RESEARCH ARTICLE

Misinformation in News Coverage of Professional and College Athlete Musculoskeletal Ailments

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Abstract

Background: The general population's understanding of musculoskeletal health is likely influenced by media reports of the ailments of prominent athletes.
We assessed factors independently associated with debatable or potentially misleading medical statements in mainstream sports media coverage of the ailments of professional and college athletes.

Methods: We identified and assessed 200 Internet media reports of musculoskeletal ailments of prominent athletes between February 19th and March 26th, 2018. We recorded medical statements about mechanism, diagnosis, treatment, and prognosis. We then classified those statements as accurate, debatable, or possibly misleading. We created a multivariable logistic regression model to identify factors independently associated with debatable or possibly misleading statements.

Results: Forty-five percent of statements were debatable or possibly misleading. Statements about diagnosis (Odds Ratio [OR]=0.17; *P< 0.001*), treatment (OR=0.33; *P=0.007*), or prognosis (OR=0.27; *P=0.003*) and statements about shoulder and elbow ailments were more likely to be inaccurate compared to statements about mechanism and statements about knee ailments (OR=3.3; *P=0.04*) respectively.

Conclusion: Coverage of sports ailments in the mainstream media are a common source of misinformation. Ailments of prominent athletes may represent a useful opportunity to teach people about musculoskeletal health.

Level of evidence: Not applicable.

Keywords: Ailments, Media, Misinformation, Musculoskeletal, Sports

Introduction

Our impression is that, for many people, much of their understanding of musculoskeletal health comes from mainstream online health information (1). Since media coverage is often incomplete or biased, it is possible that people are often misinformed, with the consequence that our culture's understanding of musculoskeletal health is flawed or biased.

Millions of people access the Internet daily for health concerns (2). Physicians are concerned about people's ability to find helpful online content and the potential for misinformation without a clinician's guidance (3, 4). Studies about media reports of vertebroplasty and platelet rich plasma (PRP) therapy identified frequent misinterpretation of available evidence as well as misleading and potentially harmful statements. The reports were more likely to present the benefits than the risks of the procedures (5, 6). Misinformation may affect how the patient and physician interact, potentially creating an adversarial or defensive attitude.

We consider information with inaccurate information or with an incomplete discussion of an area of debate to be potentially misleading. This study assessed factors independently associated with debatable or potentially misleading medical statements in mainstream sports media coverage of the ailments of professional and college athletes.

Materials and Methods

We searched the Internet using the key words "injury", "sports", "league", "professional", and "college" in three Web Search Engines (Google, Yahoo!, and Bing) with our

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browser in privacy mode, after cleaning our search history and cookies, between February 19th and March 26th, 2018 (2). This allowed us to browse the Web without storing or using local data that could be retrieved, so our search results were not adjusted based on our prior search history. According to our a priori power analysis (described below), this meant that we needed around 67 webpages from each web browser. We included the first 10 hits of each search engine, excluded duplicates, and then took the next 10 hits from each engine. We continued until we obtained 67 websites from Google and Bing, and 66 from Yahoo!, resulting in 200 websites [Table 1]. We included any media report containing medical statements regarding ailments of either professional or college athletes. Two trained medical researchers and an orthopaedic surgeon independently assessed the websites for their statements and accuracy and consensus was made in case of discrepancy for each statement. One researcher rated the statements first. A second researcher checked the work. The senior author checked all the work and resolved the few discrepancies.

Table 1. Website/Article characteristics

Variables	
Websites	N = 200
Web browser	
Google	67 (35)
Bing	67 (35)
Yahoo!	66 (33)
Statements	N = 719
Accuracy of statements[1]	
Accurate	392 (55)
(Debatable/Possibly) Misleading	327 (45)
Accuracy per type of statement[1]	
Mechanism N = 203 (28)	
Accurate	157 (77)
(Debatable/Possibly) Misleading	46 (23)
Diagnosis N = 110 (15)	
Accurate	54 (49)
(Debatable/Possibly) Misleading	56 (51)
Treatment N = 191 (27)	
Accurate	82 (43)
(Debatable/Possibly) Misleading	109 (57)
Prognosis N = 215 (30)	
Accurate	99 (46)
(Debatable/Possibly) Misleading	116 (54)
Anatomical location	
Shoulder/Elbow	29 (15)
Wrist/Hand	32 (16)
Other upper extremity	15 (7.5)
Hip	11 (5.5)
Knee	37 (19)
Ankle/Foot	26 (13)
Other lower extremity	41 (21)
Neck/Back	9 (4.5)
Type of injury	
Bone	66 (33)
Muscle	23 (12)
Ligament (including dislocation, sprain, and insufficiency)	87 (44)
Tendon	24 (12)
Sport	
Basketball	59 (30)
American football	54 (27)
Baseball	34 (17)
Ice Hockey	27 (14)
Soccer	26 (13)
League	
Professional	164 (82)
College	36 (18)

Discrete variables as number (percentage); [1] Multiple statements per website/article possible.

For each article we recorded athlete, anatomical location of the problem (any part of the upper or lower extremity, neck, or back), type of problem (bone, muscle, ligament [including dislocation, sprain, and insufficiency], or tendon), college or professional level, and type of sport; Basketball (NBA, NCAA), American Football (NFL, NCAA), Baseball (NBL), Ice Hockey (NHL), and Soccer (MLS). Within each report we retrieved any medical statement about the mechanism, diagnosis, treatment, and prognosis of the problem. We then classified those as accurate, debatable, or possibly misleading. Debatable/possibly misleading statements were grouped together with misleading statements for analysis. An example of an accurate statement was the need for surgery for an ankle fracture-dislocation; an example of a debatable/possibly misleading statement was when the athlete had a clavicle fracture and the article said it would be 4-6 weeks to return to play.

From the 200 websites we retrieved 719 medical statements: 203 (28%) about mechanism, 110 (15%) about diagnosis, 191 (27%) about treatment, and 215 (30%) about prognosis [Table 1]. Three hundred ninety-two (55%) were labeled as accurate and 327 (45%) as debatable or possibly misleading. Statements concerning treatment, diagnosis, and prognosis seem more misleading (all higher rates than 50%) than statements

Appendix 1. Randomized statements per website/article

Variables	N = 200
Type of statement	
Mechanism	64 (32)
Diagnosis	31 (16)
Treatment	55 (28)
Prognosis	50 (25)
Accuracy of statements	
Accurate	106 (53)
(Debatable/Possibly) Misleading	94 (47)
Accuracy per type of statement	
Mechanism	
Accurate	47 (73)
(Debatable/Possibly) Misleading	17 (27)
Diagnosis	
Accurate	11 (35)
(Debatable/Possibly) Misleading	20 (65)
Treatment	
Accurate	27 (49)
(Debatable/Possibly) Misleading	28 (51)
Prognosis	
Accurate	21 (42)
(Debatable/Possibly) Misleading	29 (58)

Discrete variables as number (percentage).

about the mechanism of the problem (23% [Table 1]).

Discrete data are presented as number and percentage. Fisher exact tests were used to compare discrete variables with the dichotomous accuracy outcomes. We used a random number generator from Microsoft Excel to randomly select one statement from each article since multiple statements per website may be correlated, resulting in 200 total statements [Appendix 1]. We created a multivariable logistic regression model to assess factors independently associated with accuracy of statements. We included variables with *P<0.10* on bivariate analyses in the final models [Appendix 2]. We considered *P<0.05* significant.

We performed a power analysis for the difference in accuracy between statements about mechanism and prognosis. Based on pilot data with a proportion of accurate statements in the mechanism group of 78% and 63% in the prognosis group, a priori power analysis showed that we needed 288 statements to detect a difference with power set at 0.80 and alpha set at 0.05. Since we had 4 different medical statement groups we aimed to get at least double the amount of statements. We estimated that each article would contain at least 3 statements to rate for accuracy, suggesting that 200 websites would be sufficient.

Appendix 2. Bivariate analysis of factors associated with accuracy of statements.

Variables N = 200	Accurate N = 106	(Debatable/ Possibly) Misleading N = 94	*P value*
Type of statement			
Mechanism	47 (44)	17 (18)	**0.001**
Diagnosis	11 (10)	20 (21)	
Treatment	27 (25)	28 (30)	
Prognosis	21 (20)	29 (31)	
Anatomical location			
Shoulder/Elbow	9 (8.5)	20 (21)	**0.02**
Wrist/Hand	17 (16)	15 (16)	
Other upper extremity	7 (6.6)	8 (8.5)	
Hip	4 (3.8)	7 (7.5)	
Knee	27 (25)	10 (11)	
Ankle/Foot	11 (10)	15 (16)	
Other lower extremity	25 (24)	16 (17)	
Neck/Back	6 (5.7)	3 (3.2)	
Type of injury			
Bone	30 (28)	36 (38)	0.08
Muscle	15 (14)	8 (8.5)	
Ligament	52 (49)	35 (37)	
Tendon	9 (8.5)	15 (16)	
Sport			
Basketball	30 (28)	29 (31)	0.16
American football	31 (29)	23 (24)	
Baseball	12 (11)	22 (23)	
Ice Hockey	17 (16)	10 (11)	
Soccer	16 (15)	10 (11)	
League			
Professional	86 (81)	78 (83)	0.85
College	20 (19)	16 (17)	

Bold indicates statistically significant difference; Discrete variables as number (percentage).

Results

Accounting for potential interaction of variables using multivariable logistic regression analysis, diagnostic statements (Odds Ratio [OR]=0.17; 95% Confidence Interval [CI]=0.06 to 0.45; Standard Error [SE]; *P=<0.001* [Table 2]), treatment statements (OR = 0.33; 95% CI=0.14

Table 2. Multivariable logistic regression analyses of factors independently associated with accuracy of statements.

Dependent variable	Retained variables	Odds Ratio	95% CI	Standard error	*P value*	C statistic[1]
Accurate vs. (Debatable/Possibly) Misleading	Type of statement					
	Mechanism		Reference value			
	Diagnosis	0.17	0.06 to 0.45	0.09	**<0.001**	
	Treatment	0.33	0.14 to 0.74	0.14	**0.007**	
	Prognosis	0.27	0.12 to 0.65	0.12	**0.003**	
	Anatomical location					
	Shoulder/Elbow		Reference value			
	Wrist/Hand	2.1	0.65 to 6.7	1.2	0.22	
	Other upper extremity	2.3	0.56 to 9.2	1.6	0.25	
	Hip	1.2	0.25 to 5.5	0.92	0.85	0.74
	Knee	4.5	1.4 to 14	2.7	**0.01**	
	Ankle/Foot	1.6	0.49 to 5.1	0.95	0.45	
	Other lower extremity	3.3	1.0 to 10	1.9	**0.04**	
	Neck/Back	3.8	0.68 to 21	3.3	0.13	
	Type of injury					
	Bone		Reference value			
	Muscle	1.8	0.51 to 6.3	1.1	0.36	
	Ligament	1.6	0.76 to 3.6	0.65	0.21	
	Tendon	0.70	0.23 to 2.1	0.40	0.53	

Bold indicates statistically significant difference; CI = Confidence Interval; [1] The C statistic is a measure of model fit and is the area under the receiver operating characteristics curve.

to 0.74; SE=0.14; *P=0.007*), and prognostic statements (OR=0.27; 95% CI=0.12 to 0.65; SE=0.12; *P=0.003*) were all independently associated with less chance of being accurate compared to mechanism statements. Compared to shoulder and elbow injuries, statements concerning knee (OR=4.5; 95% CI=1.4 to 14; SE; *P=0.01*) and other lower extremity injuries (OR=3.3; 95% CI=1.0 to 10; SE; *P=0.04*) were more likely to be accurate.

Discussion

Coverage of sports injuries in the mainstream media is a potential source of misinformation. It seems, by far, the most likely place a person will hear medical terms and explanations of etiology, diagnosis, therapy, and prognosis. This study looked at the accuracy of information in news coverage of injured professional and college athletes.

This study found that statements concerning diagnosis, treatment, and prognosis were all less likely to be accurate than statements looking at the mechanism of the problem. This is consistent with prior research that found a notable percentage of orthopaedic information available through the Internet is relatively inaccurate and of limited quality (7). It makes sense that statements about mechanism were less debatable since most were direct trauma.

We also found that statements concerning knee and other lower extremity problems were more likely to be accurate than shoulder and elbow coverage. Similar studies in this field, have found that most athletic ailments affect the ankle and knee, though upper extremity injuries presented to the emergency room are common too (8, 9). This may be due to the fact that leg injuries are more often traumatic (relatively less debatable) and upper limb problems may be more often related to arm use (e.g. throwing athletes), which is a greater source of variations in option and debate. This information is similar to a study done by Sytema and colleagues, that found the odds of an upper extremity problem were higher when participating in a no-ball and no-contact sport, than when participating in a sport that involves physical contact or a ball (10).

We acknowledge some study limitations. First, 2 researchers and one orthopaedic surgeon (senior author) rated the accuracy of the statements. The ratings are somewhat subjective and might vary with other raters but would mostly likely be comparable. Second, it is possible that postings were missed on the days we performed the search because the order of search results can change daily. Since we searched on

random days and did not exclude specific reports, we believe we obtained representative media coverage. Third, our study only included websites that were in English, which might limit generalizability. Fourth, there were certain search terms used in this study, such as "injury", "sports", "league", "professional", and "college" that could affect the findings.

In conclusion, coverage of sports ailments in the mainstream media is likely a source of misinformation about the mechanism, diagnosis, treatment, and prognosis of musculoskeletal injuries. Ailments of prominent athletes may represent a useful opportunity to teach people about musculoskeletal health. Balanced, dispassionate experts in communicating musculoskeletal science to a lay audience could work directly with journalists to improve the quality of health information provided to the public, particularly when that information is directly sought because of its importance to sports competition.

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