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Original Research

What do students perceive as fair oral examinations in the field of anatomy?

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ABSTRACT

Oral exams deliver distinct advantages over written exams; however they are often criticized because of their poor standardization. In anatomical teaching they offer the opportunity to assess the practical capability of students within the context of real human specimens. The purpose of this study was to find out which format of oral examination students find most favourable and to analyze how this preferred examination format affects the result of the examination process. A comparative study was performed with students from consecutive summer terms. The five oral examinations during the dissection course were either performed in front of the entire group (approximately 20 students) or in front of small groups of 2-4 students. They were conducted by "their" lecturer (the person who instructed these students throughout the dissection course) or by an examiner unknown to the students. The majority of students in both cohorts preferred examination in small groups (2009: 71%, 2010: 62%) and felt uncomfortable when examined in large groups. 78% of the students in 2009 preferred taking exams by different lecturers. In 2010, only 21% favoured the rotation model whereas more than one half preferred taking exams by a single lecturer. In general students valued transparency and fairness such as clear communication of the results and comprehensible decisions by the examiners, higher than the actual format of the oral examination. Examination in small groups and by a single lecturer resulted in a clear reduction in the number of students who failed and helped to improve oral examination in context of academic teaching.

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INTRODUCTION

Examinations do not solely serve the purpose of assessing the success of a learning process, but are also meant to motivate and encourage students ["Assessment drives learning", 1]. Encouragement, however, requires that the examination process, results, and communication of success and failure are experienced as transparent and fair by the target group. Oral assessment and their anticipation are often reported to be nightmares for students and may substantially hinder enjoying the learning process [2]. Written exams have clear criteria by which their quality can be measured such as validity, objectivity and reliability [3]. This makes it possible to objectively compare the quality and standard of various written exams.

Written exams, however, are not well suited to assessing the practical capability of students.

Oral exams, in comparison to written exams, have crucial advantages such as improving verbal skills, flexible performance and making cheating more difficult [4]. For the final examinations of medical doctors in Switzerland, efforts are underway to create a "structured oral exam" [5]. The Association for Medical Education (Gesellschaft für Medizinische Ausbildung) has published a position paper on structured course assessment [6] during medical education. The creation of a national list of competence-based educational objectives for medicine in Germany is ongoing [7]. In the following sections,

two different oral exam formats are compared in consecutive sessions in the field of human medicine (with about 300 students per year).

Procedure for Anatomy Assessment of 2nd Semester Medical Students

At Leipzig University, dissection courses are taken in the 2nd semester (first year of study) from April until mid-July using alcohol-fixed human bodies [8]. A total of 10-14 students perform dissection of the whole body except the brain (neuroanatomy is taught in the 3rd term). Dissection starts at the body wall, includes thorax, abdomen and retroperitoneal space as well as the extremities and is concluded with a sketch of the neck and head structures. This procedure involves five oral examinations, during which approximately 20 students are assessed at the cadavers, they dissected. Since a major issue of the examination is to test the students' capability to demonstrate crucial structures and to explain their function in the context of the whole body, a major aim throughout dissection is to isolate, memorize, and recognize their localization within their topographic environment. There are no grades, but exams simply result in "pass" or "fail", thereby reducing the complexity of the assessment. Thus, oral exams in gross anatomy reach far beyond the repetition of facts, but involve contextual understanding, knowledge of variations and pathologies of individual cadavers as well as the social component of studying together thereby reaching high levels of Miller's

pyramid of competence [9] unattainable by written exams.

Questions Raised

The following questions were crucial for this study:

Traditionally, groups of approximately 20 students (defined by a common teacher and/or the specimen dissected together) were examined at once. How would students rate this format compared to tests in small groups of four students?

Traditionally, students were examined by various teachers, most of them widely unknown to the group. How would students rate this format compared to tests performed by "their" teacher? Can advantages and disadvantages of the different approaches be identified?

Which conclusions can be drawn about oral examinations in general?

METHODS

A change in the format of examination at the Leipzig Institute of Anatomy created an ideal situation for conducting an internal survey (12 questions, two of which were open) involving all medical students of two consecutive years. The aim was to compare their experience and perceptions using the large group approach (students take turns answering questions in front of their peers, Fig. 1a, c) and the novel approach (small groups, one examiner, Fig. 1b, d).

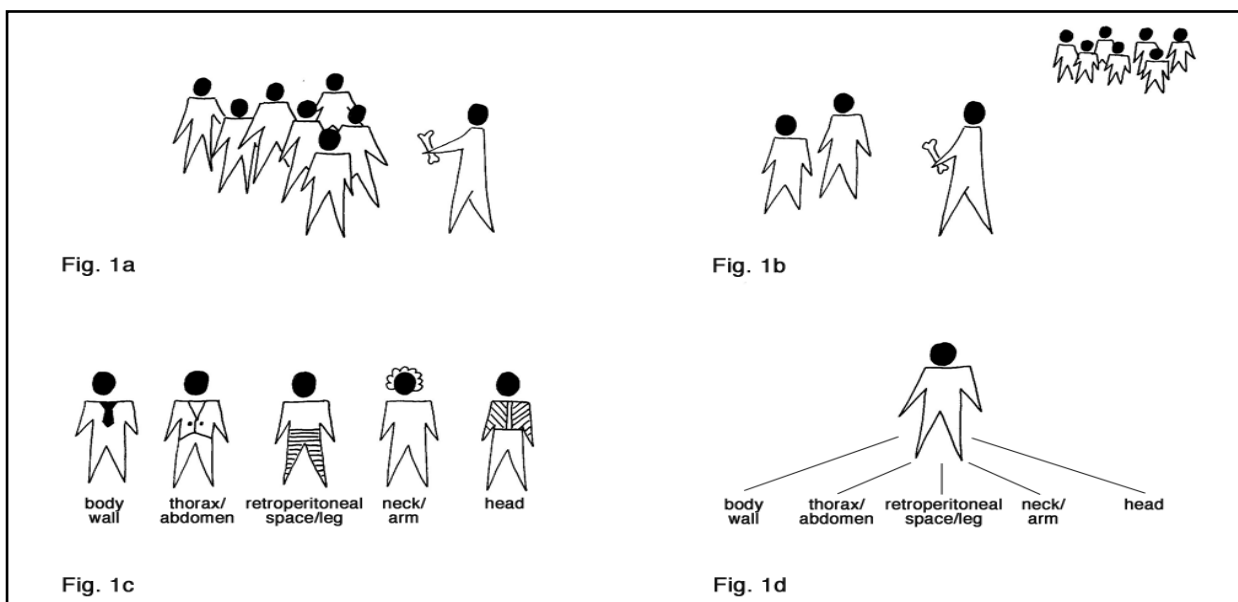


Figure 1: Examination methods.

Fig. 1a: Large group: Every student individually answers in front of the whole group (ca. 20) and demonstrates the structures.

Fig. 1b: Small group: Two to four students are examined on the same specimen in consecutive exam rounds.

Fig. 1c: Separate examiners: Students are examined by different assistants in each segment of assessment.

Fig. 1d: One examiner: The students are always examined by the same examiner, as a rule this would be their teaching assistant.

To guarantee anonymity as far as possible, age and gender of the individual respondents were not recorded. The total number of students interviewed during the first survey was 103 male and 220 female students (total: 323), with an age range of 19-44 years (average age 23.25). The second survey consisted of 106 male and 216 female students (total: 322), with an age range of 19-50 years (average age 22.5). The sample for the first survey consisted of 286, and the second of 293 participants, resulting in a response rate of 88% and 91% respectively. The survey was performed during the course in neuroanatomy, one term after the dissection course, thus allowing a high response rate. Microsoft Office Excel 2003 was used for data evaluation and chart design.

RESULTS

Only questions focusing on the main issues are shown. All data points are displayed as percentages to maximize comparability.

Group Size (Fig. 2)

By examining a group as a whole, all students are able to hear all questions and responses allowing them to self-assess their knowledge. An additional benefit to whole group examination is that all students are able to observe the examination process and raise objections should they believe that the process is flawed or unfair. There were, however, a number of students, who felt uncomfortable with being examined in front of the entire group. In some cases a group of students kept distance to the examination table and chatted until it was their turn.

Examiner (Fig. 3)

Teaching assistant and students get to know one another very well when working together during the dissection courses as they spend a significant amount of time (as compared to other types of teaching) together in close contact. This allows the characteristics (e.g. "strong" and "weak", dedicated and undedicated) of students to be easily assessed. One objective of an exam situation may be to match the difficulty of questions to the profile of the student. Outstanding students could be challenged with difficult questions, whereas dedicated average students may be presented with moderately difficult questions.

If the examiner does not personally know the students and consequently is perfectly unbiased, a more objective assessment of the students is required. In

these scenarios emotions of the examiner due to intimate knowledge of the particular student are not to be expected. Although the mandatory assessment guidelines apply to all examiners, there are differences in the way in which answers are assessed. Students being assessed exclusively by a more "easy-going" teacher may find the oral anatomy exams less daunting; they do, on the other hand, never get to know more rigid, challenging examiners throughout the dissections course, but may well meet this type of teacher in the oral part of the preclinical exam. Moreover, it is a common experience that strong and dedicated students do not appreciate examinations to be "too easy", particularly since a "pass-or-fail" system does not distinguish them from the average and lower-than-average group.

Exam Results

The failed exams are shown in Tab. 1. The number of attendants in the different exams varies because of various reasons (e.g. illness). The implementation of the small group format with the same examiner resulted in a significant decrease of failed exams in all cases.

Summary of Results

During the summer semester 2009, a total of 78% of students favoured taking their exams by various teachers, whereas this applied to only 21% in 2010. Of note, the group of 2009 had no experience in being tested solely by "their" teacher. Among the 2010 group, more than one half preferred to be examined by "their" teacher. In both years the vast majority of students preferred to be assessed in small groups and about half of them experienced an exam in front of the entire group as "uncomfortable". Approximately 30% preferred the large group, most likely for the benefit of getting a more complete picture of potential questions. Between 70 (2009) and 90% (2010) felt that the exam results were clearly communicated to them and, in case they failed, they were able to understand the decision of cases kept to the internally published educational objectives. The answers to the open questions provide a preliminary insight into the perceptions of the students on several issues, including their perception on the quantity of the learning material to be mastered, the overall quality of the course, and the quality of the supervision provided by teaching assistants, but the study design was not sufficiently focused on these the respective examiner (= 11), who in 80 to 90% of issues to draw clear-cut conclusions. However, students uniformly highlighted the importance of the dissection course within the canon of undergraduate medical

education in their responses which is in line with previous data [10, 11]. The students were generally satisfied with the exam type, as long as the respective examiner followed the educational objectives (> 80%), the result was clearly communicated to them (75% and 86% respectively) and they were able to understand the basis of the decision (57% and 76% of the failed students respectively). The type of exam was no determining factor for students' satisfaction, but rather the perceived transparency and fairness of the exam.

Question 1: I would like to be examined ...

Fig. 2a Fig. 2b

Question 2: In case you were examined in a large group in more than one assessment: Did you consider this type of exam beneficial for your preparation for the preclinical medical exam because you were able to get a more complete picture of potential questions or did you rather feel uncomfortable having to be examined in front of the entire group?

Fig. 2c Fig. 2d

Question 3: I would like to be examined ...

Fig. 3a Fig. 3b

Question 4: I would like to be examined ...

Fig. 3c Fig. 3d

Question 5: As a rule, was the exam result (pass/fail) clearly communicated to you?

Fig. 3e Fig. 3f

Question 6: Where applicable, were you able to follow the examiner's decision in case of a failed exam?

Fig. 3g Fig. 3h

Question 7: As a rule, have the examiners followed the educational objectives agreed upon?

Fig. 3i Fig. 3k

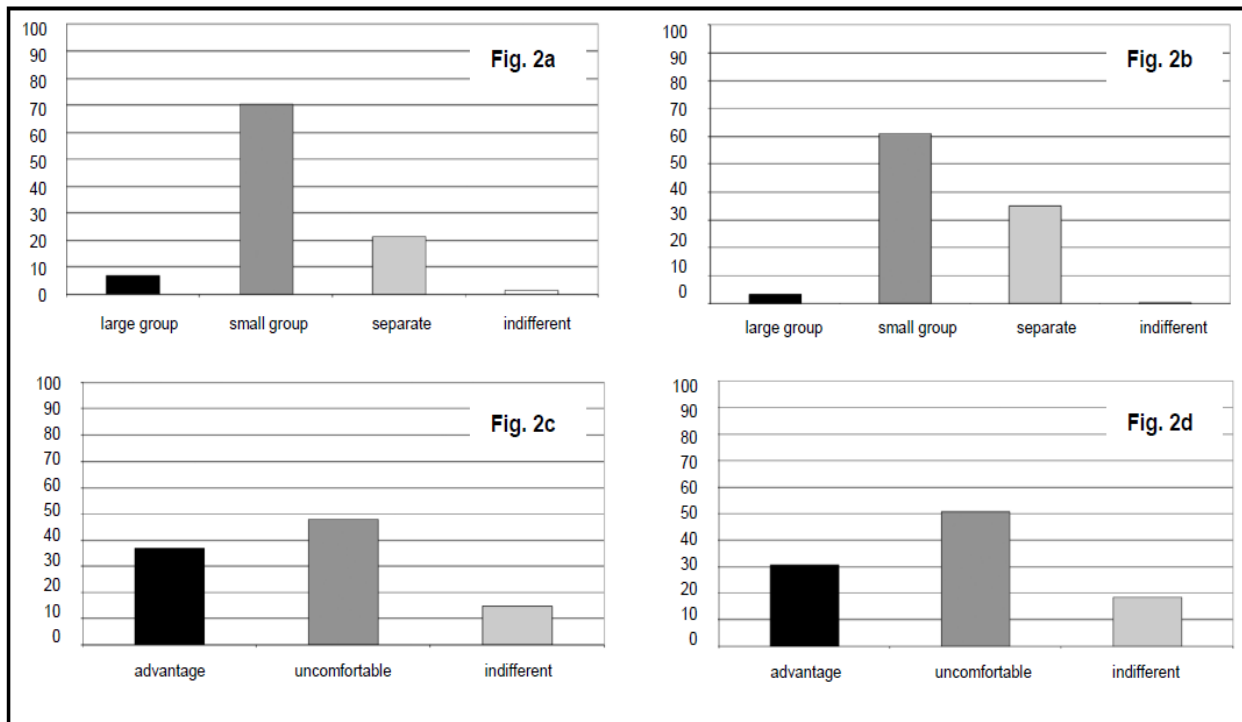


Figure 2: Group size. Students' perceptions in consecutive sessions.

Fig. 2a: 71% of students favour small groups (2009); Fig. 2b: 62% of students favour small groups (2010); Fig. 2c: 37% of the respondents saw the benefits of being examined in front of the entire group, however, almost half of them (48%) experienced this type of exam as "uncomfortable" (2009); Fig. 2d: 31% of the respondents saw the benefits of being examined in front of the entire group, however, more than half of them (51%) experienced this type of exam as "uncomfortable" (2010).

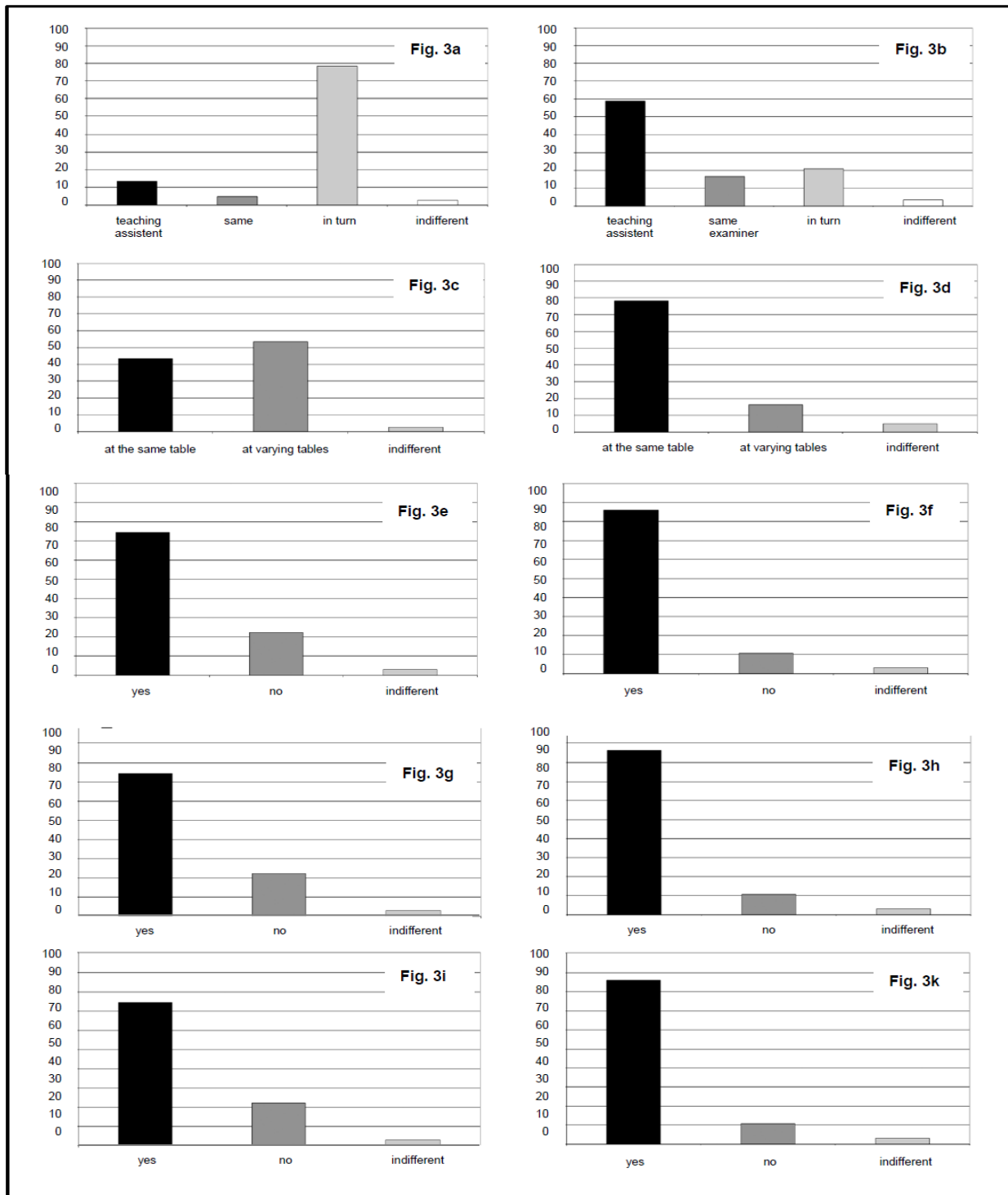


Figure 3: Examiners. Students' perceptions in consecutive sessions.

Fig. 3a: 78% of this year were happy with taking exam questions in turn (2009); Fig. 3b: Almost 80% of the next year then preferred the exam with the same examiner, ideally "their" teacher (2010); Fig. 3c: 44% of the students preferred to be examined at the same table, 53% at varying tables (2009); Fig. 3d: 78%, who had never known exams with rotation of examiners, now apparently felt far more confident when taking the examination at the same table. Only 17% saw the benefits of an exam at changing tables (2010); Fig. 3e: 75% of the students were happy with the way the exam results were communicated (2009); Fig. 3f: 86% of the students were happy with the way the exam results were communicated (2010); Fig. 3g: 76% were able to follow the examiner's decision in case of a failed exam, 33% were not able to do so (2009); Fig. 3h: 76% were able to follow the examiner's decision in case of a failed exam, only 16% were not able to do so (2010). More individual supervision seems to improve communication between examiner and candidate (cf. question 5); Fig. 3i: 84% of the students indicated that the examiner followed the expected levels of performance (2009); Fig. 3k: 89% of the students indicated that the examiner followed the expected levels of performance (2010).

Table 1. Exam results (five exams per semester) in consecutive years.

	Summer term 2009		Summer term 2010	
	failed/total	failed/%	failed /total	failed/%
body wall	34/297	11.4	10/343	2.9
thorax/abdomen	37/263	14.1	18/351	5.1
retroperitoneal space/lower limb	48/299	16.0	18/338	5.3
neck/upper limb	47/284	16.5	14/279	5.0
head	46/284	16.2	21/310	6.8

DISCUSSION

In this study, we used a change in the testing approach of our institute for a survey addressing who students wish to be examined during the dissection course which included all students of the years 2009 and 2010: The 2009 group experienced oral exams in large groups with changing examiners; the 2010 group was tested in small groups with the same examiner who also was "their" teacher throughout the dissection course

The main results are that both cohorts favoured being examined in small groups, but only the 2010 group preferred their teacher as continuous examiner. The 2009 cohort who was not familiar with this process favoured changing examiner which we interpret such that a change of examiner is believed to provide a better preparation for the final oral preclinical exam where students are randomly assigned to one teacher of the institute. However, once familiar with the approach of all oral tests of the dissection course (=5) being taken by the respective teacher of the group, the advantage of familiarity and trust seems to predominate over the promise of a better preparation for the final oral exam.

Due to their (semi-) public character, oral examinations are very different from other methods of assessment [12]. Though conducting these exams (not preparing for them) is frequently very time-consuming, they do have considerable advantages [13]. These include the exercising of verbal skills, the opportunity for examiner and candidate to react flexibly (examiners are able to adapt the complexity of questions based on the quality of responses) and the fact that cheating is much more difficult or even impossible. Between examiner and candidate a situation arises which is characterized by nonverbal signals and direct feedback [14]. The difficulty of creating standardized and well-documented oral exams performed by unbiased teachers is a disadvantage of this exam type and there is an urgent need for improvement of evidence-based teaching and assessment oral exams are in need of further improvement [15]. To establish a high quality

oral exam standard, examiners can learn from one another at departmental, regional and international levels [16].

Fear of failing in front of others (teachers and peers) is a particular burden of oral exams which may impact on the outcome. For this reason, our institute introduced a "parcours" consisting of 20 "stations" (models, skeletal pieces, anatomical specimens) and an accompanying sheet of multiple-choice questions for assessment of students who failed in previous oral exams in order to rule out that fear of their particular situation significantly contributed to their failure. However, due to the focus on topographic and functional issues taught in gross anatomy, we - in contrast to others [17] - do not consider this approach as best to test what is needed in medical professions. In order to overcome the shortcomings of an oral exam situation, Wiggins et al. [18] recommend to repeat and thus to "practise" the same type of exam. In fact, students of the dissection course already have experienced oral exams in anatomy during their first term. Khera et al. [19] recommend participation in examiner training courses. This can certainly be further improved upon by providing preparatory and feedback sessions. The time pressure of a semester may not allow for such meetings, however, they may be combined with semester preparation and evaluation sessions.

Oral examinations allow for direct interaction between teaching staff and students, which can also be a great opportunity for developing trust as much as self-criticism, if students can clearly attribute failures to their own lack of knowledge. Due to the mentioned advantages of oral exams and the particular content in gross anatomy which certainly requires direct student-teacher interaction for the demonstration of structures within their topographic environment, we do not regard attempts to completely abolish oral exams [20] as a powerful solution. However, anatomists certainly should keep in mind that oral test in gross anatomy can provide a traumatizing experience for susceptible individuals and therefore, any attempt should be taken

to minimize their psychological burden. What our study contributes in this context is that students clearly favour small over large groups and that, once they experienced continuity of oral exams performed by the teacher they are familiar with, the vast majority seems to be more comfortable with this situation. However, to exclude a bad experience with a novel, previously unknown teacher e.g. in the preclinical exam, it will certainly be helpful to create uniform standards in regard to the questions being asked and to motivate all examiners to prevent traumatizing situations for our students.

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