Evidence-based Medicine in Facial Plastic Surgery
Current State and Future Directions

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KEYWORDS

• Evidence-based medicine • Level of evidence • Grades of recommendation
• Patient-reported outcomes • Clinician-reported outcomes

KEY POINTS

- Evidence-based medicine involves application of the best available evidence while attending to patient preferences.
- Choosing the appropriate levels of evidence hierarchy depends on the type of study: treatment, prognosis, diagnosis, and economic/decision analysis.
- Clinical practice guideline recommendations are based on assessments of the quality of evidence and strength of recommendation.
- Outcome measures are essential to evidence-based medicine, and consist of (1) patient-reported outcomes, (2) clinical efficacy outcomes, and (3) actuarial or financial outcomes.
- Inconsistent patient characteristics and poorly defined outcome measures pose major challenges to performing meta-analyses and, ultimately, implementing existing evidence to individual patient care.

INTRODUCTION

The current state of evidence-based medicine (EBM) encompasses the evaluation and application of best available evidence, incorporation of clinical experience, and emphasis on patient preference and values. Anecdotally, surgeons exiting a national lecture on EBM were concerned with the possibility that EBM leads to more narrowed treatment options, less emphasis on individualized care, and an algorithmic approach to patients. Others complain about the stifling of innovative treatment options and emphasis on levels of evidence (LOEs).[1] This article describes the value of EBM to surgeons, relating clinical applications and future quality improvement opportunities.

Although the modern outcomes movement in EBM has been attributed to concepts explored and developed by Dr David Sackett in the 1970s and 1980s,[2–5] early evidence of this idea can be found historically. Examples include Nurse Florence Nightingale, Dr Eugen Bleuler, and Dr Ernest Codman, who promoted mindful observation, meticulous data collection, and thorough analysis

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as means to improve outcomes in clinical practice.[6–8] In 1981, Dr David Sackett[3] published a series of articles emphasizing the importance of critical analysis of published research in medical literature. This series highlighted use of epidemiology in conjunction with best available evidence applied in the clinical settings.[2–5] This concept was later developed and coined as EBM by Dr Gordon Guyatt in the early 1990s.[4]

The foundation of EBM is based on the core principles of assessment and application of best available evidence to guide clinical practice while attending to the informed patients' preferences and values.[9] Incorporating these two fundamental, interrelated principles in medical decisions bridges the gap between EBM and preference-based medicine, which calls for patient-centered research. Facial plastic and reconstructive surgery requires a conscientious blending of patient preference and values, while ensuring best outcomes. For example, success after rhinoplasty includes both patient-reported and clinician-derived outcome measures, which incorporate patient satisfaction, surgeon perception, and objective measures (eg, photograph analysis).[10]

Sackett and colleagues[5] explained EBM as a "bottom up approach that integrates the best external evidence with individual clinical expertise and patients' choice." Since its inception, EBM methodology has advanced through technology and international, multidisciplinary collaborations. This progress enables clinicians to critically examine external evidence from systematic research and apply it to clinical practice. EBM is integral to the policy changes of health care reform in the United States, the goals of which include enhancing quality, reducing cost, and improving patient satisfaction (a noble, potentially difficult goal).

This article discusses principles essential to EBM, examines resources commonly used in EBM practice, and emphasizes strengths while identifying limitations of EBM in relation to facial plastic and reconstructive surgery.

LEVELS OF EVIDENCE

Critical to the practice of EBM is identifying and implementing the highest level of evidence (LOE) to answer clinical questions. LOEs are a hierarchical ranking system that provides a framework for physicians and patients to find the best evidence.

The Canadian Task Force on the Periodic Health Examination first described LOE in 1979.[11] The task force's goal was to provide recommendations on preventive health interventions. To this effect, they rated the available evidence to determine the effectiveness of a given intervention and used that rating when providing recommendations for the annual physical examinations. Notably, they placed randomized controlled trials (RCTs) at the highest LOE, emphasizing the importance of reducing error caused by bias and confounding factors.[12]

Sackett[13] and other participants of the American College of Chest Physicians Conference on Antithrombotic Therapy expanded the definition of LOE in 1986. The basis of their undertaking was to establish a classification system that allowed recommendations to be based on rigorous, controlled studies whenever possible. They particularly subdivided RCTs by the qualitative degree of type I (false-positive) and type II (false-negative) errors shown by the study.[13] Most LOE rating scales ow in use are based on the University of Oxford Centre for Evidence Based Medicine (**Table 1**), which was further modified in 2000 and 2009.[14]

As EBM became increasingly accepted, surgical and other procedure-based specialties argued that applicable research questions did not lend themselves to RCTs and advocated modified LOE definitions. There are 4 types of studies that are relevant in choosing the appropriate LOE hierarchy: treatment, prognosis, diagnosis, and economic/decision analysis.[15]

Therapeutic studies lend themselves to rigorous RCTs. The researcher determines the intervention and the predetermined outcome measure. Therefore, placing high-quality RCTs at the top of the rating scale is appropriate. However, prognostic studies are more common in surgery, in which randomization is difficult. RCTs in surgery are difficult in application but also in the ensuring of ethical

Table 1
Oxford Centre for Evidence-Based Medicine evidence rating scale

LOE	Description
I	Systematic review of randomized trials or n-of-1 trials
II	Randomized trial or observational study with dramatic effect
III	Nonrandomized controlled cohort/ follow-up study
IV	Case series, case-control studies, or historically controlled studies
V	Mechanism-based reasoning

Adapted from OCEBM Levels of Evidence Working Group. The Oxford levels of evidence 2. Oxford Centre for Evidence-Based Medicine. Available at: http://www.cebm.net/index.aspx?o55653. Accessed September 25, 2015.