The Journal of Foot & Ankle Surgery 56 (2017) 1009–1018

Contents lists available at ScienceDirect

The Journal of Foot & Ankle Surgery

journal homepage: www.jfas.org

What Is the Current Role and Factors for Success of the Journal Club in Podiatric Foot and Ankle Surgery Residency Training Programs?

Eric So, DPM [1], Christopher F. Hyer, DPM, MS, FACFAS [2], Marcus P. Richardson, DPM [1], Randall C. Thomas, DPM, FACFAS [3]

[1] *Resident Physician, Grant Medical Center, Columbus, OH*
[2] *Program Director, Grant Medical Center, Columbus, OH*
[3] *Assistant Associate Director, Grant Medical Center, Columbus, OH*

ARTICLE INFO

Level of Clinical Evidence: 5

Keywords:
critical appraisal
graduate medical education
medical literature
podiatry
structured review instrument
surgical training
survey

ABSTRACT

The journal club (JC) is a traditional part of postgraduate medical education, although little has been written on its current role in podiatric surgical training programs. The goal of the present study was to determine how JCs are conducted and the factors associated with their success. Anonymous electronic surveys were distributed to all podiatric foot and ankle surgical training program directors in the United States with a valid e-mail address. A total of 202 surveys were initially e-mailed to training program directors, with a second and third round sent to those who did not respond. The eventual response rate was 47.5%. The variables associated with success included high faculty attendance, dissemination of articles in advance, and regularly scheduled meetings. Of the residency programs that responded, 39.0% provided some type of handout or supplemental session and 39.8% provided supplemental session or handouts regarding the process of critical review, epidemiology, or biostatistics. A structured review instrument or checklist was used to guide critical appraisal in 21.5% of the JCs, and 11.8% of the programs provided feedback to residents. The JC was perceived by residency directors to be valuable and worthy of maintaining. Residency directors perceived the following factors to be associated with a successful JC: faculty participation, a designated leader, mandatory attendance, dissemination of materials in advance, and regularly scheduled meetings. Areas cited for improvement included implementation of a structured review instrument, delineation of clear goals, and periodic evaluation. We believe these findings could aid residency directors interested in maximizing the educational benefits of their JC.

The first record of a North American journal club (JC) dates back to 1875, founded by Sir William Osler at McGill University for the purchase and distribution of periodicals that he could not afford as an individual (1). He encouraged JC attendees to apply their updated knowledge from attending the JC to relevant patient cases (1). Thus, the philosophy of the JC from its inception was to share current knowledge and translate it into evidence-based patient care (2–4). Over the course of time, the JC has evolved from serving as a forum to discuss and review current medical literature to teaching critical appraisal skills (5).

Surveys of other medical specialties have revealed that JCs are a frequent component of residency programs, with a rate of 100% in 67 physical medicine and rehabilitation programs (6), 95% in 124 internal medicine programs (2), and 84% in 74 family medicine programs (7). The Council of Podiatric Medical Education (CPME) have provided general guidelines for JCs and their role in contributing to the curriculum in podiatric foot and ankle residency education (8). However, no recommendations are available regarding the way JCs are to be conducted. This highlights the sparse published data regarding the current role of JCs in the podiatric foot and ankle surgical training program curriculum. The goal of the present study was to determine how JCs are currently conducted to elucidate which factors lead to success and to identify variables for improvement.

Materials and Methods

Survey questions were constructed after consultation with the OhioHealth podiatric residency faculty to define JC practices in podiatric foot and ankle surgical training programs and establish potential areas for improvement (Fig. 1). Anonymous electronic surveys were distributed to all residency program directors (RPDs) or a designee using publically available contact information from the Centralized Application Service for Podiatric Residencies directory (available at: www.casprcrip.org). Study data were collected and managed using REDCap (Research Electronic Data Capture) electronic

Financial Disclosure: None reported.
Conflict of Interest: None reported.
Address correspondence to: Eric So, DPM, Grant Medical Center, 111 South Grant Avenue, Columbus, OH 43215.
E-mail address: ericso70@gmail.com (E. So).

1067-2516/$ - see front matter © 2017 by the American College of Foot and Ankle Surgeons. All rights reserved.
http://dx.doi.org/10.1053/j.jfas.2017.04.028

How long has your residency program been in existence?
< 1 year, 1-5 years, 5-10 years,10-15 years,15-20 years, > 20 years
Does your program have a regularly scheduled journal club? Yes or No
How many residents are in your residency program? _____
Journal club attendance is (voluntary/mandatory)
What is the average resident attendance at journal club?
<25%, 25-50%, 50-75%, >75%
What is the primary goal of journal club?
To develop critical appraisal skills
To keep current with the literature
To impact clinical practice
Are there formal written learning objectives for journal club?
Yes or No
How often does your journal club meet?
Weekly
Twice per month
Once per month
Quarterly
Other_____
Where does your journal club meet?
Hospital (conference room, library, faculty office, etc.)
Faculty home
Restaurant
Other
How long does your journal club usually last?
< 1 hour,1-2 hours, 2-3 hours, > 3 hours

Fig. 1. Survey questionnaire. EBM, evidence-based medicine.

data capture tools hosted at OhioHealth (9). REDCap is a secure, web-based application designed to support data capture for research studies, providing an intuitive interface for validated data entry; audit trails for tracking data manipulation and export procedures; automated export procedures for seamless data downloads to common statistical packages; and procedures for importing data from external sources (available at: https://redcap.vanderbilt.edu/). Responses regarding format, prevalence, content, efficacy, and areas for improvement were gathered. The surveys were redistributed on 2 occasions after the initial attempt at 2-week intervals. No payment or incentive was offered to the RPDs for completing the survey.

The residency program characteristics are described using frequencies and percentages for categorical variables and the mean ± standard deviation and/or median and range for continuous variables. The χ^2 test and Fisher's exact test were used to examine features associated with a successful JC, defined as the RPD reporting the JC was "extremely beneficial" to the residency program. Sidorov (2) defined a successful JC as one that has been in existence for >2 years or that has had an estimated attendance of ≥50%. With this definition of success, it was conceivable that determining the factors associated with a successful JC would be difficult owing to the suspected high prevalence of residency JCs meeting either of these criteria based on previous reports (2,3,10). The selection of "extremely beneficial" as the indicator for a perceived successful JC was determined by elucidating the factors that differentiated between JCs that were of extreme benefit and those that were only moderately beneficial. The response by the RPD to determine the perceived success of the JC has been performed in surgery and emergency medicine JCs (11,12). SAS, version 9.4 (SAS Institute, Inc., Carey, NC), was used for analysis. Statistical significance was set at $p < .05$ for all tests.

Results

The online survey was distributed to 209 podiatric RPDs in the United States. Of the 209 e-mailed surveys, 202 (96.7%) were delivered to a valid e-mail address. Of the 202 surveys e-mailed to RPDs with valid e-mail addresses, 96 surveys were returned with ≥1

What time of day does your journal club meet?
Weekday Morning
Weekday Lunch
Weekday Afternoon
Weekday Evening
Weekends
Which Journals are routinely reviewed during your journal club? (circle all that apply)
Journal of Foot and Ankle Surgery
Journal of Podiatric Medicine and Surgery
Foot and Ankle International
Foot and Ankle Specialist
Journal of Bone and Joint Surgery (Am)
Journal of Bone and Joint Surgery (Br)
Clinical Orthopedics and Related Research
Other
Who typically selects the journal articles for journal club?
Faculty
Chief Resident
Resident
Any combination of the above
Journal club articles are mostly…
Classic/historical articles
Review articles
Case reports
Original research
Any combination of the above
Who is assigned to present at journal club?
Faculty
Chief resident
One resident per article
Other
How many articles are usually reviewed during your journal club?
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, >10

Fig. 1. *(continued).*

response, for a response rate of 47.5%. The characteristics of the residency programs for which a survey was returned with ≥1 response (n = 96) are listed in Table 1.

The number of residents in the program ranged from 2 to 24 (median 6). Of the 96 residency programs with a returned survey, 90 (93.8%) had a JC with mandatory resident attendance, 3 (3.1%) had a JC with attendance optional, 2 (2.1%) did not have a JC, and 1 (1.0%) did not respond to the question, "Does your program have a regularly scheduled JC?" Both programs that did not currently participate in a JC had previously had a JC.

These programs cited reasons for discontinuing the JC as a lack of time or place to meet (n = 2) and the presence of more important educational sessions, such as radiology rounds, cadaver laboratory, board review, and so forth (n = 1). The main barriers for restarting a JC were little perceived educational value (n = 1), lack of time or a place to meet (n = 1), and lack of faculty engagement (n = 1).

What is the typical article presentation format at journal club?
Short, verbal (<15 minutes/article)
Long, verbal (>15 minutes/article)
Powerpoint/slide presentation
Are Structured Review Instruments, or checklist/form to guide critical appraisal of journal club articles used?
Yes or No
Does your program provide supplemental sessions or handouts regarding the process of critical review, critical appraisal, epidemiology, or biostatistics?
Yes or No
Are other medical specialties invited to journal club? (i.e Radiologist, Vascular surgery, etc.)
Yes or No
In your opinion, the most important factor for a successful journal is …
Regular faculty attendance
Attendance by a majority of residents
Regular attendance of other health professionals
Duration of journal club
Number of articles
Article type (Review article, EBM article, etc.)
Presentation format (short verbal, long verbal, Powerpoint/slide presentation)
Other
Is food provided at journal club?
Yes or No
Overall, how beneficial is journal club in your residency program?
Extremely beneficial
Somewhat beneficial
Not beneficial
Is feedback provided?
Yes (comment sheet/anonymous)
No

Fig. 1. *(continued).*

The JC characteristics for the 93 residency programs with a JC are presented in Table 2. The success of the JC was not reported for 3 clubs (n = 90). Journals articles were routinely selected from *The Journal of Foot and Ankle Surgery*® (n = 87), *Foot and Ankle International*® (n = 67), The *Journal of Bone and Joint Surgery*®, American volume (n = 64), *Journal of the American Podiatric Medical Association*® (n = 41), *Foot and Ankle Specialist*® (n = 27), The Journal of Bone and Joint Surgery®, British volume (n = 24), *Clinical Orthopedics and Related Research*® (n = 24), and other, unspecified (n = 16).

The effect on clinical decision-making was the most important cited goal of the JCs. Improving critical appraisal skills was the second most important goal, and the interpretation of statistics was the least important goal (Table 3). Of the residency programs with JCs, 39.8% (n = 37) provided supplemental sessions or handouts regarding the process of critical review, critical appraisal, epidemiology, or biostatistics. The use of a structured review instrument or checklist or form to guide critical appraisal was reported by 21.5% of residency programs with JCs. Among the residency programs that provide feedback

Table 1
Residency program characteristics (n = 96)

Characteristic	Value
Duration of residency program (y)	
<5	10 (10.4)
5 to 10	11 (11.5)
>10	75 (78.1)
Institution type	
Hospital (e.g., nonuniversity/non-Veterans Administration)	48 (50.0)
University-affiliated	21 (21.9)
Veterans Administration-affiliated	17 (17.7)
Community hospital	8 (8.3)
Other	2 (2.1)
Residents in program (n)	8.0 ± 4.3

Data presented as n (%) or mean ± standard deviation.

forms for the JC (n = 24), feedback was solicited through roundtable open discussion (n = 13; 54.2%), face-to-face informal conversation (n = 6; 25.0%), comment sheets (n = 4; 16.7%), and new innovation evaluations (n = 1; 4.2%).

Duration of the residency program, institution type, and number of residents were not significantly associated with an "extremely beneficial" JC (Table 4). The factors that did not have a significant correlation with the success of a JC were the frequency of JC meetings, length of time, provision of food, presence of formal written learning objectives, who chooses the journal articles, types of articles reviewed, presenter, format, presence of a medical specialist, and the most important listed factor for a successful JC (Table 5). JCs were perceived as more successful by RPDs when held on weekday mornings (71.9%) than JCs held on weekday afternoons (20.0%; $p = .011$; Table 5).

More programs that disseminated the articles >1 week in advance had a perceived successful JC compared with programs sending articles 3 days to 1 week before or 1 to 2 days before the meeting ($p = .042$; Table 5). More programs that provided feedback forms were perceived to be successful than those programs that did not provide feedback (79.2%; $p = .013$; Table 5). Although the difference was not statistically significant, a strong trend was seen for the presence of formal, written learning objectives being associated with a successful JC ($p = .135$; Table 5).

Discussion

The academic JC is an integral aspect of medical training. Its role has been reviewed in internal medicine, family practice, surgery, pediatrics, emergency medicine, physical medicine and rehabilitation, gynecology and obstetrics, orthopedics, and neurosurgery studies (2,3,6,10–24). Unlike most other medical teaching conferences in a residency program, the JC requires audience participation as a key feature to provide education. The successful JC fosters an open exchange of ideas, opinions, and interaction among those in attendance, which helps optimize the educational value (13). Accrediting agencies such as the CPME have emphasized the importance of the JC as a valuable part of medical education and training. According to the CPME, a "journal review session, consisting of faculty and residents, must be scheduled at least monthly to facilitate reading, analyzing, and presenting medical and scientific literature" (8).

Formal Learning Objectives or Goals

Defining the goals of the JC is important. Residency programs with formal written learning objectives were more likely to have a successful JC in internal medicine and orthopedic programs (2,13). In our study, a strong trend was found for formal written learning objectives resulting in a successful JC. Although many studies have compiled educational goals for JCs by surveying program directors, few asked whether the goals had been formalized in writing. In a survey of emergency medicine program directors, 42% of the programs did not have formal written learning objectives for JCs (11). The results of the present study suggest this is also an opportunity for improvement in podiatric foot and ankle surgical training programs, because only 34% of those surveyed had stated the objectives of the JC session (Table 2). The establishment of formal, written educational objectives could be implemented in podiatric foot and ankle surgical training program JCs and would likely lead to improvement in the quality of the JC itself. The content discussed, the number of articles, and which journals they are drawn from will thus be guided by these objectives. The effectiveness of the JC can then be measured according to these objectives (13).

Primary Goal of JCs

According to published medical education data, the primary goal of the academic JC is to teach critical appraisal skills (2,3,17–19,25–32). Critical appraisal skills equip learners with the skills necessary to evaluate and assess the value of information reported in the medical literature. In a survey of orthopedic RPDs, training residents in the critical evaluation of scientific articles was the most important goal of the JC in 67% of programs responding (3). In a survey of 278 general surgery program directors, >50% indicated that their JC was important or very important to their training program, with learning critical appraisal skills and providing training in research education as the top 2 objectives cited (12). In contrast to these specialties, our study of podiatric foot and ankle RPDs revealed the most important goal of the JC was to effect clinical decision-making.

Additional Goals of JCs

Improving resident interpretation of biostatistics and epidemiology has been shown to be important but difficult to measure. In 1 report, 2 approaches to the JC were compared in a randomized trial (18). In a self-assessment, residents whose conference emphasized epidemiology and biostatistics thought they read with more attention to study design and methodology than their counterparts who participated in a traditional JC. Despite the perceptions of residents, objective testing of knowledge in epidemiology, biostatistics, and critical evaluation revealed no significant differences between the 2 groups (18). Another study compared the acquisition of knowledge in clinical epidemiology and biostatistics between 2 pediatric programs with monthly JC meetings. The only difference between the 2 programs was that 1 featured 2 introductory sessions on epidemiologic principles (27). Objective pretesting and post-testing revealed no difference between study groups in the acquisition of knowledge in these areas. The present study found that among podiatric RPDs, teaching epidemiology and biostatistics was the least important goal for the JC.

JCs can stimulate research interest, which might motivate residents to learn more about reading critically and to conduct their own research. One study found that the JC was a powerful motivator of residents' reading behavior and improved their ability to critique research methodology (17). Crank-Patton et al (12) showed that most surgical program directors believed the JC was important for providing training in research education. The CPME requires a didactic schedule to provide instruction in research methodology (8). JCs provide a forum for residents to participate and engage in research activities.

Frequency of JC Meetings

The frequency of JC meeting seems to be a critical variable in participation and success. In a study of orthopedic training programs,

Table 2
Journal club characteristics (n = 93)

Characteristic	n (%)
Frequency of journal club meetings	
Weekly	28 (30.1)
Twice per month	12 (12.9)
Once per month	53 (57.0)
Time of day	
Weekday evening	35 (37.6)
Weekday morning	32 (34.4)
Weekday afternoon	10 (10.8)
Weekday lunch	7 (7.5)
Variable	5 (5.4)
Weekend	0 (0.0)
No response	4 (4.3)
Duration of meetings (h)	
<1	25 (26.9)
1 to 2	53 (57.0)
2 to 3	12 (12.9)
No response	3 (3.2)
Meeting location	
Hospital (e.g., conference room, library, faculty office)	74 (79.6)
Restaurant	10 (10.8)
Faculty home	3 (3.2)
Other	3 (3.2)
No response	3 (3.2)
Food provided	
Yes	31 (33.3)
No	60 (64.5)
No response	2 (2.2)
Proportion of residents who usually attend (%)	
<25	1 (1.1)
25 to 50	4 (4.3)
50 to 75	12 (12.9)
>75	73 (78.5)
No response	3 (3.2)
Formal written learning objectives	
Yes	30 (32.3)
No	59 (63.4)
No response	4 (4.3)
Selection of journal articles*	
Faculty	39 (41.9)
Chief resident	46 (49.5)
Resident	45 (48.4)
Advanced distribution of articles (days)	
1 to 2	9 (9.7)
3 to 7	45 (48.4)
>7	35 (37.6)
No response	4 (4.3)
Article types reviewed*	
Original research	79 (84.9)
Review	69 (74.2)
Classic/historical	56 (60.2)
Case reports	56 (60.2)
Presenter*	
Faculty	18 (19.4)
Chief resident	15 (16.1)
One resident per article	77 (83.0)
Other	11 (11.8)
Articles reviewed at each meeting (n)	
1	10 (10.8)
2	15 (16.1)
3	24 (25.8)
4	16 (17.2)
5	5 (5.4)
6	8 (8.6)
8	4 (4.3)
9	4 (4.3)
10	2 (2.2)
No response	5 (5.4)
Format	
Short verbal (<15 min/article)	54 (58.1)
Long verbal (>15 min/article)	14 (15.1)
PowerPoint/slide presentation	17 (18.3)
Other	2 (2.2)
No response	6 (6.5)
Medical specialists invited (e.g., radiology, vascular surgery)	
Yes	30 (32.2)
No	60 (64.5)
No response	3 (3.2)
Feedback forms provided	
Yes	24 (25.8)
No	66 (71.0)
No response	3 (3.2)
Most important for successful journal club	
Regular facility attendance	38 (40.9)
Attendance by most residents	21 (22.6)
Article type (review, evidence-based medicine)	16 (17.2)
Presentation format	8 (8.6)
Other	6 (6.5)
No response	4 (4.3)

(continued on next column)

Table 2 (*continued*)

* Check all that apply; thus, answer choices will not sum to 100.

78% of programs met monthly for the JC (3). Monthly JC meeting were conducted in 86% of emergency medicine residency programs, 81% of general surgical residency programs, 61% of physical medicine and rehabilitation residency programs, and 43% of internal medicine programs (2,6,11,14).

The present study has shown that 58% of podiatric foot and ankle surgical training programs hold JC meetings on a monthly basis. Conducting JC meeting more than once per month could be difficult, particularly if a program intends to have residents review numerous articles for each JC meeting or if a detailed and structured critical appraisal of JC articles is expected. Overly frequent JC meetings can cause JC fatigue and risk creating a state of diminishing return. It could also be difficult to have significant faculty involvement if the frequency is too often. However, of the 26 programs that conduct JC meetings on a weekly basis, 18 were successful (70%).

Time Schedule

Most medical training programs such as internal medicine, family medicine, and pediatric residency programs meet in the middle of the day (2,16). In contrast, surgical programs such as orthopedic residency programs (68%), neurosurgery (45%), and general surgery (42%) meet in the evening (68%), with the remainder meeting at the beginning of the workday (3,10,33).

In our study, 80% of programs with established times held JC meetings either in the early morning or in the evening (Table 5). Five programs had variable meeting times. Of those 5 programs, 4 (80%) had deemed their JC unsuccessful. The results of the present study are consistent with those from other surgical residency programs in that the daily and clinical demands of a surgical training program are less amenable to midday meetings than are those in nonsurgical training programs.

Moderator

According to a systematic review, a successful JC will have a leader who selects papers and leads the discussion (4). Having a designated leader for a JC correlated significantly with the effectiveness of the JC (16). This moderator should be responsible for the organization, execution, and evaluation of the JC. Having a skilled moderator, whether resident or faculty member, is important to the value and attendance of the JC (13). It might be beneficial to train a leader or facilitator of the JC in relevant research design or statistical knowledge to appropriately direct group discussions and assist the group to work toward its goals.

Although having a leader who is a faculty member is important, the results from other studies have suggested that an active group of

Table 3
Importance of journal club goals

Goals	How Residency Sites Ranked Journal Club Goals						
	1, Most Important	2	3	4	5	6, Least Important	No Response
Impact clinical decision-making	44 (47.3)	14 (15.1)	6 (6.5)	1 (1.1)	3 (3.2)	3 (3.2)	22 (23.7)
Improve critical appraisal skills	21 (22.6)	46 (49.5)	2 (2.2)	5 (5.4)	4 (4.3)	0 (0.0)	15 (16.1)
Conduct literature searches	2 (2.2)	6 (6.5)	33 (35.5)	17 (18.3)	12 (12.9)	4 (4.3)	19 (20.4)
Prepare manuscripts and/or presentations	2 (2.2)	6 (6.5)	16 (17.2)	29 (31.2)	17 (18.3)	1 (1.1)	22 (23.7)
Interpret statistical data	3 (3.2)	12 (12.9)	20 (21.5)	18 (19.4)	25 (26.9)	1 (1.1)	14 (15.1)
Other	1 (1.1)	0 (0.0)	0 (0.0)	2 (2.2)	1 (1.1)	14 (15.1)	75 (80.6)

Data presented as n (%).

residents in planning and operating a JC is associated with longevity and success (2,11,19). Deenadayalan et al (4) stated that providing access to a statistician could assist the leader in preparing for JC meetings and answer questions that might arise from the discussion. In the present study, a designated moderator was not significantly associated with a successful JC.

Faculty Participation

The most commonly cited factor for a successful JC was regular faculty attendance (Table 5). Faculty participation is common in resident-oriented JCs and has been found to improve their educational value (18,24). The interaction by faculty allows residents to observe how senior practitioners approach and use the published data. This observation is important because young residents tend to model their practices based on knowledge imparted by their mentors (33).

Attendance

Not surprisingly, attendance was greater if a mandatory attendance requirement was in place. The effectiveness of JCs appears to improve if the expectation is explicit that residents attend JC meetings. In our study, 81% of programs had >75% resident attendance. Attendance by most residents was cited as the second most important factor for a successful JC (Table 5).

Setting and Food Availability

The regular provision of food has been associated with successful JCs (3). This might result in a more relaxed learning environment and help establish the long, continuous existence and high attendance rates of the JC (2). Although conducting JC at a restaurant or bar might be relaxing, conversation could be inhibited if music is playing or if other distracting ambient noise is present (13). Crank-Patton et al (12) cautioned against conducting JC meetings in a social environment or faculty home because the meetings could become a social function that detracts from the educational purpose. However, the venue should facilitate relaxation and conversation. Seating participants in a circle seems to be the most effective for encouraging participation (13). In podiatric foot and ankle surgical training programs, JC meetings were held in a hospital conference room in 74 of 90 programs (82%). However, location did not appear to influence the success of the JC (Table 5).

Table 4
Residency program characteristics by success of journal club

Characteristics	More Successful (n = 52)	Less Successful (n = 38)	*p* Value
Duration of residency program (y)			.372
<5	7 (77.8)	2 (22.2)	
5 to 10	7 (63.6)	4 (36.4)	
>10	38 (54.3)	32 (45.7)	
Institution type			NS
Hospital (nonuniversity/non-Veterans Administration)	30 (66.7)	15 (33.3)	
University-affiliated	10 (52.6)	9 (47.4)	
Veteran Administration-affiliated	7 (41.2)	10 (58.8)	
Community/retail	4 (57.1)	3 (42.9)	
Other	1 (50.0)	1 (50.0)	
Residents in program (n)	8.1 ± 3.6	7.8 ± 5.2	NS

Abbreviation: NS, not significant.
Data presented as n (%) or mean ± standard deviation.

The present study did not distinguish the existence of industry or other entity for JC sponsorship. Sponsored support has the potential to inject undue bias into the educational process and would need to be carefully controlled. This has important implications in defining the role of industry bias in podiatric foot and ankle surgical training programs. Our survey did not inquire about the extent of industry support of the JCs and was beyond the scope of the present study. Further research is needed to better define the effect of industry support on the JC curriculum.

Article Selection

Articles are typically selected for their clinical, surgical, and methodologic relevance. Article selection should have an overarching purpose or focus for that particular JC. Selection of relevant articles that interest the residents or allowing the residents to participate in the selection of articles is also an important method of generating resident participation (24).

Considerable variability remains in the number of articles appraised and the duration of JC meetings (21,26). Although our study did not find an association between the numbers of articles chosen and a successful JC, a delicate balance is required between limiting valuable discussion (too many articles) and limiting the breadth of information (too few articles). The most common range appears to be between 2 and 4 articles; however, this should be individualized to each program.

In the present study, 94% of podiatric foot and ankle residency programs routinely reviewed >1 journal (Table 2). This likely reflects a desire for the residency programs to provide wider exposure to the expanding volume of published medical data.

Structured Review Instrument

A structured review instrument is a checklist or form to guide the resident through the critical appraisal of a JC article. Several investigators have described and recommended checklist-based systems to aid residents in analyzing the methods and experimental design, use of statistics, data, and conclusions (24,26,32,34,35). One study assessed the benefit of a structure review instrument in emergency medicine residencies and found it increased resident satisfaction and improved the perceived educational value of the JC without increasing the resident workload or decreasing attendance (26). This tool can also be used for resident evaluation of knowledge acquisition and the effect of the meeting on the overall educational

Table 5
Journal club characteristics stratified by success of journal club

Characteristics	n	More Successful* (n = 52)	Less Successful* (n = 38)	*p* Value
Frequency of journal club meetings				.252
Weekly	26	18 (69.2)	8 (30.8)	
Twice per month	12	5 (41.7)	7 (58.3)	
Once per month	53	29 (55.8)	23 (44.2)	
Time of day				.011
Weekday evening	34	20 (58.8)	14 (41.2)	
Weekday morning	32	23 (71.9)	9 (28.1)	
Weekday afternoon	10	2 (20.0)	8 (80.0)	
Weekday lunch	7	4 (57.1)	3 (42.9)	
Variable	5	1 (20.0)	4 (80.0)	
Duration of meetings (h)				.204
<1	24	11 (45.8)	13 (54.2)	
1 to 2	53	35 (66.0)	18 (34.0)	
2 to 3	12	6 (50.0)	6 (50.0)	
Meeting location				
Hospital (e.g., conference room, library, faculty office)	74	42 (56.8)	32 (43.2)	
Restaurant	10	4 (40.0)	6 (60.0)	
Faculty home	3	3 (100.0)	0 (0.0)	
Other	3	3 (100.0)	0 (0.0)	
Food provided				.589
Yes	30	16 (53.3)	14 (46.7)	
No	59	35 (59.3)	24 (40.7)	
Proporation of residents usually attending (%)				.707
<25	1	0 (0.0)	1 (100.0)	
25 to 50	4	2 (50.0)	2 (50.0)	
50 to 75	12	8 (66.7)	4 (33.3)	
>75	73	42 (57.5)	31 (42.5)	
Formal written learning objectives				.135
Yes	30	21 (70.0)	9 (30.0)	
No	58	31 (53.5)	27 (46.6)	
Selection of journal articles†				.756
Faculty	39	25 (64.1)	14 (35.9)	
Chief resident	46	29 (63.0)	17 (37.0)	
Resident	44	25 (56.8)	19 (43.2)	
Advanced distribution of articles (days)				.042
1 to 2	9	2 (22.2)	7 (77.8)	
3 to 7	45	26 (57.8)	19 (42.2)	
>7	35	24 (68.6)	11 (31.4)	
Article types reviewed†				.947
Original research	79	47 (59.5)	32 (40.5)	
Review	69	38 (55.1)	31 (44.9)	
Classic/historical	56	32 (57.1)	24 (42.9)	
Case reports	56	31 (55.4)	25 (44.6)	
Presenter†				.316
Faculty	18	12 (66.7)	6 (33.3)	
Chief resident	15	12 (80.0)	3 (20.0)	
One resident per article	77	47 (61.0)	30 (39.0)	
Other	11	5 (45.5)	6 (54.6)	
Articles reviewed in each meeting (n)				.453
1	10	5 (50.0)	5 (50.0)	
2	15	7 (46.7)	8 (53.3)	
3	24	14 (58.3)	10 (41.7)	
4	16	10 (62.5)	6 (37.5)	
5	5	3 (60.0)	2 (40.0)	
6	8	5 (62.5)	3 (37.5)	
8	4	3 (75.0)	1 (25.0)	
9	4	2 (50.0)	2 (50.0)	
10	2	2 (100.0)	0 (0.0)	
Format				.561
Short verbal (<15 min/article)	54	30 (55.6)	24 (44.4)	
Long verbal (>15 min/article)	14	10 (71.4)	4 (28.6)	
PowerPoint/slide presentation	17	10 (58.8)	7 (41.2)	
Other	2	0 (0.0)	2 (100.0)	
Medical specialists invited (e.g., radiology, vascular surgery)				.131
Yes	30	14 (46.7)	16 (53.3)	
No	60	38 (63.3)	22 (36.7)	
Feedback forms provided				.013
Yes	24	19 (79.2)	5 (20.8)	
No	66	33 (50.0)	33 (50.0)	
Most important for successful journal club				.962
Regular facility attendance	38	23 (60.5)	15 (39.5)	
Attendance by most residents	21	13 (61.9)	8 (38.1)	
Article type (e.g., review, evidence-based medicine)	16	9 (56.3)	7 (43.8)	

(*continued on next page*)

Table 5 (*continued*)

Characteristics	n	More Successful* (n = 52)	Less Successful* (n = 38)	*p* Value
Presentation format	8	4 (50.0)	4 (50.0)	
Other	6	3 (50.0)	3 (50.0)	

Data presented as n (%).

* A more successful journal club was defined as one for which the podiatric residency program director reported the journal club was "extremely beneficial" to the residency program; journal club success was not reported for 3 clubs (n = 90).

† Check all that apply; thus, answer choices will not sum to 100%.

training program (13,26,30,36). Although important elements of the structured review instrument were not evaluated in the present study, this could be an area of investigation in the future. An example of a structured review instrument is provided in Supplemental Appendix I.

Self-Evaluation of JC

According to podiatric foot and ankle surgical training program directors, most believe that the JC is extremely or somewhat important. However, in our study, only 26% of podiatric residency programs performed formal assessments to evaluate the effectiveness of their JC. Jouriles et al (11) reported that 42% of emergency medicine programs lacked any form of written learning objectives for the JC. This can be problematic, because the lack of written learning objectives could inhibit learning and the ability to evaluate one's educational progress.

Without well-defined learning objectives for each JC, new knowledge or skills might not be acquired and accurate evaluations might not be possible. Some programs have reported using a pretest and post-test format to assess the acquisition of critical appraisal skills (27). In contrast, others have used the critical evaluation of a factitious standardized article (37). Regardless of the evaluation method used, the JC organizer should perform the assessment periodically and use the information obtained to improve the educational value of the JC.

With respect to podiatric foot and ankle surgical training programs, the most important goal of JC is to effect clinical decision-making (Table 3). Therefore, the self-evaluation process should revolve around the program's goals. Although not statistically significant, the success of podiatric foot and ankle surgical training program JCs showed a trend toward a decrease as the number of years the residency program had been in existence increased ($p = .372$). One explanation could be that a program might be resistant to change, which could create fatigue and decrease participant satisfaction. Just as with all educational activities, JCs likely will need periodic refinements to keep them stimulating for, and valuable to, the participants (38).

Perhaps 1 method to gauge the interest level of the JC is to ask the participants directly or through an evaluation form. This sort of evaluation could also ask residents for anonymous feedback regarding the strengths, weaknesses, and potential improvements for the JC. One other method of evaluation is to ask residents to self-assess their clinical reading habits and behaviors as a measure of success; improvements in residents' self-evaluation with time would indicate a successful JC program. In the present study, a greater proportion of residency programs that provided feedback forms were more successful than were the programs that did not ($p = .013$; Table 5). Among the programs that provided or engaged in feedback, roundtable open discussion was the most commonly cited (Table 5).

The present study had a number of limitations. With a response rate of 47%, the results of the present study might not be generalizable to all podiatric foot and ankle surgical training programs. Despite this limitation, our response rate was greater than that in published reports from other medical specialties (10). The strategy of disseminating the survey during a 4-week period multiple times at relatively equal intervals appeared to maximize the response rate.

Another limitation of the present study was the lack of response from residency programs currently without a JC. Therefore, investigation into the factors contributing to the nonexistence of a JC was not possible. Moreover, the directory of residency directors was obtained from the public domain (Centralized Application Service for Podiatric Residencies; available at: www.casprcrip.org). On e-mailing the survey, several immediate replies were received indicating a "no-longer valid" e-mail address. Although attempts were made to acquire valid addresses, this potentially could have hindered the response rate. Another limitation was that several of the primary e-mail addresses listed were not for the RPD but rather a designated administrative assistant of the program. Although in our e-mail we had instructed this person to forward the e-mail to the RPD, it is still possible that the nonresidency director, primary contact person might not have forwarded the survey appropriately, potentially limiting the response rate even further. Finally, the determination of a successful JC was a subjective measure based on the perceptions of the RPD and might not necessarily correlate with an independent measure of success. Sidorov (2) objectively defined a successful JC as one that has been in existence for >2 years or had an estimated attendance rate of ≥50%. However, based on previous reports, the vast majority of residency JCs met 1 or both of these criteria (2,3,10). Therefore, it is conceivable that determining the factors significantly associated with a successful JC would be difficult owing to the inability to distinguish successful JCs from unsuccessful JCs. Selection of "extremely beneficial" as the indicator for a perceived successful JC was based on elucidating the factors that differentiate between JCs that were of extreme benefit from those that were only moderately beneficial. The response by RPDs to determine the perceived success of the JC has been performed in surgery and emergency medicine JCs (11,12).

The present study also had several strengths. A wide variety of residency programs was represented (Table 1). Therefore, the results of the present study are a fair representation of the successful factors important in podiatric JCs. The manner in which the questionnaire was constructed helped to create an objective standard in podiatric foot and ankle surgical training program JCs for which no generally accepted or objective standard exists.

JCs are an important part of graduate medical education, and further research is needed, not only to define the optimal curriculum, but also to define better methods to encourage faculty participation, establish written learning objectives, and perform periodical self-evaluation. The results from the present study indicate that the JC is still widely used as a beneficial educational resource and helps meet core competency requirements. Future work aimed at interventions that promote a more effective JC should be examined.

In conclusion, the role of the JC is seen by many as a method to help streamline the educational process by providing an avenue through which residents can focus on relevant articles and topics and gain independent appraisal skills. It serves as an educational modality for residents to learn the skills and knowledge to perform evidence-based surgery and keep abreast of new knowledge. The JC serves numerous purposes in training programs and could have varied goals

in different programs. Several variables have been identified that lead to perceived success, including a designated leader or moderator for each session, encouraging good faculty attendance and participation, mandatory attendance requirements for residents, implementation of a structured review instrument, articulating clear goals for the JC with periodic evaluation, and instituting appropriate changes that ensure the JC remains a valuable and successful part of the training program. This will ideally serve as a point for discussion of how to maximize the benefits of JCs.

The results of our survey are intended to encourage podiatric foot and ankle surgical training RPDs to both evaluate the quality of their JC and identify factors that result in the JC being a successful component of surgical residency training. The results of the present study have shown that the foundational elements of a successful JC should include mandatory attendance, disseminating the reading material far enough in advance, regularly scheduled meetings, and faculty participation with a designated moderator.

Acknowledgments

The authors would like to thank all the residency program directors who completed and returned their surveys. We also wish to acknowledge the following and thank them for their participation in the present study and contribution to our report: Michelle Pershing, PhD, and Christy Collins, PhD.

Supplementary Material

Supplementary material associated with this article can be found in the online version at www.jfas.org (http://dx.doi.org/10.1053/j.jfas.2017.04.028).

References

1. Cushing H. *The Life of Sir William Osler*, Vol. 1, pp. 132–133. Oxford University Press, New York, 1926.
2. Sidorov J. How are internal medicine residency journal clubs organized, and what makes them successful? Arch Intern Med 155:1193–1197, 1995.
3. Greene WB. The role of journal clubs in orthopaedic surgery residency programs. Clin Orthop Relat Res 373:304–310, 2000.
4. Deenadayalan Y, Grimmer-Somers K, Prior M, Kumar S. How to run an effective journal club: a systematic review. J Eval Clin Pract 14:898–911, 2008.
5. Linzer M. The journal club and medical education: over one hundred years of unrecorded history. Postgrad Med J 63:475–478, 1987.
6. Moberg-Wolff EA, Kosasih JB. Journal clubs: prevalence, format, and efficacy in PM&R. Am J Phys Med Rehabil 74:224–229, 1995.
7. Van Derwood JG, Tietze PE, Nagy MC. Journal clubs in family practice residencies. South Med J 84:483–487, 1991.
8. Council of Podiatric Medical Education. *Standard and Requirements for Approval of Podiatric Medicine and Surgery Residencies*, CPME.org. Available at: http://www.cpme.org/residencies/content.cfm?ItemNumber=2444&navItemNumber=2245. Accessed October 15, 2016.
9. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics supports. J Biomed Inform 42:37–81, 2009.
10. Rajpal S, Resnick D, Raskaya M. The role of journal club in neurosurgical training. Neurosurgery 61:397–403, 2007.
11. Jouriles NJ, Cordell WH, Martin DR, Wolfe R, Emerman CL, Avery A. Emergency medicine journal clubs. Acad Emerg Med 3:872–878, 1996.
12. Crank-Patton A, Fisher JB, Toedter J. The role of the journal clubs in surgical residency programs: A survey of APDS program directors. Curr Surg 58:101–104, 2001.
13. Dirschl DR, Tornetta P, Bhandari M. Designing, conducting, and evaluating journal clubs in orthopedic surgery. Clin Orthop Relat Res 413:146–157, 2003.
14. Cheatham ML. A structured curriculum for improved resident education in statistics. Am Surg 66:585–588, 2000.
15. Hartzell JD, Veerappan GR, Posley K, Shumway NM, Durning SJ. Resident run journal club: a model based on the adult learning theory. Med Teach 31:e156–e161, 2009.
16. Heiligman RM, Wollitzer OA. A survey of journal clubs in US family practice residencies. J Med Educ 62:928–931, 1987.
17. Linzer M, Brown JT, Frazier LM, DeLong ER, Siegel WC. Impact of a medical journal club on house-staff reading habits, knowledge, and critical appraisal skills: a randomized controlled trail. JAMA 260:2537–2541, 1988.
18. Linzer M, DeLong DR, Kupart KH. A comparison of two formats for teaching critical reading skills in a medical journal club. J Med Educ 62:690–692, 1987.
19. Linzer M, Mercando A, Hupart KH. Role of a medical journal club in residency training. J Med Educ 61:471–473, 1986.
20. Manzar S. Residents perspective on the journal club. Saudi Med J 24:1026–1027, 2003.
21. Melchior JA, Meals RA. The journal club and its role in hand surgery education. J Hand Surg Am 23:972–976, 1998.
22. Mobbs RJ. The importance of the journal club for neurosurgical trainees. J Clin Neurosci 11:57–58, 2004.
23. Seeling CB. Affecting residents' literature reading attitudes, behaviors, and knowledge through a journal club intervention. J Gen Intern Med 6:330–334, 1991.
24. Thurnau GR, Fishbrune JI. Format of an obstetrics and gynecology journal club and four years' experience. Am J Obstet Gynecol 160:313–316, 1989.
25. Alguire PC. A review of journal clubs in postgraduate medical education. J Gen Intern Med 13:347–353, 1998.
26. Burstein JL, Hollander JE, Barlas D. Enhancing the value of journal club: use of a structured review instrument. Am J Emerg Med 14:561–563, 1996.
27. Langkamp DL, Pascoe JM, Nelson DB. The effect of a medical journal club on residents' knowledge of clinical epidemiology and biostatistics. Fam Med 24:528–530, 1992.
28. Mattingly D. Journal clubs. Postgrad Med 542:120–122, 1966.
29. Sandifer QD, Lo SV, Crompton G. Evaluation of a journal club as a forum to practice critical appraisal skills. J R Coll Physicians Lond 30:520–522, 1996.
30. Spillane AJ, Crowe PJ. The role of the journal club in surgical training. Aust N Z J Surg 68:288–291, 1998.
31. Valentini RP, Daniels SR. The journal club. Postgrad Med J 73:81–85, 1997.
32. Woods JR, Winkel CE. Journal club format emphasizing techniques of critical reading. J Med Educ 57:799–801, 1982.
33. Shifflette V, Mitchell C, Mangram A, Dunn E. Current approaches to journal club by general surgery programs within the Southwestern Surgical Congress. J Surg Educ 62:162–166, 2012.
34. Brautigan MW. A systematic approach to research curricula for emergency medicine residencies. J Emerg Med 1:459–464, 1984.
35. Krough CL. A checklist system for critical review of medical literature. Med Educ 19:392–395, 1985.
36. Seifer DB, Adelson MD, Abdul-Karin RW, Baggish MS. Appraising a clinical journal article in obstetrics and gynecology. Am J Obstet Gynecol 160:198–201, 1989.
37. Bazarian JJ, Davis CO, Spillane LL, Blumstein H, Schneider SM. Teaching emergency medicine residents evidence-based critical appraisal skills: a controlled trial. Ann Emerg Med 34:148–154, 1999.
38. Jones SR, Harrison MM, Crawford IW. Journal clubs in clinical medicine. Emerg Med J 19:184–185, 2002.