece to the modern era. *Anatomy and Cell Biology*, 48, 153-169.
- González-López, E., y Cuerda-Galindo, E. (2012). La utilización de cadáveres y órganos en la investigación y docencia médica. Lecciones de la historia. *Medicina Clínica*, 138, 441-4.

- Horne, D.J., Tiller, J.W., Eizenberg, N., Tashevskaja, M., y Biddle, N. (1990). Reactions of first-year medical students to their initial encounter with a cadaver in the dissecting room. *Academic Medicine*, 65, 645-646.
- Leboulanger, N. (2011). First cadaver dissection: Stress, preparation, and emotional experience. *European Annals of Otorhinolaryngology, Head and Neck Diseases*, 128, 175-183.
- Mompeó, B. (2014). Metodologías y materiales para el aprendizaje de la anatomía humana. Percepciones de los estudiantes de medicina “nativos digitales”. *Fundación Educación Médica*, 17, 99-104.
- Penney, J.C. (1985). Reactions of medical student to dissection. *Journal of Medical Education*, 60, 58-60.
- Prados, J.C., et al., (2008). Desarrollo de representaciones volumétricas como metodología docente para el autoaprendizaje en el área de Anatomía. Recuperado de <http://hdl.handle.net/11268/3057>
- Pérez, M., Porta-Riba, N., Ortiz-Sagrasta, J.C., Martínez, A., Götzens-García, V. (2007). Anatomía humana: Estudio de las reacciones de los estudiantes de primero de medicina ante la sala de disección. *Educación Médica*, 10, 105-113.
- Patel, S.B., Mauro, D., Fenn, J., Sharkey, D.R., y Jones, C. (2015). Is dissection the only way to learn anatomy? Thoughts from students at a non-dissecting based medical school. *Perspectives Medical Education*, 4, 259–260.
- Qamar, K., y Osama, M. (2014). Role of dissection in ligh of students’ perceptions. *Journal Pakistan Medical Association*, 64, 1021-1204.
- Redwood, C.J., y Townsend, G.C. (2011). The dead center of the dental curriculum: Changing attitudes of dental students during dissection. *Journal Dental Education*, 75, 1333-44.
- Sandor, I., Birkas, E., y Györffy, Z. (2015). The effects of dissection-room experiences and related coping strategies among Hungarian medical students. *BMC Medical Education*, 15-73. Doi: 10.1186/s12909-015-0355-9.
- Vidal, O., Ginestá, C., Espert, J.J., Valentini, M., y García-Valdecasas, J.C. (2016). Los cadáveres en fresco, un antiguo modelo quirúrgico en la cirugía general actual. *Cirugía Española*, 94, 201-205.

ANEXO 1 CUESTIONARIO PREVIO

DNI			
Edad		Sexo	
Las siguientes frases que utilizamos para describir a nosotros mismos se dan a continuación. Lea cada frase, y luego marque la casilla que mejor refleje lo que está sintiendo ahora mismo, en este momento. No gaste demasiado tiempo, indique la respuesta que mejor refleje sus sentimientos actuales. No existen respuestas correctas o incorrectas.			
		No	Ni si Ni no
			Si
1. Me siento tranquilo/a			
2. Me siento seguro/a			
3. Me siento nervioso/a			
4. Me siento asustado/a			
5. Me siento feliz			
6. Me siento a gusto			
7. Me siento relajado/a			
8. Me siento preocupado/a			
9. En general, ¿se siente emocionalmente preparado/a para entrar en la sala de disección?			
10. ¿Alguna vez ha visto un cadáver?			
11. ¿Qué sentimientos le produce el pensamiento de la disección? (marque una o varias)			
Nada, sin problemas	Curiosidad	Otra cosa:	
Ansiedad	Incertidumbre		
Desagrado	Miedo		
12. ¿Qué cree que es lo más desagradable en la sala de disección? (marque una o varias)			
Nada, sin problemas	El olor	Otra cosa:	
Ver la cara al cadáver	Tocar al cadáver		

ANEXO 2. CUESTIONARIO POSTERIOR

DNI			
Edad		Sexo	
Las siguientes frases que utilizamos para describir a nosotros mismos se dan a continuación. Lea cada frase, y luego marque la casilla que mejor refleje lo que está sintiendo ahora mismo, en este momento. No gaste demasiado tiempo, indique la respuesta que mejor refleje sus sentimientos actuales. No existen respuestas correctas o incorrectas.			
		No	Ni si Ni no
		Si	
1. Me siento tranquilo/a			
2. Me siento seguro/a			
3. Me siento nervioso/a			
4. Me siento asustado/a			
5. Me siento feliz			
6. Me siento a gusto			
7. Me siento relajado/a			
8. Me siento preocupado/a			
9. En general, ¿se ha sentido emocionalmente preparado/a para entrar en la sala de disección?			
10. ¿Ha tenido pensamientos sobre de la vida y la muerte en la sala de disección?			
11. ¿Ha tenido miedo de perder el control en la sala de disección? (salir de la sala, sentirse mal o mareado/a, etc.)			
12. Tras la práctica ¿donaría usted su cuerpo a la ciencia?			
13. Recomendaría usted esta práctica para otros cursos			

Diga cuál es su **grado de satisfacción** con la práctica que ha realizado hoy (marque una):

- Muy Insatisfecho/a
- Insatisfecho/a
- Satisfecho/a
- Muy satisfecho/a

¿Cómo puntuaría usted globalmente su grado de satisfacción con la práctica? (de 0 a 10, donde 0 es la peor nota y 10 es la mejor nota?)	
--	--

7.- Otras aportaciones de esta Tesis

**Mabel López Solera
Ana M.^a Sanz Redondo
Caridad Pérez de los Reyes
(Coords.)**

**Experiencias de
Innovación Docente
en Enseñanza Superior
de Castilla-La Mancha
2019**



III Jornada de
Innovación Docente

Experiencias de innovación docente en Enseñanza Superior de Castilla-La Mancha, 2019

(Libro de comunicaciones)

III Jornada de Innovación Docente
Universidad de Castilla-La Mancha
Toledo, 25 junio 2019
Programa y Comunicaciones

Comité organizador JIDCLM 2019
Vicerrectorado de Docencia, UCLM
Real Casa de la Misericordia, c\ Altagracia nº 50 – 13071 Ciudad Real
<https://eventos.uclm.es/30635/detail/iii-jornada-de-innovacion-uclm.html>

Experiencias de innovación docente en Enseñanza Superior de Castilla-La Mancha, 2019

(Libro de comunicaciones)

Mabel López Solera

Ana M.^a Sanz Redondo

Caridad Pérez de los Reyes

(Coords.)



Ediciones de la Universidad
de Castilla-La Mancha

Cuenca, 2019

© de los textos: sus autores.
© de la edición: Universidad de Castilla-La Mancha

Edita: Ediciones de la Universidad de Castilla-La Mancha

Colección JORNADAS Y CONGRESOS n.º 21



Esta editorial es miembro de la UNE, lo que garantiza la difusión y comercialización de sus publicaciones a nivel nacional e internacional.

D.O.I.: http://doi.org/10.18239/jor_21.2019.04

Composición: Compobell

Hecho en España (U.E.) – *Made in Spain (U.E.)*



Esta obra se encuentra bajo una licencia internacional Creative Commons BY-NC-ND 4.0. Cualquier forma de reproducción, distribución, comunicación pública o transformación de esta obra no incluida en la licencia Creative Commons BY-NC-ND 4.0 solo puede ser realizada con la autorización expresa de los titulares, salvo excepción prevista por la ley. Puede Vd. acceder al texto completo de la licencia en este enlace: <https://creativecommons.org/licenses/by-nc-nd/4.0/deed.es>

Ansiedad frente a la práctica de disección en alumnos de Enfermería, Logopedia y Terapia Ocupacional

C. Romo-Barrientos⁴, A. Mohedano-Moriano¹,
J.J. Criado Álvarez^{1,4*}, Mt Gil^{1,4}, A.I. Corregidor-Sanchez¹,
Cipriano-Crespo, C¹, M. Rodriguez- Hernandez¹,
J Gonzalez-Gonzalez^{1,4}, J.L. Martin-Conty¹, B. Polonio¹,
A. Viñuela^{1*}

¹Facultad de Ciencias de la Salud, UCLM, Talavera de la Reina, España. ²Facultad de Medicina de Albacete, UCLM, Albacete, España. ³Servicio de salud de Castilla la Mancha, SESCAM, Albacete, España. ⁴Servicio de salud de Castilla la Mancha, SESCAM, Talavera de la Reina, España.

Han contribuido igual en el trabajo

mcromo@sescam.jccm.es

*Integrated Care Management, Castilla-La Mancha Health Services, Talavera de la Reina, Spain.

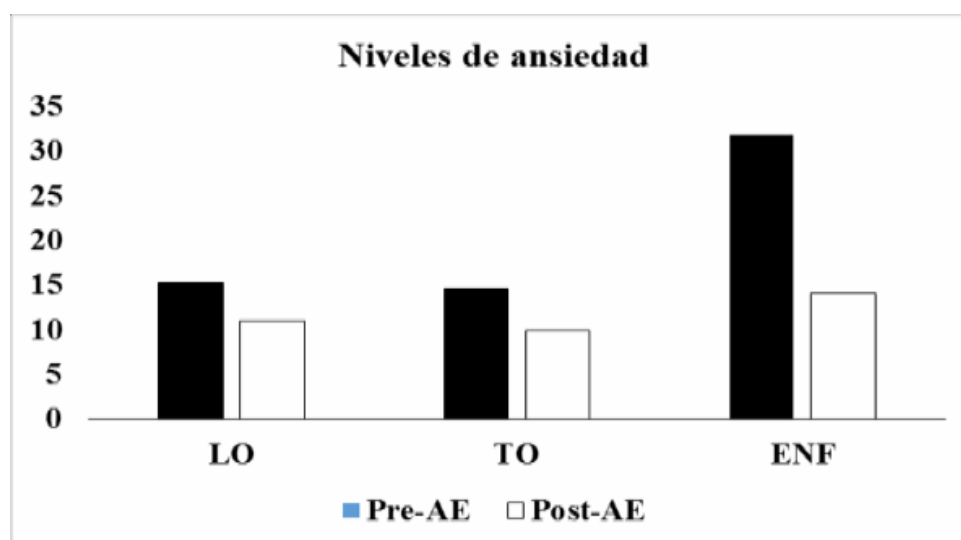
Las prácticas con el cadáver humano suponen una parte básica en la enseñanza de la anatomía humana. Sin embargo, esta experiencia de prosección con cadáver puede ser estresante para el estudiante (Leboulanger, 2011), generando un elevado nivel de ansiedad. El objetivo de este estudio es conocer las actitudes, reacciones, miedos y estado de ansiedad de los estudiantes de primer curso de Enfermería (ENF), Logopedia (LO) y terapia ocupacional (TO) de la Facultad de Ciencias de la Salud, Talavera de la Reina, UCLM, frente a la primera práctica de prosección.

Se trata de un estudio transversal de tipo pre-post a la práctica, administrando a los estudiantes un cuestionario "ad hoc" y el cuestionario State-Trait Anxiety (STAI) para conocer el nivel de ansiedad en sus tres medidas, Ansiedad Rasgo (AR, ansiedad basal, como se sientes las personas en el día a día) y Ansiedad Estado (AE, ansiedad emocional, mide como se siente una persona ante situaciones de tensión, miedo, ect...).

Existen diferencias estadísticamente ($p < 0,05$) entre las puntuaciones de las diferentes Grados de Ciencias de la Salud, observándose un descenso significativo en la AE. Comparando las tres muestras, encontramos mayores niveles de AE previos en los alumnos de ENF, seguidos de LO y TO que descendieron después de realizar la práctica.

Los estudiantes de ENF muestran mayor puntuación en la AE, tanto antes como después de la práctica; parecen estar más concienciados sobre la experiencia a la que se van a realizar. A pesar de un mayor nivel (AE), los alumnos de ENF se sienten igualmente preparados que los LO y TO para afrontar la disección (Fig 1). Finalmente, los estudiantes de los tres Grados valoran positivamente las prácticas de prosección.

La prosección permite a los alumnos acercarse al cuerpo humano, en un contexto real, permite relacionar las estructuras anatómicas a nivel espacial, destacando su posición y relaciones entre las estructuras (Vidal 2016). Además, permite al estudiante a enfrentarse con la muerte, siendo beneficioso para la profesión del enfermero (Garvey et al., 2015), fomenta el liderazgo y el trabajo en grupo (Talarico, 2012; Flack and Nicholson, 2018).



Niveles de Ansiedad estado en los distintos grados de ciencias de la salud de la facultad de Terapia ocupacional, logopedia y enfermería.

Aunque no podemos negar que esta experiencia puede llevar a respuestas estresantes que deben tratarse mediante la preparación avanzada y los mecanismos de afrontamiento, mediante el uso de información previa del proceso de disección, las donaciones de cadáveres, pensamientos sobre la vida y la muerte (Casado et al., 2012). El uso de música de fondo en la sala de disección (Anyanwu, 2015), humanizar el encuentro estudiante-cadáver (Coulehan et al., 1995) o describir previamente el olor antes de entrar a la sala de disección (Dempster et al., 2006), podría ayudar a reducir ansiedad.

REFERENCIAS:

- Anyanwu, E., 2015. Background music in the dissection laboratory: impact on stress associated with the dissection experience. *Adv. Physiol. Educ.* 39, 96–101.
- Casado, M., Castaño, G., Arráez-Aybar, L., 2012. Audiovisual material as educational innovation strategy to reduce anxiety response in students of human anatomy. *Adv. Heal. Sci. Educ.* 17, 431–440.
- Coulehan, J., Williams, P., Landis, D., Naser, C., 1995. The first patient: reflections and stories about the anatomy cadaver. *Teach. Learn. Med. An Int. J.* 7, 61–66.
- Dempster, M., Black, A., McCorry, N., Wilson, D., 2006. Appraisal and consequences of cadaver dissection. *Med. Educ. Online* 11, 4592.
- Flack, N., Nicholson, H., 2018. What do medical students learn from dissection? *Anat Sci Educ* 11, 325–335.
- Leboulanger, N., 2011. First cadaver dissection: Stress, preparation, and emotional experience. *Eur. Ann. Otorhinolaryngol. Head Neck Dis.* 128, 175–183.
- Mc Garvey, A., Hickey, A., Conroy, R., 2015. The anatomy room: A positive learning experience for nursing students. *Nurse Educ. Today* 35, 245–250.
- Talarico Jr, E., 2013. A change in paradigm: giving back identity to donors in the anatomy laboratory. *Clin. Anat.* 26, 161–172.

Valoración de los cursos formativos prácticos de anatomía en el preGrado

A. Mohedano-Moriano¹, J.C. Delgado^{2,3}, J.J. Criado Álvarez^{1,4*}, Mt Gil^{1,4}, C. Romo-Barrientos⁴, M.I. Gandía⁵; A.I. Corregidor-Sanchez¹, Cipriano-Crespo, C¹, M. Rodríguez- Hernández¹, J Gonzalez-Gonzalez^{1,4}, J.L. Martín-Conty¹, B. Polonio¹, A. Viñuela^{1*}

¹Facultad de Ciencias de la Salud, UCLM, Talavera de la Reina, España. ²Facultad de Medicina de Albacete, UCLM, Albacete, España. ³Servicio de salud de Castilla la Mancha, SESCAM, Albacete, España. ⁴Servicio de salud de Castilla la Mancha, SESCAM, Talavera de la Reina, España. ⁵Colegio de Integración motórico Antonio Machado. Consejería de educación. JCCM.

*Han contribuido igual en el trabajo.

Alicia.Mohedano@uclm.es

Keywords: Cursos formativos, anatomía, Pregrado

Introducción: La asignatura de Anatomía Humana forma parte de todos los planes de estudios en los grados de ciencias de la salud como asignatura obligatoria. Una profunda comprensión de esta disciplina es básica para el ejercicio profesional de todos los grupos de sanitarios. En estas últimas décadas, por las diversas reformas curriculares, los contenidos relativos a esta materia se han visto disminuidos en todos los grados de ciencias de la salud (Morris, and Jacques, 2018), especialmente las horas del laboratorio (Nwachukwu et al, 2015). Esta disminución puede provocar fisuras en el conocimiento de los estudiantes. Actualmente, aumentar el tiempo dedicado a esta disciplina no podría ser posible debido, a que estos planes de estudios están saturados. Con lo cual es necesario fomentar la enseñanza de la anatomía en la formación de pregrado y posgrado, mediante cursos formativos que podrían suplir las carencias de los conocimientos anatómicos. Este estudio trata de conocer la valoración de los estudiantes de primer curso del Grado de Terapia Ocupacional sobre un curso formativo práctico de anatomía (pre-Grado) paralelo a la impartición de la asignatura de anatomía y fisiología humana.

Material y métodos: Se trata de un estudio descriptivo realizado con los estudiantes del Grado de Terapia Ocupacional matriculados en la asignatura de anatomía y fisiología Humana (anual, 12 ECTS), pertenecientes a la Facultad de Ciencias de la Salud (FACSALUD) en Talavera de la Reina de la Universidad de Castilla-La Mancha (UCLM) que se han inscrito de forma voluntaria a un curso de Anatomía Palpatoria para Terapeutas Ocupacionales (aparato músculoesquelético) impartido durante el primer cuatrimestre del año académico 2018/2019 coincidiendo con la finalización del bloque temático del aparato locomotor de la asignatura Anatomía y Fisiología Humana. La duración de dicho curso es 12,5 horas (8 horas prácticas). Las sesiones prácticas eran supervisadas y tutorizadas por 2 fisioterapeutas y 2 profesores

de anatomía. En el Grado de Terapia Ocupacional, la asignatura de Anatomía y Fisiología Humana es anual (12 ECTS). Un cuestionario anónimo (“ad hoc”) fue distribuido entre los estudiantes, estos cuestionarios recogían información sobre la organización del curso, la formación recibida, la calidad y evaluación con preguntas cerradas y respuestas de escalamiento ‘nada’, ‘un poco’, ‘aceptable’ y ‘bueno’ (0, 1, 2 y 3 puntos). La satisfacción del curso se recogió de igual forma pero también con pregunta abierta.

Resultados: En este estudio participaron 26 alumnos de primer curso de Terapia Ocupacional. La edad media de los alumnos es de 20,12 años, con 25 mujeres (96,2%).

Tabla1. Evaluaciones del curso a través de los siguientes aspectos	Nada (0)	Poco (1)	Acceptable (3)	Bueno (4)
	%	%	%	%
Los objetivos del curso son adecuados	0.0	0.0	50	50
Los contenidos de anatomía presentados son novedoso	0,0	0,0	46,2	53,8
Nivel de conocimientos adquiridos.	0.0	0.0	69,2	30,8
Nivel de destrezas adquiridas	0.0	0.0	76,9	23,1
Durante el curso se adquieren habilidades y aptitudes para el desarrollo de mi trabajo	0.0	0.0	26,9	73,1
La posibilidad de aplicar los conocimientos anatómicos adquiridos en la práctica profesional	0.0	11,5	50	38,5
El clima de trabajo en pequeños grupos fue satisfactorio	0.0	0.0	26,9	73,1
Este curso ofrece oportunidades profesionales para su futuro	0.0	0.0	57,7	42,3
¿Estás satisfecho de curso realizado?	0.0	0.0	42,3	57,7

Respecto al cuestionario (tabla 1) el 100% de los estudiantes consideran que los objetivos del curso han sido adecuados, el 53,8% consideran que los contenidos impartidos son bastantes novedosos. La mayoría de los estudiantes valoraron positivamente (100%) la adquisición de habilidades y actitudes para su futura vida profesional, el 73,1% (consideran como buena). En relación a la valoración de conocimientos adquiridos, el 100% lo consideran aceptable y buena, 69,2% y 30,8% respectivamente. En la adquisición de destrezas solo el 23,1% lo consideran buena respecto al 76,9% que lo consideran aceptable. El 88,5% de los estudiantes consideran que tendrán posibilidad de aplicar estos conocimientos anatómicos en su ejercicio profesional frente a un 11,5% que lo consideran como poco probable. El 73,1% considera que el clima de trabajo era bueno, el 100% creen que realizar este curso ofrece posibilidades profesionales cara a su futuro (42,3% buena) y finalmente 100% de los estudiantes están satisfecho con el curso (57,7% buena). Respecto a la pregunta abierta:

¿Por qué estaban satisfecho? Contestaron:

7# “Me ha parecido un curso interesante, además de útil cara al futuro”.

9# “Porque es muy práctico y el aprendizaje así es más eficaz”.

15# “Si, porque es una forma muy práctica y visual para localizar los músculos y una forma diferente para incorporar los conocimientos”.

17# “Ayuda a afianzar los conocimientos de anatomía”.

20# “Lo aprendido, me parece útil para mi profesión”.

26# “Una actividad muy interesante y además una forma muy dinámica de aprender”.

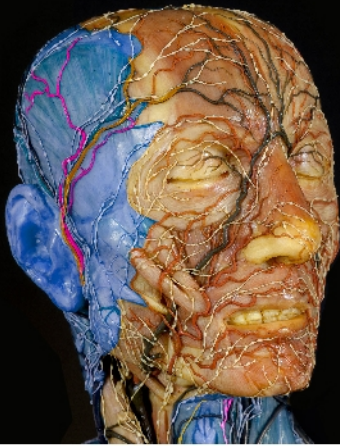
Conclusión: Estos cursos suponen un refuerzo de los conocimientos adquiridos en el desarrollo de las clases de modo que los alumnos afianzan mejor sus conocimientos y destrezas que han adquiriendo a través de una sesión más práctica y participativa.

Por otro lado, son capaces de ver el desarrollo de esta actividad desde el punto de vista de la práctica profesional acercándoles a su futuro profesional.

REFERENCIAS:

- [1] Morris H, Jacques S. 2018. Dissection should remain a key part of medical education. *ANZ J Surg.* 88:10-12.
- [2] Nwachukwu C, Lachman N, Pawlina W. 2015. Evaluating dissection in the gross anatomy course: Correlation between quality of laboratory dissection and students outcomes. *Anat Sci Educ.* 8(1):45-52.

INTERNATIONAL CONGRESS OF ANATOMIA CLINICA



15TH EUROPEAN ASSOCIATION OF
CLINICAL ANATOMY (EACA)

11TH INTERNATIONAL SYMPOSIUM OF
CLINICAL AND APPLIED ANATOMY (ISCAA)

24th to 26th JUNE MADRID 2019

Carmen Romo Barrientos, Juan José Criado-Álvarez, Alino Martinez-Marcos, Isabel Ubeda-Bañon, Alicia Flores-Cuadrado, Daniel Saiz-Sanchez, Alicia Mohedano Moriano

contributed with the Poster Presentation titled:

**ANXIETY OF THE STUDENTS OF OCCUPATIONAL THERAPY AND MEDICINE
IN FRONT OF THE DISSECTION ROOM**

in the International Congress of Anatomía Clínica (EACA 2019) held in
Madrid, Spain, in June from 24th to 26th, 2019

DOCUMENTO FIRMADO DIGITALMENTE

Fabrice Duparc

Director of the Scientific Committee

Marko Konschake

Director of the Scientific Committee

José Ramón Sañudo

President of the Local Committee



ABSTRACT

Abstracts of the oral communications and posters presented during the congress Anatomia Clinica

© Springer-Verlag France SAS, part of Springer Nature 2019

**INTERNATIONAL CONGRESS OF
ANATOMIA CLINICA**

A JOINT MEETING OF

**15TH EUROPEAN ASSOCIATION OF
CLINICAL ANATOMY (EACA)**

**11TH INTERNATIONAL SYMPOSIUM OF
CLINICAL AND APPLIED ANATOMY (ISCAA)**

24th to 26th JUNE
MADRID
2019

INVITED SOCIETIES

www.eaca2019.com

ABSTRACTS BOOK

Objective: To determine the relationships between the mental nerve and the anatomical repairs for the use of oral surgery.

Materials and methods: A prospective and cross-sectional study was designed that included 31 human cadavers that were dissected at the level of the hemimandible. We analyzed the emergency variables of the NM and its relationships with dental pieces attached.

Results: It was found that the most frequent distance between the NM emergence with respect to the alveolar ridge and the mandibular ridge was from 11 to 15.5 mm in 57.6% of cases and from 11 to 15.5 mm in 72.7% of cases respectively. The relationship of the NM with respect to the attached teeth was mainly at the level of the second lower premolar in 63.6% of cases. 18.2% presented an accessory NM and the most frequent location was higher than the NM in 66.7% of specimens.

Conclusions: The NM emergence in a sample of Peruvians is mostly below the second lower premolar. Few cases presented an accessory MN. These data should be taken into account in surgeries in the mental region to avoid clinical complications.

P-087

Study of the occasional neck venous drainage variations

Antonio Caravaca García¹, Antonio Sanmartin Caballero¹, Wasim Elhendi Halawa², David Almorza Gomar³, Gonzalo Pérez Arana⁴, Jose Arturo Prada Oliveira³

¹Hospital Punta de Europa, SAS, Algeciras, Spain; ²Hospital del S.A.S. Punta de Europa, Algeciras, Spain; ³University of Cadiz, Cádiz, Spain; ⁴Inibica, Universidad de Cadiz, Cádiz, Spain

The venous system is usually characterised for a broad variability, which introduces a clinical attention. This is a common aspect, but it is especially interesting in the neck region. This region keeps common aspects to other corporal portions: as the double drainage system—deep and superficial—; and the common variations in middle calibre venous, which connect to the great venous vessels. But the neck region possesses different and critical clinical approaches.

Material: We analysed the clinical variations in those patients under ORL surgical and explorative procedures in our Hospital.

Method: We analysed the occasional variations appeared during the clinical practice of ORL procedures and surgical approach.

Results: We observed usual variations described in literature. Though we reported some unusual variants. We described uncommon anastomoses between External and Internal Jugular Veins, extremely gross External Jugular Veins, or alternative origin of External Jugular Veins after gross postero auricular veins.

Discussion: Many ORL procedures, urgent or usual, are underwent under a precise and correct anatomical basis. Then many unwished consequences can appeared due to the surgical aggression of superficial venous networks. A precise information and formation of anatomical variants and malformations need to be correlated to the study of anatomy. The approach to medical practice based in anatomical knowledge offers many opportunities and disadvantages. Medical routines based in the precise location of structures is the only way to success. But thus, a narrow inflexible approach can be the opportunity to serious problems related to the damaged venous system.

P-088

The anatomical considerations of the compensatory hypertrophy of the upper half of the masseter after bont-a injection

Kyu-Lim Lee¹, Hyun Jin Cho², Hyun-Jin Park¹, Tansatit Tanvaa³, Hee-Jin Kim¹

¹Division in Anatomy and Developmental Biology, Department of Oral Biology, Human Identification Research Institute, BK21 PLUS Project, Yonsei University College of Dentistry, Seoul, Republic of South Korea; ²Labella Clinic, 455 Gangnam-daero, Seocho-gu, Seoul, Republic of South Korea; ³The Chula Soft Cadaver Surgical Training Center and Department of Anatomy, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Introduction: Previous studies related to BoNT-A injection procedures of the masseter were confined to the clinical anatomy of the lower half of the masseter. Nevertheless, some alternative BoNT-A injection procedures are performing on the upper half of the masseter for the midface shaping and there have not been any studies focused on the upper masseter. Therefore, the aim of this study is to determine the detailed anatomical structure of the upper half of the masseter to provide a safer and more effective injection guideline.

Materials and methods: Twelve hemifaces from Korean and Thai cadavers were used in this study. The masseter was dissected from the origin layer by layer, and the tendon and belly of the masseter was observed.

Results: The tendinous pattern (Type A) surrounding the tendon on the surface of or deep in the masseter was in 33% of the cases (4/12). The capsule pattern, in which the tendon formed more than one capsule surrounding the muscle completely, was in 67% of the cases (8/12). In the capsule pattern, 1 or 2 capsule were observed in 42% (5/12) and in 25% (3/1), respectively.

Conclusions: A typical short of long-term sequela related to masseteric hypertrophy injection procedure is the compensatory hypertrophy and the paradoxical masseteric bulging after injecting BoNT-A, respectively. This symptom is manifested by an uneven injection of the entire area and multiple layers of muscle. Based on the result of this study, more effective procedure can be performed by identifying the pattern of the tendon and belly.

P-089

Prevalence and feature of bifid mandibular canals in a european population: a cbct study

Sara Bernardi¹, Serena Bianchi¹, Giuseppe Varvara², Emanuele Candido², Beatrice Feragalli², Maria Adelaide Continenza¹, Maurizio Piattelli², Guido Macchiarelli¹

¹Department of Life, Health and Environmental Sciences, University of L'Aquila, L'Aquila, Italy; ²University of G. d'Annunzio Chieti and Pescara, Chieti, Italy

Introduction: Mandibular canal is a skeletal structure hosting neurovascular shaft composed by Alveolar Inferior Artery, Alveolar Inferior Vein and Alveolar Inferior Nerve. Mandibular canal morphology present variations described and known in literature as bifurcation. These variations can be involved during several proce-



Universidad de
Castilla-La Mancha