



Prehospital Amputation: An Experimental Comparison of Techniques



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INTRODUCTION

Prehospital limb amputation is a rare, but potentially life-saving intervention. When adequate resuscitation is not possible due to difficult patient access, hemodynamically unstable patients may benefit from an emergent prehospital amputation. There have been a limited number of case reports detailing prehospital amputation^[1-4]. Furthermore, there has only been one experimental trial^[5]. Leech et al. explored prehospital-friendly methods of amputation on human cadavers; however, due to a small sample size of four trials, the data has limited reliability.

Objective: Experimentally compare three prehospital amputation techniques on porcine legs to compare time to procedure completion, rates of instrument malfunction, and cleanliness of cut.

METHODS

- Three participants: emergency medicine physician, paramedic, and medical student.
- Each participant performed 3 amputations of each technique, resulting in n=27 amputations.



Technique 1: Scalpel to make a circumferential incision in soft tissue, and Gigli wire saw to cut through bone.



Technique 2: Hacksaw to cut through soft tissue and bone.



Technique 3: Recip. saw to cut through soft tissue and bone.

RESULTS

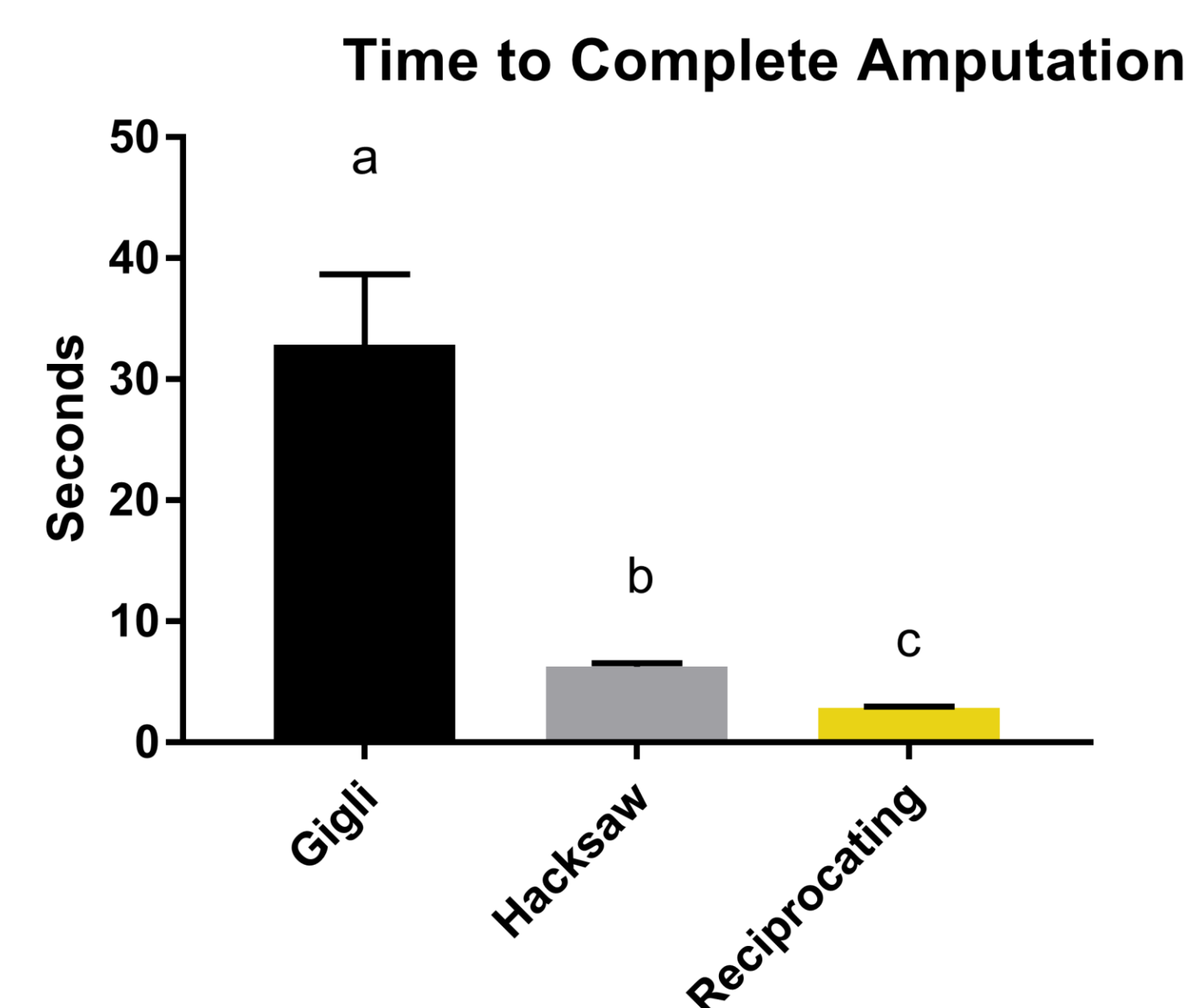


Figure 1. Time was measured from start of cut to complete amputation.

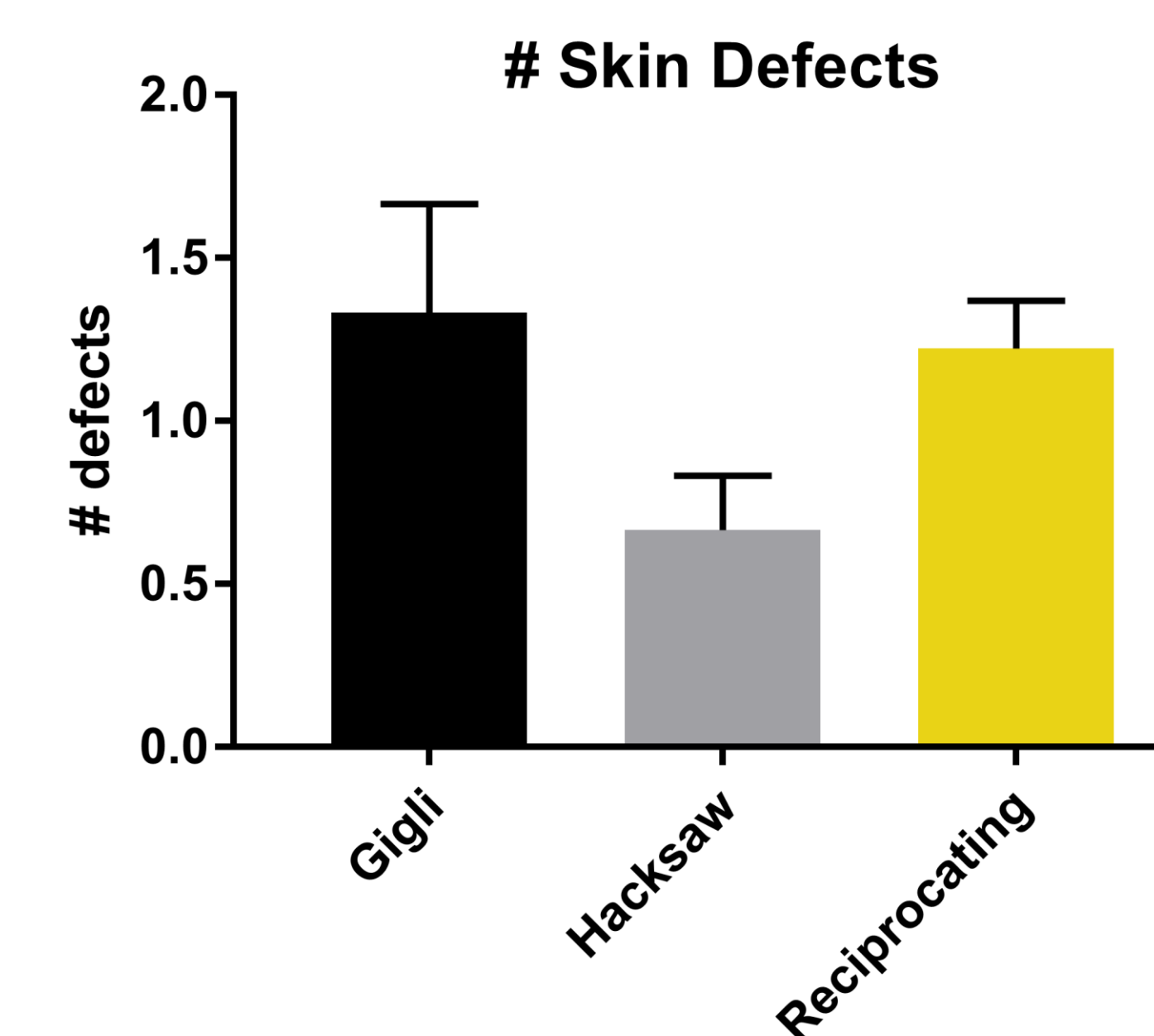


Figure 3. Skin defects were defined as number of ragged edges following amputation.

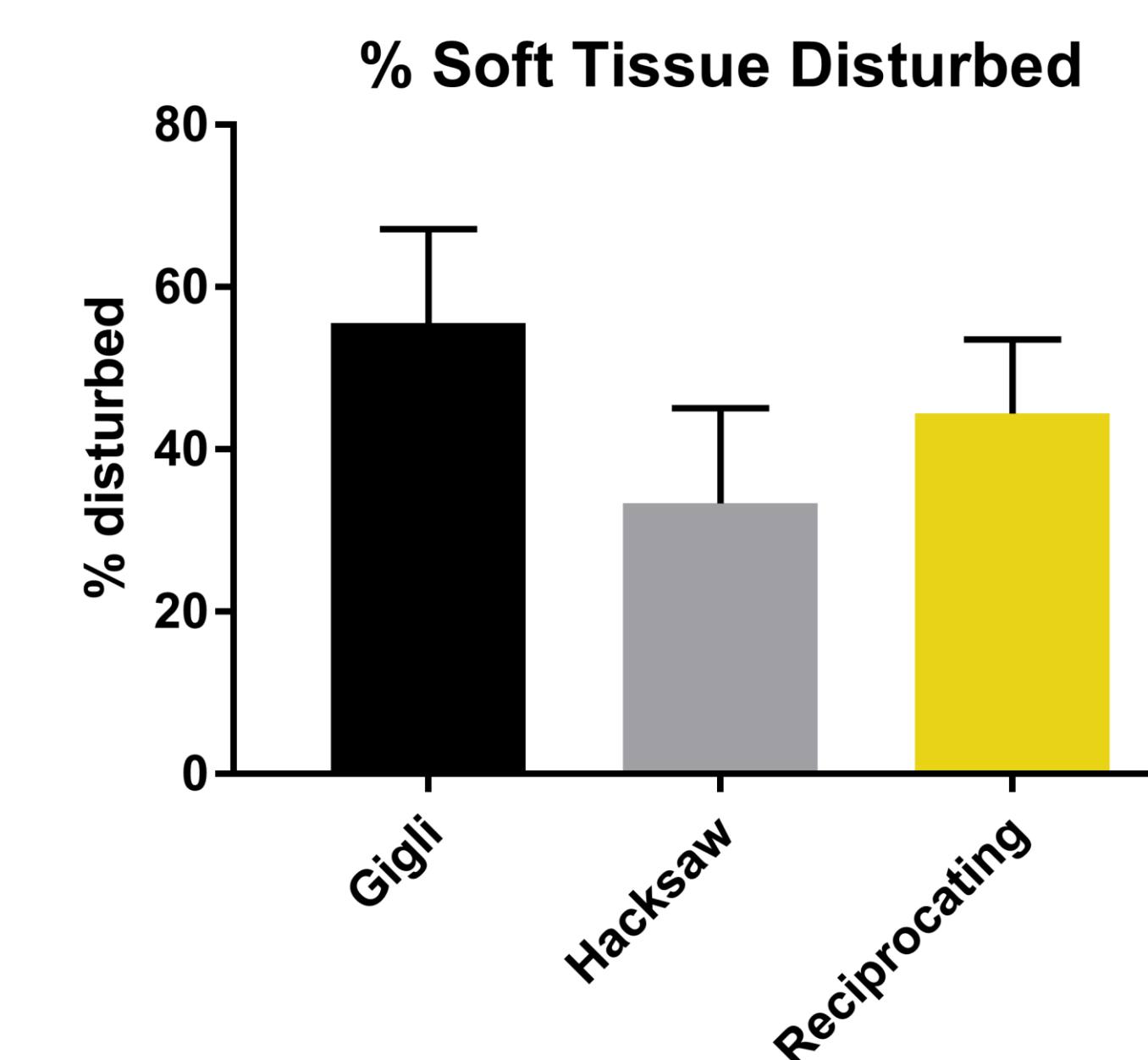


Figure 5. Soft tissues disturbance was subjectively graded based on precision of cut.

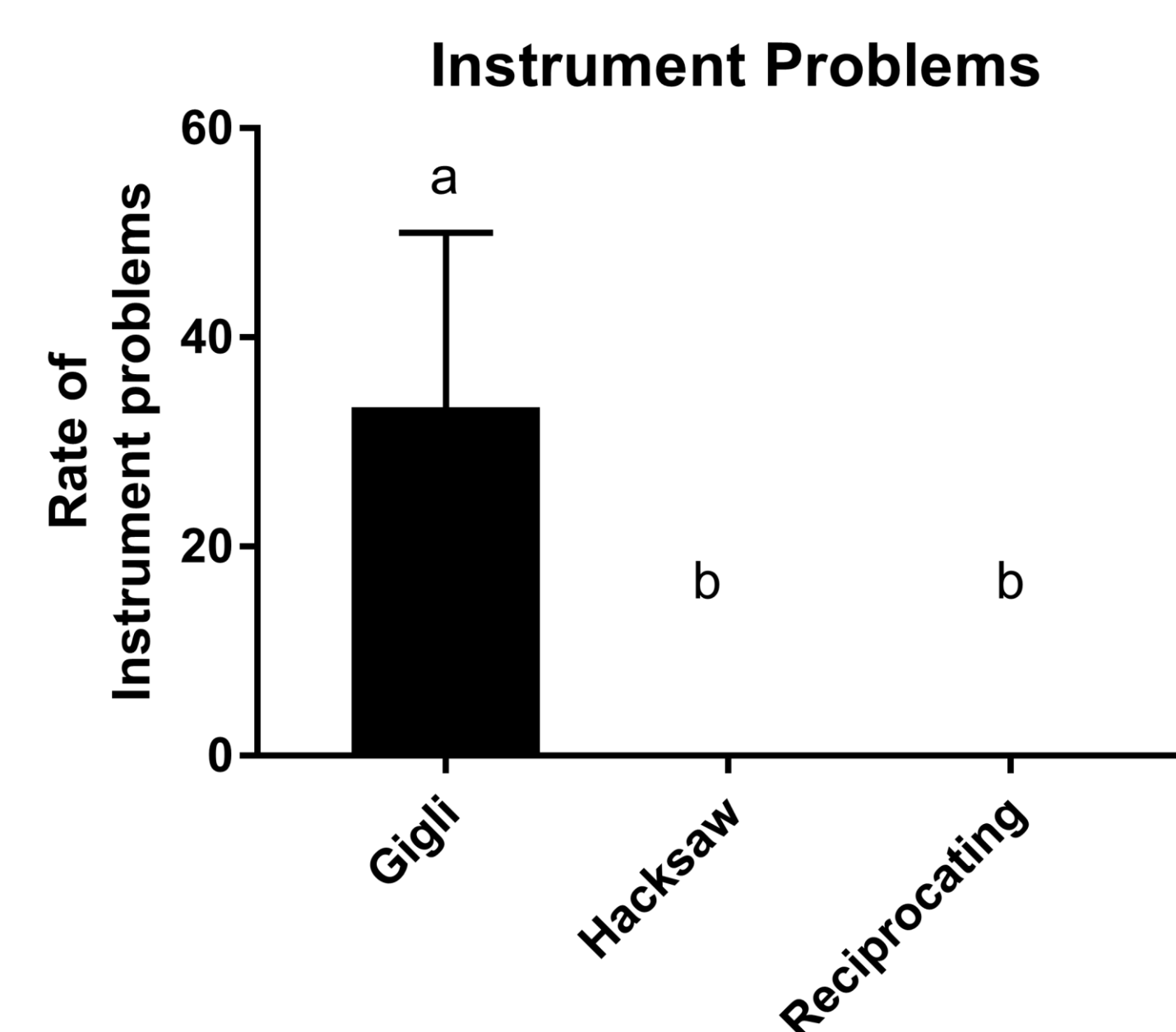


Figure 2. Instrument problems were defined as unexpected malfunctions. Gigli Saw Technique had an instrument problem on 3/9 trials.

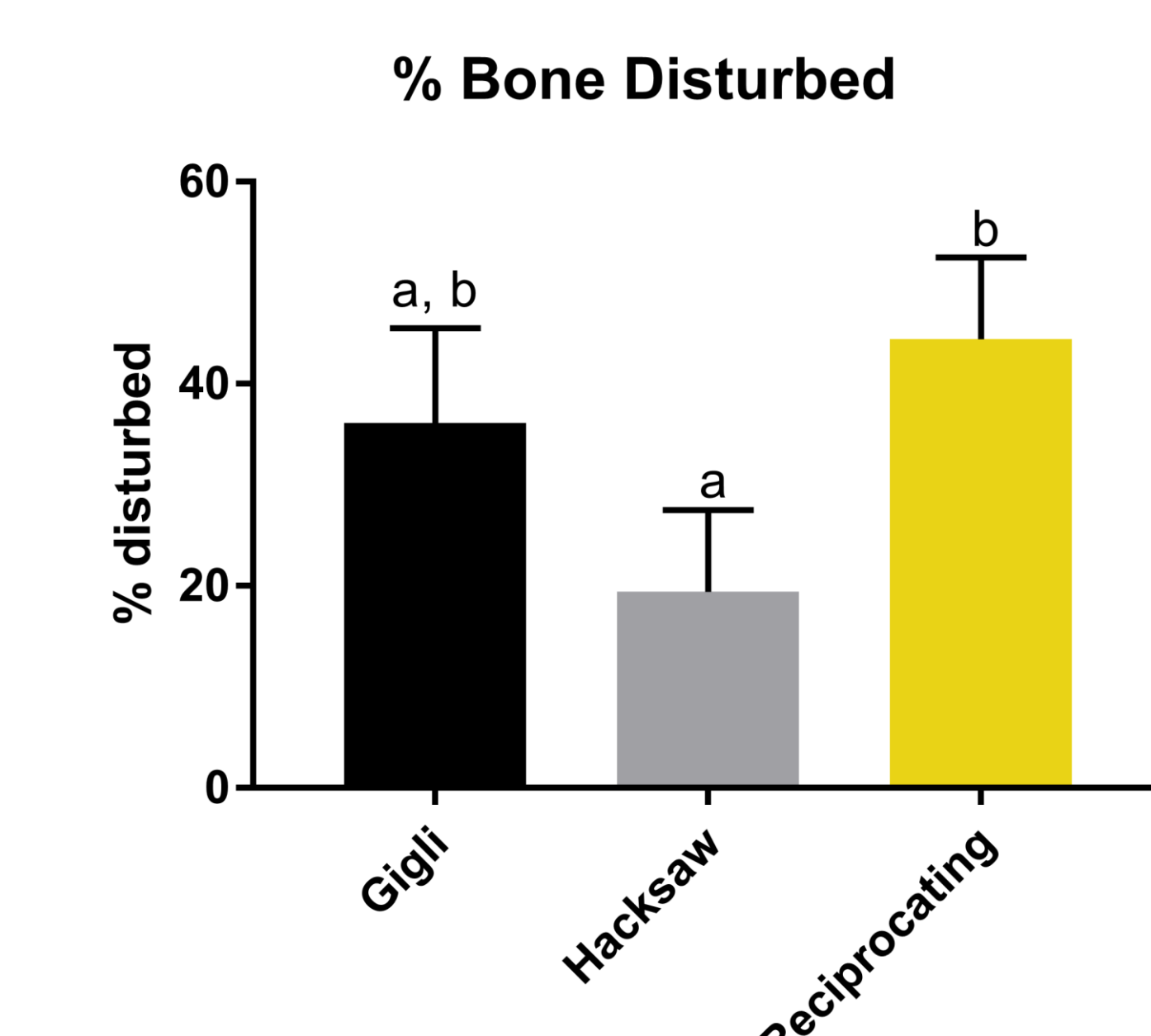


Figure 4. Bone disturbance was subjectively graded based on number of gross bone deformities.

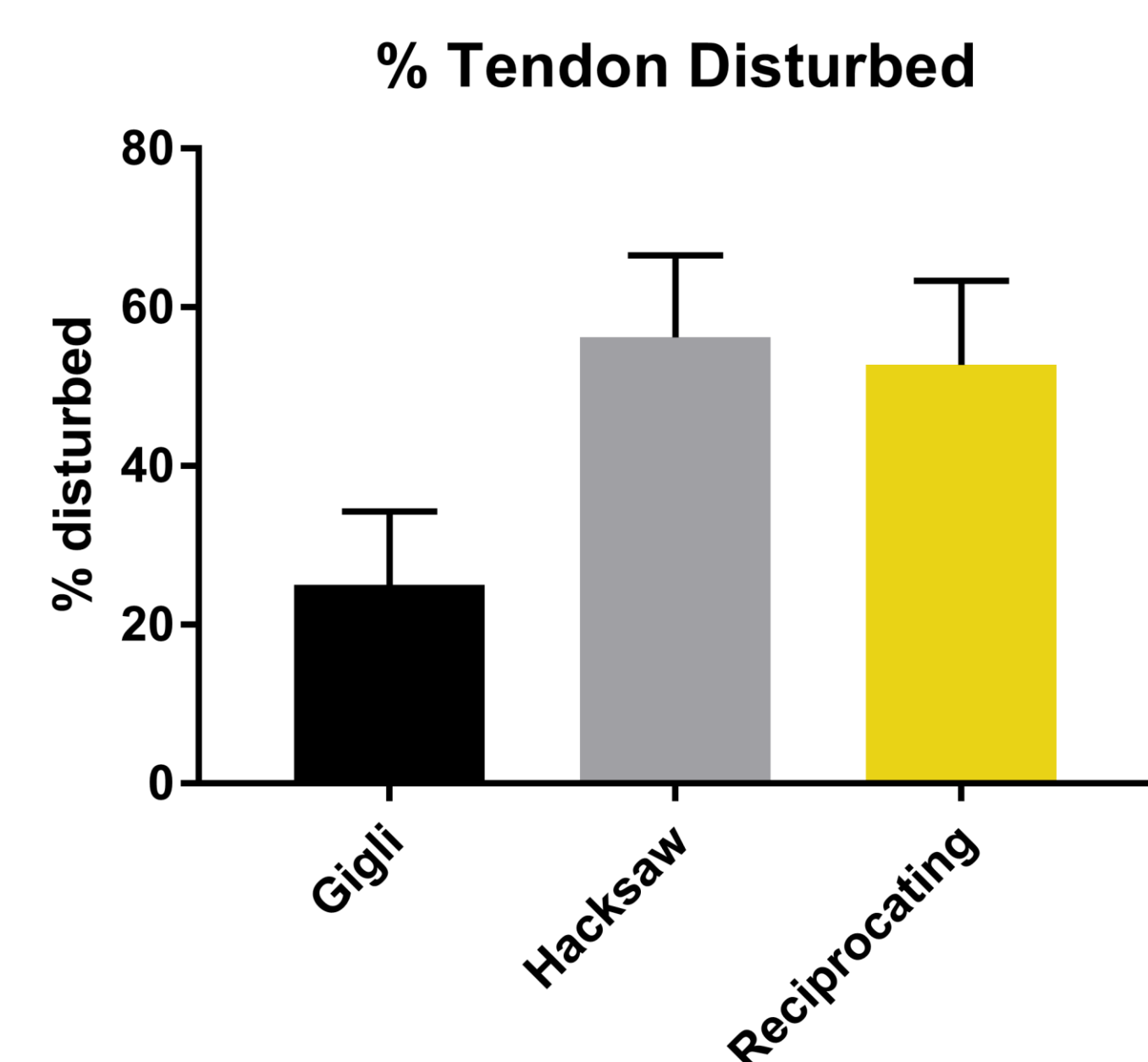


Figure 6. Tendon disturbance was subjectively graded based on precision of cut.



DISCUSSION

We propose the mnemonic 'OH CRAP' for prehospital amputation of an extremity. We believe this mnemonic will help prehospital providers remember the key steps of this procedure during a stressful and time-critical resuscitation.

- Optimize resuscitation
- Have equipment ready
- Contact medical control
- Remove patient's clothing
- Amputate
- Post-amputation care and transport

CONCLUSION

- Prehospital limb amputation is an option of last resort only to be implemented in critical situations.
- Amputation with a hacksaw or reciprocating saw may result in faster completion of the time-sensitive procedure with fewer instrument malfunctions.
- Lack of difference in skin, soft tissue, and tendon disturbance between techniques demonstrates there may be multiple viable instruments for prehospital amputation; however, further investigation is warranted.

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