

Setting the classification standards for Para-shooters with vision impairment

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Shooting for athletes with vision impairment

- VI shooting is not presently on the Paralympic programme
- Classification criteria:
 - Regular minimum impairment criteria ($VA \geq 1.0 \log\text{MAR}$ & $VF < 20$ deg radius)
 - Only one sport class



AIM 1: Establish the minimum
impairment criteria for VI shooting

Unadapted form



AIM 2: Establish the appropriate
number of classes for VI shooting

Adapted form



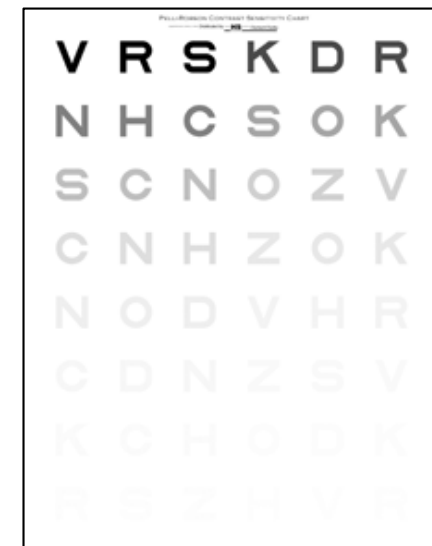
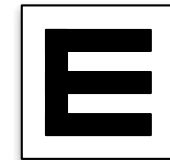
Study 1: Minimum Impairment Criteria Method

Participants: 27 elite able-sighted shooters

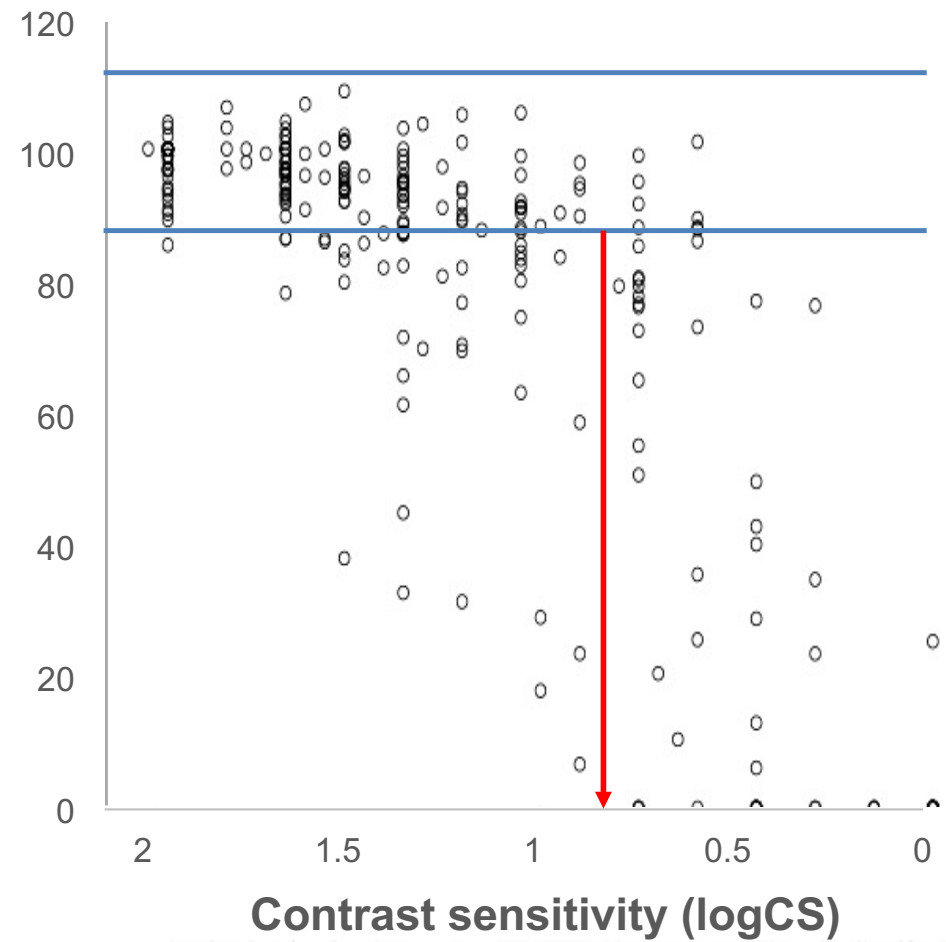
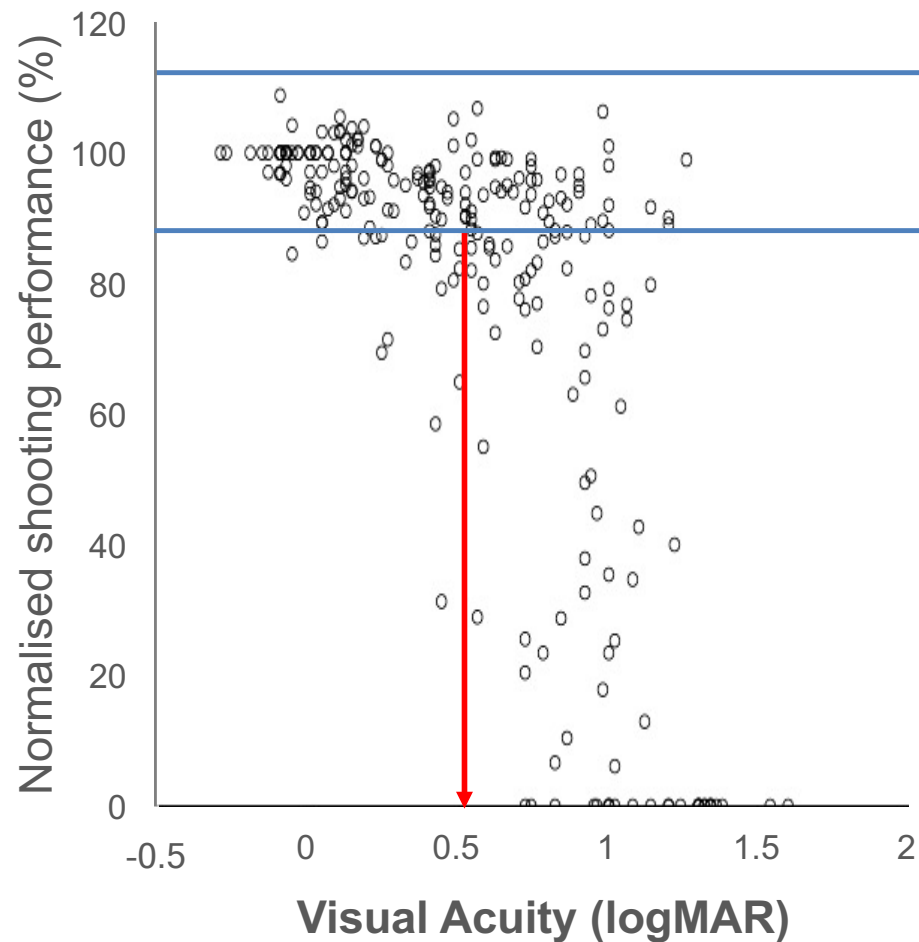
Procedure: Participants took part in regular 10m rifle shooting while wearing lenses that simulated:

- i. Loss of visual acuity and contrast sensitivity ('Simspecs')
- ii. Loss of visual acuity ('Blurring lenses')

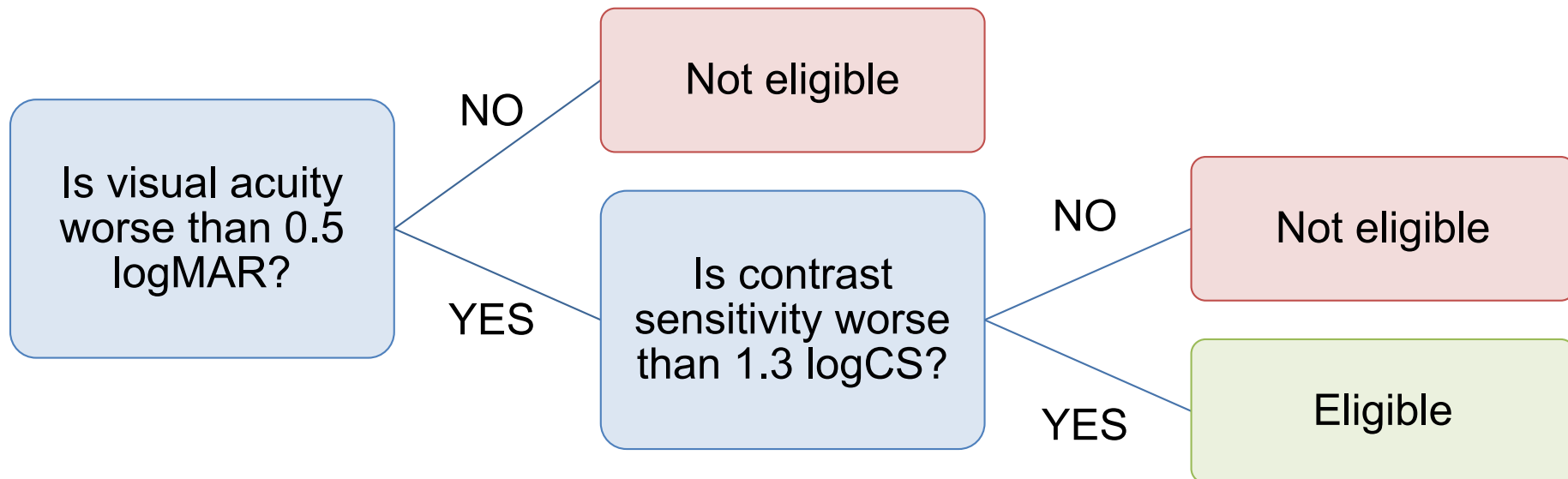
Analysis: Combination of *signal detection analysis*, *stepwise logistic regression*, and *decision-tree analysis (recursive binary splitting)*



Study 1: Minimum Impairment Criteria Results



Study 1: Minimum Impairment Criteria Results: Decision-tree analysis



Study 1: Minimum Impairment Criteria

Conclusions

- The current minimum impairment criteria ($VA \geq 1.0 \log\text{MAR}$) may not be inclusive enough
 - Less impairment is likely to decrease performance in the unadapted form of the sport
- Contrast sensitivity should be considered as part of the minimum impairment criteria
- The minimum impairment criterion for the visual field is still to be resolved

AIM 1: Establish the minimum
impairment criteria for VI shooting

Unadapted form



AIM 2: Establish the appropriate
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Adapted form



Study 2: Sport class(es)

Method

Participants: 10 international-level shooters with vision impairment

Procedure: Assess vision and performance (qualifying score) during competition.

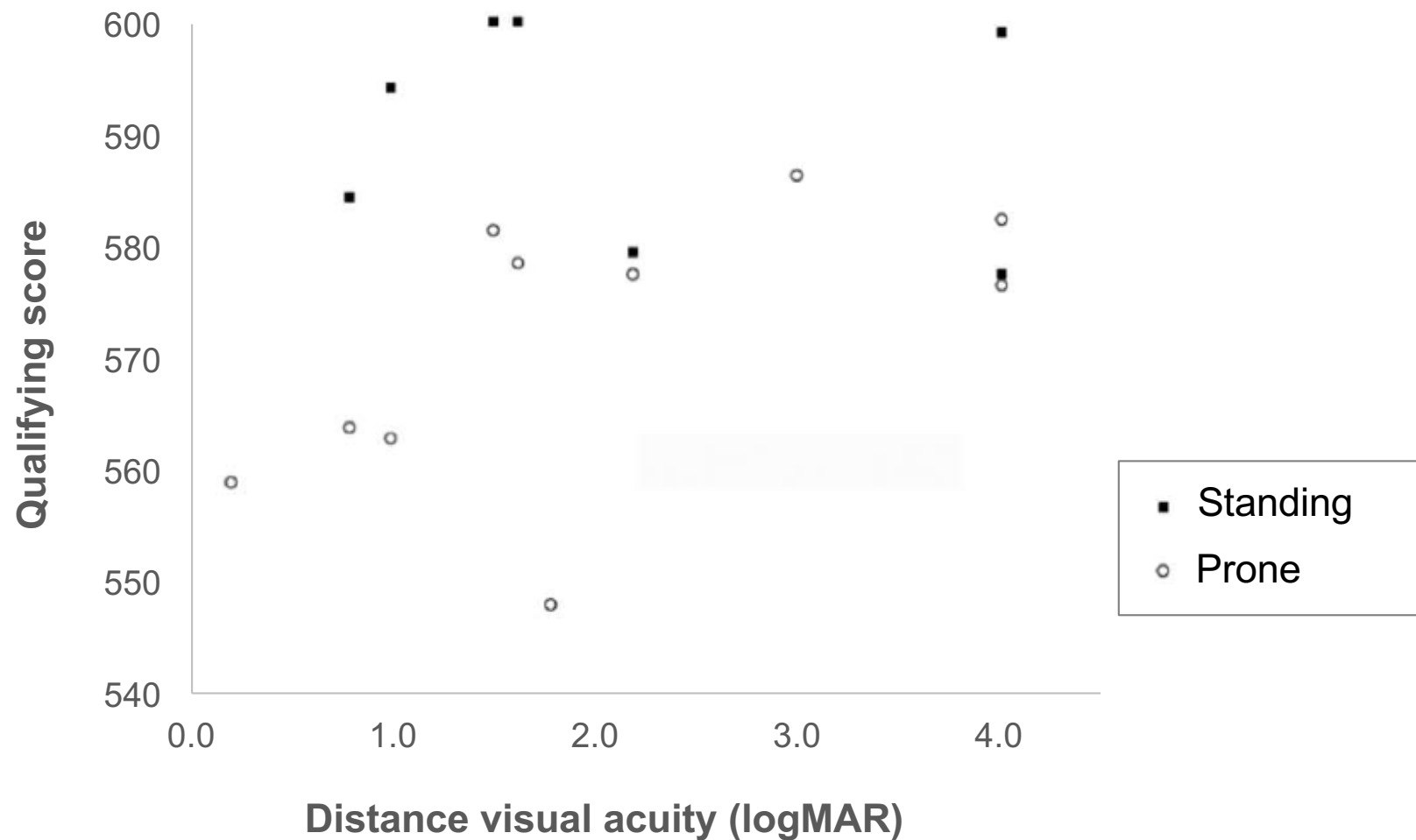
Vision measures:

1. Distance visual acuity
2. Near visual acuity
3. Contrast sensitivity
4. Visual field

Analysis: Non-parametric testing: Kendal τ correlations and Wilcoxon signed-rank test



Study 2: Sport class(es) Results



Study 1: Sport class(es)

Conclusions

- There doesn't appear to be a need for separate sport classes in VI shooting
 - Athletes with some remaining vision do not appear to have an advantage over those with no functional vision
 - Auditory guidance appears to compensate for vision loss
- Limitation of low athlete numbers



General conclusions

- Evidence suggests that shooting should have:
 - A more inclusive MIC that allows for VA and CS
 - Only one sport class
- Work to do to resolve:
 - The exact minimum inclusion criteria
 - Criteria for the visual field

ACKNOWLEDGEMENTS



Classification Research Partner



International Paralympic Committee

This project is supported by a Classification Research Grant awarded by the International Paralympic Committee.

supported by



Agitos Foundation

This project is supported by an Agitos Research Grant awarded by the Agitos Foundation.

Allen, P.M., Latham, K., Mann, D.L., Ravensbergen, H.J.C., Myint, J. (2016). The level of vision necessary for optimal performance in rifle shooting: setting the standards for Paralympic shooting with vision impairment. *Frontiers in Psychology*, 7: 1731,

Myint, J., Latham, K., Mann, D.L., Gomersall, P., Wilkins, A.J., Allen, P.M. (2016). The relationship between visual function and performance in rifle shooting for athletes with vision impairment. *BMJ Open Sport & Exercise Medicine*, 2(1), e000080.