

Clasper, Jonathan C. (2017) Mortality and orthopaedic injury following military trauma D.Sc. in Medicine. Awarded by published work.

Overview

Prior to the work presented in this thesis, there was little work on the effect of blast on the skeletal system, and what work there was usually related to free field blast, an explosion in air with little consideration of the effects of the environment on the injury pattern. In particular, the effect of buried devices on both foot soldiers, and those in vehicles had not been considered or differentiated in detail. This is not only of relevance to survivors, but also those killed in the incident, as injury or prevention, or mitigation may offer more potential for improved outcomes rather than further improvements in treatment, given the already significant advances made during recent conflicts.

The majority of the work spans the period from 2003, the 2nd Gulf War, a predominately ballistic conflict, to 2014 with the withdrawal of combat troops from Afghanistan, a conflict associated with the widespread use of the Improved Explosive Device (IED). My contribution to the literature will be considered under the following headings:

Injury Analysis (6 papers)

Injury Prevention/Mitigation (5 papers)

Management (8 papers)

Outcome (13 papers)

Education (9 papers)

This thesis contains the following published articles:

Injury Analysis

Ramasamy A, Hill, AM, Masouros S, Gibb I, Bull A.M.J, Clasper JC. (2011) Blast-related fracture patterns: a forensic biomechanical approach *J.R.Soc.Interface* 2011;8(58)689-698
doi:10.1098/rsif.2010.0476

Singleton, JA, Gibb IE, Bull AM, Mahoney PF, Clasper JC, Primary blast lung injury prevalence and fatal injuries from explosions: Insights from post-mortem computed tomographic analysis of 121 improvised explosive device fatalities. *J Trauma Acute Care Surg* 2013;75(2 Suppl 2):S269-74

Singleton JA, Gibb IE, Bull AM, Clasper JC. Blast-mediated traumatic amputation: evidence for a revised, multiple injury mechanism theory. *J R Army Med Corps* 2014;160(2):175-9

Edwards DS, McMenemy L, Stapley SA, Patel HD, Clasper JC. 40 years of terrorist bombings – A meta-analysis of the casualty and injury profile. *Injury* 2016;47(3):646-52

Singleton JA, Gibb IE, Hunt NC, Bull AM, Clasper JC. Identifying future ‘unexpected’ survivors: a retrospective cohort study of fatal injury patterns in victims of improvised explosive devices. *BMJOpen* 2013;3:e003130:1-8

Pearce AP, Bull AMJ, Clasper JC. Mediastinal injury is the strongest predictor of mortality in mounted blast amongst UK deployed forces. *Injury* 2017 48(9):1900-1905

Injury Prevention/Mitigation

Walker NM, Eardley W, Clasper JC. UK combat-related pelvic junctional vascular injuries 2008-2011: implications for future intervention *Injury* 2014;45(10):1585-1589

Spurrier E, Gibb I, Masouros S, Clasper J. Identifying spinal injury patterns in underbody blast to develop mechanistic hypotheses. *Spine* 2016 41(5):E268-275

Spurrier E, Singleton JA, Masouros S, Gibb I, Clasper J. Blast injury in the spine: Dynamic Response Index is not an appropriate model for predicting injury. *Clin Orthop Relat Res* 2015 473(9):2929-2935

Ramasamy MA, Hill AM, Phillip R, Gibb I, Bull AM, Clasper JC. FASS is a better predictor of poor outcome in lower limb blast injury than AIS: implications for blast research. *J Orthop Trauma* 2013 27(1):49-55

Ramasamy A, Masouros SD, Newell N, Hill AM, Proud WG, Brown KA, Bull AM, Clasper JC. In-vehicle extremity injuries from improvised explosive devices: current and future foci. *Philos Trans R Soc Lond B Biol Sci* 2011 366(1562):160-170

Management

Ramasamy A, Midwinter M, Mahoney P, Clasper J. Learning the lessons from conflict: Pre-hospital cervical spine stabilisation following ballistic neck trauma. *Injury* 2009 40(12):1342-1345

Morrison JJ, Mellor A, Midwinter M, Mahoney PF, Clasper JC. Is pre-hospital thoracotomy necessary in the military environment? *Injury* 2011 45(5):469-473

Bonner TJ, Eardley WG, Newell N, Masouros S, Matthews JJ, Gibb E, Clasper JC. Accurate placement of a pelvic binder improves reduction of unstable fractures of the pelvic ring. *J Bone Joint Surg Br* 2011 93(11):1524-1528

Clasper J. The interaction of projectiles with tissues and the management of ballistic fractures. *J R Army Med Corps* 2001;147:52-61

Trimble K, Clasper J. Anti-personnel mine injury: mechanism and medical management. *J R Army Med Corps* 2001;147(1):73-79

Ramasamy A, Hill AM, Clasper JC. Improvised explosive devices: pathophysiology, injury profiles and current medical management. *J R Army Med Corps* 2009;155(4):265-272

Boyd M, Mountain A, Clasper JC. Improvised skeletal traction in the management of ballistic femoral fractures *J R Army Med Corps* 2009;155:194-196

Brown KV, Ramasamy A, McLeod J, Stapley S, Clasper JC. Predicting the need for early amputation in ballistic mangled extremity injuries. *J Trauma* 2009;66(4):S93-S98

Outcome

Hinsley DE, Phillips SL, Clasper JC. Ballistic fractures during the 2003 Gulf Conflict – early prognosis and high complication rate *J R Army Med Corps* 2006; 152(2):96-101

Clasper JC, Phillips SL. Early failure of external fixation in the management of war injuries *J R Army Med Corps* 2005;151(2):81-86

Clasper JC, Rowley DI. Outcome, following significant delays in initial surgery, of ballistic femoral fractures managed without internal or external fixation. *J Bone Joint Surg Br* 2009;91(1):97-101

Brown KV, Murray CK, Clasper JC. Infectious complications of combat-related mangled extremity injuries in the British military. *J Trauma* 2010;69(1):S109-S115

Clasper JC, Brown KV, Hill P. Limb complications following pre-hospital tourniquet use. *J R Army Med Corps* 2009 155(3):200-202

Brown KV, Ramasamy A, Tai N, MacLeod J, Midwinter M, Clasper JC. Complications of extremity vascular injuries in conflict. *J Trauma* 2009 66(4):S145-S149

Brown KV, Clasper JC. The changing pattern of amputations. *J R Army Med Corps* 2013 159(4):300-303