

The education and training of future hip preservation surgeons: aggregate recommendations of high-volume surgeons

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ABSTRACT

Hip preservation is one of the fastest growing subspecialties in orthopaedic surgery. Surgical training recommendations and guidelines in this field are lacking. To survey high volume hip preservation surgeons regarding their perspectives on the current and future training of surgeons entering their field, a cross-sectional survey of 16 high-volume hip preservation surgeons was conducted to gather perspectives and opinions on the most appropriate education of future hip preservation surgeons. All participants completed the survey in person and anonymously. Of the surveyed surgeons, the mean career hip preservation volume was 1031.25 cases (250 to >3000) with an average annual volume of 162.08 cases (75–400). The average number of hip arthroscopy cases necessary to competently perform joint access is 19, labral repair is 34, acetabuloplasty/femoroplasty are 54, labral reconstruction is 101 and capsular closure/plication is 53. Fifty-six percent of the surgeons believe mid-career surgeons who have never performed hip preservation surgery should not adopt it as part of their practice. The mean optimal number of cases recommended was 128 hip arthroscopies during a dedicated hip preservation fellowship and 67 hip arthroscopies during a sports medicine fellowship. Surgeons with an interest in hip preservation careers, should strongly consider a 12-month dedicated hip preservation fellowship that provides exposure to at least 128 cases, including open and arthroscopic techniques, hip arthroplasty, and research opportunities. Mid-career surgeons should be cautious about adopting hip preservation into their practice if they have not had prior adequate training.

INTRODUCTION

The field of orthopaedic surgery has seen significant subspecialization over the last decade [1, 2]. During this period, hip preservation has seen a drastic rise in the number of procedures performed, technical demand of newer techniques and individuals pursuing careers in this field [3]. Consequently, longer training programs which include more advanced training are required. Due to the youth of this field, there is no consensus on how to best prepare orthopaedic surgeons for a career in hip preservation.

Currently, a sports medicine fellowship is a common way to gain additional exposure to hip preservation.

The Accreditation Council for Graduate Medical Education (ACGME) currently has no recommended case involvement minimums for hip preservation for orthopaedic residents or fellowship programs. Residents completed training in 2015–2016 participated in an average of 8.4 ± 10 hip arthroscopies (range 0–87; median 5) [4]. Those participating in at least 22 hip preservation cases

were in the 90th percentile. In the case log guidelines for sports medicine fellowships (November 2015), the ACGME expects fellows to report cases in multiple different categories, including hip preservation. However, no minimum case requirement is given and the four listed CPT codes [diagnostic with or without synovial biopsy, removal of loose body, debridement/shaving of articular cartilage (chondroplasty), abrasion arthroplasty and/or resection of labrum, synovectomy; 29860, 29861, 29862, 29863, respectively] do not include the more relevant codes released in 2011 (femoroplasty, acetabuloplasty and labral repair; 29914, 29915, 29916, respectively) [5].

The last decade has seen the advent of dedicated hip preservation fellowships, aimed at providing trainees with the highest level of preparation for a career including hip preservation. To date and to our knowledge, there are five such programs in the United States: Boston Children's Hospital (Boston, MA), Duke University (Durham, NC), Hospital for Special Surgery (New York City, NY), University of Colorado (Denver/Boulder, CO) and the American Hip Institute (Chicago, IL). Many trainees enter such dedicated hip preservation fellowships as a second fellowship, after completion of a first fellowship in sports medicine, reconstruction, pediatrics or trauma. There are an additional eight fellowships in six different countries around the world listed on the website for the International Society for Hip Preservation (ISHA), not including the ISHA International Traveling Fellowship.

Due to the increasing prevalence of hip preservation and lack of formalized and structured training requirements for hip preservation, this study aimed to gather consensus of expert opinions from high-volume hip preservation surgeons on the current state of training of hip surgeons and how to best train future generations. We hypothesized that most of the surveyed experts would advocate for fellowship (sports or dedicated hip preservation) training prior to beginning a career in hip preservation but that there would be variability in their opinions.

MATERIALS AND METHODS

A cross-sectional survey, composed of 12 questions regarding the future education of arthroscopic hip surgeons, was administered to 16 high-volume surgeons specializing in hip preservation. The questionnaire was structured to gauge opinions on the current training regimen of hip preservation surgeons and how it might be improved for the future. A high-volume surgeon has been defined as an arthroscopist who performs more than 50 hip preservation cases annually. This study group included surgeons who had case experience ranging from 75 to 400 hip

arthroscopies performed annually and a total of 250–3000 cases performed in their careers.

All participants completed the survey in person in an anonymous fashion and their completed questionnaires were collected at the end of the meeting. This study was determined to be institutional review board exempt because the survey was confidential and anonymous, with no identifiers linked to individual responses. Completion of the survey implies consent.

The survey asked surgeons to provide recommendations regarding (i) the ideal ways to begin hip preservation practice; (ii) the optimal amount of surgeries required for a surgeon to gain competency; (iii) whether arthroscopy is best practiced by sports medicine or hip-focused surgeons and (iv) the minimum number of studies that should be published by an individual fellow.

Basic statistical analyses were performed using Microsoft Excel (Microsoft Corporation; Redmond, WA) with the RealStatistics add-in package.

RESULTS

Sixteen high-volume arthroscopic hip surgeons participated in the survey. The mean annual number of hip arthroscopies performed was 162.1 (range, 75–400) while mean number performed over their career was 1031.25 (range, 250–3000).

Total number of surgeries required for competency

The surgeons reported the number of surgeries a practicing hip arthroscopist should perform for various procedures before competency is achieved (Table I). Arthroscopic joint arthroscopic access is thought to require the least number of cases (19.4, range 10–40) while labral reconstruction requires the most (100.7, range 10–200).

How to start practicing hip preservation

The experts were also asked about acceptable and ideal ways in which to begin a hip preservation practice. The options provided included: (i) a weekend course; (ii) observation; (iii) a sports fellowship with some hip

Table I. Number of surgeries required for competency

<i>Procedure</i>	<i>Mean ± SD, range</i>
Joint access	19.4 ± 9.1 (10–40)
Labral repair	34.3 ± 12.4 (15–50)
Acetabuloplasty and femoroplasty	53.8 ± 26.9 (20–100)
Labral reconstruction	100.7 ± 57.6 (10–200)
Capsular closure/plication	53.3 ± 49.0 (10–200)

Table II. Acceptable ways to begin hip preservation

Options	No. of surgeons	% of surgeons
Weekend course	4	25%
Observation	7	43.8%
Sports fellowship with some hip preservation exposure	16	100%
Dedicated hip preservation fellowship	13	81.3%

Table III. Ideal ways to begin hip preservation

Options	No. of surgeons	% of surgeons
Weekend course	2	12.5%
Observation	1	6.3%
Sports fellowship with some hip preservation exposure	9	56.3%
Dedicated hip preservation fellowship	14	87.5%

preservation exposure and (iv) a dedicated hip preservation fellowship (Tables II and III). More than one answer was permitted. All surgeons report that a sports fellowship is an *acceptable* way to learn hip preservation while only 25% believe a weekend instructional course is acceptable. *Ideally*, 14 (87.5%) surgeons believe that a dedicated hip preservation fellowship should be completed prior to undertaking a career in hip preservation.

Sports medicine fellowships

Many surgeons performing hip preservation today come from a sports medicine background. Taking this into account, surgeons were asked about the acceptable and ideal number of cases beginning hip preservation surgeons should be exposed to during a sports fellowship (Table IV). The responses indicate a mean of 40.7 (range, 10–60) as an acceptable minimum and 66.9 (range, 25–100) as the ideal number of cases.

Hip preservation fellowships

Surgeons were also surveyed regarding the specifics of a hip preservation fellowship. The optimal number of cases that fellows should be exposed to during a 1-year hip preservation fellowship is summarized in Table V.

Table IV. Number of cases required for sports fellowship

No. of cases	Mean, SD, range
Acceptable minimum	40.7 ± 15.9 (10–60)
Ideal number	66.9 ± 27.2 (25–100)

Table V. Number of optimal surgeries fellows should be exposed to

Surgery	Mean, SD, range
Hip preservation	128.6 ± 64.2 (50–250)
Periacetabular osteotomy (PAO)	36.1 ± 15.6 (10–50)
Hip arthroplasty	116.4 ± 58.7 (30–200)
Other open hip preservation surgeries	82.5 ± 59.6 (0–200)

Table VI. Optimal duration of a dedicated hip preservation fellowship

Duration	No. of surgeons	% of surgeons
3 months	0	0.0%
6 months	6	37.5%
12 months	9	56.3%

When inquired as to the optimal duration of a dedicated hip preservation fellowship, all responding surgeons believe 6–12 months is necessary, while none report 3 months as sufficient (Table VI).

Furthermore, during a dedicated 1-year hip preservation fellowship, respondents state that should fellows should be expected to produce an average of 2.4 (range, 1–4.5) original publications as part of a research requirement.

Most of the surgeons (10; 62.5%) believe that hip arthroscopies should be done by surgeons who focus primarily on the hip. Nine surgeons (56.3%) report that mid-practice surgeons who have never done hip preservation should not seek to adopt it as part of their practice. Additionally, 10 surgeons (62.5%) reported that in the future, most hip arthroscopies will be done by surgeons who focus on the hip.

DISCUSSION

Overall, most of the expert hip surgeons surveyed believe hip preservation requires additional year of training. The *ideal* way to accomplish this is with a dedicated hip preservation fellowship with exposure to 128 hip preservation

cases, both arthroscopic and open, hip arthroplasty and a research component. A sports fellowship that offers an experience of 41–67 hip arthroscopies would be an adequate option, however. Labral reconstruction requires the most training volume with approximately 101 cases thought to be needed for competency. The majority of surgeons agreed that a one weekend instructional course and observation only were unacceptable ways to undertake Hip preservation in practice and that mid-career surgeons should be cautious about adopting hip preservation into their practice if they have not had prior adequate training.

This study aims to assist in guidelines for the surgical aspects hip preservation training but does not address didactic parameters. Peters *et al.* highlight the lack of effective education that occurs at the level of theory and understanding of hip pathology [6]. They note that core concepts, such as acetabular dysplasia and femoroacetabular impingement (FAI), are more formally taught during pediatric services and less so in sports medicine or adult reconstruction. They cite different philosophical approaches between pathology-based European (hip or knee surgeon-specific) and treatment-based United States (arthroplasty vs. arthroscopy) training as a potential reason for the inability to standardize the educational process. They acknowledge the inconsistent hip preservation experience across adult reconstruction and sports medicine fellowships, the paucity of hip preservation fellowships worldwide, and that these limited exposures ‘may not be sufficient to allow the fellow to return to unrestricted practice in joint preservation.’ The authors also state that an ideal formalized hip preservation fellowship training would include both open and arthroscopic approaches, similar to the results of this survey [hip preservation as well as periacetabular osteotomy (PAO) and other open Hip Preservation surgeries were recommended]. They also admit that this may necessitate the creation of new training models with multiple faculty members providing unique and specific contributions.

The number of dedicated, yet non-accredited, hip preservation fellowships have grown dramatically in recent years. In 2012, Peters *et al.* were aware of only two-year long dedicated hip fellowship programs (unnamed) in the United States and ‘perhaps’ two international programs. In 2017, there are five known dedicated hip preservation fellowships in the United States and according to the website for the International Society for Hip Preservation (ISHA), an additional eight [Spain, Ireland, Chile, Mexico, Australia, United Kingdom (3)] around the world, not including the ISHA International Traveling Fellowship. Many trainees enter such dedicated hip preservation fellowships as a second fellowship, after completion of a first fellowship in sports medicine, reconstruction, pediatrics or trauma. The increase in number of these fellowships is likely a response to an increase in demand for

additional hip preservation training, and begins to address the suggestions of Peters *et al.* and results of this survey.

Most experts surveyed in this study agree that a dedicated hip preservation fellowship is the *ideal* way to begin a career dedicated to the respective field. This sentiment is likely due in part to the notoriously steep learning curve associated with hip preservation but also related to the additional hip-specific clinical and surgical skills such as hip arthroplasty, PAO and other open hip preservation surgeries that are unlikely to be encountered in a sports medicine fellowship. This sentiment has been echoed independently by other hip preservation surgeons [7]. For trainees who are unable or unwilling to perform a dedicated hip preservation fellowship, a sports medicine fellowship is believed to be an *acceptable* way to begin a hip preservation practice. A minimum of 41 arthroscopic hip cases is suggested during a sports medicine fellowship; however, 67 cases are optimal. Even if the trainee experiences this optimal case load, it remains short of the 101 procedures thought to be necessary for competent labral reconstruction. In addition, trainees are very unlikely to encounter the 36 PAOs, 116 hip arthroplasties and 83 other open hip preservation surgeries that are recommended during a dedicated hip preservation fellowship while in a sports medicine fellowship. These surgical skills are crucial for a hip preservation surgeon as they may apply to patients who are not hip preservation candidates or have failed a primary hip preservation.

While there are currently no required case minimums for sports medicine or hip preservation fellowships regarding hip preservation, one study suggested 30 *independent* are required before operative time and complications begin to decrease [8, 9]. To emphasize, these were *independent* procedures—without supervision or during training—and training background was not considered. Therefore, the number of independent cases needed to reduce operative time and complications may vary depending on the type and amount of training received. Although, Souza *et al.* demonstrated that the overall incidence of complications for one surgeon performing hip preservation did not change over the course of a 9-year period, they found that the nature of the complications changed with time. As the surgeons became more accomplished with basic techniques, more advanced skills were required to address more challenging problems resulting new and different complications [10]. The use of a dry model arthroscopic simulation to assess the performance of arthroscopic hip labral repair has been shown to be both valid and reliable and may aide in tailoring these numbers and the recommended case volume by experts in this survey to an individual and his/her operative skills [11]. Of note, lateral positioning produced longer procedure times and worse performance scores among trainees performing hip preservation on a simulator [12].

Surgeons who began practicing before most fellowships offered training in hip preservation face the dilemma of whether to adopt this procedure as part of their practice. The surveyed majority believe it should *not* be incorporated into mid-career practice if the surgeon has no prior experience. The plausible factors contributing to this view are the significant time investment to achieve competency, the deep and constrained anatomy of the hip and pelvis, and most importantly, the complications and inconsistent outcomes associated with a learning curve. These factors likely contributed to the majority opinion that, in the future, hip preservation will be performed by surgeons whose practice is dedicated to surgery of the hip.

CONCLUSION

Surgeons in training, interested in hip preservation careers, should strongly consider a 12-month dedicated hip preservation fellowship that provides exposure to 128 cases, both open and arthroscopic techniques, hip arthroplasty, as well as research opportunities. A sports medicine fellowship that offers a volume of 67 hip preservation cases is adequate, but not ideal. Mid-career surgeons, should be cautious about adopting hip preservation into their practice if they have not had prior adequate training.

CONFLICT OF INTEREST STATEMENT

Dr. Domb reports grants from Arthrex, grants from Medacta, grants from Stryker, grants and other from American Orthopedic Foundation, during the conduct of the study; personal fees from Adventist Hinsdale Hospital, personal fees and non-financial support from Amplitude, grants, personal fees and non-financial support from Arthrex, personal fees from DJO Global, grants, personal fees and non-financial support from Medacta, personal fees from Orthomerica, grants, personal fees and non-financial support from Pacira, grants, personal fees and non-financial support from Stryker, outside the submitted work; In addition, Dr. Domb has a patent 8920497 - Method and instrumentation for acetabular labrum reconstruction with royalties paid to Arthrex, a patent 8708941 - Adjustable multi-component hip orthosis with royalties paid to Orthomerica and DJO Global, and a patent 9737292 - Knotless suture anchors and methods of tissue repair with royalties paid to Arthrex and Dr. Domb is a board member for the American Orthopedic Foundation, American Hip Foundation, Arthroscopy Editorial Board, AANA Learning Center Committee, Hinsdale Hospital Foundation, and has ownership interests in Hinsdale Orthopedic Associates, Hinsdale Orthopedic Imaging, American Hip Institute, SCD#3, North Shore Surgical Suites, Munster Specialty Surgery Center.

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