

## Evaluation of the Orthopaedic Trauma Association Open Fracture Classification (OTA-OFC) as a Predictive Tool in Open Tibial Shaft Fractures

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**Purpose:** This study was undertaken to correlate the Orthopaedic Trauma Association Open Fracture Classification (OTA-OFC) with complication rates and to determine if it can be used as a predictive tool in the treatment of open tibial shaft fractures.

**Methods:** This is a retrospective review from 2 high-volume Level-I trauma centers of open tibial shaft fractures (OTA 42) over a 6-year period. Open fracture characteristics (OTA-OFC) were recorded. Primary outcomes were type of definitive closure, 90-day wound complication rates, need for unplanned return to operating room (OR) within 90 days for wound complication, and nonunion rates.

**Results:** A total of 538 patients were included for study. 57.4% (n = 309) were closed primarily at index surgery or in a delayed fashion. Local soft-tissue advancement or rotational flap was used in 9.7% (n = 52) while free soft-tissue transfer was used in 22.3% (n = 120). 12 patients (2.2%) had skin grafting while 43 patients (8%) required an amputation. Two patients were treated with wet-to-dry dressings (0.3%). Of those followed for 90 days (n = 454), 41 (9.0%) had a significant wound complication and 38 (93%) of those required an unplanned reoperation. 70% were infections (8 superficial, 21 deep) and 29% (n = 12) were wound dehiscence. All 5 OTA-OFC classification groups significantly correlated with type of definitive closure (r = 0.17-0.78, P < 0.05) with OTA-OFC skin showing the strongest correlation (r = 0.78). OTA-OFC muscle weakly correlated with wound complication (r = 0.10, P = 0.03) and no OTA-OFC classification correlated with need for an unplanned secondary procedure at 90 days. OTA-OFC skin, muscle, and arterial all weakly correlated with nonunion (r = 0.18-0.25, P < 0.05). OTA-OFC contamination neared a significant correlation with nonunion (r = 0.125, P = 0.053). Using logistic regression, OTA-OFC muscle was predictive of nonunion in this patient population (odds ratio [OR] = 2.8; 95% confidence interval [CI] 1.6, 4.8). No other OTA-OFC category was predictive of a complication.

**Conclusion:** Several important findings were identified in our patient population of open tibia fractures. Approximately 10% of open tibial shaft fractures experience a wound complication within 90 days of definitive soft-tissue coverage and the majority of those patients will require a second surgical procedure. The OTA-OFC correlates variably with type of definitive closure, the development of a wound complication, and the occurrence of a nonunion. Importantly, OTA-OFC muscle classification is predictive of the development of nonunion. This information should be used by treating surgeons when counseling patients regarding their risk of complications when diagnosed with an open tibial shaft fracture.