WORKSHEET for Evidence-Based Review of Science for First Aid treatment of Harness suspension Trauma

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Clinical question.

For people suspended in a harness for a prolonged period awaiting rescue, what interventions are effective in the prevention of poor clinical outcomes (e.g. syncope).

Is this question addressing an intervention/therapy, prognosis or diagnosis? Intervention
State if this is a proposed new topic or revision of existing worksheet: Revision of ANZCOR GL 9.5.1

Conflict of interest specific to this question

Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet? No

Search strategy (including electronic databases searched).

The following search strategy was developed for a scoping review to update Guideline 9.1.5 (Harness suspension trauma – First aid management) for the EMBASE.com platform, which includes both the Medline and Embase bibliographic databases (Table 1). Search terms were developed that capture the following alternative names for harness suspension trauma:

- harness suspension trauma
- suspension trauma
- suspension syndrome
- harness hang syndrome
- suspension syncope
- suspension presyncope.

The population may also be described as

- orthostatic shock while suspended
- orthostatic intolerance (along with other terms).

The only EMTREE terms relevant to this population relate to syncope and presyncope, so the results from these terms and the orthostatic terms were refined by combining with key words such as hanging, suspension or harness.

When the results of these search strings were refined with limits for study subjects (not animals), publication types (conference abstracts and case reports etc were excluded), the number of results was sufficiently low to allow no further refinement. Therefore, no intervention search terms (first aid) were necessary. As no prior literature search was identified, it is not appropriate to limit this search by date.

The literature search strategy was run on 31 January 2020 and 126 records were identified:

Table 1

#	EMBASE.com 31 Jan 2020	Records
#1	(suspension NEAR/3 (trauma OR syndrome OR syncope OR presyncope OR 'pre syncope')):ti,ab	53
#2	(hang* NEAR/3 (trauma OR syndrome OR syncope OR presyncope OR 'pre syncope')):ti,ab	56
#3	(harness NEAR/3 (trauma OR syndrome OR syncope OR presyncope OR 'pre syncope')):ti,ab	11
#4	#1 OR #2 OR #3	113
#5	harness:ti,ab OR suspen*:ti,ab OR hang*:ti,ab	199,135
#6	(orthostatic NEXT/2 (intolerance OR shock)):ti,ab	1,749
#7	'presyncope'/de OR 'faintness'/de	44,708
#8	#5 AND (#6 OR #7)	148
#9	#4 OR #8	249
#10	#9 NOT (('animal'/exp OR 'nonhuman'/exp OR 'rodent'/exp OR 'animal experiment'/exp OR 'experimental animal'/exp OR rat:ti,ab OR rats:ti,ab OR mouse:ti,ab OR mice:ti,ab OR dog$:ti,ab OR pig$:ti,ab OR porcine:ti,ab OR swine:ti,ab OR chick$:ti,ab) NOT 'human'/exp)	223
#11	#10 NOT ([conference abstract]/lim OR [conference review]/lim OR [editorial]/lim OR [erratum]/lim OR [letter]/lim OR [note]/lim OR [book]/lim OR 'case report'/de)	**126**

The search developed in EMBASE.com was modified for the CINAHL database (Table 2), and 51 records were identified:

Table 2

#	CINAHL 31 Jan 2020	Records
S1	suspension N3 (trauma OR syndrome OR syncope OR presyncope OR 'pre syncope')	28
S2	hang* N3 (trauma OR syndrome OR syncope OR presyncope OR 'pre syncope')	15

S3	harness N3 (trauma OR syndrome OR syncope OR presyncope OR 'pre syncope')	4
S4	S1 OR S2 OR S3	41
S5	harness or suspen* or hang*	11,900
S6	orthostatic W2 (intolerance OR shock)	299
S7	(MH "Syncope+")	4,039
S8	S5 and (S6 or S7)	16
S9	S4 OR S8	**51**

The EMBASE.com search was adapted for the Cochrane Library, and 28 records were identified (Table 3). One was a Cochrane protocol but this was not relevant to the topic. With only 27 records identified in the Cochrane Controlled Register of Trials (CENTRAL), all trial records were downloaded for screening:

Table 3

#	Cochrane library 31 Jan 2020	Records
#1	suspension NEAR/3 (trauma OR syndrome OR syncope OR presyncope OR 'pre syncope')	19
#2	hang* NEAR/3 (trauma OR syndrome OR syncope OR presyncope OR 'pre syncope')	5
#3	harness NEAR/3 (trauma OR syndrome OR syncope OR presyncope OR 'pre syncope')	-
#4	#1 or #2 or #3	24
#5	harness or suspen* or hang*	11,104
#6	orthostatic NEXT/2 (intolerance OR shock)	178
#7	MeSH descriptor: [Syncope] explode all trees	412
#8	#5 and (#6 or #7)	6
#9	#4 or #8	28
	Cochrane protocols	1
	Trials	**27**

Hand searching identified a report by the UK Health and Safety Executive (Adisesh 2009), which was performed to provide the evidence base for the guideline on harness suspension and first aid management (Adisesh 2011). Being a report and not indexed in bibliographic databases, it was not identified in the literature searches.

- **State inclusion and exclusion criteria**

Inclusion:
Harness suspension and variations, syncope and variations, treatment, out of hospital, RCT, case series, observational studies, experimental studies

Exclusion:
Case reports, treatment more advanced than first aid

- **Number of articles/sources meeting criteria for further review:**

The scoping review search strategy yielded 202 papers. Twenty six of these were reviewed as full text papers and 12 found to be relevant to the guideline.

Articles identified in:

EMBASE.com (MEDLINE & EMBASE databases): n=7

CINAHL: n=3

Cochrane trials: n=1

Hand search: n=1

Summary of evidence

The scoping review search strategy below yielded 202 papers. Twenty six of these were reviewed as full text papers and 12 found to be relevant to the guideline.

Some papers make a distinction between conscious and moving vs unconscious suspension. Two papers mention providing footrest for person to "pump calf muscles on" or attempting to position person horizontal if unable to be released, but all papers discussing treatment advocate early release from harness if safe to do so.

The myth of not positioning the released person horizontal or supine immediately came from an hypothesis (eg Raynovich et al 2009) and was promulgated by industry members in opinion pieces and not tested. However, as early as 2009, Adisesh et al recommended horizontal position on release from harness.

These papers provide only indirect evidence for framing a guideline, the strongest from Rauch et al in 2019 in their study in healthy volunteers. Hence no systematic review or GRADE process was applied to this guideline

REVIEWER'S FINAL COMMENTS AND ASSESSMENT OF BENEFIT / RISK:

The great majority of papers included in this review recommend taking the person out of the harness and placing that person horizontal as soon as safe to do so.

Some papers make a distinction between conscious and moving vs unconscious suspension. Two papers mention providing footrest for person to "pump calf muscles on" or attempting to position person horizontal if unable to be released, but all papers discussing treatment advocate early release from harness if safe to do so.

The myth of not positioning the released person horizontal or supine immediately came from an hypothesis (noted by Raynovich et al 2009) and was promulgated by industry members in opinion pieces and not tested. However, as early as 2009, Adisesh et al recommended horizontal position on release from harness.

These papers provide only indirect evidence for framing a guideline, the strongest from Rauch et al in 2019 in their study in healthy volunteers. This paper gives convincing evidence of harm from continued suspension even in healthy conscious volunteers. Hence no systematic review of the literature or GRADE review of the evidence was used for this guideline.

Conclusion

TREATMENT RECOMMENDATION:
Remove from harness and place person horizontal as soon as safe to do so

Acknowledgements:

Citation List

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