Literature Recommended as Study Aids for the Hip Reconstruction Section of the Orthopaedic In-Training Examination

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Abstract

One section of the Orthopaedic In-Training Examination (OITE) assesses knowledge about hip reconstruction. In the investigation reported here, we examined OITE hip reconstruction questions and sought to identify which literature can be recommended as study aids for this section of the test.

All hip reconstruction questions on the OITE from 2002 to 2006 were characterized according to diagnosis and treatment. Journals cited most often in this section were identified from the OITE key. This content domain was compared with the literature in terms of overall proportion of questions/articles related to hip reconstruction and in terms of diagnoses and treatments.

Of the 1375 OITE questions asked over the 5 years, 79 were related to hip reconstruction. More than half of these hip reconstruction questions were related to primary total hip arthroplasty, with complications being the diagnosis tested most often.

The results of this study suggest that residents may benefit from using general orthopedic journals when preparing for the OITE hip reconstruction section. When preparing an educational program, however, one should be aware that clinical journals may not reflect the OITE in terms of proportion of basic science and biomechanics articles.

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The Orthopaedic In-Training Examination (OITE) was designed to be a standardized measure for testing orthopedic residents' knowledge about associated pathologies, diagnostic evaluations, surgical techniques, and treatment options.[1] After trauma and pediatrics, hip and knee reconstruction was the most frequently tested specialty area over a recent 5-year period, representing nearly 1 of every 10 questions on the OITE. Risner and colleagues[2] recently suggested that a cohort of residents at their institution did not meet an acceptable level of performance on these hip and knee questions. Furthermore, those authors reported a national-level negative trend for resident performance in this area. One tool that may be useful in improving resident knowledge and performance in this area may be the literature. Recent studies have shown that the material tested on the OITE is similar in content to recent scientific literature for some content domains and that use of current literature correlates with higher OITE scores.[3,4]

In the study reported here, we asked 5 questions: What is the content of the OITE hip reconstruction questions? Which orthopedic journals are most often listed as resources in the OITE examination key? Are the OITE hip reconstruction questions and the content of

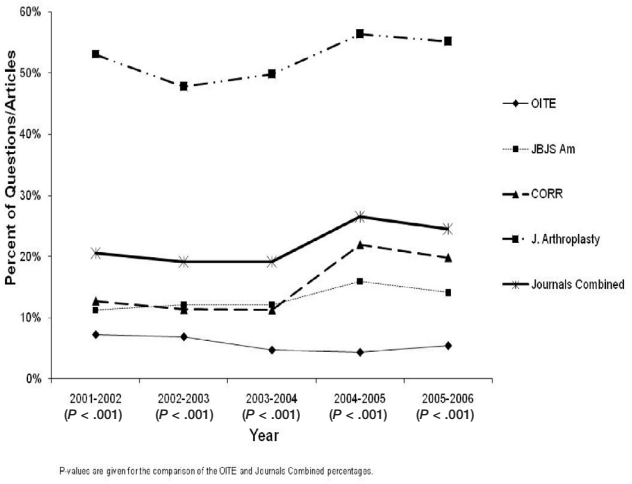

Figure. Comparison of percentage of Orthopaedic In-Training Examination questions and percentage of journal articles related to hip reconstruction over a 5-year period.

Table. Comparison of Hip Reconstruction Content for Orthopaedic In-Training Examination (OITE) and Current Literature

Category	Journals, %			All	OITE, %[a]	*P* Value[b]
	JBJS–Am[a]	*Clin Orthop*[a]	*J Arthroplasty*[a]			
Overall hip reconstruction questions/articles	13.2	15.7	52.5	22.1	5.7	<.001[d]
Diagnosis						
Osteoarthritis	6.0	5.8	3.6	4.8	2.5	<.001[d]
Rheumatoid arthritis	0.4	1.0	1.2	0.9	5.1	<.001[d]
Osteonecrosis	4.3	5.8	2.3	3.8	3.8	<.945
Fractures	8.9	6.3	4.0	5.7	19.0	<.001[d]
Infections	3.9	6.3	6.1	5.7	3.8	<.008[d]
Complications	46.8	38.1	44.3	42.9	50.6	<.001[d]
Other	23.8	31.3	26.4	27.3	16.5	<.001[d]
Arthritis general/nonspecified	39.7	31.6	52.1	34.3	35.4	.46
Treatment						
Primary total hip arthroplasty	60.6	57.9	68.4	63.4	62.0	.711
Revision total hip arthroplasty	24.8	26.3	32.6	29.0	22.8	.046[d]
Hip resurfacing	1.8	3.8	1.6	2.3	1.3	.381
Arthrodesis	1.1	1.5	0.0	0.7	3.8	<.001[d]
Joint preservation	11.3	11.0	2.0	6.8	5.1	.345
Therapy/rehabilitation	1.1	0.8	1.5	1.2	1.3	.868
Other	9.9	14.5	6.4	9.7	8.9	.75
Primary focus						
Pathology, etiology, anatomy	6.4	8.5	11.0	9.2	17.7	<.001[d]
Diagnosing cases[c]	11.3	10.0	8.7	9.7	1.3	<.001[d]
Treatment modalities and outcomes	67.7	62.7	61.3	63.1	41.8	<.001[d]
Biomechanics, materials, basic science	14.5	18.8	18.9	17.9	39.2	<.001[d]

Abbreviations: *Clin Orthop, Clinical Orthopaedics and Related Research; J Arthroplasty, Journal of Arthroplasty; JBJS–Am, Journal of Bone and Joint Surgery–American Volume.*

[a]Some questions and articles were included in more than 1 category. [b]For comparison of OITE with combined journal percentages. [c]OITE questions were categorized as diagnosis only when resident had to determine the diagnosis. [d]Statistically significant.

high-impact clinical orthopedic journals similar in terms of overall proportion and content? Is the hip reconstruction content similar across the orthopedic journals? Which textbooks are most often recommended for OITE hip reconstruction content?

Materials and Methods

We systematically reviewed the OITE over a 5-year period (2002–2006). All hip reconstruction questions were identified. To determine appropriate categories of diagnosis and treatment, Mr. Marker and Dr. Mont reviewed the educational textbooks, OITE review courses, and meeting curricula for sessions supported by the Hip Society and the American Association of Knee and Hip Surgeons. The other authors then reviewed and reached a consensus on these categories. Finally, we all discussed suggested changes and approved them before proceeding with use of the categories.

Eight diagnosis categories were determined: osteoarthritis, rheumatoid arthritis, osteonecrosis, fractures, infections, complications other than infections, arthritis general/nonspecified, and other.

Seven treatment categories were determined: primary total hip arthroplasty (THA), revision THA, hip resurfacing, arthrodesis, joint preservation (osteotomy, cartilage restoration), physical therapy/rehabilitation, and other.

We also determined an overall focus category for each question according to whether it required recall of pathology, etiology, or anatomy; diagnosis of a condition or knowledge of appropriate diagnostic modalities; determination of appropriate treatment or prognosis after treatment; or knowledge of biomechanics, materials, or basic science. Each question was included in only 1 of these 4 focus categories but could be categorized by more than 1 diagnosis or treatment category. To further characterize the questions, we noted whether each question had a corresponding image and which specific imaging modality was used.

The recommended readings provided by the American Academy of Orthopaedic Surgeons (AAOS) in the score key for the 5 examinations included in this study were reviewed. For each hip reconstruction question, the journals listed as a recommended reference were identified and tabulated. The 3 journals cited most often were selected for further evaluation as potential study aids for the OITE.

All hip reconstruction articles published in these 3 journals over the 5 years (2001–2005) preceding each OITE examination were identified. Total number of articles in these journals was counted so that we could calculate the proportion of publications related to hip reconstruction. This proportion was compared with that of the OITE hip reconstruction questions, stratified by year and by overall percentages.

The hip reconstruction articles from the top 3 cited journals were then stratified using the same diagnosis and treatment categories used for the OITE questions. On the basis of their content, some articles were included in more than 1 diagnosis or treatment category. The

articles were also stratified using the 4 focus areas. The proportions of articles and questions in each focus area were compared to assess whether OITE content and journal content were similar.

Similarly, the journals were compared with one another in terms of their hip reconstruction content. The proportion of articles in the diagnosis and treatment categories for each journal was compared with the overall percentage for the journals combined.

The AAOS score key was reviewed to identify textbooks that were recommended references for the OITE hip reconstruction questions. The 3 most often cited textbooks were identified.

All data were entered into a spreadsheet and analyzed with SPSS 13.0 software (SPSS, Chicago, Illinois). With use of the overall difference in proportion of OITE hip reconstruction questions vs the corresponding percentage of published studies in the 3 journals combined as the primary measure, a power analysis indicated sample size sufficient to answer the primary research question at a power of greater than 80%. χ^2 test with Yates correction was used to compare all proportions. $P<.05$ was considered significant.

Results

The 79 hip reconstruction questions represented 6% of all 1375 OITE questions over the 5-year period reviewed. The questions most often focused on treatment options (42%) and biomechanics, materials, and basic science (39%). Stratification by subcategories showed that more than half of the questions (62%) were related to primary THA, with complications being the diagnosis tested most often (51%).

The 3 orthopedic journals most often cited for the OITE hip reconstruction section were clinically focused: *Journal of Bone and Joint Surgery–American Volume (JBJS–Am), Clinical Orthopaedics and Related Research (Clin Orthop),* and *Journal of Arthroplasty (J Arthroplasty)*. These journals represented more than 62% of all the recommended journal references.

The next most often cited journals were *Journal of Bone and Joint Surgery–British Volume* and *Journal of the American Academy of Orthopaedic Surgeons*. Also cited were *Orthopedic Clinics of North America, American Journal of Sports Medicine, Journal of Biomedical Materials Research, American Journal of Orthopedics, Injury,* and *Acta Orthopaedica Scandinavica*. Rarely cited journals were *Orthopedics, Journal of Trauma, Journal of the Southern Orthopaedic Association, Journal of Pediatric Orthopaedics, Clinical Biomechanics, Biomaterials,* and *American Journal of Therapeutics*.

Twenty-two percent (1288/5832) of the hip reconstruction articles identified in the 5-year review were from the 3 journals cited most often—statistically significantly ($P<.001$) higher than the 6% of OITE questions related to hip reconstruction during the corresponding period. Even when *J Arthroplasty* was excluded—53% of its articles were related to hip reconstruction—the percentage of hip reconstruction articles in the other 2 journals (15%) was still significantly ($P<.001$) higher than the percentage of OITE hip reconstruction questions. Findings were similar when OITE and journals were stratified by year. The percentage of hip reconstruction articles in the 3 journals combined was statistically significantly higher than the corresponding percentage of OITE hip reconstruction questions (Figure).

Although general trends were similar for the proportion of questions and articles when stratified by diagnosis and treatment categories, there was a statistical difference for some of the percentages for the categories (Table). In addition, the literature focused more on treatment modalities and outcomes (OITE, 42%; literature, 63%; $P<.001$) than on pathology, etiology, and anatomy (OITE, 18%; literature, 9%; $P<.001$) and biomechanics, biomaterials, and basic science (OITE, 39%; literature, 18%; $P<.001$).

The content of the 3 journals cited most often was the same, with a few exceptions. The percentage of joint preservation articles (studies assessing treatments, such as osteotomies and cartilage restoration techniques) was significantly ($P<.001$) lower for *J Arthroplasty* (2%) than for *JBJS–Am* (11%) and *Clin Orthop* (11%). In addition, compared with the other 2 journals, *J Arthroplasty* had a higher percentage of general arthritis articles than articles related to more specific disease etiologies, such as osteonecrosis and osteoarthritis.

Overall, textbooks represented 21% of the recommended references provided for the OITE hip reconstruction questions reviewed over the 5-year period. The 3 textbooks cited most often—*Orthopaedic Knowledge Update* (39%), *Instructional Course Lectures* (30%), and *Adult Hip* (9%)—represented approximately 78% of the total number of cited textbooks.

Discussion

Education is essential for the continuation of high-quality health care, and it is important to learn how hip reconstruction can be taught best to residents. Knowledge of the type of questions on the OITE, and of their content, can guide resident educators who are focusing their programs to enhance available educational opportunities. This was our primary reason for conducting this study. The results suggest that residents preparing to take the OITE would benefit by reading the current literature and focusing mostly on material related to biomechanics, materials, and basic science. The journals cited most often were *JBJS–Am* and *Clin Orthop*. We recommend these as optimal literature resources for resident review.

This study provides a framework for topic areas and subcategories that residents and educators can use with respect to hip reconstruction. Residents should have a thorough understanding of primary THAs (the procedures tested most often, 62%) as well as associated hip reconstruction complications (the diagnoses tested most

often, 51%). In addition, residents should be familiar with interpreting radiographic hip reconstruction studies to supplement their decision making in arriving at accurate diagnoses and selecting appropriate treatment modalities.

The results from this study are similar to those from a recent study of OITE content related to the hand.[3] The OITE hand study suggested that general orthopedic journals should be recommended as study aids more often than specialty journals. The present study included a specialty journal, *J Arthroplasty,* for comparison. As expected, the proportion of hip reconstruction articles in this journal was much higher than the proportions of such articles in the other 2 journals studied and of hip reconstruction questions on the OITE. In addition, there were differences in the stratification of journal content, with *J Arthroplasty* having fewer joint preservation articles and a higher percentage of general arthritis articles in comparison with the other 2 journals. With particular respect to preparation for the OITE, we recommend using general orthopedic journals as study aids.

Although we expected the percentage of hip reconstruction articles in *J Arthroplasty* to be higher than the percentage of OITE hip reconstruction questions, we noted that the percentage for the other 2 journals was higher than the OITE percentage as well. There are several possible explanations for this finding. The OITE may focus on less often encountered, potentially life-threatening conditions (such as bone tumors rather than joint arthroplasties) because of the importance of not missing or mismanaging them. Another possible explanation is that the volume of hip reconstruction research is higher relative to other fields, or that the number of hip reconstruction papers being submitted (and consequently being accepted and published) is higher than that in other specialty areas. A study assessing the percentage of articles accepted stratified by specialty area is being designed to further assess these possibilities.

One of the key differences between the OITE questions and the literature was the smaller proportion of basic science, pathology, anatomy, and biomechanics studies. More than 27% of the OITE questions were related to these areas, whereas the journals focused more on treatment options and outcomes. These results suggest not only that there may be a need for more studies on underlying pathology and etiology and more biomechanics, materials, and basic science papers but also that residents may benefit by using other resources when studying this content for the OITE.

In summary, hip reconstruction questions represent approximately 6% of the material tested on the OITE. Residents preparing for this section of the OITE should focus on studying general orthopedic journal articles on complications associated with primary THA. Residents and residency directors preparing educational programs should be aware that clinical journals may not reflect the OITE in terms of proportion of basic science and biomechanics articles and that additional study aids may be necessary.

Authors' Disclosure Statement

The authors report no actual or potential conflict of interest in relation to this article.

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