

Eminence-Based Medicine Versus Evidence-Based Medicine: Level V Evidence in Sports Medicine

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Abstract: Through extensive survey analysis, we investigated expert opinion in sports medicine. The study had 3 purposes: to provide clinical guidance for cases in which the correct action is not necessarily apparent, to examine expert opinion itself, and to delineate areas of future study. A total of 500 members of the American Medical Society for Sports Medicine and the American Orthopaedic Society for Sports Medicine evaluated a set of 25 statements on unresolved issues in sports medicine. The following 10 statements were deemed false: “It’s okay for 12-year-old pitchers to throw curve balls; it’s the pitch count that matters”; “Resistance training (‘weight lifting’) should be avoided until physcal closure”; “Jogging during pregnancy is to be avoided”; “At an athletic event, if sideline coverage is offered by an emergency medical technician and athletic trainer, there is little additional benefit from having a physician present”; “Contact sport athletes who sustain a second concussion should be excluded from contact sports permanently”; “The utility of pre-season medical screening is derived from the history; as such, student-athletes should complete a questionnaire, with physical examination reserved for only those with a positive relevant history”; “Femoroacetabular impingement is a myth—the designation of anatomic variation as disease”; “An AC (acromioclavicular) separation in a contact athlete should not be treated surgically if the athlete won’t give up the sport; it will fail”; “Ankle taping induces weakness and atrophy of the dynamic stabilizers of the ankle”; “Only autografts should be used in ACL (anterior cruciate ligament) surgery, as allografts have an unnecessary high failure rate in clinical practice.” One statement was accepted as true: “Surgery to treat anterior (patello-femoral) knee pain in a patient with normal patellar mechanics and stability is contraindicated.” In short, expert opinion may be a helpful adjunct to clinical practice. Expert opinion cannot replace individual judgment and certainly does not trump the primary medical literature. Yet when better evidence is lacking, expert opinion is valuable for even the staunchest practitioner of evidence-based medicine.

Keywords: evidence-based medicine; expert opinion; level V evidence

Introduction

The practice of evidence-based medicine is based optimally on sources that provide the highest levels of evidence. Wright¹ has noted, “The essence of levels of evidence is that, in general, controlled studies are better than uncontrolled studies, prospective studies are better than retrospective studies, and randomized studies are better than nonrandomized studies.” Prospective, randomized, controlled trials stand atop the evidence hierarchy.² At the base is the lowest level of evidence—level V, or expert opinion. Placement of expert opinion somewhere within the hierarchy of evidence-based medicine relies on the intuitive argument that however limited it is, expert opinion is better than nonexpert opinion. However, cultural history is littered with numerous examples of experts being wrong—from the Decca Records executive who declined signing The Beatles to a contract in 1961 because “guitar groups are on the way out,”³ to the perhaps apocryphal head

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of the patent office who advocated closing it in 1899 because “everything worthwhile has already been invented.”⁴ Thus, the apt role of expert opinion is not clearly defined.

The correct use of expert opinion should be based on recognition of its strengths and weaknesses. To that end, we investigated by survey analysis the nature of expert opinion in sports medicine. Our primary purpose was to provide clinical guidance in areas in which the correct action is not necessarily apparent. Our secondary purpose was to study the nature of expert opinion and thereby highlight its strengths and weaknesses. Our final charge was to identify areas of controversy within the larger sports medicine community and between orthopedic and nonoperative sports medicine practitioners. This delineation may help to guide future study in clinical decision making.

Methods

Statements regarding unresolved issues in sports medicine were presented to members of the American Medical Society for Sports Medicine and the American Orthopaedic Society for Sports Medicine (AOSSM) (Table 1). Results were collected electronically until 500 completed surveys were received. Respondents were asked to agree or disagree with a given statement according to the following 7-point, centered, symmetrical scale:

1. “The statement is false.”
2. “The statement is very likely to be false.”
3. “The statement is probably false.”
4. “The statement may be true/false; 50–50.”
5. “The statement is probably true.”
6. “The statement is very likely to be true.”
7. “The statement is true.”

For each question, the mean and distribution of the responses were noted. The respondents were classified as “orthopaedic specialists” (AOSSM members) and “non-orthopaedic specialists” (all others).

The group’s responses were interpreted according to the following arbitrary scheme:

- If the mean response was ≤ 3.0 , a consensus that the statement is false was said to have been reached.
- If the mean response was ≥ 5.0 , a consensus that the statement is true was said to have been reached.
- If the mean response of the orthopedic sports specialists group differed from the mean of the nonorthopedic sports specialists by ≥ 1.0 , this difference was deemed significant.

- If $\geq 50\%$ the responses were “probably false,” “may be true/false; 50–50,” or “probably true” (the center groups), we inferred from the data that the experts were uncertain about this statement.
- A given statement was deemed controversial if it simultaneously received $\leq 20\%$ support for “false” or “very likely to be false” and $\leq 20\%$ support for “very likely to be true” or “true.”

A total of 554 sports specialists clicked on the link for the electronic survey, and 500 (the arbitrary point for closing the survey) completed it, yielding a completion rate of 90%. Of them, 112 respondents were orthopedic sports specialists.

The consensus identified the following statements as false:

- “It’s okay for 12-year-old pitchers to throw curve balls; it’s the pitch count that matters.”
- “Resistance training (‘weight lifting’) should be avoided until physeal closure.”
- “Jogging during pregnancy is to be avoided.”
- “At an athletic event, if sideline coverage is offered by an emergency medical technician and athletic trainer, there is little additional benefit from having a physician present.”
- “Contact sport athletes who sustain a second concussion should be excluded from contact sports permanently.”
- “The utility of pre-season medical screening is derived from the history; as such, student-athletes should complete a questionnaire, with physical examination reserved for only those with a positive relevant history.”
- “Femoroacetabular impingement is a myth—the designation of anatomic variation as disease.”
- “An AC (acromioclavicular) separation in a contact athlete should not be treated surgically if the athlete won’t give up the sport; it will fail.”
- “Ankle taping induces weakness and atrophy of the dynamic stabilizers of the ankle.”
- “Only autografts should be used in ACL (anterior cruciate ligament) surgery, as allografts have an unacceptably high failure rate in clinical practice.”

Only 1 statement was deemed true:

- “Surgery to treat anterior (patello-femoral) knee pain in a patient with normal patellar mechanics and stability is contraindicated.”

Table 1. Survey Responses

Statement	Group Mean Agreement Value	Orthopedic Surgeon Mean Agreement Value	Nonsurgeon Mean Agreement Value	Indicating "The statement is false," n %
1. It's okay for 12-year-old pitchers to throw curve balls; it's the pitch count that matters ⁷	2.9	3.6	2.7	36
2. For patients with an acute ankle injury, the ability to hop on the sidelines is sufficient evidence to allow the athlete to return to the field	3.2	3.6	3.0	32
3. ACL reconstruction is optimally performed with double bundle technique ⁸	3.4	2.5	3.6	20
4. Resistance training ('weight lifting') should be avoided until physseal closure ⁹	2.0	2.4	1.9	54
5. In a patient with impingement syndrome of the shoulder to be treated surgically, 'the acromion is innocent' and unless there is a focal spur, no bone has to be removed ¹⁰	3.7	4.4	3.6	13
6. Platelet-rich plasma injections, to the extent they offer any benefit at all, are placebos	3.3	3.6	3.1	12
7. Reconstructing a torn and deficient ACL will prevent meniscal tears ¹¹	4.3	5.4	4.0	15
8. Proximal hamstring ruptures in athletes require repair, distal ones don't ¹²	3.2	3.8	3.0	20
9. The etiology of medial joint line knee pain in a 50-year-old can be deduced by the location: pain anterior to the medial collateral ligament is apt to be arthritis, and not a meniscus tear	3.2	3.8	3.0	18
10. Subacromial decompression is contraindicated in patients who did not get relief with a lidocaine injection test ¹³	3.6	4.3	3.4	15
11. Ruptures of the Achilles tendon, in the setting of tendinopathy, can be prevented with physical therapy and cushioning shoe inserts ¹⁴	3.2	2.9	3.2	19
12. Jogging during pregnancy is to be avoided ¹⁵	1.7	2.1	1.5	62
13. The rising popularity of surgical fixation of clavicle fractures ¹⁶ represents the triumph of marketing over reason and experience	3.9	3.1	4.1	14
14. At an athletic event, if sideline coverage is offered by an emergency medical technician and athletic trainer, there is little additional benefit from having a physician present ¹⁷	2.2	2.6	2.0	52
15. Arthroscopic debridement for arthritis of the knee, to the extent it works at all, works by a placebo effect ¹⁸	4.4	3.7	4.6	7
16. Contact sport athletes who sustain a second concussion should be excluded from contact sports permanently ¹⁹	2.0	2.7	1.7	57
17. Surgery to treat anterior (patello-femoral) knee pain in a patient with normal patellar mechanics and stability is contraindicated ²⁰	5.3	5.0	5.4	6

Indicating “The statement is very likely to be false,” n %	Indicating “The statement is probably false,” n %	Indicating “The statement may be true/false; 50–50,” n %	Indicating “The statement is probably true,” n %	Indicating “The statement is very likely to be true,” n %	Indicating “The statement is true,” n %
19	9	7	13	9	5
15	9	10	18	11	5
10	11	42	9	6	3
19	12	5	5	3	2
19	16	15	14	15	8
17	25	33	7	5	1
7	10	12	26	24	7
22	15	17	15	8	3
22	14	24	11	9	1
16	19	16	15	14	4
23	19	14	15	7	3
20	12	4	1	0	1
14	13	14	24	13	7
20	10	7	7	3	2
11	16	15	16	19	15
18	9	8	2	4	1
6	6	7	16	29	30

Table I. (Continued)

Statement	Group Mean Agreement Value	Orthopedic Surgeon Mean Agreement Value	Nonsurgeon Mean Agreement Value	Indicating “The statement is false,” n %
18. The utility of pre-season medical screening is derived from the history; as such, student-athletes should complete a questionnaire, with physical examination reserved for only those with a positive relevant history ^{21,22}	2.7	3.4	2.6	42
19. Femoroacetabular impingement is a myth—the designation of anatomic variation as disease ^{23,24}	2.4	2.5	2.3	37
20. An AC separation in a contact athlete should not be treated surgically if the athlete won't give up the sport; it will fail ²⁵	2.7	2.6	2.7	34
21. Ankle taping induces weakness and atrophy of the dynamic stabilizers of the ankle ²⁶	2.5	2.3	2.6	33
22. A patient with bilateral spondylolysis is cleared to play contact sports as long as he or she can tolerate the symptoms ²⁷	3.8	4.2	3.6	20
23. Patients whose age multiplied by their body mass index exceeds 1,200 can be presumed to have some component of their knee pain explained by arthritis ²⁸	4.1	4.1	4.1	9
24. Physician ownership of surgi-centers and PT facilities creates conflicts of interest that can never be completely resolved if the physician refers his or her own patients there ²⁹	4.5	3.5	4.8	14
25. Only autografts should be used in ACL surgery, as allografts have an unacceptably high failure rate in clinical practice ³⁰	2.5	2.4	2.5	38

Abbreviations: AC, acromioclavicular; ACL, anterior cruciate ligament; PT, physical therapy.

For some statements, the responses clustered toward the middle; we labeled these statements as “uncertain.” These were as follows.

- 62% uncertain: “ACL reconstruction is optimally performed with double bundle technique.”
- 65% uncertain: “Platelet-rich plasma injections, to the extent they offer any benefit at all, are placebos.”
- 50% uncertain: “Subacromial decompression is contraindicated in patients who did not get relief with a lidocaine injection test.”
- 51% uncertain: “The rising popularity of surgical fixation of clavicle fractures represents the triumph of marketing over reason and experience.”
- 70% uncertain: “Patients whose age multiplied by their body mass index exceeds 1,200 can be presumed to

have some component of their knee pain explained by arthritis.”

Some statements attracted strong responses on both extremes and were labeled as controversial. The responses and statements are as follows.

- 32% false; 23% true: “In a patient with impingement syndrome of the shoulder to be treated surgically, ‘the acromion is innocent’ and unless there is a focal spur, no bone has to be removed.”
- 22% false; 31% true: “Reconstructing a torn and deficient ACL will prevent meniscal tears.”
- 28% false; 20% true: “The rising popularity of surgical fixation of clavicle fractures represents the triumph of marketing over reason and experience.”

(Continued)

Indicating “The statement is very likely to be false,” n %	Indicating “The statement is probably false,” n %	Indicating “The statement may be true/false; 50–50,” n %	Indicating “The statement is probably true,” n %	Indicating “The statement is very likely to be true,” n %	Indicating “The statement is true,” n %
13	12	8	13	9	3
23	19	12	4	3	1
20	17	12	9	5	2
26	19	10	7	5	1
16	10	11	18	15	10
7	8	41	21	12	3
7	8	11	22	18	19
21	14	13	8	3	2

- 36% false; 25% true: “A patient with bilateral spondylolysis is cleared to play contact sports as long as he or she can tolerate the symptoms.”
- 21% false; 37% true: “Physician ownership of surgi-centers and PT (physical therapy) facilities creates conflicts of interest that can never be completely resolved if the physician refers his or her own patients there.”

The following statements attracted significantly different mean responses based on the respondent’s specialty.

- Surgeons’ mean, 2.5; nonsurgeons’ mean, 3.6: “ACL reconstruction is optimally performed with double bundle technique.”
- Surgeons’ mean, 4.3; nonsurgeons’ mean, 5.4: “Reconstructing a torn and deficient ACL will prevent meniscal tears.”

- Surgeons’ mean, 3.1; nonsurgeons’ mean, 4.1: “The rising popularity of surgical fixation of clavicle fractures represents the triumph of marketing over reason and experience.”
- Surgeons’ mean, 2.7; nonsurgeons’ mean, 1.7: “Contact sport athletes who sustain a second concussion should be excluded from.”
- Surgeons’ mean, 3.5; nonsurgeons’ mean, 4.8: “Physician ownership of surgi-centers and PT facilities creates conflicts of interest that can never be completely resolved if the physician refers his or her own patients there.”

Limitations

Surveys such as this have inherent limitations. In this study, subjects may have produced different results had the statements been phrased differently. As Tversky and Kahneman⁵ have

famously shown, the framing of alternatives deeply influences responses. In the present study, the statement “Femoroacetabular impingement is a myth—the designation of anatomic variation as disease” might have secured greater support with more neutral phrasing, such as “The findings that produce femoroacetabular impingement might be found among many asymptomatic patients, just as disc bulges in the spine are known to be prevalent in patients without complaints.”

In addition, this study did not allow the expert to state a level of certainty. For instance, 38 pediatricians were in the study sample, and each provided responses to the technical statements about surgery. Yet, the survey did not allow them to indicate how confident they were about their opinions.

Conclusion

Expert opinion may be a helpful adjunct to clinical practice, but cannot replace individual judgment, and certainly does not trump the primary medical literature. Yet as Sackett et al⁶ has noted, “Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients.” When better evidence is lacking, expert opinion is valuable for even the staunchest practitioner of evidence-based medicine.

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Conflict of Interest Statement

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