Does the OTA Open Fracture Classification Align with the Gustilo-Anderson Classification? A Study of 2215 Open Fractures

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Purpose: The Orthopaedic Trauma Association Open Fracture Classification (OTA-OFC) was developed to capture the clinically important fracture characteristics not described by the Gustilo-Anderson classification. However, it is unknown how much unique value the OTA-OFC adds to the Gustilo-Anderson classification. We sought to quantify the association between these classification systems.

Methods: We retrospectively reviewed 2215 operatively treated open extremity fractures of patients aged ≥18 years and with prospectively documented OTA-OFC and Gustilo-Anderson classification. We excluded fractures that were non-extremity, nonoperative, or unspecified in classification. Our outcome measures were the frequency, distribution, and association of OTA-OFC category scores and Gustilo-Anderson classification types. Furthermore, we utilized multivariable linear regression and coded both classification systems as continuous variables to model the association of each OTA-OFC category to Gustilo-Anderson classification severity. Fitted regression coefficients (β) were reported to measure the slopes of the predictor OTA-OFC variables in all models and assess their relative strengths of association.

Results: Gustilo-Anderson Type IIIA (n = 978; 44.2%) fractures were the most common, followed by Type I or II (n = 961; 43.4%), Type IIIB (n = 204; 9.2%), and Type IIIC fractures (n = 72; 3.3%). As expected, lower severity Gustilo-Anderson fractures also had lower severity OTA-OFC category scores, on average. However, we observed substantial variability in the strength of association between OTA-OFC categories and Gustilo-Anderson classification severity. OTA-OFC Arterial and Skin scores were most associated with more severe Gustilo-Anderson classifications (β = 0.50 and 0.46, respectively). OTA-OFC Bone Loss and Muscle scores demonstrated comparatively weaker associations (β = 0.17 and 0.20, respectively). Notably, OTA-OFC Contamination scores showed almost no association with Gustilo-Anderson classification severity (β = 0.05; 95% confidence interval, 0.01–0.09).

Conclusion: Our results suggest that the Gustilo-Anderson classification is not strongly associated with the OTA-OFC Bone Loss, Muscle, or Contamination scores. Therefore, the more detailed OTA-OFC provides unique data not well captured by the Gustilo-Anderson classification. Most importantly, we found assigned Gustilo-Anderson classification type was poorly associated with wound contamination—a significant predictor of open fracture infection and complications. For research and clinical communication, augmenting the Gustilo-Anderson classification with the OTA-OFC Contamination score may be important to enhance the risk stratification of open fractures.