

Global Trends Influencing Orthopedic Surgeons' Ankle Fracture Management: A Bullet Health Analysis Series Case

Kilian T Drouaud¹, Arthur Pierre Drouaud, Keli Doe, Charles Moon, Jan Paul Szatkowski, Derek W Moore

¹College of Natural Sciences

INTRODUCTION: The management of ankle fractures (AF) vary based on fracture characteristics, patient demographics, and surgeon preferences. However, global differences in practice patterns and surgical decision-making for this injury remain poorly understood. In response to the growing need for clarity around orthopedic surgical decision-making, we contribute to the Bullet Health Analysis (BHA) series with this study, analyzing global trends in the management of a single case of AF. By surveying surgeons via Orthobullets.com and holding patient-related variables constant, we aim to identify how geographic location contributes to variation in treatment preferences.

METHODS: An international survey was administered through Orthobullets.com between April 2019 through March 2025, targeting practicing orthopedic surgeons. Standardized polls, collaboratively developed using the best available evidence and a peer-reviewed, evidence-based item list, were designed to capture global treatment preferences of a 40-year-old male with an isolated ankle fracture (Figure 1). Subsequent analyses using chi-square and multivariate logistic regression analysis were performed to evaluate variation across international practice regions.

RESULTS: Our study encompassed the largest survey for an individual case with 3,630 surgeons from 76 countries. Of the respondents, 62.60% indicated that they would treat this fracture "nonoperatively" and 37.40% preferred to treat this fracture "operatively." The chi-square analysis revealed statistically significant differences in responses by geographic region ($p < 0.01$). The breakdown of treatment management choices by continent are shown in Table 1. Non-operative immobilization management revealed 38.78% selected a weight bearing walking boot while 36.04% preferred a non-weight bearing cast. Multivariate logistic regression for immobilization decisions by continents are shown in Table 2.

DISCUSSION AND CONCLUSION:

While previous studies have found that geographic variations in AF treatment within the US our findings extend this discourse by revealing that international practice locations also influence treatment approaches. These differences may reflect regional approaches to surgical training, rehabilitation philosophy, and resource availability. Additionally, cultural and socioeconomic factors, such as patient access to care, insurance status, and local attitudes toward surgery, also play a significant role in shaping treatment preferences across regions. These results underscore the complex landscape of AF management and the importance of a broader understanding across varied healthcare systems for international building.



Table 1. Geographic Differences in Operative Versus Non-Operative Management

| Continent | Non-operative | Operative | OR (95% CI), p-value |
|---------------|---------------|-----------|-----------------------------|
| North America | 1043 | 461 | Reference |
| Oceania | 111 | 39 | 0.795 [0.543-1.164], 0.238 |
| Latin America | 69 | 59 | 1.935 [1.344-2.785], <0.001 |
| Europe | 639 | 423 | 1.498 [1.270-1.766], <0.001 |
| Africa | 102 | 87 | 1.930 [1.421-2.621], <0.001 |
| Asia | 248 | 258 | 2.354 [1.916-2.892], <0.001 |

Abbreviations: Odds Ratio (OR); Confidence Interval (CI)

Table 2. Multivariate Analysis of Surgeon Preferences by Continent for Non-Operative Immobilization Practices

| Immobilization Practices | Surgeons (n, %) | Multivariate Logistic Regression Analysis Continent OR (95% CI), p-value (Reference: North America) |
|--|-----------------|--|
| Walking Boot - Weight Bearing as Tolerated | 1129 (38.78%) | Reference |
| Cast - Non-Weight Bearing | 1049 (36.04%) | Europe 1.658 [1.351-2.033], <0.001 Asia 4.659 [3.486-6.203], <0.001 Africa 6.360 [4.044-10.001], <0.001 Oceania 1.003 [0.661-1.520], 0.990 Latin America 2.342 [1.375-3.991], 0.002 |
| Cast - Weight Bearing as Tolerated | 255 (8.76%) | Europe 2.580 [1.881-3.539], <0.001 Asia 2.780 [1.723-4.488], <0.001 Africa 2.422 [1.663-3.643], <0.001 Oceania 0.885 [0.411-1.909], 0.756 Latin America 2.373 [1.036-5.435], 0.041 |
| Walking Boot - Non-Weight Bearing | 478 (16.42%) | Europe 1.093 [0.849-1.407], 0.492 Asia 1.824 [1.263-2.665], 0.001 Africa 1.411 [0.724-2.750], 0.312 Oceania 0.548 [0.302-0.993], 0.047 Latin America 2.516 [1.408-4.494], 0.002 |

Abbreviations: Odds Ratio (OR); Confidence Interval (CI)