

How Surgeons Make Decisions When the Evidence Is Inconclusive

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Purpose To address the factors that surgeons use to decide between 2 options for treatment when the evidence is inconclusive.

Methods We tested the null hypothesis that the factors surgeons use do not vary by training, demographics, and practice. A total of 337 surgeons rated the importance of 7 factors when deciding between treatment and following the natural history of the disease and 12 factors when deciding between 2 operative treatments using a 5-point Likert scale between “very important” and “very unimportant.”

Results According to the percentages of statements rated very important or somewhat important, the most popular factors influencing recommendations when evidence is inconclusive between treatment and following the natural course of the illness were “works in my hands,” “familiarity with the treatment,” and “what my mentor taught me.” The most

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important factors when evidence shows no difference between 2 surgeries were “fewer complications,” “quicker recovery,” “burns fewer bridges,” “works in my hands” and “familiarity with the procedure.” Europeans rated “works in my hands” and “cheapest/most resourceful” of significantly greater importance and “what others are doing,” “highest reimbursement,” and “shorter procedure” of significantly lower importance than surgeons in the United States. Observers with fewer than 10 years in independent practice rated “what my mentor taught me,” “what others are doing” and “highest reimbursement” of significantly lower importance compared to observers with 10 or more years in independent practice.

Conclusions Surgeons deciding between 2 treatment options, when the evidence is inconclusive, fall back to factors that relate to their perspective and reflect their culture and circumstances, more so than factors related to the patient’s perspective, although this may be different for younger surgeons.

Clinical relevance Hand surgeons might benefit from consensus fallback preferences when evidence is inconclusive. It is possible that falling back to personal comfort makes us vulnerable to unhelpful commercial and societal influences. (*J Hand Surg* 2013;38A:1202–1208. Copyright © 2013 by the American Society for Surgery of the Hand. All rights reserved.)

Key words Decision making, evidence-based medicine, treatment.

EVIDENCE-BASED MEDICINE HAS been defined as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individuals and populations.”¹ In practice, this involves an integration of individual clinical expertise with the best available external clinical evidence from systematic research.^{1–3} Patients and health care providers look to scientific evidence to help guide their medical decisions.

The “Evidence-Based Guidelines” from the American Academy of Orthopaedic Surgeons have been largely inconclusive for lack of evidence.⁴ Well-designed, prospective, randomized controlled trials frequently show no difference or a small and possibly unimportant difference between 2 treatments.^{5,6} Clinical evidence in 2010 classified 2,500 common treatments as 51% having insufficient evidence, 23% likely to be beneficial, 7% requiring trade-offs between benefits and harms, 5% unlikely to be beneficial, 3% likely to be ineffective or harmful, and 11% being clearly beneficial.⁷ How do health care providers decide which option to recommend to their patients when the evidence is inconclusive?

This study addresses the factors that surgeons deciding between 2 options fall back to when the data are inconclusive. Specifically, we tested the null hypothesis that the top fallback principles do not vary by training, demographics, and practice.

MATERIALS AND METHODS

Using an institutional review board–approved protocol, we asked the 400 surgeons of the Science of Variation

Group to complete a survey about decision making in the face of inconclusive evidence, and 337 participated. The Science of Variation Group is an international collaboration of fully trained surgeon observers that studies variation in the definition, interpretation, classification, and treatment of human illness. Collaborative authorship, scientific curiosity, and camaraderie are the only incentives for participation.

Evaluation

The observers were first asked to enter their demographic and professional information: sex, country or world region of practice, years in independent practice, supervision of trainees, and surgical subspecialty. Next, the observers were given the following context:

“The American Academy of Orthopaedic Surgeons Evidence-Based Guidelines have been largely inconclusive for lack of evidence. It is difficult to show a difference in a well-designed prospective randomized, controlled trial—most will show little or no difference between treatments. Therefore it is important to decide—before starting the study—what our fallback will be. How do we decide between treatment options when the data are either insufficient or otherwise inconclusive?”

In this context, participants were asked to rate the importance of 7 factors when deciding between operative treatment and palliative treatment (eg, the natural history of the disease) and 12 factors when deciding between 2 operative treatments (Table 1), with a com-

TABLE 1. Geographic Difference and Factors

Variable	Mean		Mean Difference	P Value
	U.S.	E.U.		
The Importance That a Given Treatment Is Better Than the Course of the Illness Without Treatment				
Works in my hands	-1.30	-11.04	-10.26	.023
Familiarity with treatment	-0.84	-1.04	0.20	.065
What my mentor taught me	-0.58	-0.68	0.10	.38
Do something versus do nothing	-0.29	-0.53	0.24	.14
What others are doing	-0.11	-0.40	0.29	.018
Patients requiring the procedure	0.28	0.03	0.25	.057
Highest reimbursement	1.18	0.78	0.40	< .01
The Importance When Comparing 2 Surgeries for a Given Problem				
Fewer complications	-1.79	-1.86	0.07	.21
Quick recovery	-1.40	-1.52	0.12	.15
Burns fewer bridges	-1.36	-1.15	-0.21	.023
Works in my hands	-1.30	-1.15	-0.15	.13
Familiarity with procedure	-1.21	-1.21	0.00	1.00
Cheapest/most resourceful	-0.69	-0.47	-0.22	.049
Shorter procedure	-0.51	-0.76	0.25	.016
Aesthetics: smaller or fewer scars	-0.46	-0.50	0.04	.74
What my mentor taught me	-0.39	-0.53	0.15	.23
What others are doing	-0.11	-0.23	0.12	.32
Patients requiring the procedure	0.26	0.12	0.14	.24
Highest reimbursement	1.08	0.63	0.45	< .01

ment section for listing additional factors. The ratings were based on a 5-point Likert scale between very important and very unimportant. The statements were developed by brainstorming. One author created a list, and the other authors edited until all authors felt that the list covered all potential fallback options.

Statistical analysis

Categorical data were presented as frequencies and percentages. The statements were ranked from highest to lowest by adding the percentages of the very important and somewhat important (Figs. 1, 2). The write-in answers were grouped by subject. In addition, the Likert scale was translated to an ordinal scale from 2 (very important) to -2 (very unimportant), and the mean on each scale across the entire sample was calculated. We analyzed the influence of nationality, years in practice, fractures treated per year, and specialization on preferred fallbacks. The subcategory “years in practice” was dichotomized to less than or equal to 10 years and more than 10 years of experience to facilitate analysis. For continuous variables, we used a

Mann Whitney U test to compare 2 groups and a Kruskal-Wallis test for multiple groups. We evaluated differences between subgroups with the Mann Whitney U test.

Observer demographics

The demographics for the 337 respondents are listed in Table 2.

RESULTS

Statement rating

According to the percentages of statements rated very important or somewhat important, the most popular fallbacks when evidence cannot demonstrate that a given treatment is better than following the natural course of the illness are noted in Figure 1. The top fallbacks when evidence shows no difference between 2 surgeries are noted in Figure 2.

United States versus Europe

Using the average values on the numeric conversion of the Likert scale, Europeans rated “works in my hands,”

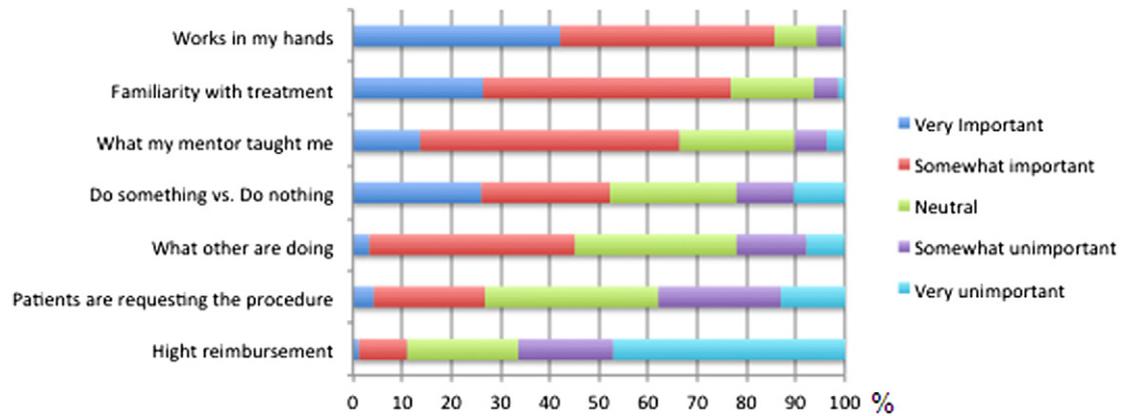


FIGURE 1: The percentages of popular fallbacks when evidence cannot demonstrate that a given treatment is better than the natural course of the illness.

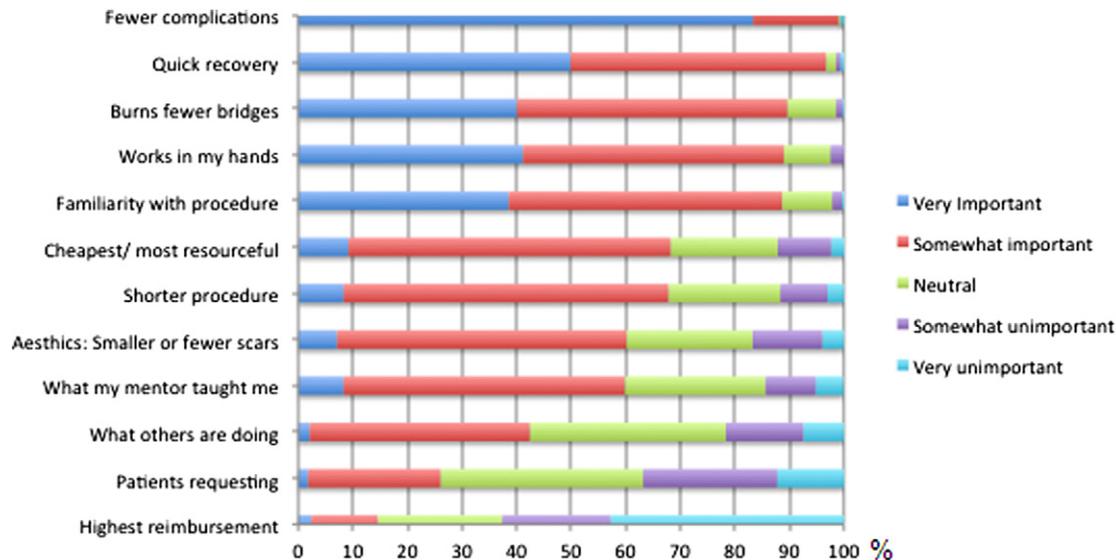


FIGURE 2: The percentages of top fallbacks when evidence shows no difference between 2 surgeries.

“burns fewer bridges,” and “cheapest/most resourceful” of significantly greater importance and “what others are doing,” “highest reimbursement,” and “shorter procedure” of significantly lower importance than surgeons in the United States (Table 1).

Years in practice

Observers with 10 or fewer years in independent practice rated “what my mentor taught me,” “what others are doing,” and “highest reimbursement” of significantly lower importance compared to observers with more than 10 years in independent practice (Table 3).

Orthopedic specialty

General orthopedists rated “what my mentor taught me” of greater importance than orthopedic traumatolo-

gists and hand and wrist surgeons. In addition, general orthopedists rated “what others are doing” of greater importance than shoulder and elbow surgeons and hand and wrist surgeons (Table 4).

Write-in answers

The most common write-in answers were “best available outcome/evidence-based” (14 surgeons), “common sense and risk for patients” (5 surgeons), and “shared decision making or patient’s opinion” (4 surgeons).

DISCUSSION

Because evidence-based medicine is an amalgamation of individual clinical expertise and best available evidence, the question arises, what is the basis for provider

TABLE 2. Demographics

	N	%
Sex		
M	306	91
F	32	9
Location of practice		
Asia	19	6
Australia	6	2
Canada	18	5
Europe	92	27
United Kingdom	11	3
United States	174	52
Other	17	5
Years in practice		
0–5	106	31
6–10	72	21
11–20	102	30
21–30	57	17
Supervise		
Yes	279	83
No	58	17
Fractures per year		
0–5	61	18
6–10	71	21
11–20	109	32
> 20	99	29
Specialization		
General orthopedics	21	6
Orthopedic traumatology	120	36
Shoulder and elbow	54	16
Hand and wrist	129	38
Other	13	4

recommendations when the best evidence is inconclusive? We found that the most popular factors that surgeons use to make recommendations when evidence is inconclusive relate primarily to the surgeon's perspective (eg, "works in my hands," "familiarity with the treatment," "what my mentor taught me") rather than the patient's perspective (eg "doing something vs doing nothing," "patients are requesting the procedure"). Exceptions include "fewer complications" and "quicker recovery," which benefit both the surgeon and the patient. Highest reimbursement was also rated relatively unimportant, particularly in Europe but across all countries and regions.

This study should be interpreted in light of the fact that the 337 participating surgeons may not be repre-

sentative of the average surgeon, because many surgeons in the surveyed group are in academic practice. Also, important options such as "I share the decision with the patient" were not offered because it was our intention to study the recommendation of the surgeon before accounting for the patient's preferences. Finally, there is evidence that incentives such as reimbursement can have a subconscious influence that may not be accounted for by this survey.⁸

That health care providers fall back to their personal preferences based on experience is no surprise.⁹ On the other hand, it is notable that factors related to quality, safety, and efficiency such as "cheapest/ most resourceful," "shorter procedure," and "what others are doing" (in the sense of diminished unwarranted variation) were rated relatively unimportant. The fact that Europeans rated "cheapest/more resourceful" significantly more important than Americans may reflect the prevalence of national health care in Europe, leading to a greater awareness of the management of limited resources. In contrast, surgeons from the United States rated "what others are doing," "highest reimbursement," and "shorter procedure" more important than European surgeons. It is not clear whether these factors relate most to quality and efficiency or marketing and profitability of health care in a for-profit system, or both.

Less experienced surgeons placed significantly less importance on "what my mentor taught me," "what others are doing," and "highest reimbursement." This might reflect a change in mindset as the emphasis is placed on evidence and as we continue to address the rising costs of health care.

The write-in answers revealed that surgeons prefer to fall back to the "best available outcome/evidence-based" even when the scenario is that the evidence is inconclusive. Patient-centered care/shared decision making was also mentioned, which is entirely applicable. The involvement of patients in decision making is particularly important when the evidence is inconclusive. Decision aids (independent structured guides, either written, video, or web-based) have been shown to decrease decision conflict and, for some illnesses, use of resources.^{10–13} These merit additional study.

In other words, rather than studying the surgeon's recommendation before accounting for the patient's preferences, it might have been preferable for our survey to include the option of following the patient's preference when evidence is inconclusive. On the other hand, we have an obligation to consider resources, safety, simplicity, consistency, efficiency, practicality, optimism, and patient self-management as important goals in and of themselves, and this is part of the expertise that we share

TABLE 3. Difference in Experience

Years in practice	Mean		Mean Difference	P Value
	10 or fewer	> 10		
The importance that a given treatment is better than the course of the illness without treatment				
Works in my hands	-1.19	-1.25	0.05	.56
Familiarity with treatment	-0.99	-0.92	-0.06	.50
What my mentor taught me	-0.84	-0.47	-0.37	< .01
Do something versus do nothing	-0.52	-0.39	-0.13	.34
What others are doing	-0.35	-0.01	-0.34	< .01
Patients requiring the procedure	0.14	0.27	-0.13	.27
Highest reimbursement	0.92	1.13	-0.21	.08
The importance when comparing 2 surgeries for a given problem				
Fewer complications	-1.77	-1.86	0.09	.072
Quick recovery	-1.42	-1.47	0.05	.47
Burns fewer bridges	-1.29	-1.27	-0.02	.83
Works in my hands	-1.26	-1.30	0.04	.58
Familiarity with procedure	-1.29	-1.20	-0.90	.25
Cheapest/most resourceful	-0.61	-0.65	0.04	.71
Shorter procedure	-0.69	-0.54	-0.14	.13
Aesthetics: smaller or fewer scars	-0.47	-0.47	-0.01	.95
What my mentor taught me	-0.65	-0.31	-0.33	< .01
What others are doing	-0.25	-0.05	-0.20	.058
Patients requiring the procedure	0.13	0.30	-0.16	.14
Highest reimbursement	0.71	1.08	-0.36	< .01

TABLE 4. Difference in Specialty— Post Hoc Tukey Test

Variable		Versus	Mean Difference	P Value
The importance that a given treatment is better than the course of the illness without treatment				
What my mentor taught me	General orthopedics	Orthopedic traumatology	-0.62	.033
		Hand and wrist	-0.65	.033
The importance of the following factors when comparing 2 surgeries for a given problem				
What others are doing	General orthopedics	Shoulder and elbow	-0.62	.033
		Hand and wrist	-0.65	.033
		Other	-0.92	.048
What my mentor taught me	General orthopedics	Hand and wrist	-0.71	.011
		Other	-1.20	.003
		Shoulder and elbow	-0.82	.037

with our patients. Patients look to their surgeons for expertise regarding the optimal fallback options when evidence is inconclusive. Perhaps—on the basis of the results of this survey study—surgeons will be motivated to develop consensus regarding the fallback principles that best support optimal health.

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