LETTER TO THE EDITOR

New Level of Evidence Guidelines Change Previously Published Manuscripts' Designation

Dear Editor

In 2015, The Journal of Bone and Joint Surgery (JBJS) updated its level of evidence (LOE) scale. We reviewed all studies published in JBJS in the two years before updating the LOE scale, and re-designated according to the updated scale. Level 4 therapeutic studies were the most common (32%). Level 2 prognostic studies had the greatest number of LOE designation changes (26). Near perfect agreement was met for therapeutic (k:0.96) and diagnostic studies (k:0.96). Prognostic studies demonstrated a lower agreement (k:0.65). Studies published in JBJS before 2015 may have different LOE designations if published today.

Part of evaluating research is understanding the methodological rigor of studies. A way to distill this information is the level of evidence (LOE) scale. The Journal of Bone and Joint Surgery (JBJS) adopted LOE designations in 2003 and updated its LOE scale in 2015 (1,2). We applied the updated LOE scale to studies published in JBJS before the update to evaluate consistency in LOE designations. All studies published in JBJS in the two years before the change in the LOE scale were reviewed. These studies were re-designated according to the updated LOE scale. The number and percentage of studies that had a change in LOE were determined, and agreement was calculated.

Four hundred fifty of the six hundred sixty-five articles had an initial LOE designation and were included. The number of each study type and original LOE designation are in Table 1. Level 4 therapeutic studies were the most common study type (32%). Changes in LOE designation are in Table 2. Level 2 prognostic studies had the greatest number of changes (26) with the updated LOE scale. The entire cohort had near perfect agreement in LOE designation when comparing designations before and after the newly implemented criteria (k:0.88). When each study type was individually examined, Fleiss' Kappa demonstrated almost perfect agreement for therapeutic (k:0.96) and diagnostic studies (k:0.96). Prognostic studies had a lower agreement (k:0.65).

Overall, when the updated LOE scale was applied to the

Table 1. Description of study type and original LOE designation for evaluated JBJS studies

	Number of Articles	Level 1 Evidence	Level 2 Evidence	Level 3 Evidence	Level 4 Evidence
Therapeutic	286 (63.6%)	53	34	53	146
Prognostic	127 (28.2%)	12	41	47	27
Diagnostic	35 (7.8%)	10	11	11	3
Economic	2 (0.4%)	0	2	0	0
Total	450	75 (16.7%)	88 (19.6%)	111 (24.7%)	176 (39.1%)

Table 2. Description of LOE designation changes with the updated LOE scale

	Total Studies	LOE 1 Changed	LOE 2 Changed	LOE 3 Changed	LOE 4 Changed	Changed LOE
Therapeutic	286	0	3	2	2	7 (2%)
Prognostic	127	0	26	4	0	30(24%)
Diagnostic	35	1	0	0	0	1 (3%)
Economic	2	0	0	0	0	0 (0%)
Total	450	1	29	6	2	38 (8%)

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THE ONLINE VERSION OF THIS ARTICLE ABJS.MUMS.AC.IR

older studies, 38 (8%) had a change in LOE designation. While the overall level of agreement for LOE designation was almost perfect, readers should be aware that listed LOE designations might be outdated when evaluating orthopaedic literature published before 2015. The majority of LOE differences came from 26 prognostic level 2 studies that were downgraded to level 3 evidence. This is most likely because in the original LOE scale, the prognostic level 2 designation included retrospective studies (1). However, in the 2015 update, retrospective studies have been downgraded to level 3 (2).

The LOE scale has been was updated for JBJS. Based on changes in the scale, some studies published before 2015 would have a reduced LOE designation if published today. Changes in the LOE scale particularly affect retrospective prognostic studies. Physicians reading studies published before 2015 must be aware that the published LOE designation may not accurately represent current standards.

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