

Taisuke KINUGASA, PhD  
Japan Sport Council

Ryuji HIRAMATSU, PhD  
The University of Tokyo

# Race Performance Trajectories of Tandem Para-cyclists

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# Why Race Performance Analysis Matters?

Understanding competitive performance is paramount of identifying Paralympic pathways

Variability of competitive performance has been studied mostly in Olympic sports (Malcata and Hopkins, 2014)

Paralympic swimmers (Fulton et al, 2009): within-swimmer CV was ~2.2% in 100 FR

Knowledge of this variability is important for sports scientists when conducting race analysis and physiology testing etc and provide appropriate feedback to coaches and athletes

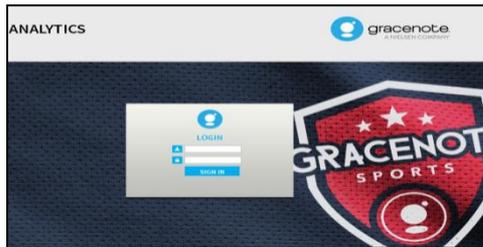
Understanding performance progressions to Paralympic podiums is needed for setting clearer development milestones towards achieving success at the Paralympic pathway

Estimates of the progression and variability required for a Paralympic cyclist to increase his chances of the podium finish at the Paralympic Games have not been well established

**Aim:** To estimate race performance trajectories of Tandem Paracyclists by comparing with that of sighted cyclists at the World Championship track cycling event to establish the developmental benchmarks

**Subjects:** The Men's 1-km track cyclists with Visual Impairment, VI (N=80, aged  $34.8 \pm 9.9$  yrs) and the medalists (N=18, aged  $32.0 \pm 7.5$  yrs) over 6 Paralympic Games (1996-2016)

**Data collection:** Total of 96 race times using Gracenote (previously known as Infostrada), IPC Historical Results Archive, and Richard Sports Services



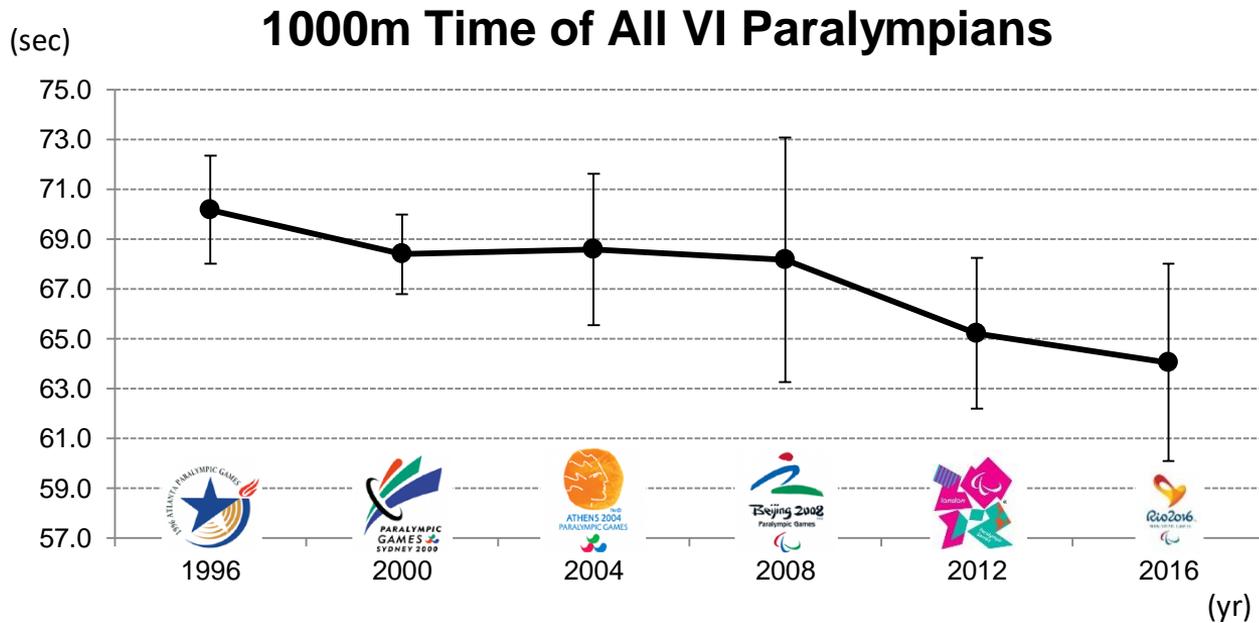
[www.paralympic.org/sdms4/hira/web](http://www.paralympic.org/sdms4/hira/web)



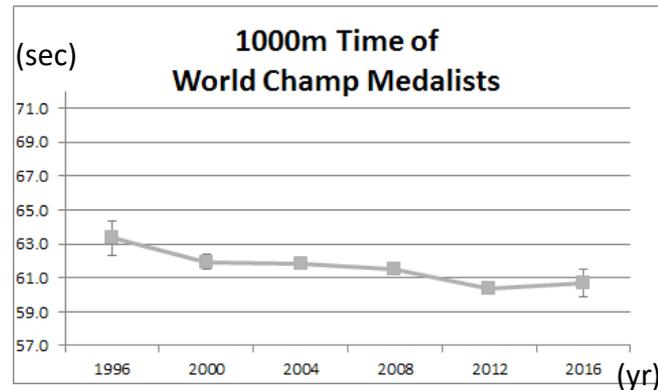
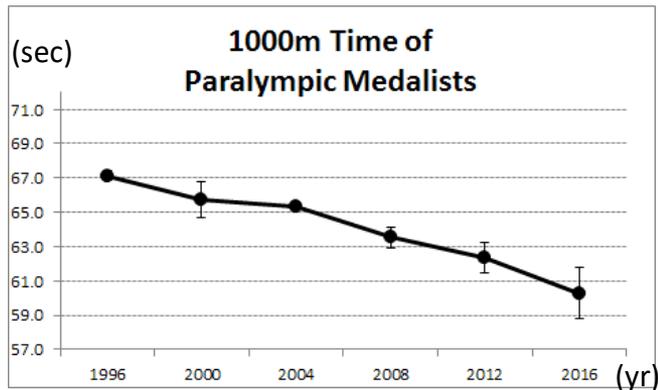
[www.rsstiming.com](http://www.rsstiming.com)

**Benchmarking sighted cyclists:** UCI Track World Championships medalists' data (N=13, aged  $25.6 \pm 4.2$  yrs) on 1996, 2000, 2004, 2008, 2012, and 2016 (total of 18 records)

**Statistical analysis:** The race times were log-transformed and the progression was expressed as % changes in mean performance. The variability was expressed as the coefficient of variation (CV) in between competitions. Uncertainty in mean differences was expressed as 90 % confidence limits (CL).



The results of the Tandem Para-cyclists showed that the 4-yr progression was 1.9% (90% CL 1.2 to 4.5%) and the between competition CV was 0.8% (90% CL 0.5 to 1.8%)



## Paralympic medalists (N=18)

## World Champ medalists (N=13)

**Progression**  
**(% change/4-yr)**

2.2%  
(90% CL 1.4 to 5.3%)

0.9%  
(90% CL 0.6 to 2.1%)

**CV (%/4-yr)**

0.8%  
(90% CL 0.5 to 1.8%)

0.8%  
(90% CL 0.5 to 2.0%)

Men's 1-km Tandem Para-cycling race performance in a 4-yr Paralympic cycle is 2.4 times greater progression (% change) than that of sighted cyclists and the between competition variability (CV) was similar

Tandem Para-cyclists who want to substantially increase their medal potentials should aim for an improvement of at least 0.4% per year