Research and Development

Extrication in trauma

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National Fire Chiefs Council

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Background – Road traffic collisions

Global problem

- 1.35 million road deaths this year and a further 50 million serious injuries
- United Nations Sustainable development Goals – halve all road deaths and injuries by 2020
- This is unacceptable and preventable

The financial impact

- Road traffic crashes cost most countries 3% of their gross domestic product (WHO)
- For one three lane carriageway closure, on a busy motorway, the economic impact can be more than £500,000

Current post-crash response procedures

- Do we have published research to support extrications methods?

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UK FRS response to road traffic collisions

- 50 individual Fire and Rescue services across; England, Scotland, Wales, Northern Ireland, the Channel Islands and the Isle of Man.
- Total number of Road traffic collisions for GB approx. 130,000
- > 38,000 Firefighters across the UK
- The following slides use data from England only as an example of the UK.

Extrications by FRS (England only)

	Method of extrication							
Year	Total	Roof removal	Other space creation	B post rip[2]	Roof flap (vehicle on side)	Side removal (vehicle on roof)	Dashboard roll	Unknown
2009/10	8,939	3,738	3,099	373	287	247	237	958
2010/11	8,434	3,760	2,994	330	271	224	185	670
2011/12	8,414	3,898	2,948	326	242	219	179	602
2012/13	7,387	3,921	2,522	284	235	221	165	39
2013/14	7,312	3,788	2,500	342	270	212	189	11
2014/15	6,783	3,294	2,521	333	235	188	207	5
2015/16	6,228	2,735	2,528	345	216	205	190	9
2016/17	5,697	2,312	2,460	340	230	161	186	8

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RTCs attended by FRS (England only)

2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
33,621	30,106	28,345	27,930	28,118	29,088	30,882	29,900	30,025

Example of turn out times for fires (England only - not RTC)

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Table 2 Average response times to fires by response time component and type of fire with a summary of trends,[16] England; 2017/18

Type of fire[17] and response time component	2017/18	Change since 2016/17	Change since 2012/13
Primary			
Call handling	1 minute 25 seconds	-2 seconds ↓	+14 seconds ↑
Crew turnout	1 minute 38 seconds	-2 seconds ↓	-11 seconds ↓

Attendance times examples

- Lancashire Fire and Rescue

Target = 11 minutes and 15 seconds (actual 9:33)

Average distance 5.12 km

- Cleveland Fire Brigade

Target = 8 minutes (actual 5:37)

- Scottish Fire Service 10.40 (Q4 2016/2017)
- Dr Nutbeam research
- Average extrication time 30 minutes
- FRS in attendance 5 minutes before the ambulance service at many incidents

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Challenges

- 36 second increase in attendance times to road vehicle fires from 2011/2012 to 2016/2017. (England)
- Extrication times are increasing and car data applications are not being widely used.
- Differing levels of trauma care training and equipment across the 50 Fire and Rescue Services
- Too little research in extrication

Road Safety Trust
Supporting Road Safety

EXIT

EXTRICATION IN TRAUMA PROJECT

Multi agency research project with fire, health and academia.

Core funding - the Road Safety Trust

Medical leads – Dr Tim Nutbeam & Rob Fenwick

Academics - Dr James Shippen & Dr Barbara May

Fire lead - Mike Dayson

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The research question…..

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The bigger picture…. Are we doing everything we can to improve patient outcomes?

Do we have robust, evidence based research to support the actions we take in a post-crash response context?

The EXIT Project looks to discover the method of extrication that causes the least movement

This will either support current practice or may highlight how we can improve outcomes

Together we can save millions of lives.

Who is responsible for extrication research?

https://fphc.rcsed.ac.uk/media/1764/pre-hospital-spinal-immobilisation.pdf fphc.rcsed.ac.uk

Once fully immobilised the collar may be loosened to reduce discomfort, reduce intra-cranial pressure and potentially facilitate airway management.

2. An immobilisation algorithm may be adopted although the content of this remains undefined.

Selective immobilisation algorithms are viable in the UK pre-hospital setting. Using algorithms such as these in the pre-hospital environment ,would allow clinicians to immobilise only those who meet pre-defined criteria. The precise details of these pre-hospital criteria are yet to be decided but may well resemble the NEXUS rules. With any algorithm, a sensitivity level must be accepted that strikes a balance between prevention of SCI and use of the finite resources available. Furthermore, the practice of 'clearing the C-spine' should be aimed at including all serious injuries and treating accordingly.

The suggestion that some of the criteria in the above mentioned guidelines might be 'weighted' was discussed although no firm conclusions were drawn, in particular, it was felt that the subjective elements (e.g. mechanism of injury) could be viewed as a source of over-triage whereas objective elements such as age might be given more priority.

3. There may be potential to vary the immobilisation algorithm based on the conscious level of the patient.

Route to change..

Review of current procedures / events / International developments

Identification of research opportunity

Stakeholder engagement

Academic Research with the Fire and Rescue Service

Published research papers

Research presented at conferences and directly to stakeholders

Consensus statements produced based on current published research

Consensus statements referenced in National Operational Guidance

National Operational guidance used to develop / change standard operating procedures

New or reinforced procedures are carried out by operational crews

Improved patient outcomes / efficient use of resources

Savings to GDP / international influence / support global objectives

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Our journey so far….

- Approached by Dr Tim Nutbeam and Rob Fenwick
- Communicated with NFCC leads
- Applied for funding from the Road Safety Trust (joint application with health)
- Talked to Williams F1
- Developed test car
- Tested system at film studio
- Found difficulties with system
- Met with Dr James Shippen and introduced to IMUs…

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Inertial measurement Units (IMU)

- Each sensor contains:

  3 gyroscopes

  3 accelerometers

  3 magnetometers

- Each sensor can detect how it's moving through space.

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- By attaching 17 sensors to the body, the movement of the person can be measured.
- IMUs can be used on confined spaces such as within a vehicle.

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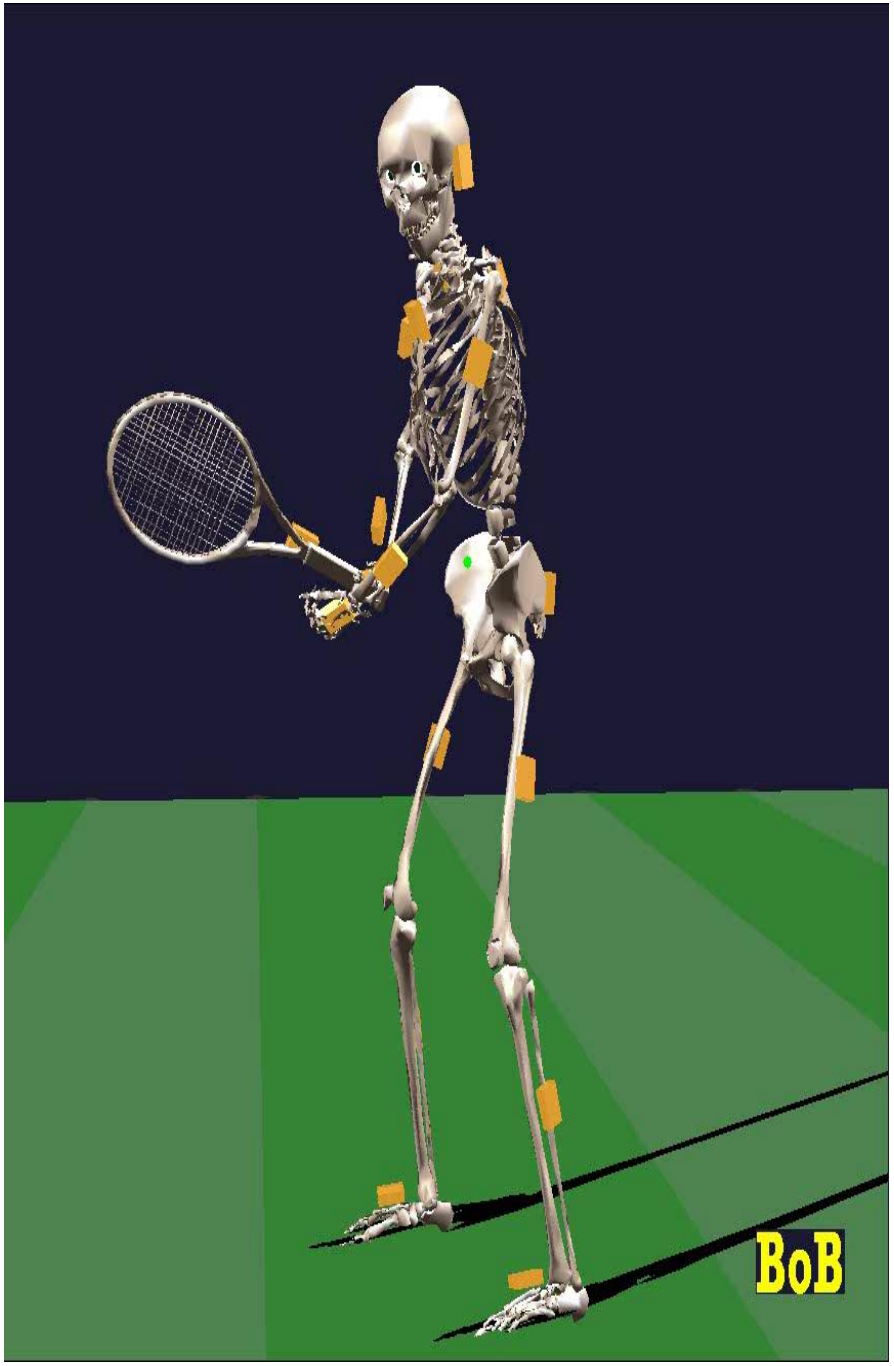

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