Does Surgeon Level of Expertise Correlate with Patient Outcomes?

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INTRODUCTION: It is difficult to objectively evaluate the results of surgical techniques as there is inherent variability between surgeons in regard to experience, skill level, and knowledge. Tang suggested a classification system in 2009 in an attempt to standardize surgeon level of expertise, with categories ranging from Non-Specialist (Level I) to Expert (Level V). This epidemiological analysis of all articles citing Tang's original paper examines if a surgeon's self-reported level of expertise correlates with outcomes, and to evaluate whether the current definition of Tang level is sufficient to account for expertise bias.

METHODS: In May 2021, all articles citing Tang level of expertise were identified from Tang's original article using the "Cited by" feature on Google Scholar. Two-hundred-twenty-two articles were identified. Articles citing Tang were eligible for inclusion if the article described a novel technique and provided author(s)' levels. Two-hundred-five articles were included. Statistical analysis was conducted, and p-values less than 0.05 were considered significant.

RESULTS:

The most common specialties of authors reporting Tang level of expertise were orthopaedic surgery (82.9%) and plastic surgery (15.5%). The most common subspecialty was hand surgery, with 86.4% of authors having completed a fellowship in hand surgery. 2020 was the year with the most studies reporting level of expertise (31.7%), followed by 2021 (20.0%), and 2019 (17.1%). The most common study types were prospective cohort (36.1%), followed by retrospective cohort (20.0%), and case report or case series (19.5%). The majority of studies (80.5%) reported positive results with their technique, and of these, 63.3% were statistically significant. Level of expertise was not significantly associated with a doctoral degree, type of residency completed, fellowship completion, hand fellowship, author sex, study type, or result significance.

DISCUSSION AND CONCLUSION: The current Tang classification is both under-reported and incomplete in its present state. To account for expertise bias, we recommend all authors report Tang level when describing surgical techniques. Studies with multiple authors should explicitly state the level of each author, as well as a weighted average accounting for the total contribution of each individual.

Table 1. Tang Levels of Expertise in reporting treatment outcomes.

Levels	Criteria
Non-specialist (I)	A surgeon who is in training or is a general practitioner.
Specialist- less experienced (II)	A surgeon who has completed training, but who has not yet acquired in-depth knowledge or high-volume experience in the use of the technique(s).
Specialist- experienced (III)	A surgeon who has obtained appreciable experience in use of the relevant technique(s), having practiced as a specialist over a longer period (typically >5 years).
Specialist- highly experienced (IV)	A specialist who possesses in-depth knowledge and experience with use of the relevant technique(s). This experience is indicated by having performed or been involved as a leading participant in scholastic studies relevant to the disorder(s) or technique(s).[a]
Expert (IV)	A highly experienced specialist who has made a recognized contribution to knowledge related to the disorder being investigated,[b] or who has pioneered the technique(s) in the report.

[a]Original publications relevant to the investigated disorder or technique in a professional journal are the indicators of having performed academic studies.
[b]Having publications critical to advancement of the treatment of the disorder under investigation and usually being a well-known senior surgeon in this field.

Table 2. Demographics of senior authors reporting Tang Level of Expertise in novel technique publications.

Demographic (N=205)*	Frequency (%); Mean ± SD
Male (n=205)	183 (89.3%)
Degree (n=205)	
PhD	64 (31.2%)
MD	193 (94.1%)
Dual	58 (28.3%)
Year of Residency Graduation (n=121)	2001.3 ± 9.02
Residency Type (n=187)	
Orthopedic Surgery	155 (82.9%)
Plastic Surgery	29 (15.5%)
Family Medicine	1 (0.5%)
General Surgery	1 (0.5%)
Physical Medicine and Rehabilitation	1 (0.5%)
Fellowship Type (n=176)	
Hand	152 (86.4%)
Non-Hand Orthopedic Fellowship	19 (10.8%)
H-index (n=205)	14.2 ± 11.67
PubMed-indexed Publications (n=205)	66.5 ± 69.77

SD= standard deviation
* Several demographic details were not publicly available for all authors. The available data for each demographic is detailed.