

Time Motion Characteristics and Physiological Responses of Para-Footballers with Cerebral Palsy in Two Small Sided Games



Henríquez M. ^{1, 2}, Iturricastillo A. ³, and Reina R. ⁴

¹ National Rehabilitation Centre Pedro Aguirre Cerda, Santiago, Chile, ² Chilean Paralympic Committee, Santiago, Chile

³ Physical Education and Sport Department, Faculty of Education and Sport, University of the Basque Country, UPV/EHU, Vitoria-Gasteiz, Spain

⁴ Department of Sport Sciences, Miguel Hernández University, Elche, Spain



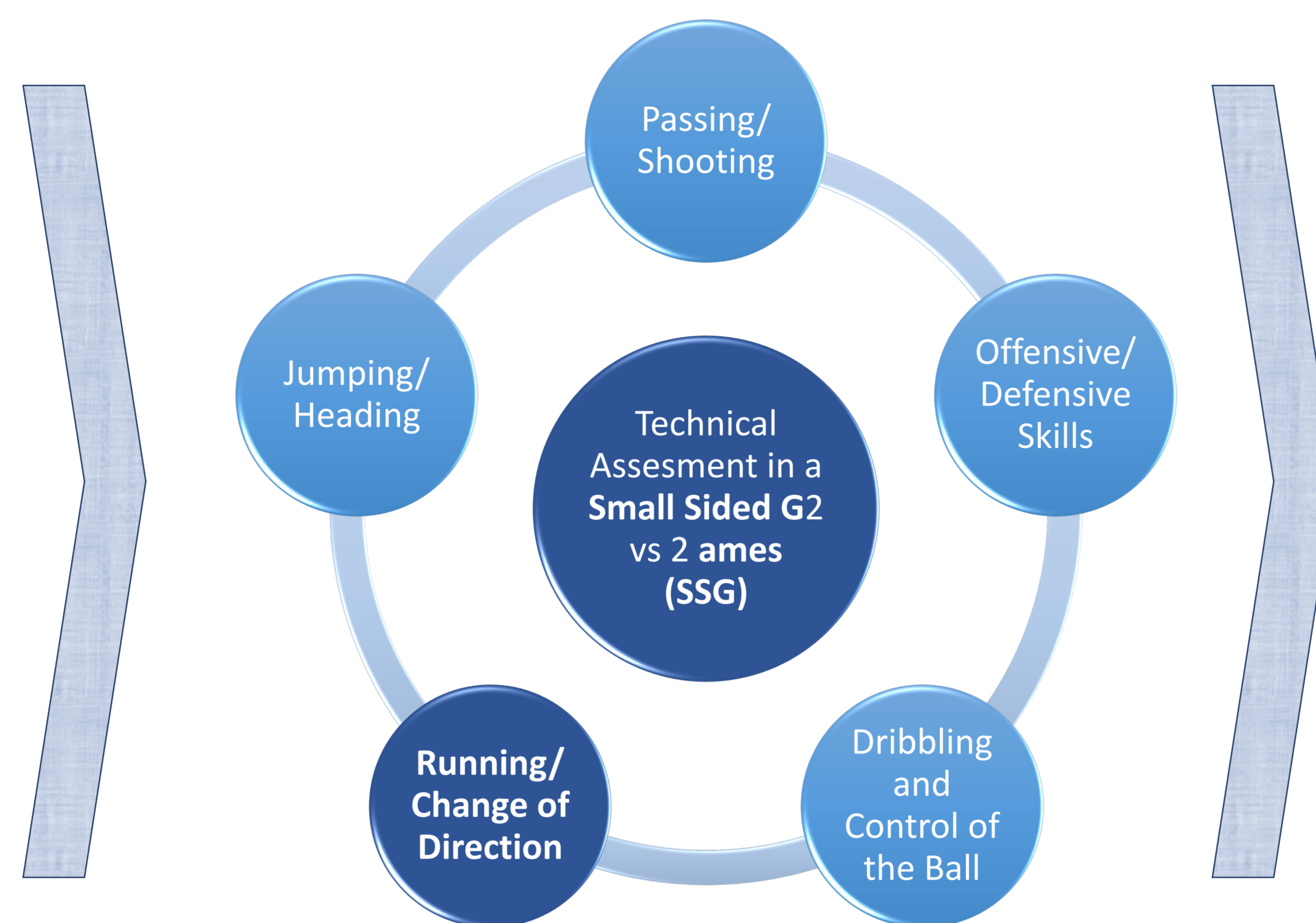
INTRODUCTION

IFCPF CLASSIFICATION CODE



- Spastic Hypertonia
- Athetosis & Dystonia
- Ataxia

- Eligible Impairment
- Minimum Impairment Criteria
- Technical Assessment**
- Class Allocation for Competition
- Observation in Competition
- Class Status Allocation



- The physical demands in CP-football players (CPFP) during official matches has been described (Yanci et al., 2019).
- Actually, a 2 vs 2 SSG is part of the classification process as part of the technical assessment (IFCPF, 2018), but the comparison of the performance of eligible CPFP in different SSG formats and matches is unknown.
- The aim of this study is to compare the physical performance during two formats of 2-a-side (SSG-2) and 4-a-side (SSG-4) SSGs with regard to the performance in a simulated match (SM).

METHODS

PARTICIPANTS

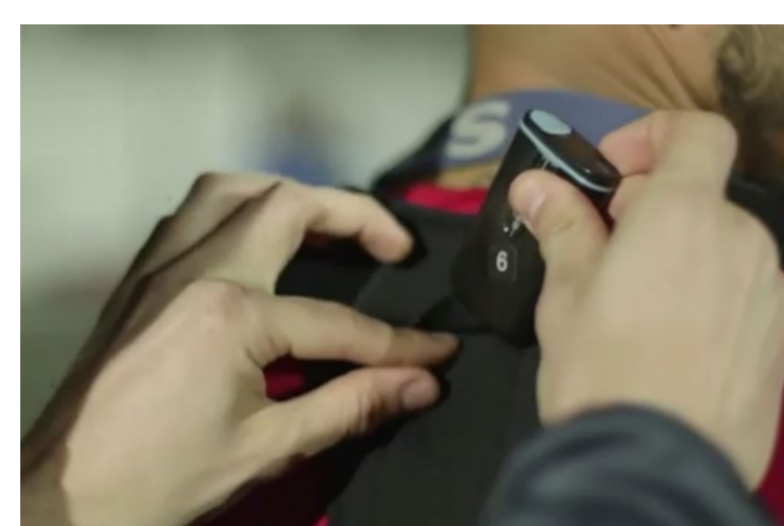
14 International CPFP



Age: 26 ± 5.5 yr
Weight: 64.6 ± 9.9 kg
Height: 170.7 ± 5.6 cm

GPS VARIABLES

- Total distance (m.min⁻¹) (TD)
- Maximum speed reached (Velmax)
- Distance at different intensities (m.min⁻¹)
- Short-term actions (number.min⁻¹)
- Sprint count (number.min⁻¹)
- Player load (PL)
- Metabolic power (MP)



SSG and SM

Table 1. Protocol followed and characteristics of the different SSG and the SM in bout duration, number of bouts, duration recovery, pitch area and pitch ratio per player.

Activity	Duration (min)	Number of bouts	Duration recovery between SSG (min)	Pitch area (m)	Pitch total area (m ²)	Pitch ratio per player (m ²)
2 vs. 2	2	6	2	12 x 24	288	1:72
4 vs. 4	4	6	2	36 x 24	864	1:108
SM	30	1	0	70 x 50	3500	1:292

SSG = small-sided games; SM = simulated game

Statistical Analysis

- Kolmogorov-Smirnov normality test
- Repeated-measurements ANOVA with a Bonferroni's post-hoc test
- Cohen's effect sizes (ES): trivial <0.2; small 0.2-0.5; moderate 0.5-0.8; large >0.8.
- $p < 0.05$

RESULTS

Table 2. External load of football players with cerebral palsy according to different training tasks.

GPS VARIABLES	SSG2	SSG4	SM	ES (SSG2 vs. SSG4)	ES (SSG2 vs. SM)	ES (SSG4 vs. SM)
TD (m.min⁻¹)	109.79 ± 11.13	105.47 ± 13.08	99.43 ± 9.48	0.35	0.97	0.51
Vel_{max} (km.h⁻¹)	20.01 ± 1.43	21.27 ± 2.17	22.59 ± 1.87	-0.67	-1.51	-0.63
Distance at different intensities (m.min⁻¹)						
Z1 (< 6.9 km.h⁻¹)	14.30 ± 2.67	15.08 ± 2.65	14.70 ± 1.90	-0.28	-0.17	0.16
Z2 (7.0 - 9.9 km.h⁻¹)	49.73 ± 6.36	48.71 ± 6.76	41.56 ± 4.84	0.15	1.40*	1.18†
Z3 (10.0 - 12.9 km.h⁻¹)	35.58 ± 7.49	30.84 ± 9.25	30.41 ± 8.33	0.55	0.63	0.05
Z4 (13.0 - 15.9 km.h⁻¹)	8.73 ± 3.91	8.72 ± 3.88	9.64 ± 3.01	0.00	-0.25	-0.26
Z5 (16.0 - 17.9 km.h⁻¹)	1.36 ± 0.99	1.82 ± 1.27	2.47 ± 1.37	-0.39	-0.90*	-0.48
Z6 (> 18.0 km.h⁻¹)	0.09 ± 0.21	0.30 ± 0.51	0.64 ± 0.55	-0.52	-1.28*	-0.62
Short-term actions (number.min⁻¹)						
High Acc (2.0/3.0 m.s⁻²)	0.03 ± 0.05	0.02 ± 0.03	0.01 ± 0.02	0.24	0.51	0.38
Mod Acc (1.0/2.0 m.s⁻²)	0.93 ± 0.58	0.55 ± 0.31	0.34 ± 0.15	0.79*	1.35*	0.84
Mod Dec (-2.0/-1.0 m.s⁻²)	0.79 ± 0.40	0.47 ± 0.18	0.32 ± 0.15	1.00*	1.51*	0.88
High Dec (-3.0/-2.0 m.s⁻²)	0.13 ± 0.14	0.07 ± 0.09	0.07 ± 0.06	0.50	0.54	0.00
Sprint count (number.min⁻¹)	0.13 ± 0.12	0.19 ± 0.14	0.24 ± 0.14	-0.45	-0.82	-0.35
PL (AU.min⁻¹)	3.43 ± 1.31	2.79 ± 1.04	32.47 ± 1.36	0.53	-21.12*	-23.80†
MP (watt.min⁻¹)	0.85 ± 0.10	0.39 ± 0.05	0.26 ± 0.03	5.65*	7.76*	3.06†

SD = standard deviation, SSG2 = 2 vs 2 small sided game, SSG4 = 4 vs 4 small sided game, SM = simulated game ES = effect size, Acc = acceleration, Dec = deceleration, AU = arbitrary units. Significant difference compared to SSG2 (* P < 0.05), Significant difference compared to SSG4 († P < 0.05).

CONCLUSIONS

- The external load in CPFP is different for the SSG2, SSG4 and SM due to the different pitch ratio per player.
- From a classification perspective, it could be difficult to replicate the real competition demands according to the differences presented in the execution of the tasks, being a challenge for classification in Paralympic team sports.
- However, it seems that the SSG-2 is the one that can best discriminate high-intensity elements, a determinant factor for the comparison between sport classes in CPFP during their technical assessment.

REFERENCES

- IFCPF. (2018). *Classification Rules and Regulations*. International Federation of CP Football, (January), 1–113.
- Yanci, J., Castillo, D., Iturricastillo, A., & Reina, R. (2019). Evaluation of the official match external load in soccer players with cerebral palsy. *Journal of Strength and Conditioning Research*, 33(3), 866–873.