Evaluation of content and accessibility of hand fellowship websites

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Abstract

Background Graduates of general, orthopedic, and plastic surgery residencies utilize web-based resources when applying for hand fellowship training. The purpose of this study was to evaluate the accessibility and content of hand fellowship websites (HFWs).

Methods Websites of accredited hand surgery fellowships were eligible for study inclusion. HFWs were evaluated for comprehensiveness in the domains of education and recruitment. Website content was correlated with program characteristics via Fisher exact tests.

Results Fifteen plastic, 65 orthopedic, and 1 general surgery hand fellowships were analyzed. Seventy-four hand fellowships maintained an HFW (91 %). HFWs were not found for 3 plastic and 4 orthopedic hand programs (20 versus 6 %, $p=0.118$). HFWs provided only half of all analyzed content (54 %—education and 49 %—recruitment). Orthopedic programs had more education content than plastic surgery programs (55 versus 44 %, $p=0.030$). Programs in the South had more education content than programs in the Northeast (63 versus 47 %, $p=0.001$), but not more than programs in the West (54 %) or Midwest (55 %). Larger programs with more fellows had greater education content than those with only one fellow (57 versus 49 %, $p=0.042$). Programs affiliated with top-ranked medical schools had less education content than

lower-ranked schools (48 versus 56 %, $p=0.045$). No differences existed in recruitment content between programs.

Conclusions Most hand surgery fellowships lack readily accessible and comprehensive websites. The paucity of online content suggests HFWs are underutilized as educational resources and future opportunity may exist to optimize these tools.

Keywords Plastic · Orthopedic · Hand · Website · Education · Fellowship · Surgery

Introduction

Graduating orthopedic, plastic, and general surgery residents seeking additional training in hand surgery utilize Internet resources to manage their fellowship applications. To seek comprehensive program lists in deciding where to apply, residents utilize websites maintained by the American Medical Association and the American Society for Surgery of the Hand (ASSH). These governing bodies of hand surgery education maintain the Fellowship and Residency Electronic Interactive Database (FREIDA) and the ASSH Fellowship Program Directory, respectively. These organizations help oversee the Hand Surgery Fellowship Match, which was created to appoint fellows in a single, coordinated process. During 2014, there were 80 programs participating in the Match offering a total of 160 fellowship positions [15].

About half of plastic surgery trainees [9, 11] and the overwhelming majority of orthopedic residents seek fellowship training [3]. Residents obtain advice from mentors, senior colleagues, and the Internet during the fellowship application process. Hand fellowship applicants can obtain unbiased program data from the ASSH and FREIDA databases. These databases provide program lists and direct interested applicants to hand fellowship websites (HFWs) for additional

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information. These resources provide information on the characteristics and strengths of each program, research opportunities, and teaching faculty that may help residents identify programs with similar interests. Currently, the educational utility and accessibility of HFWs remain unknown.

Initial interest in using the Internet for graduate medical education and recruitment of trainees occurred at the turn of the century [17, 23]. More recently, literature in diverse specialties demonstrates the potential utility of program websites for trainees [5, 13, 16, 23]. Plastic surgery training program websites were found to be inadequate resources for trainees applying into the discipline [18]. In a similar study, orthopedic sports medicine fellowship websites demonstrated a lack of online content for prospective residents [14]. While the recommended content for HFWs has not been clearly defined, studies in other specialties suggest that websites are routinely consulted to provide program information to applicants [5, 6, 8]. Given this trend, we sought to analyze HFWs both for accessibility and educational content. We hypothesized that HFWs would be largely inaccessible and ineffective resources for interested hand fellowship applicants.

Materials and Methods

Study Inclusion

The American Medical Association maintains a comprehensive database of active hand surgery fellowships participating in the Match on FREIDA [7]. This database was cross-referenced with ASSH [4] to develop a comprehensive list of accredited hand surgery fellowship programs in the USA. After an extensive online search, these two program databases were the only publically available resources for hand surgery applicants. The program lists of accredited hand surgery fellowships on FREIDA and ASSH were accessed on April 1, 2014.

Accessibility

Both the FREIDA and ASSH databases were evaluated for accessibility of program information. Variables that were collected from these databases included number of hand surgery fellowships, direct website links, website links requiring additional navigation steps to access the fellowship website, and absent/broken links. A direct link was defined as linking directly to the HFW. Links to the respective medical school, hospital, or surgical departments requiring additional navigation steps to reach the fellowship websites were categorized as links requiring multiple steps. Links not present on the

databases or that did not navigate to a functional page were categorized as non-functional/absent.

When the link was non-viable, a Google search was performed with the “program name+hand surgery fellowship.” All Google searches were performed on April 1, 2014. When not found after this search, the corresponding surgery division or department website was searched for information regarding the hand fellowship. HFWs not found after this search were deemed inaccessible and excluded from further content analysis.

Website Evaluation

All websites were accessed and evaluated by two medical students and reviewed by a practicing hand surgeon. Fellow education and recruitment variables were noted as being present or absent without judgment on information quality. That is, if the HFW maintained information on the topic, the variable was marked as being present. This method was employed to maintain objectivity during our assessment. Any discrepancies in judgment were reviewed, and a collective agreement was obtained.

Fellow Education

Available HFWs were evaluated for comprehensiveness in mentioning key components of the hand surgery curriculum dictated by the Accreditation Council of Graduate Medical Education (ACGME). In all, ten fellow education variables were evaluated including evaluation criteria, on-call requirements, meetings attended, rotations, research, journal club, didactic instruction, academic conferences, affiliated hospitals, and operative experience.

Fellow Recruitment

Additional analyses included program information employed to describe their program to recruit potential fellows. The following ten variables were included for study based on the methodology of similar studies in other medical literature: selection criteria, association links, interview dates, graduate information, salary, fellow listing, application links, eligibility criteria, faculty listing, and general program description [14, 16, 18].

Program Comparison

HFWs obtained a percentage score in the domains of education and recruitment based upon the preceding criteria. Fellowship programs were stratified by region [20], number of fellowship positions, and affiliation with a top *US news* hospital [12] and medical school [21]. As the faculty of hand fellowship programs often includes both plastic

and orthopedic trained surgeons, we also included affiliation with a top US news orthopedic hospital [22] in our analysis. While published rankings of hand surgery fellowship programs do not exist, the authors investigated the above criteria as a surrogate for program notoriety. These fellowship program characteristics were compared according to scores obtained as a result of our analyses.

Statistical Analyses

For accessibility, Fisher's test was employed to compare the databases of ASSH and FREIDA. For website comprehensiveness, Fisher's test was used to compare programs by characteristics including region (Northeast, South, Midwest, South), number of fellows (1, >1), and affiliation with a top 20 medical school, top hospital, and top 20 orthopedic hospital. All statistical tests were two-tailed, and calculations were performed on STATA 13 (StataCorp, College Station, TX). *P* values of less than 0.05 were statistically significant.

Results

Query of the FREIDA and ASSH databases provided a list of 81 accredited hand surgery fellowship programs. Seven hand surgery fellowships did not have fellowship-specific information on their respective orthopedic or plastic surgery department websites. Four plastic surgery and three orthopedic hand surgery fellowship programs did not have an HFW (27 versus 5 %, *P*=0.118). Seventy-four HFWs were available for content analysis (91 %).

Accessibility of Information

Both FREIDA and ASSH provided a list of 81 hand surgery fellowships (Table 1). The ASSH database had more direct links to HFWs than FREIDA (42 versus 15 %, *P*=0.001). The number of direct website links did not vary by surgical discipline in either the FREIDA or ASSH database (*P*>0.05). The percentage of links requiring multiple steps to navigate to the HFW ranged from 68 % with the FREIDA database to 31 % with the ASSH database. Similarly, non-functional links

ranged from 17 to 27 % when using the FREIDA or ASSH database, respectively.

Fellow Education

HFWs maintained an average of 5.4 out of 10 possible fellow education variables (Fig. 1). Most programs described or listed the typical operative experience performed by the hand service (89 %) and a list of affiliated hospitals (81 %). However, only 41 % of programs provided an overview of hand rotations during the year, and 32 % mentioned on-call requirements. The key components of the non-clinical curriculum were commonly mentioned: academic conferences (69 %), didactic lectures or courses (68 %), and journal clubs (64 %). For research, faculty interests were mentioned by 56 % of programs and academic research meetings by 32 %. A minority of programs mentioned how fellows would be evaluated during the year (10 %).

Fellow Recruitment

On average, HFWs afforded 4.9 out of 10 possible fellow recruitment variables (Fig. 2). Every analyzed HFW provided a general program description, and most provided faculty listings (89 %), eligibility criteria (72 %), and application links (59 %). A minority of programs provided a list of fellows (42 %) and previous graduates (34 %). Salary information (42 %), interview dates (34 %), links to regional or national academic societies (11 %), and selection criteria (5 %) were not commonly provided.

Program Comparison

After analysis, HFWs were ranked by education and recruitment content. For each domain, HFWs could receive a maximum of 10 points for the items listed above. Hand surgery programs of orthopedic departments exhibited more education content than their plastic surgery counterparts (52 versus 40 %, *P*=0.022, Table 2). Most programs were located in the Northeast, and these programs had less online education content than programs in the South (47 versus 63 %, *P*=0.001), but not less than programs in the West or Midwest (*P*>0.05). Larger programs as measured by the number of fellows (>1 per year) had more education content than programs with only one fellow (57 versus 49 %, *P*=0.042). Programs affiliated with a top 20 medical school had less online education content than their lesser ranked counterparts (44 versus 56 %, *P*=0.045). Education content did not differ by affiliation with a top hospital or orthopedic hospital (*P*>0.05).

Fellow recruitment content did not vary by program characteristics (Table 2).

Table 1 Accessibility of program websites from online databases

	FREIDA (%)	ASSH (%)
No. of fellowships	81 (100)	81 (100)
Direct link	12 (15)	34 (42)
Link requiring multiple steps	55 (68)	25 (31)
Non-functional/absent link	14 (17)	22 (27)

Fig. 1 Educational content on hand fellowship websites

Discussion

The Internet is an easily accessible resource for physicians and patients interested in obtaining medical information. Previous studies have demonstrated the utility of program websites for physician recruitment [5, 8, 13], and results from the present study demonstrate that this resource is not being exploited by hand surgery fellowship programs. Overall, these findings have implications for applicants and training programs in hand surgery.

A growing body of literature has documented deficiencies in content for websites used by surgical residents and fellows. In 2001, Rozental et al. assessed academic orthopedic surgery department websites and found “extremely limited” information for trainees [17]. They concluded that the Internet was underutilized as a communication tool by orthopedic

departments. In 2004, Reilly et al. came to similar conclusions after analyzing the websites of general surgery residency programs [16]. In 2013, Mulcahey et al. analyzed websites of accredited orthopedic sports medicine fellowships and found online information was often inaccessible and incomplete [14]. In 2014, Silvestre et al. demonstrated that plastic surgery residency websites have poor accessibility and limited online content for applicants [18]. Results from the present study indicate that HFWs are not readily accessible and often underutilized.

Of the 81 available hand fellowships, HFWs did not exist for seven programs and less than half of all programs had direct links on national databases for resident education. These findings may have negative consequences for hand surgery fellowship programs. Literature in other medical specialties suggests that inaccessible and incomplete websites may deter

Fig. 2 Recruitment content on hand fellowship websites

Table 2 Comparison of website content by program characteristics

Characteristic	No.	Education Content (%)	<i>P</i>	Recruitment Content (%)	<i>P</i>
Department			0.022		1.00
Orthopedic	62	52		49	
Plastic	11	40		48	
General	1	80		50	
Location			0.009		0.715
NE	28	47		46	
S	19	63		48	
MW	14	55		50	
W	13	54		52	
Fellows			0.042		0.367
1	29	49		47	
>1	45	57		50	
Top medical school			0.045		0.367
N	48	56		50	
Y	26	44		47	
Top hospital			0.614		0.557
N	55	54		48	
Y	19	55		51	
Top orthopedic hospital			0.523		0.315
N	59	53		44	
Y	15	56		48	

potentially interested applicants from applying to such programs. In their survey of emergency medicine applicants, Gaeta et al. found that many applicants would not apply to a program due to the poor quality of its website [8]. In a similar study, Mahler et al. found emergency medicine applicants valued website information the same as advice from mentors [13]. A study of internal medicine [6] and anesthesia [5] applicants had similar findings: most applicants use program websites to decide where to interview and ultimately rank programs. While the implications of these findings to hand surgery are not readily apparent, it seems plausible that hand surgery fellowship applicants may value information on program websites.

A motivation for the present study was to assess differences in the use of the Internet by specialty within hand surgery. A potential area of concern is the diminishing presence of plastic surgery trained hand surgeons [10]. Our results indicate that orthopedic program websites contain greater online education content than plastic surgery websites. Surprisingly, 3 of the 15 plastic surgery programs did not have a HFW (20 %) compared with only 6 % of orthopedic programs, a finding that trended toward significance ($P=0.118$). This finding suggests that orthopedic-based hand surgery fellowships may be keener to the utility of websites for fellow education. Paradoxically, programs

affiliated with a top-ranked medical school maintained websites with less education content. This association did not uphold according to affiliation with top hospitals and may be explained in part by the low cost of developing a website such that equal opportunity exists regardless of resources or finance. Rankings of hand surgery fellowships do not exist, and it appears website quality exists independently of medical school or hospital affiliation. We did find, however, that programs with a greater number of training positions had more online education content, a finding consistent with the plastic surgery literature [18].

The paucity of online content on HFWs likely has multiple etiologies. The logistics of hand surgery training are in evolution [19], and a formal program curriculum for hand surgery training has only recently been written [1]. There have been discussions for unification in the formal training pathway for hand certification [2]. As its training pathway evolves, hand surgery will remain a sub-specialized discipline. Thus, given this smaller community, intangible factors like reputation or recommendations from mentors may carry greater weight than in other medical specialties. Nearly 40 % of hand surgery programs recruit only one fellow each year, thus potentially limiting the perceived utility of HFWs in attracting applicants. Recent match data show that hand surgery fellowships remain competitive with 205 applicants for only 160 positions [15]. Thus, given the large number of qualified applicants, hand surgery programs may perceive little incentive to develop quality websites to attract candidates. Yet, a few programs each year do not match a full set of fellows [15]. Thus, it may benefit hand surgery programs to improve their websites to effectively recruit future applicants.

Our study has several limitations and thus offers potential areas for research. First, the informational needs of potential applicants during the hand fellowship application process remain unknown and are an ongoing area of research. Given this limitation, we restricted our analysis to accreditation requirements for fellow education and well-established recruitment variables. It is possible that these criteria have less importance to hand fellowship applicants. Second, our queries were limited to short descriptions of these program variables and did not assess the quality of such information. Third, it is possible that program websites deemed inaccessible were in fact on the Internet but not found with our methodology. However, inaccessibility of program information is tantamount to its absence. These results represent a snapshot of the current state of HFW content, and any conclusions drawn are at best temporary, as online content is updated periodically and largely fluid.

Despite these limitations, our results demonstrate a paucity of information on HFWs. Improvement in the accessibility and content of these websites may assist future residents interested in applying to hand surgery fellowships.

Conflict of Interest Jason Silvestre declares that he has no conflict of interest.

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