Original Article

Recall Knowledge of Anatomy for Interns after Graduation from Medical Schools

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ABSTRACT

Background: Educational achievement testing is a challenging area of medical education. The purpose of the medical education is mainly to generate excellent medical physicians. There is several diverse systems of medical education in the world. We do not know which system is the best for training of medical students. It is a big issue in Sudanese medical schools to seek for the most effective medical education system.

Objectives: To analyze how medical education is carried out in medical schools by testing the recall knowledge of the basic sciences after graduation.

Material and Methods: We tested the recall knowledge of anatomy among interns after graduation from our different medical schools that implemented different medical education systems using a self-administered questionnaire consisted of 10 single best answer questions validated by anatomists and surgeons from 3 different universities adopting different types of curricula.

Results: A 365 interns within different training specialties were included for the final assessment. The anatomy was considered a difficult subject by 67.1%, and 67.7% were scored 5-7.The system adopted by participants' school of graduation, number and discipline of the rotation when participating in the study, whether preparing for specialty exam or not, showed high significant correlation with the score attained on answering the basic anatomy questions, ($P<0.05$). But the score was not influenced by gender and the time lapse since graduation, ($P > 0.05$).

Conclusion: Interns graduated from schools adopting integrated system or Hybrid system scores better than those graduated from schools adopting the conventional medical system.

Keywords: Anatomy; Medical education; Integrated (Problem-based); Conventional instructional (Discipline-based); Hybrid (Combination).

Medical school curricula reflect how schools conceptualize the relationship between basic and clinical sciences, with courses and learning experiences meant to advance students through the clinical reasoning process from novice to expert[1].

Gross anatomy is the cornerstone of medical education; anatomical knowledge is undoubtedly essential for doctors regardless of their specialty, particularly since they continue to perform physical examinations,

make medical decisions, communicate with colleagues and provide explanations to patients. Furthermore, expert knowledge of anatomy is essential in the present day, particularly for surgeons, because of the development of various surgical techniques and emergence of more sophisticated imaging technologies[2].

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The past decade has seen major changes in teaching of anatomy to medical students. Anatomy education has a long history, and it continues to evolve. Recently, many anatomy curricula have been restructured to reflect novel teaching philosophies: problem- based learning (PBL), teaching by organ system and integration with clinical experiences. Training of medical students should enable them to become safe and effective physicians[3]. Medical students preferentially adopt a deep approach to learning, correlated with better outcomes than surface approaches[4,5]. On graduating from university, each doctor is faced with the task of transforming the theoretical knowledge gained during training into the practical[6].

While teaching medical students one must carefully put in mind; what portion are they retaining in memory? What are they learning?. This seems to be the central question for medical education[7]. Surely if students are not remembering what they have been taught then the effort was wasted; if students cannot make use of the knowledge they have been taught, if that knowledge becomes inert and inaccessible, then why teach it in the first place[7-9].

Studies have mostly focused on basic science knowledge and its usefulness in clinical diagnosis, less attention has been given to the transformation of acquired knowledge over time[10].

A loss of knowledge among senior medical students was confirmed by all the studies conducted. Studies found that medical students show a decline in pre-clinical knowledge of basic science by 21% to 35%. One study stated that the knowledge loss over the ten months was 52% of neuroanatomy[11-13].

The integrated PBL approach seems to be associated with uncertainty and perceived deficiencies in terms of basic science knowledge. PBL is used to describe many heterogeneous educational activities. It is therefore hard to prove or disprove the claims made by its advocates. In order to objectify the deficiencies perceived by PBL, we investigated whether PBL and non-PBL graduates in Sudan differ in recall knowledge of anatomy at the period of internship.

MATERIAL AND METHODS:

A cross sectional study recruited interns from seven teaching hospitals in Khartoum state, Sudan. The study was based on structured questionnaire containing ten validated clinical anatomy single best answer questions (SBA) that the graduates were supposed to recall from their prior knowledge.

More than 10 clinicians from different disciplines were asked to generate topics that graduates are likely to encounter during clerkship and for which they need anatomical knowledge. On the basis of this list, a team of authors and anatomists from 3 different medical schools developed 10anatomical questions. All questions were marked out of ten.

Questionnaire included other information; gender, age, year of graduation, medical school and their curriculum system adopted and whether preparing for board exams such as MD, MRCS, USMLE and PLAB. Pre-testing was conducted using a sample of 20 interns who were asked to comment on the content and clarity of the questionnaire. Necessary modifications were made as per the feedback received and two statements were added to test the participant's perceptions regarding anatomy (Appendix 1). All participants were asked to complete a short questionnaire before taking the anatomy test. To answer anatomy questions the time slot was 10 minutes for each participant and participants were not allowed to open books or talk to colleagues. The obtained results were categorized into 3 score groups; ≤ 4, 5 — 7, and ≥ 8.

Their perception regarding anatomy was tested by 2 questions; how much it is difficult? And how much knowledge retained in your mind, you think?. These questions were graded from 0 to 10 (0 easiest score and 10 highest score).

The results were spread in master sheet, entered into computer and managed statistically using SPSS for data analysis. We used Kolmogorov-Smirnov test to investigate the normality of distribution of scores obtained from questions. Since the distribution was normal, we correlated scores using Pearson Chi square between the groups.

Numerical variables were expressed as mean and standard deviation. Categorical variables were expressed as percentage and the association between different variables was performed. Significance level was defined as $p \leq 0.05$.

RESULTS:

A total of 379 self-administered questionnaires were distributed among interns after acceptance of the given informed consent (Appendix 1). Out of those, 365 participants answered the questions and filled the questionnaire appropriately. The remaining 14 questionnaires were excluded from the study for being not correctly filled. Out of 365 respondents 262 (71.8%) were females and 103 (28.2%) were males with male to female ratio of 1:2.5.

Two hundred thirty six (64.7%) were from schools adopting integrated system, 83 (22.7%) were graduated from medical schools adopting conventional instructional system and 46 (12.6%) were graduated from medical schools adopting hybrid system. Two hundred thirty eight (65.2%) participants spent between 1 to 2 years since graduation, 74 (20.3%) of the participants spent less than one year, and 53 (14.5%) spent more than 2 years since graduation.

The participants were interns in their training program within different specialties. At the timing of participation in this study, 101 (27.7%) of the participants were in their Obstetrics and Gynecology rotation, 98 (26.8%) were in Medicine, 87 (23.8%) were in Surgery and 79 (21.6%) were in Pediatrics rotation. Hundred thirty eight (37.8%) of participants were preparing for qualifying examinations.

To test participant's perception we first asked students what they thought about the difficulty of anatomy education and the extent to which they felt they had retained in their mind, into which we scored the difficulties from 0 to 10 (0 is the easiest and 10 is most difficult). The vast majority of the respondents 245 (67.1%) have considered anatomy is a difficult subject and scored ≥ 8.

In the same way the vast majority of the respondents 231(63.3%) thought that they retained a fair level of anatomical knowledge in their mind and scored 5-7 (Table 1).

Table 1: Participant's perception of anatomy education and retention of knowledge.

Score	How much anatomy is difficult?		How much knowledge retained in their mind?	
	Frequency	*%*	*Frequency*	*%*
0-4	033	09.1	057	15.6
5-7	087	23.8	231	63.3
8-10	245	67.1	077	21.1
Total	365	100	365	100

*0: Easiest/Minimum score, 10: Most difficult/Maximum score.

Thirty-eight (10.41%) participants scored ≥8 in the assessment**,** 247 (67.7%) scored between 5-7 and 80 (21.9%) scored ≤ 4 (Figure 1). The mean for all participant's

marks was found to be 5.72±1.61, and for those who graduated from medical schools adopting conventional instructional system was 4.86 ±1.65, for graduates from medical schools adopting integrated system was 6.33 ±1.33and for graduates from medical schools adopting hybrid system was 5.9 ± 1.72. Building on these facts, there is significant correlation between integrated system and the high score attained by the participants (P=0.000).

Correlations of scores attained by the participants with other parameters in the questionnaire were elucidated. The system adopted by participants' school of graduation, number and discipline of the rotation when participating in the study, whether preparing for specialty exam or not, showed high significant correlation with score of the participants on answering the basic anatomy questions in the study questionnaire, (P values <0.05). The score of the participants was not influenced by their gender and the time lapse since graduation, (P values > 0.05) (Table 2).

DISCUSSION:

While education system and curriculum are diverse among medical schools in our country, the aim of almost all medical school is focused on generating excellent clinical physicians. Therefore, considerable number of medical schools uses to pay more attention in early delivery of clinical education.

Assessment in medical education is essential for ensuring competence and evaluating the quality of training. Anatomical knowledge can be assessed by written, practical or oral methods. Written assessments typically consist of extended matching questions (EMQs), single best answer questions (SBAs) and short answer questions (SAQs)[14]. Built on this basic, assessment of the retained anatomical knowledge among respondents was carried out by SBA modality.

Medical students build their clinical knowledge on the grounds of previously obtained basic knowledge. There is a growing concern among medical educators that traditional programs of teaching medical students have not provided better outcomes of learning. In the conventional system of medical education, basic medical sciences (anatomy, biochemistry and physiology) are taught in the early years of medical course with least interdisciplinary interaction. Such a system is teacher centered with minimal active participation from the students[15].

Worldwide trends in medical education have influenced medical education for decades by the introduction of an integrated curriculum, implementation of problem-based learning, early exposure to clinics, and so on. These reforms have changed basic science education including anatomy[2]. Though whole of the syllabus cannot be covered by this approach and a hybrid approach has to be adopted in which few topics are covered by traditional didactic lectures and the rest as clinical cases[16]. Moreover, it requires greater coordination among different basic and clinical departments and a motivated faculty committed to improvement in standard of medical education[17].

The vast majority of respondents (77.3%) were graduated from medical schools adopting problem-based and hybrid systems, this explain the trend in medical education in Sudan towards changes from classical conventional instructional (Discipline-based) into integrated (Problem-based) to hybrid (Combination) systems.

The majority of the respondents (67.1%) had considered anatomy is difficult to be learnt. In the other way, study in Korea [2] among students' perception of anatomy education at a Korean medical college 58.7% of students felt that their anatomy

Figure 1: Scores of participants in the knowledge test of anatomy recall

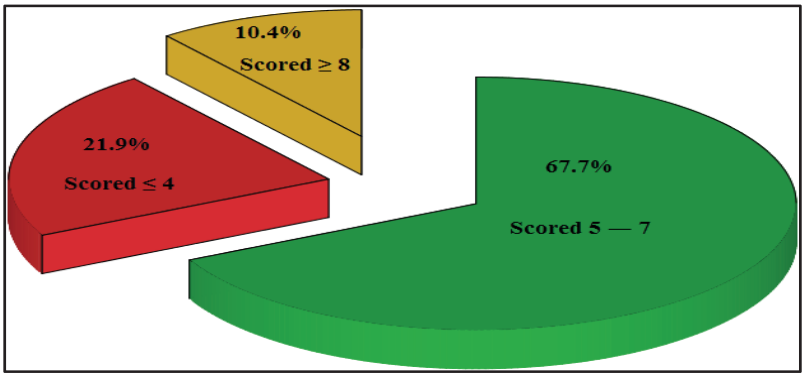

Table 2: Characteristics of studied groups

System adopted	Attained score ≥8	5 —7	≤ 4	Total (%)	P value
Integrated (Problem-based)	28 (11.9%)	184 (78.0%)	24 (10.1%)	236 (64.7%)	
Conventional instructional (Discipline-based)	6 (7.20%)	31 (37.4%)	46 (55.4%)	83 (22.7%)	0.000
Hybrid (Combination)	4 (8.70%)	32 (69.6%)	10 (21.7%)	46 (12.6%)	
Gender performance					
Female	24 (9.20%)	177 (67.6%)	61 (23.2%)	262 (71.8%)	
Male	14 (13.6%)	70 (68.0%)	19 (18.4%)	103 (28.2%)	0.110
Discipline of rota					
Obs. &Gynae.	10 (9.90%)	65 (64.4%)	26 (25.7%)	101 (27.7%)	
Medicine	3 (3.10%)	66 (67.3%)	29 (29.6%)	98 (26.8%)	
Surgery	17 (19.5%)	53 (61.0%)	17 (19.5%)	87 (23.8%)	0.000
Pediatrics	8 (10.1%)	63 (79.8%)	8 (10.1%)	79 (21.6%)	
Number of rota					
1st	6 (6.50%)	36 (39.1%)	50 (54.4%)	92 (25.2%)	
2nd	4 (7.02%)	40 (70.17%)	13 (22.8%)	57 (15.6%)	
3rd	15 (14.6%)	85 (82.5%)	3 (2.90%)	103 (28.2%)	0.000
4th	13 (11.5%)	86 (76.1%)	14 (12.4%)	113 (31.0%)	
Preparation for specialty exam					
Non	8 (3.50%)	152 (67.0%)	67 (29.5%)	227 (62.2%)	
Medicine/Pediatrics	3 (5.70%)	43 (81.1%)	7 (13.2%)	53 (14.5%)	
Surgery/ orthopedics	16 (37.2%)	25 (58.1%)	2 (4.70%)	43 (11.8%)	0.001
Obs. &Gynae.	10 (28.6%)	22 (62.8%)	3 (8.60%)	35 (9.60%)	
Others	1 (14.3%)	5 (71.4%)	1 (14.3%)	7 (1.90%)	
Time since graduation					
< 1 year	8 (10.8%)	51(68.9%)	15 (20.3%)	74 (20.3%)	
1 - 2 years	23 (9.6%)	162 (68.1%)	53(22.3%)	238 (65.2%)	
> 2 years	7 (13.2%)	34 (64.2%)	12 (22.6%)	53 (14.5%)	0.200
Total	38 (10.4)	247 (67.7%)	80 (21.9%)	365 (100%)	

education had been helpful for clinical clerkship in spite of that it is difficult. In contrary, students in general consider anatomy a very important subject for their future as practicing doctors[18].

There is a widespread belief among physicians and medical educators that a substantial portion of the basic science information learned in the traditional preclinical years in medical school is lost during the clinical years[19]. This has been supported by many studies[20,21]. Miller[12] flagged that it is not uncommon for students to retain around 10% of the anatomy offered in their traditional course. Things have not changed since then. Another cross-sectional study in Saudi Arabia reported that 21% of their students were able to recall anatomy in their clinical years[13]. The current study showed better results with recall knowledge of anatomy being 78.1% among respondents.

Approximately eighty four (84.4) of respondents felt that they were able to recollect the facts related to anatomy during their clinical practice. The general picture is that gross anatomy shows a modest loss[20,22,23]. Krebs[24] discovered that medical students retained 65% of the simple basic science knowledge.

Anatomy is essential for all branches of medicine. The anatomical knowledge gathered is used by a doctor throughout his life[25].Whatever methods of instruction used[26] and whatever types of questions examined, the findings hadpointed to a loss of knowledge[27]. This is in agreement with the results obtained in the current study as the accumulative knowledge loss was 21.9%. This loss was observed in all respondents irrespectively.

We cannot completely rule out the possibility of pre-existing systematic differences between students from different medical schools. However, given the homogeneity of Sudan high school education and the national admission procedure to medical school, significant differences between schools in student levels are unlikely.

In fact, the respondents from schools adopting problem based learning found to have the highest level of anatomy recall knowledge as compared to the graduate from other medical schools adopting the classical conventional system. In contrary, Prince et al.[18] in Netherlands had concluded that problem-based learning students were found to have the same perceived level of anatomy knowledge as students at other medical schools. Differences in actual levels of knowledge were found between schools. No significant effects on knowledge levels were found for PBL schools versus non-PBL schools.

The level of basic science knowledge used in clinical diagnosis differs depending on the discipline and mirrors to some extent the content of clinical clerk-ships: anatomy appear more susceptible to substantial decay[10].

In conclusion up to 78.1 % of preclinical knowledge of anatomy can be memorized by all intern doctors after graduation irrespective to differences in curricula. In modern curricula, the early integration of anatomy and clinical skills education at undergraduate level is seen as important. The findings of this study reflected that medical doctors graduated from schools adopting integrated instructional system or Hybrid system scores better than those graduated from schools adopting the conventional medical system.

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CONFLICT OF INTEREST:
The authors declare that there is no conflict of interest.

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REFERENCES:

1. Hecker K., Violato C. Medical School Curricula: Do curricular approaches affect competence in medicine? Fam Med 2009;41(6):420-6.
2. Min J.C., Young-il H. Students' perception of anatomy education at a Korean medical college with respect to time and contents. Anat Cell Biol 2013;46:157-162.
3. Holla S.J., Ramachandran K., Issac B., Koshy S. Anatomy education in a changing medical curriculum in India: Medical students feedback on duration and emphasis of gross anatomy teaching. AnatSciEduc 2009;2:179-183.
4. Pandey P.,Zimitat C. Medical students learning of anatomy: Memorization, learning, and visulization. Medical Education 2007;41(1): 7-14.
5. Smith C., Mathias H. An investigation into medical students' approachesto anatomy learning in a systems-based prosection course. Clinical Anatomy 2007;20:843-848.
6. Jaschinski J., De Villiers M.R. Factors influencing the development of practical skills of interns working in regional hospitals of the Western Cape province of South Africa. SA FamPract 2008;50(1):70-75.
7. D'Eon M.F. Knowledge loss of medical students on first year basic science courses at the university of Saskatchewan. BMC Medical Education 2006, 6:5.
8. Cox K. Knowledge which cannot be used is useless. Med Teacher 1987; 9:145-54.
9. Ellis J.S., Semb G.B., Cole B. Very long-term memory for information taught in school. ContempEduc Psych 1998; 23:419-33.
10. Wilhelmsson N., Laksov K.B., Dahlgren L.O., Hult H., Nilsson G., Ponzer S., et al. Long-term understanding of basic science knowledge in senior medical students. International Journal of Medical Education. 2013;4:193-197.
11. Lazic E, Dujmovic J, Hren D. Retention of basic sciences knowledge at clinical years of medical curriculum. *Croat Med J*. 2006; 47: 882– 887.
12. Miller G.E. An inquiry into medical teaching. J Med Educ. 1962;37:185–91.
13. Alam A. How do medical students in their clinical years perceive basic sciences courses at King Saud University? Ann Saudi Med. 2011;31:58–61.
14. Rowland S., Ahmed K., Davies D.C., Ashrafian H,. Patel V., Darzi A., et al. Assessment of anatomical knowledge for clinical practice: Perceptions of clinicians and students. SurgRadiolAnat 2011; 33: 262-9.
15. Gupta S., Gupta A.K., Verma M., Kaur H., Kaur A., Singh K. The attitudes and perceptions of medical students towards basic science subjects during their clinical years: A cross-sectional survey. Int J Appl Basic Med Res. 2014;4(1): 16–19.
16. Abraham R.R., Vinod P., Kamath M.G., Asha K., Ramnarayan K. Learning approaches of undergraduate medical students to physiology in a non-PBL-and partially PBL-oriented curriculum. AdvPhysiol Educ. 2008;32:35–7.
17. Nayak S., Ramnarayan K., Somayaji N., Bairy K.L. Teaching anatomy in a problem-based learning (PBL) curriculum. Neuroanatomy. 2006;5:2–3.
18. Prince K.J.A.H., Mameren H.V, Hylkema N., Drukker J., Scherpbier A.J.J.A., Van der Vleuten C.P.M. Does problem-based learning lead to deficiencies in basic science knowledge? An empirical case on anatomy. Medical Education 2003;37:15–21.
19. Custers E.J. Long-term retention of basic science knowledge: A review study. Adv Health SciEduc Theory Pract. 2010;15:109–28.
20. Kennedy W.B., Kelley P.R., Jr, Saffran M. Use of NBME examinations to assess retention of basic science knowledge. J Med Educ. 1981;56:167–73.
21. Norman G. The essential role of basic science in medical education: The perspective from psychology. Clin Invest Med. 2000;23:47–51.
22. Blunt M.J., Blizard P.J. Recall and retrieval of anatomical knowledge. Br J Med Educ. 1975;9:252–63.
23. Dubois A.B., Nemir P., Jr, Schumacher C.F., Hubbard J.P. Graduate medical education in basic sciences. J Med Educ. 1969;44:1035–43.
24. Krebs R., Hofer R., Bloch R., Guibert J-J. Conversation etoubli des connaissances en biologieacquises pour le premier examenpropédeutique de medicine. MEDUCS

Bulletin de l'Association Suisse d'EducationMedicale 1994; 4:10-15.
25. SarmaHP., Islam M. Impact of Dissection on Under Graduate and Post Graduate Study in Medical Colleges. Sch. J. App. Med. Sci., 2015; 3(2A):551-554
26. Harrison A. Using knowledge decrement to compare medical students' lo ng term retention of self-study and lecture materials. Assess and Eval in Higher Educ 1995; 20:149-59.
27. Giles R.M., Johnson M.R., Knight K.E., Zammett S., Weinman J. Recall of lecture information: A question of what, when, and where. Med Education 1982; 16:264-8.

Appendix (1)

Questionnaire No. ( )

The questionnaire designed for research purposes - **(Recall Knowledge of Anatomy for House Officer).**
Contents and data will be of use only in the purposes of the research, and any deviation will not be allowed.
The responsibility of data collection, analysis and confidentiality of the results is the responsibility of the researchers who prepared the questionnaire.
Please tick in all fields as appropriate ( )

Gender	Male 0					Female 0					
Age	.....										
Graduation year	.....										
University	.....										
System adopted in university	Classical (Discipline-based) 0					Integrated (Problem-based) 0			Hybrid (combination) 0		
Time elapsed between graduation and starting houseman ship	..... months										
Current training specialty	Medicine 0		Paediatrics 0			Obs&Gynae 0			Surgery 0		
Other completed training specialty/specialties	Medicine 0		Paediatrics 0			Obs&Gynae 0			Surgery 0		
Have you wish to do postgraduate study?	Yes 0					No 0					
Interesting speciality	Medicine 0		Paediatrics 0			Obs&Gynae 0			Surgery 0		
	Others.....										
Preparing/pervious attempt for qualifying exam (MD, MRCP, PLAB, USMLE,….etc)	Yes 0					No 0					
	If yes, Specify					.....					
Anatomy											
From 0 to 10. How much it is difficult? (0 easiest score and 10 highest score)	0 0	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0	9 0	10 0
How much knowledge retained in your mind you think?	0 0	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0	9 0	10 0

Each of the following questions consists of a statement and five suggested answers, indicate only the single correct answer by ticking ( )

1. **The femoral triangle:**
   ( ) A. Is bounded medially by the rectus femoris muscle
   ( ) B. Is bounded laterally by the adductor longus muscle
   ( ) C. Femoral artery that lies lateral to femoral vein
   ( ) D. Femoral vein lies adjacent to the femoral nerve
   ( ) E. Femoral nerve is the most medial of the neurovascular bundle in the triangle
2. **The brain supplied by blood from:**
   ( ) A. Internal carotid and external carotid arteries
   ( ) B. External carotid and vertebral arteries
   ( ) C. Internal carotid and vertebral arteries
   ( ) D. Internal carotid, external carotid and vertebral arteries
   ( ) E. Internal carotid artery and direct branch from aortic arch
3. **The thyroid gland:**
   ( ) A. Is originated from midline bud
   ( ) B. Receives a maior blood supply from the middle thyroid artery
   ( ) C. Receive some of its blood supply via the superior thyroid artery a branch of the internal carotid artery
   ( ) D. Receive some of its blood supply via the thyroideaima artery in 90% of people
   ( ) E. Is enclosed by the pretracheal fascia
4. **The breast:**
   ( ) A. Its base extends over 2nd to 6thintercostals spaces
   ( ) B. Has an arterial supply derived from the brachial artery
   ( ) C. Has a nipple in the T2 dermatome
   ( ) D. The retromammary space overlies the pectoralis minor muscle
   ( ) E. 50% of its lymphatic drainage to the axillary lymph nodes
5. **The oesophagus:**
   ( ) A. 20 cm in length
   ( ) B. Enters the abdomen through a diaphragmatic orifice at the level of the T8 vertebra
   ( ) C. Is supplied by the superior thyroid artery in its upper third
   ( ) D. Has an outermost layer called serosa
   ( ) E. Is more closely related to the anterior vagal than the posterior vagal nerve in its abdominal course
6. **The long saphenous vein:**
   ( ) A. Terminates at the saphenofemoral junction at mid-thigh
   ( ) B. Passes behind the lateral border of the patella
   ( ) C. Communicates with the deep veins of the lower limb
   ( ) D. Passes behind the lateral malleolus
   ( ) E. Has one tributary in the groin
7. **A patient presents with an inability to adduct and abduct the fingers, positive Froment's sign, loss of sensation of the medial 1.5 digits and clawing of the ring and little fingers. The nerve/s injured:**
   ( ) A. Median nerve
   ( ) B. Radial nerve
   ( ) C. Ulnar nerve
   ( ) D. Ulnar and median nerves
   ( ) E. Median, radial and ulnar nerves
8. **Levatorani:**
   ( ) A. Forms the roof of the ischiorectal fossa
   ( ) B. Is supplied by L4/L5
   ( ) C. Lies at the bifurcation of the aorta
   ( ) D. Divided into deep and superficial parts
   ( ) E. Originates from the ischial spine solely
9. **In the inguinal canal the inguinal and lacunar ligaments froms:**
   ( ) A. Anterior wall
   ( ) B. Posterior wall
   ( ) C. Roof
   ( ) D. Floor
   ( ) E. Posterior wall and roof
10. **The liver:**
    ( ) A. The left lobe is in direct contact with the left suprarenal gl
    ( ) B. Is covered completely with peritoneum
    ( ) C. Is attached to the diaphragm by the falciform ligament
    ( ) D. May be divided into 8 anatomical segments
    ( ) E. Left lobe is larger than the right lobe