

A service evaluation of inhaled methoxyflurane (Penthrox) for paediatric traumatic injuries in a UK Helicopter Emergency Medical Service

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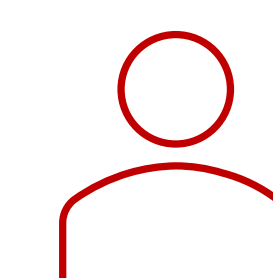
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Introduction

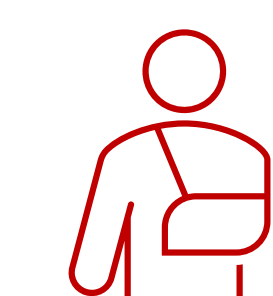
Provision of timely, effective analgesia in paediatric trauma is challenging in the prehospital setting. Inhaled methoxyflurane (IMF) is licensed for children in Australia/New Zealand but not in the UK. It is an inhaled analgesic with a favourable safety profile, which is more portable and has a lower climate change impact factor than inhaled nitrous oxide. We evaluated IMF use in children attended by a single Helicopter Emergency Medical Service (HEMS), focusing on timeliness, tolerability, need for additional analgesia/sedation, and procedural utility.

Methods

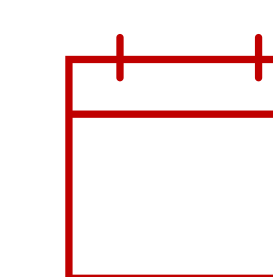
This was a retrospective observational review of consecutive paediatric trauma patients (<16 years) attended by the East Anglian Air Ambulance, between 01/10/2023 – 01/10/2025. Data were abstracted from the electronic medical record and anonymised. Outcomes included timing of administration, requirement for manipulation, requirement for additional analgesia or sedation, and complications. Descriptive statistics (median [IQR]) are reported.



Age < 16



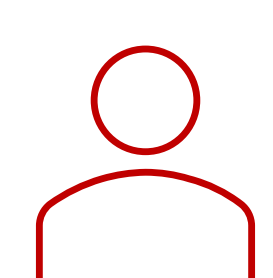
Traumatic injuries



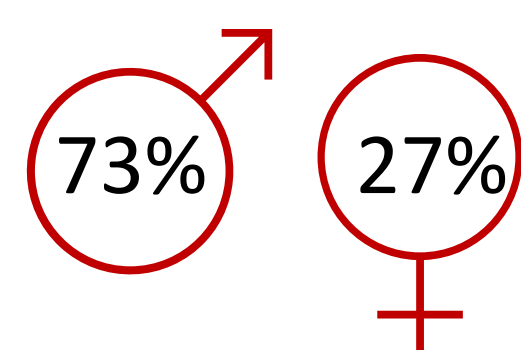
2-year period

Results

Thirty patients were included; median age 12.0 [10.0–13.8] years (range 4–15); 22/30 (73.3%) male. Most had extremity injuries, 27/30 (90.0%), including eight femoral fractures. IMF was administered a median of 5.0 [3.0–9.0] minutes after HEMS arrival. A facemask was used in 6/30 (20.0%), typically in younger children. Prior to IMF, 4/30 (13.3%) received other analgesia; after IMF, 18/30 (60.0%) required no further analgesia. Two femoral fracture reductions were completed with IMF alone, without additional sedation. IMF was not tolerated in 3/30 (10.0%); no adverse events were recorded. Thirteen patients (43.3%) were transported to hospital without a HEMS escort.



Median age 12 years



Median time to administration = 5 mins



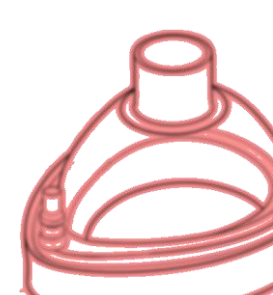
Initial HEMS analgesia in 87%



60% required no further HEMS analgesia

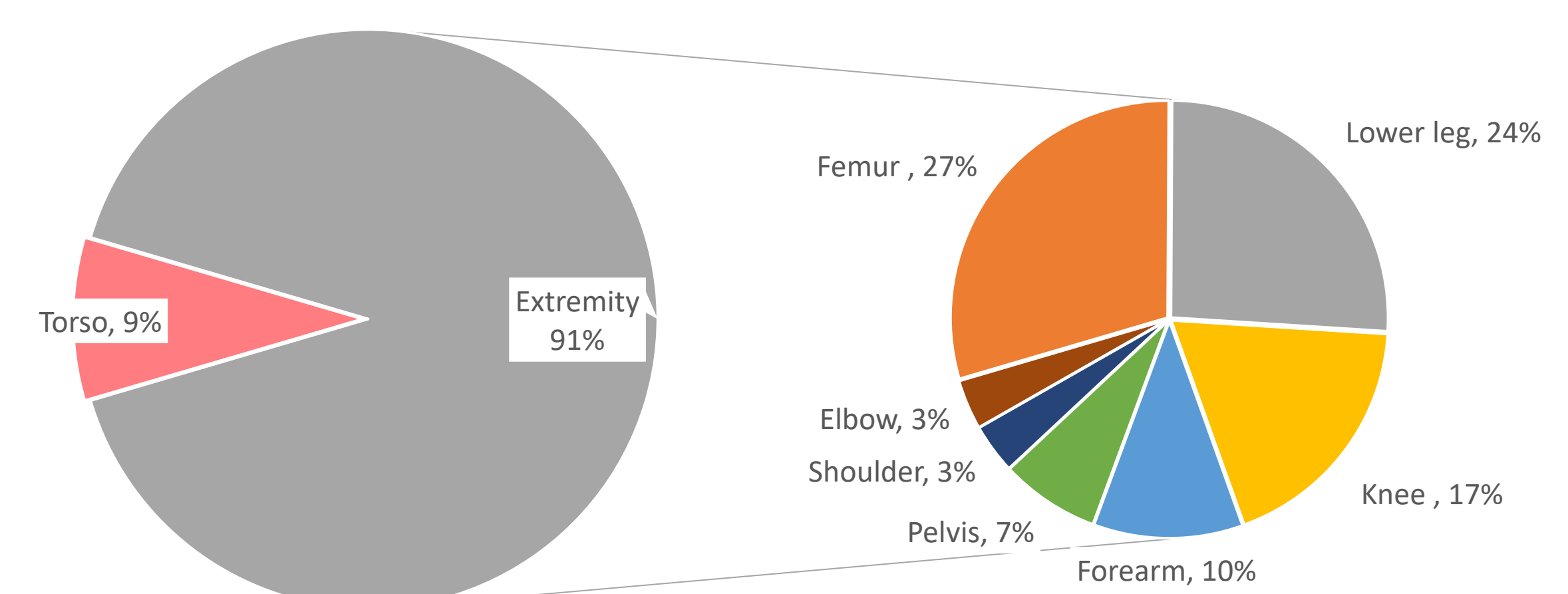


Not tolerated in 10%

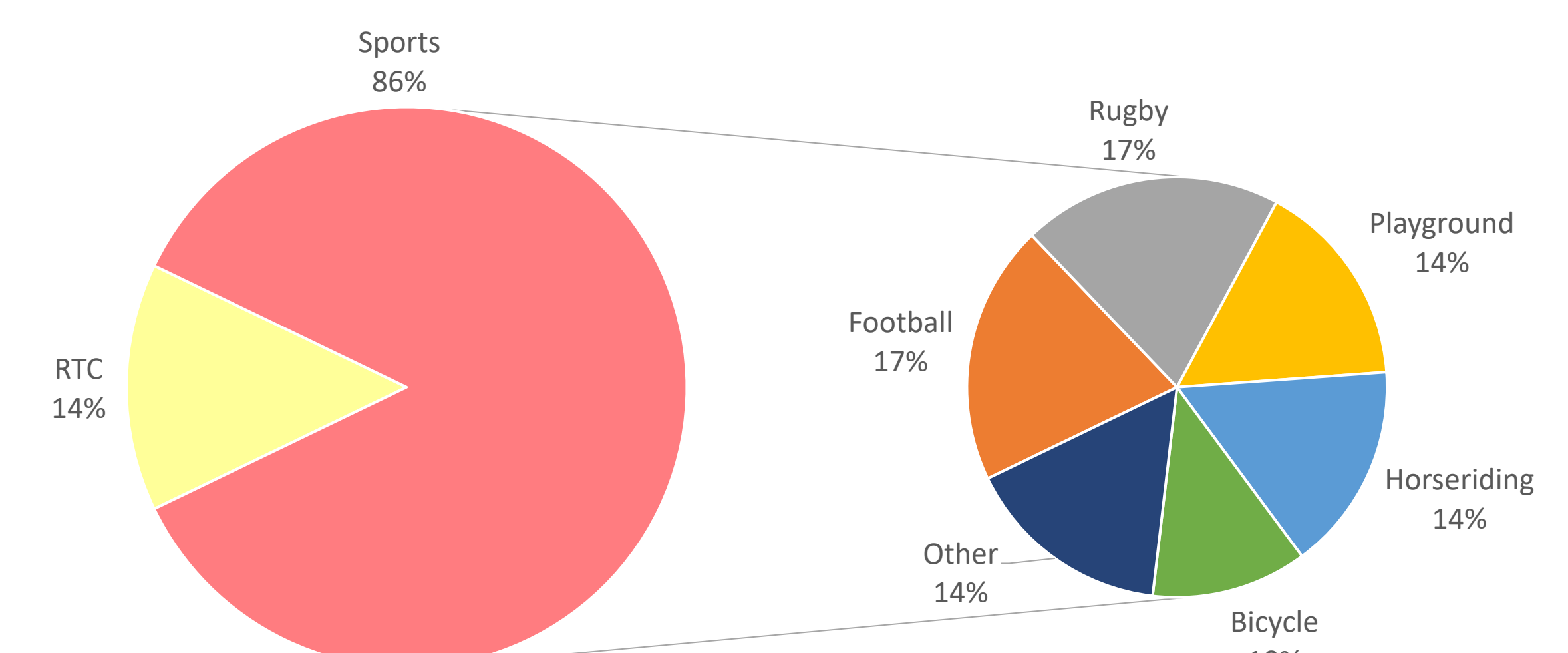


Facemask used in 20%

Body area affected



Mechanism



Conclusion

In this single-service evaluation, **IMF provided rapid, well-tolerated analgesia for paediatric trauma, with procedural utility and no observed adverse events.** Off-label prehospital use within governance frameworks appears feasible and effective, offering a portable, accessible option when IV/IO analgesia or sedation is undesirable or delayed. Prospective comparative studies capturing pain scores and longer-term safety are warranted.

