

Flaps and Lower Extremity Trauma: Differences in Flap Rates Across the United States

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INTRODUCTION: Open fractures with large soft tissue defects represent a challenging reconstructive problem. Successful attempts at limb salvage require a multi-disciplinary approach including early access to reconstructive plastic surgery. However, given the only recent rise in microsurgery, it is not yet known if this demand is being met.

MATERIALS AND METHODS: Using ICD-9CM codes, all adult patients presenting with open tibia fractures in the 2003-2012 Nationwide Inpatient Sample (NIS) were included in the analysis. Flap rates during the index hospitalization were evaluated over time and against demographics, comorbidities, rates of amputation, and patient and hospital factors regarding access to care. NIS data was multiplied to its United States (US) population estimate.

RESULTS: We identified 29,717 patients over 10 years, a predicted 14,859 open tibia fractures in the US per year, with a mean age of 41.24 ± 16.68 years. Yearly, 5.92% (n=879) of open tibia fractures receive local or free flap coverage on the index hospitalization. Younger age and peripheral vascular disease were significantly associated with increased rates of flaps ($p < 0.01$). Other medical co-morbidities, including diabetes, and race were not associated. Medicare ($p < 0.01$), patient zip code with a mean household income in the lower 25% ($p < 0.05$), city less than 1 million people ($p < 0.05$), small ($p < 0.01$) or medium ($p < 0.05$) hospitals, and rural or urban non-teaching hospitals ($p < 0.01$) were all associated with significantly lower rates of flaps. Mean income greater than 50% ($p < 0.05$), large hospitals ($p = 0.05$), urban teaching hospitals ($p < 0.01$), and metropolitan areas with at least 1 million people ($p < 0.01$) were associated with significantly higher rates of flaps than the mean. East South Central had significantly lower flap rates ($p < 0.001$) and higher amputation rates ($p < 0.01$), and geographic regions with higher flap rates were New England ($p < 0.05$), Mid Atlantic ($p < 0.001$), and Mountain ($p < 0.01$).

CONCLUSION: Rates of flap coverage for open tibia fractures differ primarily based on factors related to access to care, and are not explained by differences in medical co-morbidities. Specifically, medically underserved areas of the country, as well as individuals without financial resources received flaps at lower rates and amputations at higher rates. These findings suggest that skilled lower extremity reconstruction is not universally applied to all Americans. Hospital administrators, insurance providers and the plastic surgery community must work together to support lower extremity reconstructive surgeons.