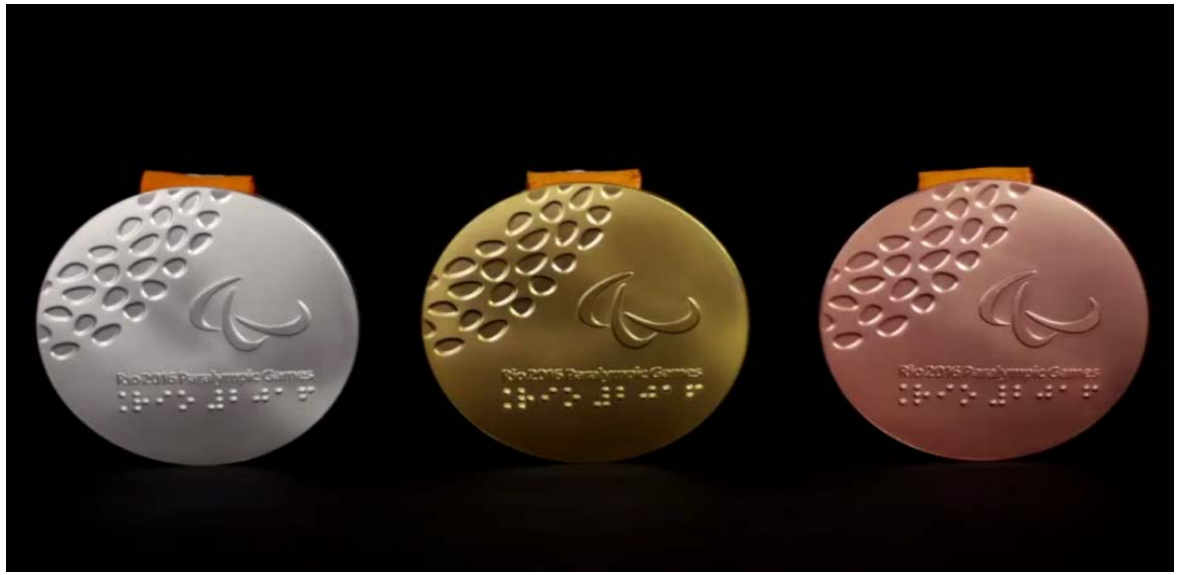
Why are athletes bringing injuries into the Games?

The risk profiles associated with the high pre-competition period injury rate at the Rio 2016 Paralympic Games: a multivariate analysis of 51,198 athlete days



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Injury & illness surveillance in Para athletes

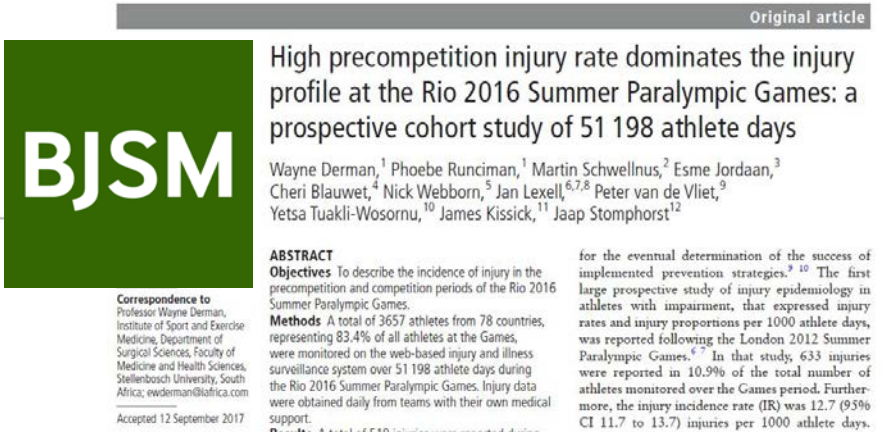
Longitudinal injury surveillance at Paralympic Games

- Pioneer studies conducted prior to 2012 in Winter Games – methodology limitations
- Introduction of the IPC Injury and Illness (I&I) surveillance in the Para athlete population
- London 2012 – Tokyo 2020

Web-based Injury and Illness Surveillance System (WEB-IISS)

- Designed for teams with own medical support
- Information provided by athlete masterlist: age, sex, sport, classification, impairment
- Information obtained through survey: injury chronicity, mechanisms, contributing factors, stage of Games, protective gear, symptoms, anatomical area, severity, time loss, special investigations, final diagnosis
- Inclusion – team physician
- Exposure data – team size x days participating
- IRB: University of Brighton (FREGS/ES/12/11); Stellenbosch University (N16/05/067)

Rio 2016 Summer Paralympic Games



3657 athletes

22 sports

160 countries

Rio2016 JOGOS PARALÍMPICOS

3-DAY pre competition period

11-DAY competition period

Exposure data:
51,198 athlete days

Overall IR

10.0 / 1000ad (95% CI 9.1 – 10.9)

510 injuries – 441 athletes

12.6% of athletes monitored

Pre-competition period IR

12.9 / 1000ad (95% CI 10.9 to 15.2) *

141 injuries – 411 athletes

3.7% of athletes monitored

* P < 0.05 significantly different from **Competition Period**

Sub-analysis

Poisson regression modelling

Derman et al, 2017 (BJSM)

UNIVERSITEIT STELLENBOSCH UNIVERSITY

Sex	Chronicity	Total number of athletes at games	Total number of athlete days	Total number of injuries	Total number of athletes with an injury	Injury incidence rate: number of injuries/1000 athlete days (95% CI)	P value (p < 0.05)
Pre-competition period							
Female	Acute traumatic/ acute on chronic	1389	4167	44	44	10,4 (3.9 – 7.6)	0.0001
	Overuse	1389	4167	30	28	7,2 (4.9 – 10.5)	0.002
Male	Acute traumatic/ acute on chronic	2268	6804	38	37	5,4 (3.9 – 7.6)	
	Overuse	2268	6804	29	28	4,3 (2.9 – 6.2)	0.01
Competition period							
Female	Acute traumatic/ acute on chronic	1389	15279	80	74	5,2 (4.1 – 6.5)	
	Overuse	1389	15279	54	53	3,4 (2.9 – 6.2)	
Male	Acute traumatic/ acute on chronic	2268	24948	172	154	6,6 (5.6 – 7.9)	
	Overuse	2268	24948	63	61	2.4 (1.8 – 3.1)	

Age group of the athlete	Chronicity of the injury	Total number of athletes at games	Total number of athlete days	Total number of injuries	Total number of athletes with an injury	Injury incidence rate: number of injuries/1000 athlete days (95% CI)	P value ($p < 0.05$)
Pre-competition period							
Age 12 - 25	Acute traumatic/ acute on chronic	996	2988	19	19	6,2 (4.0 – 9.8)	
	overuse	996	2988	17	14	5,7 (3.3 – 9.8)	0.02
Age 26 - 34	Acute traumatic/ acute on chronic	1320	3960	30	30	8,0 (5.6 – 11.3)	
	overuse	1320	3960	30	19	5,0 (3.2 – 7.9)	0.003
Age 35 - 75	Acute traumatic/ acute on chronic	1341	4023	33	32	8,5 (6.0 – 12.1)	0.03
	overuse	1341	4023	23	23	6,0 (4.0 – 8.9)	
Competition period							
Age 12 - 25	Acute traumatic/ acute on chronic	996	10956	55	51	4,9 (3.7 – 6.5)	
	overuse	996	10956	29	27	2,7 (1.8 – 3.9)	
Age 26 - 34	Acute traumatic/ acute on chronic	1320	14520	113	99	7,4 (6.0 – 9.2)	
	overuse	1320	14520	19	30	2,1 (1.5 – 3.1)	
Age 35 - 75	Acute traumatic/ acute on chronic	1341	14751	84	78	5,5 (4.3 – 6.9)	
	overuse	1341	14751	58	57	4,1 (3,1 – 5,3)	

Pre-competition vs. Competition period injuries

Sex of the athlete

Female athletes

Acute traumatic (IR 10.4 (95% CI 3.9 – 7.6)*

Chronic overuse (IR 7.2 (95% CI 4.9 – 10.5)*

Male athletes

Chronic overuse (IR 4.3 (95% CI 2.9 – 6.2)*

* P < 0.05 significantly different from **Competition Period**

Age of the athlete

Aged 12 – 24 years

Chronic overuse (IR 5.7 (95% CI 3.3 – 9.8)*

Aged 25 – 34 years

Chronic overuse (IR 5.0 (95% CI 3.2 – 7.9)*

Aged 35 – 75 years

Acute traumatic (IR 8.5 (95% CI 6.0 – 12.1)*

Discussion

High pre-competition injury rate

- 267 slots – Russian NPC
- 267 athletes given slots – 23 Aug – 7 Sept 2016
- Late preparation and higher chronic injury symptomology (flare-ups)

Chronic injuries brought into the Games setting

- A significantly higher chronic overuse IR in both male and female athletes – requires attention
- Women more at risk for chronic overuse injury
- Older athletes at risk for chronic injury
- Possible effect of stress going into the Games?

Consistent with previous literature

- Stress dysregulation more common in females
- Aging females more at risk due to rapid decline of gonadal hormones & higher allostatic load

Bale & Epperson, 2015, PMC; Cauter et al, 1996, JCEM

Conclusions

Pre-competition period IR in Para athletes

- It is vital to manage Para athletes going into the Games setting
- Consider including women & older athletes into risk assessments & mmt strategies
- Management of chronic injuries in this population requires attention

- These findings will be investigated again at the Tokyo 2020 Paralympics

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