

Analysis of an In-Service Examination for Core Pediatric Craniofacial Surgery Knowledge

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OBJECTIVE: Little is known about designing an effective residency curriculum for pediatric craniofacial surgery. This study elucidates the pediatric craniofacial curriculum of the Plastic Surgery In-Service Training Examination (PSITE) to facilitate knowledge acquisition during residency.

DESIGN: Approximately, 6 consecutive PSITEs were reviewed for pediatric craniofacial questions (2010-2015). Subjects were categorized according to topics on the American Board of Plastic Surgery written board examination. Questions were categorized using an educational taxonomy model. Answer references were categorized by source and publication lag.

RESULTS: Of 1174 PSITE questions, 147 tested pediatric craniofacial topics (12.5%). Questions appeared predominantly in the Craniomaxillofacial section (83.0%, $p < 0.001$). The annual representation was stable more than 6 years (range: 10.2%-14.4%, $p = 0.842$). Question taxonomy favored interpretation (45.6%) and decision-making (40.8%) over recall (13.6%, $p < 0.001$) skills, and 41 questions had an associated image (27.9%) and most were photographic (76.7%, $p < 0.001$). The most frequently tested categories on the American Board of Plastic Surgery written examination content outline were craniofacial anomalies (23.5%), benign and malignant tumors (17.6%), and cleft lip and palate (12.5%). Overall, 80 unique journals were cited 304 times with a mean publication lag of 9.4 ± 10.9 years. *Plastic and Reconstructive Surgery* (34.5%) was the most cited journal ($p < 0.001$).

CONCLUSIONS: These data may assist in designating core knowledge competency in pediatric craniofacial surgery for plastic surgery residents. A further understanding of PSITE

utility for core knowledge competency in pediatric craniofacial surgery would be the focus of future work. (J Surg Ed 73:375-380. © 2016 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: training, residency, craniomaxillofacial, education, boards, examination

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

INTRODUCTION

Plastic surgery residency training is designed to prepare residents for their board examinations and to ultimately create competent surgeons. Integrated plastic surgery residents have 6 years to prepare for the written examination of the American Board of Plastic Surgery (ABPS). The American Council of Graduate Medical Education (ACGME) oversees the accreditation of plastic surgery residency programs and defines 6 core competencies for residency training.¹ Medical knowledge is a competency for which residents should receive regular evaluation. In the United States, this domain is evaluated each year via the Plastic Surgery In-Service Training Examination (PSITE).²

Head and neck surgery comprises one-third of the ABPS written board examination,³ of which pediatric craniofacial surgery remains a significant subset. Given the relative rarity of cases treated,⁴ this discipline has presented difficulties for curricular design and clinical exposure for program directors in plastic surgery. Currently, many integrated plastic surgery residents are not exposed to craniofacial surgery during their first 3 years of training.⁵ Yet, the ACGME⁶ requires the completion of 50 operative cases for head and neck congenital defects upon graduation. To fulfill this requirement, many programs export their residents to affiliated children's hospitals. Thus, designing an effective pediatric craniofacial surgery rotation for plastic surgery residents can be challenging. Ultimately, plastic surgery graduates who want to practice pediatric craniofacial surgery in North

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America seek specialized craniofacial surgery fellowship training, though there is no mandate to do so.⁷

The purpose of this study was to codify the types of questions asked on the PSITE as an educational resource for trainees and educators in pediatric craniofacial surgery. Specifically, we analyzed 6 years of PSITE questions to determine (1) the proportion of questions dedicated to pediatric craniofacial topics, (2) most common clinical settings for question vignettes, (3) breakdown of question taxonomy, (4) most tested craniofacial anatomy, (5) highest yield references supporting correct answer choices, and (6) overlap with essential craniofacial surgery techniques for graduating residents.⁴ Elucidation of high-yield topics and literature sources in craniofacial surgery may facilitate the development of a core curriculum for residents.

METHODS

Each year, the American Society of Plastic Surgeons administers the PSITE to a national cohort of plastic surgery residents. A systematic analysis of 6 consecutive PSITE syllabi was conducted for which approval by the institutional review board was not required (2010-2015). A 6-year period was selected to reflect the typical examination experience of an integrated plastic surgery resident. Questions related to pediatric craniofacial surgery were included. The content outline for the written examination for the ABPS⁸ was used to categorize topics. Evaluators reviewed questions, answers, and recommended references to construct a database with variables for each question included by consensus of study investigators. Questions ultimately not scored due to poor statistical performance were excluded.

The 4 sections of the PSITE were searched for pediatric craniofacial topics. During the study period, the PSITE had comprehensive, hand and lower extremity, craniomaxillofacial, and breast and cosmetic sections. Using a question taxonomy model,⁹ questions were assigned in 1 of 3 categories—level I, recall; level II, interpretation; and level III, decision-making. This model ascribes higher cognitive processes to level III questions, as they incorporate skills of preceding levels. Question vignettes were categorized according to the clinical scenario depicted as outpatient, operating room/perioperative, emergency department/trauma, or not applicable (N/A).

Craniofacial topics were classified according to topics on the ABPS content outline for the written board examination.⁸ Section IV, “Plastic Surgery of the Head and Neck” was used to categorize questions by the category that led to the correct answer. “Other” was used to categorize topics that were tested one time throughout the study period (Supplementary Table 1).

To develop a list of high-yield literature sources in pediatric craniofacial surgery, we recorded the recommended references

for correct answer choices. These references are provided by question writers as literature supporting correct answer choices. Journal references were tabulated by source and year of publication. Publication lag was defined as the number of years from publication to PSITE administration and calculated for each journal. The most referenced textbooks were quantified by title.¹⁰⁻¹⁴

A comprehensive review of PSITE questions was undertaken to assess overlap with the top 5 craniofacial techniques for training during plastic surgery residency.⁴ As voted by an expert panel of craniofacial surgeons, these techniques were bone graft for nasal reconstruction, bone graft for perialar rim, bone graft for orbital floor defects, osseous genioplasty, and lateral canthopexy.

Question variables were presented descriptively with percentages and means. Categorical differences were determined via chi-square analyses and post-hoc analyses with Fisher exact tests. Statistical tests were 2 tailed, performed on STATA 13 (StataCorp, College Station, TX), and considered significant if $p < 0.05$.

RESULTS

Of 1174 scored PSITE questions, 147 tested pediatric craniofacial topics (12.5%). This averaged to 24.5 ± 2.7 questions per year (Table 1). Questions were written predominately in the craniomaxillofacial section (83.0%) ($p < 0.001$), and 41 questions had an associated image (27.9%) most of which were photographic (76.7%, $p < 0.001$). The percentage of dedicated pediatric craniofacial questions was stable throughout the study period (range: 10.2%-14.4%, $p = 0.842$). Level I, recall questions were a minority (13.6%, $p < 0.001$) with greater level II, interpretation (45.6%) and level III, decision-making (40.8%) questions. Most questions were written with an outpatient clinical vignette (64.6%, $p < 0.001$).

Pediatric craniofacial questions were categorized by anatomical focus (Table 2). The oropharynx (28.6%) and craniofacial skeleton (25.9%) accounted for most of the questions. Questions were categorized according to the ABPS written examination content outline (Table 3). Craniofacial anomalies (23.5%), benign and malignant tumors (17.6%), and cleft lip and palate (12.5%) were the most frequently tested categories. The distribution of diagnoses and subcategories are presented in Table 2 and multiple topics tested only once are presented in Supplementary Table 1.

A total of 304 citations to 80 unique journals gave an average of 2.1 citations per question (Table 4). *Plastic and Reconstructive Surgery* (34.5%) was the most cited journal ($p < 0.001$) followed by *Journal of Craniofacial Surgery* (10.2%). There was a mean publication lag of 9.4 ± 10.9 years for all references with the shortest publication lag for *Journal of Craniofacial Surgery* (5.6 ± 4.2). Approximately,

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