Tutorials in Clinical Research, Part VIII: Creating a Journal Club

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Objective: The present report is the eighth in a series of sequential tutorials entitled “Tutorials in Clinical Research.” The objective of the report is to provide the reader with information to create or refine a journal club. Study Design: Tutorial. Methods: The authors met weekly for 3 months and discussed the features of a journal club that would be of interest to otolaryngologists. A Medline search provided a number of relevant articles for review. Results: The report is organized into the following sections: Introduction, History of Journal Club, Goals of Journal Club, Basic Organization, Factors Associated With Successful Journal Clubs, Design of Journal Club, Selecting Literature, Evaluation of Journal Club, and Summary. Conclusions: There is a paucity of information within the otolaryngology literature regarding the journal club and the significant role it can play in physician education. The flexible nature of the journal club gives it the potential to address many educational needs. Its relevance has never been greater. Key Words: Journal club, evidence-based medicine, research design, publications, review literature.

INTRODUCTION

“Knowledge is proud that he knows so much; Wisdom is humble that he knows no more.” Cowper

The objective of the present tutorial is to serve as a practical guide for the creation of an otolaryngology journal club. It is the eighth report in the series “Tutorials in Clinical Research” written for the Laryngoscope by the Clinical Research Working Group, Washington University School of Medicine (St. Louis, MO). The expressed goal of this group is to assist those who would become more active in the application of scientific methods to their practices and to assist those who would seek to develop and publish discoveries of their own.

That the journal club is a preferred method to increase an individual’s knowledge base by reviewing and discussing pertinent medical literature is underscored by the fact that such participation is today a requirement for accreditation in internal medicine residency programs. Most physicians have had some experience with a journal club during training; however, exposure to a journal club often continues beyond the training years. Physicians who remain in an academic setting may continue their involvement with a journal club by becoming discussion leaders. Physicians in private practice may incorporate a journal club into their continuing medical education plans.

In preparation for the present report, a cursory review of the medical literature using the search word “journal club” in the PUBMED database revealed a single, brief relevant article in the otolaryngology literature. There was no information that broadly spoke to the value of the journal club within the specialty of otolaryngology. Conversely, there were many articles published in other medical fields that discussed the relevance, creation, and evaluation of the journal club as a learning tool. We hope that the present report may serve those purposes within our specialty. Specifically, this article discusses 1) the historical significance of the journal club, 2) the various goals that a journal club may achieve, 3) the basic organizational issues that must be addressed to begin the club, 4) factors associated with successful clubs, 5) the design of the journal club curriculum and journal club format options, 6) methods for selecting and appraising literature, and 7) techniques for evaluating the performance of the journal club.

DISCUSSION

History of Journal Club

The history of the journal club has been nicely reviewed by Mark Linzer. He found the first mention of such an organization in a book written by Stephen Paget, which discussed the memoirs and letters of the author’s father, Sir James Paget. The latter described his
experiences at St. Bartholomew’s Hospital in London during 1835 to 1854 and noted that “some of the self-elect of the pupils, making themselves into a kind of club, had a small room over a baker’s shop near the Hospital-gate where we could sit and read the journals.”

Linzer\(^{11}\) noted a more formal arrangement in Cushing’s description\(^{13}\) of William Osler’s journal club, started at McGill University in Montreal in 1875, and suggested that Osler may have been aware of similar practice elsewhere, perhaps Germany. Osler carried the journal club with him to Johns Hopkins, where it first met in the Department of Medicine in 1889. The success of the venture is evidenced by the fact that each department at Johns Hopkins developed its own journal club soon thereafter.\(^{14}\)

From these early beginnings, the value of the journal club became more generally appreciated and, subsequently, more broadly implemented. Mattingly,\(^{15}\) a British physician, noted in 1966 that although “the idea of journal clubs has not caught on in this country, it has in the United States, where they are a regular and often compulsory feature of hospital life.”

With a history of more than 150 years, the utility of the journal club as an effective instrument for medical education is no longer debated. However, the goals of the journal club and the techniques for its assessment continue to evolve in the 21st century. In addition, methods for literature searching and appraisal have become increasingly more sophisticated and readily available (e.g., the Internet and evidence-based medicine).

**Goals of Journal Club**

In the broadest sense, the goal of any journal club is to disseminate knowledge. Osler\(^{16}\) admonished the young physician to “read with two objects: first, to acquaint yourself with the current knowledge on a subject and the steps by which it has been reached; and secondly, and more important, read to understand and analyze your cases.” Certainly, these goals would be desired in any current journal club. However, additional and more specific goals may be pertinent depending on the individual group. As seen in Tables I and II, the potential goals of the journal club are myriad, may overlap, and may be combined.

Linzer\(^{11}\) noted that the three historical goals of the journal club are 1) to “keep up” with the literature, 2) to impact clinical practice, and 3) to teach critical reading skills. However, the priority of goals varies among different groups. In a survey of all accredited internal medicine residencies in New York City, chief residents noted that the most common goal of their journal clubs was to teach critical appraisal skills.\(^{17}\)

A survey of family practice residencies in the United States found that keeping abreast of the medical literature was the most highly regarded goal.\(^{18}\) Valentini and Daniels\(^{19}\) surveyed the pediatric residency programs in North America and found that chief residents valued critical appraisal and keeping current with the medical literature equally. Members of a general surgery journal club in Australia responded that their club not only satisfied these same two goals but also provided a “convivial social forum.”\(^{20}\)

<table>
<thead>
<tr>
<th>TABLE I. Journal Club Development and Improvement.</th>
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<tbody>
<tr>
<td><strong>Goals</strong></td>
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<tr>
<td>Keeping current</td>
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<tr>
<td>Learning critical appraisal skills</td>
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<tr>
<td>Improving clinical practice</td>
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<tr>
<td>Others (refer to Table II)</td>
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<td><strong>Basic organization</strong></td>
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<td>The leader</td>
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<tr>
<td>Permanent leader</td>
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<tr>
<td>Clinical and clinical research expertise</td>
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<tr>
<td>Need not run each meeting</td>
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<tr>
<td>The participants</td>
</tr>
<tr>
<td>12 members or less in a group is preferred</td>
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<tr>
<td>Expectations and responsibilities should be clear</td>
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<tr>
<td>The meetings</td>
</tr>
<tr>
<td>Regular</td>
</tr>
<tr>
<td>Convenient in time and place</td>
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<tr>
<td><strong>Factors associated with success (well attended; long existence)</strong></td>
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<tr>
<td>High member interest</td>
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<tr>
<td>Formal teaching of critical appraisal skills</td>
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<tr>
<td>Relevant and/or interesting articles</td>
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<tr>
<td>Discussion of complex and/or controversial issues</td>
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<tr>
<td>Food available</td>
</tr>
<tr>
<td>Doom of the journal club is assured if too many articles are reviewed</td>
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<tr>
<td><strong>Design of the meetings</strong></td>
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<tr>
<td>Curriculum</td>
</tr>
<tr>
<td>Literature selected is dependent upon the goals</td>
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<tr>
<td>Goals for each meeting may vary</td>
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<td>Several goals may be selected within a single meeting</td>
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<tr>
<td>Discussion format (recognition of principles of adult learning)</td>
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<tr>
<td>Relate learning task to immediate work and personal goals</td>
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<tr>
<td>Focus learning objectives to actual patient or situation-based problems</td>
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<tr>
<td>Emphasize problem-solving cognitive learning</td>
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<tr>
<td>Use multiple teaching formats</td>
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<tr>
<td>Facilitate active learner participation and feedback</td>
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<td>Facilitate frequent instructional feedback</td>
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<tr>
<td>Selecting the literature</td>
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<tr>
<td>Search for the best evidence</td>
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<tr>
<td>Learn scientific methods for assessing “best evidence”</td>
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<tr>
<td>Structured review instrument for use in meeting</td>
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<tr>
<td><strong>Evaluation</strong></td>
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<td>Teaching effectiveness</td>
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<tr>
<td>Measure outcomes against journal club goals</td>
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<tr>
<td>Suggestions for improvement</td>
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<tr>
<td>Periodic survey of members</td>
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There exists no literature documenting the priority of journal club goals for groups of otolaryngologists, nor is there reason to believe that there would be consistency among them. One goal is not necessarily of greater value than another. In fact, a club may elect to change or vary its goals over the course of time. However, what seems im-
TABLE II. Potential Goals of a Journal Club.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Description</th>
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<tr>
<td>To serve as an introduction to a medical field (for example, medical students)</td>
<td>To build a career knowledge base (for example, residents)</td>
</tr>
<tr>
<td>To build a career knowledge base (for example, residents)</td>
<td>To prepare for board exams</td>
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<tr>
<td>To prepare for board exams</td>
<td>To provide an update of current medical literature</td>
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<tr>
<td>To provide an update of current medical literature</td>
<td>To review a particular topic</td>
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<tr>
<td>To review a particular topic</td>
<td>To discuss controversies</td>
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<tr>
<td>To discuss controversies</td>
<td>To improve clinical practice</td>
</tr>
<tr>
<td>To improve clinical practice</td>
<td>To teach critical literature appraisal skills</td>
</tr>
<tr>
<td>To teach critical literature appraisal skills</td>
<td>To serve as a “springboard” for research ideas</td>
</tr>
<tr>
<td>To serve as a “springboard” for research ideas</td>
<td>To provide a vehicle for honing teaching skills</td>
</tr>
<tr>
<td>To provide a vehicle for honing teaching skills</td>
<td>To build a database of reviewed material for a group</td>
</tr>
<tr>
<td>To build a database of reviewed material for a group</td>
<td>To provide continuing medical education credit</td>
</tr>
<tr>
<td>To provide continuing medical education credit</td>
<td>To provide a social forum outside of the usual working environment</td>
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</table>

portant is that the group should 1) be aware of the potential goals, 2) consciously decide which to pursue, and 3) make the goals clear to all members from the outset.

Basic Organization

Selecting a leader. Mattingly stated, “There is no doubt that having a permanent chairman to organize the meetings has a lot to do with the continuing success of the club.” In a review of internal medicine residency journal clubs, Sidorov found that most had at least one faculty member with primary responsibility for coordination of the club. Interestingly, he did note that one factor which correlated with high attendance and longevity was independence from a faculty journal club. In their survey of journal clubs, Heiligman and Wollitzer found that clubs with a designated leader had a significantly higher satisfaction rating than those without a leader.

The leader, usually a faculty member or a senior level resident, must be clear as to the goal(s) of the club and must be responsible for the scheduling of meetings and for the dissemination of appropriate materials and, perhaps, the actual direction of the meetings themselves. The journal club leader does not have to be the discussion leader. Rather, the individual or individuals who conduct the discussion can be determined by the respective discussion format chosen by the particular club. Many times the discussion leader is determined on a rotating basis and may be an assigned resident or selected specialist. Preferably, the discussion leader would be well versed in techniques for literature searching, critical appraisal, and biostatistics.

Participants. There is not an ideal number for a journal club, but if there are too many participants, there may be less incentive for individual members to become involved in the discussion. A group of 12 or fewer people seems manageable and may provide an atmosphere more conducive to the participation of all individuals. If the number of members is much higher, it may be wise to split into smaller breakout groups. Sidorov found that journal clubs with both long, continuous existence and high attendance were associated with fewer house staff in the group.

The journal club is an educational device that generally differs in its format from the other medical teaching conferences such as grand rounds and didactic sessions. It has the potential for being a more intimate, low-key gathering, and this social aspect should not be ignored but rather may be exploited to increase member participation and satisfaction. Interaction and the exchange of ideas help to maximize its potential for teaching, and seating the participants in a round-table arrangement may help to facilitate this.

The expectations for responsibility on the part of the participants must be clear. Ambiguity of expectations is a sure way to allow for lessened individual commitment. If the format is such that all members are to have read the relevant article(s) before the meeting, this information should be conveyed well beforehand, to allow the busy participants enough time to perform this task. Each journal club group will have to determine how highly it values individual participation, regarding both attendance and interaction during the meetings.

Meetings. The journal club organizers must decide when the club will meet. Regular meetings are more successful; if the meetings are sporadically attended, the potential for success is lessened. Many surgical journal clubs find that meeting in the early evening, after the day’s routine work has been completed, allows for better attendance. Others may prefer the early morning. The lunch hour is popular for internal medicine journal clubs. However, this is rarely practical for surgical fields.

Frequency of meeting is another variable. Again, consistency is a key to maximizing success. Members must know when to be prepared and what to expect. Commonly, journal clubs meet on a monthly basis, although some choose weekly, biweekly, or even quarterly schedules. The duration of the meeting is another variable to be decided. A duration of 1 hour is common.

Where the journal club meets must be decided. For practical reasons, the hospital is a likely setting. However, as mentioned, there is the potential for a positive social aspect to the journal club, which can be used to broaden its appeal and add value. Accordingly, groups that choose to meet in the evenings may elect to do so at one of the participant’s homes or in a small banquet room at a nearby restaurant with the discussion to take place after dinner.

Factors Associated With Successful Journal Clubs

Sidorov in his survey of journal clubs in internal medicine residencies, defined success as high attendance and long, continuous existence. Other definitions of success would be closely related to the stated goals of the journal club itself. For example, if it were the design of an individual club to teach its members critical appraisal skills, then “success” would be the acquisition of those skills. Sidorov stressed that success depended on 1) making attendance mandatory, 2) promoting a resident journal club that is independent of a faculty journal club, 3)
providing formal teaching of critical appraisal skills, 4) making food available, and 5) emphasizing original research articles. While noting the association between improved attendance and independence from a faculty journal club, he found that many of the resident clubs, nonetheless, had support and teaching provided by the faculty. The importance of food availability underscores the social aspect of the club and the potential to distinguish itself from other teaching forums.

Heiligman and Wollitzer also identified features considered to be critical to the success of a journal club; they emphasized 1) resident interest, 2) selection of relevant and/or interesting articles and 3) discussion of complex and/or controversial issues.

Both Linzer et al. and Valentini and Daniels mentioned that a journal club is more likely to be “successful” if it appears to be meeting its goals. This again emphasizes the importance of articulating the specific goals of the club to the individual members.

One pitfall, which will surely doom a journal club to failure, is the noble, although misguided, attempt to cover too many articles. This overwhelms the participants and leads to superficial evaluation, which limits discussion and ultimately decreases retention of what has been learned. The motto “less is more” seems a reasonable guide.

**Design of Journal Club**

Once the basics have been addressed, there are more specific design options to be considered, such as type of literature content (curriculum) and choice of journal club format.

**Curriculum.** The type of literature that will be discussed by the group depends on its goals. For instance, if the club is interested primarily in serving as an introduction to a medical field, building a knowledge base, or preparing for board examinations, searching the relevant medical literature might be confined to so-called classic articles. Familiarity with these reports could be assumed as necessary for a basic understanding of the field. If it is the desire of the group to keep abreast of current literature, the curriculum will come from the most recent relevant journals.

Reviewing a particular topic in depth or developing a background search in preparation for a research project will require a more sophisticated examination of the appropriate literature, perhaps in several different fields. If the primary goal of the journal club is to teach the participants critical appraisal skills, articles may be chosen from any field so long as the appraisal subject of interest can be adequately discussed. These skills might include the ability to develop an appropriate literature search, understanding study design, recognizing and avoiding bias, and developing facility with biostatistics and clinical epidemiology. Groups interested in learning critical appraisal skills will be dependent on a group or discussion leader who is well versed in quantitative clinical epidemiology.

**Discussion format.** Although the basic premise of any journal club is to provide a forum for the discussion of relevant literature, there are many different formats which may be employed. In fact, these different approaches are not mutually exclusive, nor does a journal club have to routinely follow the same format. Each journal club may develop its own, or modify another’s, format to maximize participant satisfaction and learning.

Recognition of and emphasis on certain principles of adult learning is important. Some of these principles include 1) relating the learning task to the immediate work experience or long-term goals, 2) presenting the learning objectives in the form of actual situations or patient problems, 3) use of problem-solving, 4) use of multiple teaching formats, 5) active learner feedback, and 6) use of frequent, constructive instructional feedback.

One of the first descriptions of a journal club format designed to stress principles of adult learning was published by Inui. In these sessions, a resident presented to the group a single article that had been chosen because of its clinical relevance. This initial presentation included the study’s objective, hypothesis, and findings. A selected faculty member then served as a discussion leader and helped to analyze the methodological validity of the article and its potential for clinical applicability. In this format, the residents were able to relate the material to their clinical workplace and engage in active learner feedback. Linzer et al. employed this same structure and noted that “the meeting provides the bridge between experimental medicine and clinical practice and is meant to establish a framework for lifelong critical analysis of medical literature.”

Joorabchi described a journal club format that was problem-based and emphasized learning the skills of critical appraisal. A relevant article was chosen by residents and then reviewed by a faculty leader who prepared methodological questions for the group before the actual meeting. During the discussion sessions, resident participants met in small groups to generate collective answers to these problem-based questions. The small groups then reconvened to present their findings. The questions were formulated to stimulate independent thinking and to evaluate aspects such as the authors’ choice of study design, appropriate use of statistical evaluation, and so forth. This process accentuated problem-solving skills and the ability to critically appraise literature, in addition to simply reviewing a study’s conclusions.

Hartlaub described a somewhat similar approach, whereby a resident and faculty moderator selected a research article that was not distributed to the group before meeting. At the session, there was a brief presentation of the background and research question. The group was asked to sequentially suggest an appropriate study design, method, subject selection, and statistical evaluation; the group’s answers were then compared with the choices of the authors. Therefore, participants became actively involved in “real-time” research design with obvious implications for learning critical appraisal skills. Hartlaub hypothesized that because such a format does not require preparation before meeting, increased attendance could result.

Letterie and Morgenstern described a journal club within an obstetrics residency program, in which the club format was designed to provide teaching of critical ap-
praisal skills and review of medical literature in an environment that was both didactic and interactive. The curriculum consisted of concepts in experimental design, epidemiology, and biostatistics and was presented over the course of 1 year in monthly 2-hour sessions. Two sets of articles were distributed at each meeting. The first set of articles was reviewed in the first hour and consisted of literature on techniques of critical appraisal. The second set of articles was reviewed in the second hour and consisted of literature on clinical topics. These articles were chosen so that they illustrated and emphasized the didactic concepts of research design and statistical analysis which had been presented in the first hour. This format was well received by the residents because it not only provided familiarity with these important concepts but also displayed direct and pertinent application of these principles to clinical medicine.

Woods and Winkel described a rotating type of journal club that employed four different successful formats. This dynamic approach helped to maintain participant interest by providing diversity. One format centered on creating a controversy in which different articles with opposing viewpoints on a similar topic were presented. This forced close examination of research methodology. A second format consisted of in-depth review of "classic articles." In addition to relating important clinical information, these sessions imbued the participants with a sense of the history within their field. A third format required members to conduct a step-by-step evaluation of a single article. This involved an analysis and critique of each article. The fourth format was dedicated to discussion of experimental design. Three articles were chosen that were representative of prospective, retrospective, and survey research approaches, respectively. The relative strengths, weaknesses, and appropriateness of each were reviewed. This sort of session was noted to be particularly relevant for junior residents.

Kuppersmith et al. described a type of Internet-based journal club in the otolaryngology residency program at Baylor College of Medicine. Each of the four residency classes was responsible for reviewing one of four primary otolaryngology journals, Annals of Otolaryngology, Rhinology, and Laryngology, Archives of Otolaryngology—Head and Neck Surgery, Laryngoscope, and Otolaryngology—Head and Neck Surgery. The most interesting articles were selected and assigned to individual participants, who posted their reviews by e-mail to the online journal club mailing list. The reviews were electronically distributed to all members of the department and served as a relatively comprehensive summary of the current literature. The best articles were later chosen by the residents themselves to be discussed at an optional monthly journal club meeting. The strength of this format is in the creation of a fully searchable, online database that continues to grow with the longevity of the journal club and that can deliver information without actual meeting attendance.

**Selecting Literature**

Ultimately, the core value of a journal club rests in the literature that is discussed. It seems worthwhile to briefly mention key principles that may help in selecting quality material for discussion.

**Philosophy of evidence-based medicine.** Evidence-based medicine is a term coined by David Sackett and defined by Sackett et al. as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients." Before the formalization of the evidence-based medicine philosophy, Sackett and his colleagues at McMaster University sought to develop a strategy for physicians to access, sift through, and critically appraise the enormous volume of medical literature which is currently available. This led to the publication in 1981 of a series of articles in the *Canadian Medical Association Journal* entitled "How to Read Clinical Journals." These guides were enthusiastically received and ultimately appeared in a textbook on clinical epidemiology. A newer, more detailed series of articles entitled "User’s Guides to the Medical Literature" was introduced in the *Journal of the American Medical Association* in 1993.

"Evidence-based medicine de-emphasizes intuition, unsystematic clinical experience, and pathophysiologic rationale as sufficient grounds for clinical decision making and stresses the examination of evidence from clinical research." The significance and validity of an evidence-based approach to the practice of medicine are underscored by the finding that only 21% of medical interventions are based on sound scientific evidence. Therefore, it seems appropriate to recommend that the literature selected for a journal club be subjected to the critical appraisal philosophy espoused by evidence-based medicine. In fact, for residency programs, the journal club might be initiated with a review of the history of evidence-based medicine and its tenets.

**Rank order of study design.** Understanding of evidence-based medicine principles has led to the recognition of a hierarchy in the scientific strength of the various possible study designs. These are shown in Table III and are listed in decreasing order of strength.

<table>
<thead>
<tr>
<th>Study Design</th>
<th>Rank Order</th>
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<tr>
<td>Randomized controlled trials</td>
<td>1</td>
</tr>
<tr>
<td>Cohort studies</td>
<td>2</td>
</tr>
<tr>
<td>Case-control studies</td>
<td>3</td>
</tr>
<tr>
<td>Cross-sectional surveys</td>
<td>4</td>
</tr>
<tr>
<td>Case series reports</td>
<td>5</td>
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</table>

Although Table III illustrates that there exists a hierarchy of scientific evidence, it should not be assumed that a given article is not valid simply because it does not represent a randomized controlled trial. In fact, certain clinical questions may be more appropriately answered with other types of study designs. However, the journal club member responsible for selecting literature for discussion should be aware of this rank order and, when
possible, should select the evidence of the greatest scientific strength.

Certain databases, such as the Cochrane Library (http://www.cochrane.de/), the American College of Physicians Journal Club (http://www.acpjc.org/), and others (www.clinicalevidence.com and http://www.bmjgp.com), contain articles that have been screened for scientific rigor and adherence to the principles of evidence-based medicine. Literature searching within other databases, such as Medline, can be tailored so that specific types of study design are selected.

**Topics of research.** Each clinical research paper attempts to answer a question within one of the broad topics of clinical practice. These topics include causation, screening, diagnosis, therapy, and prognosis. Certain study designs are better than others for answering each specific type of research question and are shown in Table IV.38 This knowledge will help the journal club member select more valid articles for discussion.

### How to Read a Paper

Trisha Greenhalgh,38 in her helpful short book, How to Read a Paper, recorded a strategy for assessing the merit of a scientific paper. She began with a preliminary series of questions, which was followed by a number of questions designed to determine the methodological quality of the study. A brief synopsis of the more important components of this strategy, modified by our own experiences, is presented in Table V in the form of a review checklist. Development, validation, and field testing of the efficacy of such instruments could serve to stimulate journal club development and improvement.

At first glance, this may seem a cumbersome and time-consuming approach to the reading of an article. In fact, it probably is, when one is simply interested in “skimming” a paper. However, this type of strategy is necessary if one wishes to adequately determine the scientific validity of the literature. Consistent and repetitive use of such an approach becomes easier and adds greatly to a physician’s ability to discern good from mediocre medical information.

For journal clubs, a structured approach to the reading of an article can be instructive. Burstein et al.39 reported on their use of what they called a “structured review instrument” when reading articles in a journal club of an emergency medicine residency. This was a printed form that asked the residents to answer in stepwise fashion a series of questions regarding hypothesis, methodological design, statistical evaluation, results, and conclusions for each individual article that was read. This group found that use of such a review instrument led to increased resident satisfaction and improvement in the perceived value of the journal club.

### Evaluation of Journal Club

**Teaching effectiveness.** Although journal clubs are present in 65% of general surgery residency programs, there exists few data that might serve to evaluate effectiveness.40 One of the rare studies regarding the teaching effectiveness of the journal club within the field of surgery was concerned specifically with the ability to teach statistics to surgical residents.41 A structured curriculum formulated to introduce residents to basic statistical theory and common statistical tests was integrated into the journal club, and clinical articles were chosen that illustrated these same principles. A multiple-choice test evaluating statistical knowledge was administered before and after completion of the year-long curriculum. Test scores improved significantly. The authors emphasized the importance of resident education in statistics by noting the study by Emerson and Colditz,42 which documented that a possible, should select the evidence of the greatest scientific strength.

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### Evaluation of Journal Club

**Teaching effectiveness.** Although journal clubs are present in 65% of general surgery residency programs, there exists few data that might serve to evaluate effectiveness.40 One of the rare studies regarding the teaching effectiveness of the journal club within the field of surgery was concerned specifically with the ability to teach statistics to surgical residents.41 A structured curriculum formulated to introduce residents to basic statistical theory and common statistical tests was integrated into the journal club, and clinical articles were chosen that illustrated these same principles. A multiple-choice test evaluating statistical knowledge was administered before and after completion of the year-long curriculum. Test scores improved significantly. The authors emphasized the importance of resident education in statistics by noting the study by Emerson and Colditz,42 which documented that a reader who is conversant with descriptive statistics (percentages, means, and SD) has statistical understanding of 58% of the articles in the New England Journal of Medicine. Understanding t tests increases this access to 67%, and the additional understanding of contingency tables gives statistical access to 73% of the articles.

A number of studies within internal medicine programs have attempted to document potential teaching effects of journal club participation. One such study sought to determine whether a journal club might improve house-staff reading habits, knowledge of epidemiology and biostatistics, and critical appraisal skills.43 By a randomized and controlled design, one group of residents participated in a journal club while the control group attended a series of ambulatory medicine lectures. A test instrument was administered before and after the respective interventions. Residents in the journal club reported a significant improvement in reading habits and demonstrated better knowledge scores as compared with the control group. Both groups improved their ability to critically appraise a test article.

Seelig44 reported an uncontrolled study in which a group of internal medicine residents were initially provided with a short seminar in the setting of a journal club that incorporated principles of adult education. The seminar content was based on the series of articles from the McMaster group that taught critical literature reading skills.28–32 Reinforcement of the presented information was achieved by encouraging learner participation and feedback as well as by written assignments. Subsequent journal club meetings continued to emphasize these same skills. Objective testing of the residents’ critical appraisal knowledge improved by 60%.

A similar result was reported by Cramer and Mahoney,45 who evaluated a group of family medicine residents in a journal club that emphasized the concepts of evidence-based medicine. Over the course of a year, this cohort study documented a significant improvement in performance on a test instrument designed to evaluate understanding of these key concepts.
### Review Checklist.

#### Assessing methodologic quality:

**Was the study original?**  □ Yes  □ No

#### Preliminary questions:

**What is the point of the study (research question; hypothesis; final summary contention)?**

**What approach was taken?**

- Primary research
  - Experimental
  - Randomized controlled clinical trial
  - Other controlled clinical trial
  - Cohort
  - Case-control study
  - Cross-sectional descriptive survey
  - Longitudinal descriptive survey
  - Case series
  - Case report
  - Other

- Secondary research
  - Simple overview
  - Systematic review
  - Meta-analysis
  - Decision analysis
  - Guideline development
  - Economic development

**Was the study design appropriate for the research and/or clinical question (causation, diagnosis, screening, treatment, prognosis)?**

**Was the study ethical?**

**Was the study design sensible?**

**Was the study adequately controlled?**  □ Yes  □ No

**Was the outcome assessment blinded?**  □ Yes  □ No

**Were the statistical questions addressed?**

**Was the sample size adequate?**  □ Yes  □ No

**In what scale(s) were the data?**

- Nominal
- Binary
- Ordinal
- Quasi-dimensional
- Dimensional (Continuous)

**In what category was the research question/hypothesis?**

- Descriptive
- Comparative for contrast
- Comparative for association (trend)
- Comparative for association (agreement)

**Was/were the statistical tool(s) appropriate for the scale and research question?**  □ Yes  □ No

**Was the duration of follow-up appropriate?**  □ Yes  □ No

**Was the completeness of follow-up appropriate and/or appropriately handled in analysis?**  □ Yes  □ No

**Do your calculations of the statistics agree with the author’s?**  □ Yes  □ No

**Explain:**
**SUMMARY**

The objective of the present tutorial was to provide information that might be useful in developing and improving otolaryngology journal clubs. There is a paucity within our literature regarding this particular forum and the significant role it can play in physician education.

The flexible nature of the journal club gives it the potential to address many educational needs, and its relevance has never been greater. This is said in light of the fact that there is an enormous volume of medical literature currently available to the practitioner, and this availability demands competence in techniques for assessment and critique. The value of the journal club is also highlighted in an era that emphasizes the practice of evidence-based medicine.

The traditional goals of the journal club are to keep current with the literature, to develop the skills of critical literature appraisal, and to influence clinical practice. In addition, the journal club may possess a social aspect not encountered in the other routine teaching forums. It is hoped that this tutorial will encourage the reader to either begin his or her own journal club or reinvigorate that which already exists.

**BIBLIOGRAPHY**

32. Department of Clinical Epidemiology and Biostatistics at McMaster University. How to read clinical journals, V: to distinguish useful from useless or even harmful therapy. Can Med Assoc J 1981;124:1156–1162.
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