An Analysis of the Most Commonly Tested Topics and Their Taxonomy From Recent Self-Assessment Examinations

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OBJECTIVE: The purpose of this study is to determine the most commonly tested topics and the question taxonomy of the American Academy of Orthopaedic Surgeons Self-Assessment Examinations (SAE) from 2009 through 2014.

DESIGN: All SAEs were analyzed from 2009 through 2014. The SAEs were separated by subject and the questions of each SAE were analyzed for topic, taxonomic classification, and question type.

RESULTS: A total of 2107 questions were reviewed from 10 different subjects. In all, 6 of the 9 subjects had roughly 1/3 of their questions composed of the 3 most commonly tested topics. Each subject had at least 1 trauma-related question within its top 5 most commonly tested topics. Almost half (47%) of all questions were of taxonomy 1 classification and 29% were taxonomy 3. The Basic Science SAEs had the greatest percentage of taxonomy 1 questions of any subject (83%) whereas Trauma contained the highest percentage of taxonomy 3 questions (47%).

CONCLUSIONS: Certain topics within each subject are consistently tested more often than other topics. In general, the 3 most commonly tested topics comprise about one-third of total questions and orthopedic surgeons should be very familiar with these topics in order to best prepare for standardized examinations. (J Surg Ed ▮:▮▮▮-▮▮▮. Published by Elsevier Inc on behalf of the Association of Program Directors in Surgery)

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COMPETENCIES: Medical Knowledge, Professionalism, Practice-Based Learning and Improvement, Systems-Based Practice

INTRODUCTION

Between the Orthopaedic In-Training Examination (OITE), American Board of Orthopaedic Surgeons (ABOS) Part I examination and recertification examinations required as part of the Maintenance of Certification process, orthopedic surgeons are required to demonstrate their knowledge of a wide spectrum of orthopedic disease processes and treatments throughout their careers. The latter 2, ABOS Part I and recertification exams, are especially important to an orthopedic surgeon's career as it is necessary to pass both in order to obtain, and retain, status as a board certified orthopedic surgeon.[1] Preparing for these examinations are challenging for many physicians and it has been recommended that surgeons prepare for them by determining what material is most likely to appear on the test.[1]

In recent years, multiple studies have been completed to analyze the question types and topics that are found within the OITE.[2-16] These studies identify the topics most tested for various subjects and, therefore, can be used by residents in an effort to best prioritize their study. In addition, these studies have also reviewed the taxonomy of the OITE test questions. This analysis provided readers with an idea of how many levels of reasoning or knowledge are needed to answer each question and showed that having to directly recall a fact or formula a diagnosis or treatment from the question stem was the most common taxonomies found in the examinations.[2,5-7,11-13,15] However, it is unclear if these topics are also the most commonly tested topics for the board certification exams. One previous study found that

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the American Academy of Orthopaedic Surgeons (AAOS) Self-Assessment Examinations (SAE) were actually the most commonly used source of questions for residents preparing for ABOS Part 1 even though they are designed to help surgeons prepare for the recertification exams.[17]

Despite SAEs apparently common usage for test preparation for the OITE to recertification exams, these examinations have not been analyzed in the same manner as the OITEs in terms of their content. The aims of this study were to (1) analyze the most recently published SAEs to determine the most commonly test topics for each subspecialty, (2) to evaluate the taxonomy the questions within the SAEs, and (3) to discuss a comparison between SAE test questions and OITE questions in order to consider the utility of either for test preparation.

METHODS

All 2107 questions contained in the AAOS SAEs from 2009-2014 were examined and categorized based on central topic or diagnosis addressed within the question. There are 3 SAEs published each year on rotating topics and each test consists of roughly 100 questions. SAEs from 2009-2014 evaluated for this study covered the following topics: Basic Science, Anatomy/Imaging, Foot/Ankle, Pediatrics, Sports, Trauma, Spine, Shoulder/Elbow, Upper Extremity, Musculoskeletal Tumor, and Adult Reconstruction. Each question was reviewed and categorized by the subspecialty subject of the Self-Assessment Exam (e.g., Foot/Ankle, Adult Reconstruction) and the topic of the question (e.g., Hallux deformities, hip dysplasia). The questions from the Shoulder/Elbow and Upper Extremity SAEs were combined and analyzed as one subject.

In addition to the central topic of each question, the taxonomy of each question was evaluated using previously established guidelines.[5,10,18] Questions requiring only the recall of facts were labeled as Taxonomy 1, those necessitating **a** diagnosis or radiographic interpretation in isolation were identified as Taxonomy 2 and those requiring the test taker to make definitive management or treatment decisions were classified as Taxonomy 3.[1,5,8] To further describe the question type, questions were classified as multiple choice or extended matching.

Analysis of the different question topics and taxonomy levels were then performed to determine the most common topics for each subspecialty and the most common taxonomy levels.

RESULTS

A total of 2107 questions were reviewed from 10 different subjects. The top 10 most commonly tested topics for each subject are included in Table 1. Spine (31%), Sports Medicine (30%), Trauma(30%), Shoulder/Elbow/Upper Extremity(33%), Musculoskeletal Tumor (36%), and Foot/Ankle (28%) all had roughly one-third of their questions made up of the 3 most commonly tested topics. The top 10 topics for each of these covered 57% (Musculoskeletal Tumor) to 70% (Spine) of all questions per subspecialty. Pediatrics (57%), Basic Science (52%), and Anatomy/Imaging (54%) all had more than 50% of their questions come from the 3 most commonly tested topics and the top 10 topics covered 88% (Basic Science) to 100% (Pediatrics) of subspecialty questions. However, the topics within those subjects appear to be quite broad when compared the topics found in the other subjects. In the Pediatric SAEs specifically, 43% of all questions were based on congenital or developmental diseases. This has the potential to be a very large category based on the pure number of congenital and developmental diseases that exist. Meanwhile, one-third of the Anatomy/Imaging questions were based on sports medicine, 3 times more than any other topic for that examination.

Certain topics overlapped multiple subspecialty SAEs. Except for Musculoskeletal Tumor, Anatomy/Imaging, and Basic Science, all subjects had at least 1 trauma or fracture-related topic within the 5 most commonly tested topics for each subject. For example, the Shoulder/Elbow/Upper Extremity SAEs were composed of 34% trauma questions between elbow, hand, clavicle, and humerus trauma (13%, 8%, 7%, and 6%, respectively). The Foot/Ankle SAEs where ankle, hindfoot ,or midfoot trauma made up close to one quarter of all of the questions (10%, 9%, and 5%, respectively). Spine trauma, combining cervical, thoracic, and lumbar fractures into 1 category, would account for 17% of total Spine questions. Pediatrics questions covered trauma principles 21% of the time and Adult Reconstruction questions covered periprosthetic fracture 8% of the time. Interestingly, however, the most common topic for the Trauma SAEs was not a specific injury itself but the management of the polytrauma patient followed by pelvic fractures, a topic exclusive to the Trauma SAE.

Additional overlap between SAEs was identified for certain sports or soft tissue trauma diagnoses. Anterior shoulder instability was the most common topic for the Shoulder/Elbow/Upper Extremity SAEs (15%) and also found in the Sports Medicine SAEs for 6% of questions. Rotator cuff disease was the second most common topic for Shoulder/Elbow/Upper Extremity SAEs and also found in 3% of Sport Medicine questions. Questions regarding the anterior cruciate ligament were, by far, the most common within the Sport Medicine SAEs comprising 17% of questions. The Anatomy/Imaging SAE questions overlapped with all subspecialty test with the highest overlap with Sports Medicine topics (33%). Hip deformity such as hip dysplasia and femoral acetabular impingment (FAI) can be found in the Adult Reconstruction tests (4% hip dysplasia) and Sports Medicine tests (12% FAI).