Taming the Dragon: Determinants influencing injury occurrence and finishing of a 315 km multi-stage mountain ultramarathon.

Tom Hepburn & Katie Walker-Small

Introduction

Despite the rise in multi-stage mountain ultramarathons (MMUM), research investigating race preparation and training methods employed, in conjunction with injury rates and race outcome remain scarce. In the wider field of long-distance running, lines of investigation have examined common running injuries (Lopes et al, 2012), predictors of lower limb injuries (Hootman et al, 2002), and lifetime injury occurrence among runners (Hespanhol Junior, Pena Costa and Lopes, 2013). Still, there remains few prospective observational studies aimed at providing guidance on preparation for injury prevention and successful race completion for future multiday, ultra-distance mountain runners.

Methodology

A non-experimental design framework was used to examine pre-race training preparation, injury occurrence and completion rates of N=99 mountain runners attempting the 2019 Dragon's Back Race®. Medical and completion data collected by race staff during the event were analysed together with answers provided prior to race start through survey questionnaire submissions. Analysis of data investigated for differences between groups (medical attention seekers (MA) / non-medical attention seekers (NMA), and completers (C) / non-completers (NC).

Results

Medical assistance / No medical assistance: Running mileage (P=0.012, Cohen's *d*=0.51) and hours spent training (P=0.006, Cohen's d=0.57; Figure 1) in the 5 weeks prior to race start were lower in runners seeking medical assistance during the event. Neither frequency of resistance, balance, nor plyometric training in the 5 weeks prior to race start were significantly different between either groups. (tables 1 and 2).

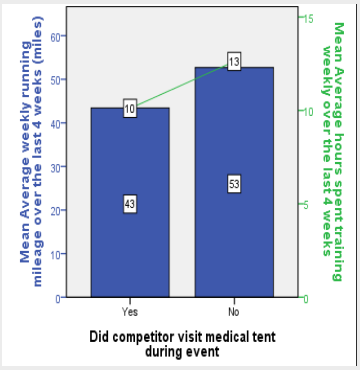

Figure 1: Average weekly running mileages and hours spent training during the 5 weeks prior to race start (MA, NMA).

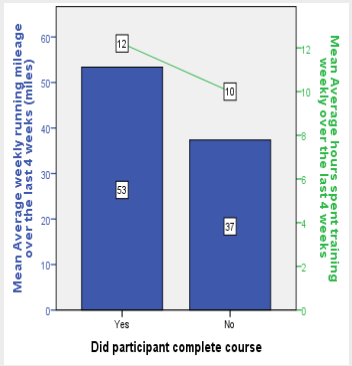

Figure 2: Average weekly running mileages and hours spent training during the 5 weeks prior to race start (C, NC).

Completers / Non completers: Running mileage (P=0.001, Cohen's *d*=0.98) and hours spent training (P=0.037, Cohen's d=0.50; Figure 2) in the 5 weeks prior to race start were significantly higher in runners who completed the full course.

Table 1: Mean differences of ancillary training methods used prior to race start between groups of completers and non-completers.

Variable (avg. frequency)	Mean rank		*U*	*P* value (Asymp. Sig. (2-tailed))
	C[a] (*n*=71)	NC[b] (*n*=28)		
Resistance training	46.84	58.02	769.500	0.057
Balance training	50.03	49.93	992.000	0.986
Plyometric training	47.80	55.59	837.500	0.125

[a] Completers: participants that completed the race.
[b] Non-completers: participants that did not complete the full race.

Table 2: Mean differences of ancillary training methods used prior to race start between those seeking medical attention and those not.

Variable (avg. frequency)	Mean rank		*U*	*P* value (Asymp. Sig. (2-tailed))
	MA[a] (*n*=41)	NMA[b] (*n*=58)		
Resistance training	48.77	50.87	1138.500	0.696
Balance training	49.78	50.16	1180.000	0.944
Plyometric training	48.45	51.09	1125.500	0.559

[a] Medical assistance sought
[b] No medical assistance sought

Summary & Conclusion

Findings from the present study suggest that in order for successful completion of, and prevention of injury during a MMUM, future runners should begin their training programme allowing for sufficient gradual increases in training hours and running mileage, to ensure stimulation of protective adaptations specific to technical mountain running. Furthermore, these results caution against the assumption that resistance, balance and plyometric training for injury prevention, although advocated in experimental studies, can maintain real-world application.

References

Hespanhol Junior, L.C., Pena Costa, L.O., Lopes, A.D. (2013) 'Previous injuries and some training characteristics predict running-related injuries in recreational runners: a prospective cohort study', Journal of Physiotherapy, 59(4), pp. 263-269. Lopes, A.D., Hespanhol Júnior, L.C., Yeung, S.S., Costa, L.O. (2012) 'What are the main running-related musculoskeletal injuries? A Systematic Review', Sports Medicine, 42(10), pp. 891-905. Hootman, J.M., Macera, C.A., Ainsworth, B.E., Martin, M., Addy, C.L., Blair, S.N. (2002) 'Predictors of lower extremity injury among recreationally active adults', Clinical Journal of Sports Medicine, 12(2), pp. 99-106.