

**A. J. Trompeter,
R. Knight,
N. Parsons,
M. L. Costa**

■ INFOGRAPHIC

Infographic: The Orthopaedic Trauma Society classification of open fractures

Open fractures can have a significant impact on patients' physical and mental wellbeing.¹ These injuries are associated with large healthcare costs²⁻⁴ and several classification systems have been proposed to enable prediction of prognosis.^{5,6} The Orthopaedic Trauma Society (OTS) open fracture classification was developed to address some of the problems associated with the existing classification systems: specifically, the use of descriptive terminology, which leads to misclassification,⁷ and the lack of evidence linking previous classifications to outcomes, which patients consider the most important.⁸

The OTS classification is based on objective descriptors of the injury after the first surgical excision (debridement). Injuries are broadly categorized as 'simple' or 'complex', based on the need for a reconstructive procedure to achieve wound closure. 'Simple' open fractures can be closed primarily without an additional reconstructive procedure. Conversely, 'complex' fractures are those which require some form of bony, soft-tissue, or vascular reconstruction to achieve wound closure and are subdivided into types A to C.

The OTS classification was investigated using a cohort of adults with open fractures of the lower limb, who were recruited as part of two large clinical trials within the UK Major Trauma Network.^{9,10} Using high-quality, prospective data, this analysis shows that the classification correlates with patient-reported disability and patient-reported quality of life in the first 12 months after the injury. However, it was not correlated with deep surgical site infection at 30 days post-injury. Further work is required to test the intra- and inter-observer reliability of this classification system, and to correlate the classification with patient-centred outcomes in different patient groups and other healthcare systems.

References

- Tutton E, Achten J, Lamb SE, Willett K, Costa ML.** A qualitative study of patient experience of an open fracture of the lower limb during acute care. *Bone Joint J.* 2018;100-B(4):522–526.
- Parker B, Petrou S, Masters JPM, Achana F, Costa ML.** Economic outcomes associated with deep surgical site infection in patients with an open fracture of the lower limb. *Bone Joint J.* 2018;100-B(11):1506–1510.
- Png ME, Madan JJ, Dritsaki M, et al; WHIST trial collaborators.** Cost-utility analysis of standard dressing compared with incisional negative-pressure wound therapy among patients with closed surgical wounds following major trauma to the lower limb. *Bone Joint J.* 2020;102-B(8):1072–1081.
- Petrou S, Parker B, Masters J, et al.** Cost-Effectiveness of negative-pressure wound therapy in adults with severe open fractures

of the lower limb: evidence from the WOLFF randomized controlled trial. *Bone Joint J.* 2019;101-B(11):1392–1401.

- Gustilo RB, Anderson JT.** Prevention of infection in the treatment of one thousand and twenty-five open fractures of long bones. *J Bone Jt Surg.* 1975;58(4):523–527.
- Parikh S, Singh H, Devendra A, et al.** The use of the Ganga Hospital score to predict the treatment and outcome of open fractures of the tibia. *Bone Joint J.* 2020;102-B(1):26–32.
- Agel J, Evans AR, Marsh JL, et al.** The OTA open fracture classification: a study of reliability and agreement. *J Orthop Trauma.* 2013;27(7):379–384.
- Rees S, Tutton E, Achten J, Bruce J, Costa ML.** Patient experience of long-term recovery after open fracture of the lower limb: a qualitative study using interviews in a community setting. *BMJ Open.* 2019;9(10):e031261.
- Costa ML, Achten J, Knight R, et al.** Effect of incisional negative pressure wound therapy vs standard wound dressing on deep surgical site infection after surgery for lower limb fractures associated with major trauma: the WHIST randomized clinical trial. *JAMA.* 2020;323(6):519–526.
- Costa ML, Achten J, Bruce J, Tutton E, Petrou S, Lamb SE, Parsons NR; UK WOLFF Collaboration.** Effect of Negative Pressure Wound Therapy vs Standard Wound Management on 12-Month Disability Among Adults With Severe Open Fracture of the Lower Limb: The WOLFF Randomized Clinical Trial. *JAMA.* 2018;319(22):2280–2288.

Author information:

A. J. Trompeter, PhD, Orthopaedic Trauma/Limb Reconstruction Surgeon, Orthopaedic Trauma/Limb Reconstruction Unit, St George's University Hospital, London, UK.

R. Knight, PhD, Senior Medical Statistician, Oxford Clinical Trials Research Unit, Centre for Statistics in Medicine, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, UK.

N. Parsons, PhD, Associate Professor in Medical Statistics, Clinical Trials Unit, Warwick Medical School, University of Warwick, Coventry, UK.

M. L. Costa, PhD, Professor of Orthopaedic Trauma Surgery, Oxford Trauma and Emergency Care, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, UK.

Funding statement:

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

ICMJE COI statement:

M. L. Costa reports employment by the University of Oxford, research grant funding to the University of Oxford from NIHR, EU, RCS England, and industry, all of which are unrelated to this article. R. Knight reports a grant from NIHR HTA, which is related to the publication of this article. N. Parsons also reports a grant from the UK National Institute for Health Research, which is related to the publication of this article. A. J. Trompeter reports consultancy for Stryker, expert testimony for an independent medico-legal practice, royalties from OUP and JP Publishers, and payment for development of educational presentations via Educational Institute for Stryker, Smith & Nephew, Orthofix, and Synthes.

Acknowledgements:

We would like to acknowledge all of the investigators for the WHIST and WOLFF trials from the UK Major Trauma Network and the National Institute for Health Clinical Research Network.

Correspondence should be sent to Matthew Costa; email: matthew.costa@ndorms.ox.ac.uk

©2020 The British Editorial Society of Bone & Joint Surgery
doi:10.1302/0301-620X.102B11
BJJ-2020-1998 \$2.00

Bone Joint J
2020;102-B(11):1467–1468.