Analysis of Table Tennis Specific Tests for Players with Intellectual Disabilities

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Acknowledgements

Background

- Athletes with an intellectual disability (ID) in athletics, swimming and table tennis were included at the 2012 Paralympic Games .

- Sport-specific classification systems for ID should be developed and applied to maintain fairness and prevent misrepresentation in classification.

- Table tennis classification system for ID has been developed in 2010 and fully applied in 2011 after several modifications.

Successful Competition in London

- 12 table tennis players (6 males and 6 females) with ID competed in 2012 London Paralympic Games
- Fair and successful competition

3S Principles in TT

- Spin
  - Top spin, side spin, back spin
  - With different kinds of rubbers
- Speed
  - Fast, moderate, slow speed
- Spot
  - Short, long, middle
  - Right hand, backhand, to the body

3C Principles in TT

- **Control**
  - Balls and opponents
- **Consistency**
  - Maintain the right skills and movements
  - Maintain the balls on the table
- **Change**
  - Use different skills and 3S to make good points and beat opponents because of changes in the playing style

Combinations in competitive TT

- 3S and 3C principles
- Table tennis skills
- Tactics in TT (set up strategies to win over opponents)

Theoretical Framework 1

- Elite ID players should demonstrate the weakness in table tennis skills and strategies
  - Weakness in table tennis may include loss of 3C (consistency, control, change) & 3S (speed, spin, spot).
  - Weak skills of table tennis including service, return service, forehand and backhand skills, and combination.
  - Using table tennis skills and 3C and 3S principles make the 4S (strategy) to win over opponents.
  - IQ lower than 75 affects motor and table tennis skills and strategies during playing TT games

Theoretical Framework 2

- "Elite ID players" do not demonstrate weakness in table tennis skills and strategies
  - Should compete in able-bodied TT

  And therefore
  - Should not be eligible for ID players in TT

Current classification stages in TT for ID players

- General eligibility criteria for ID (register with INAS)
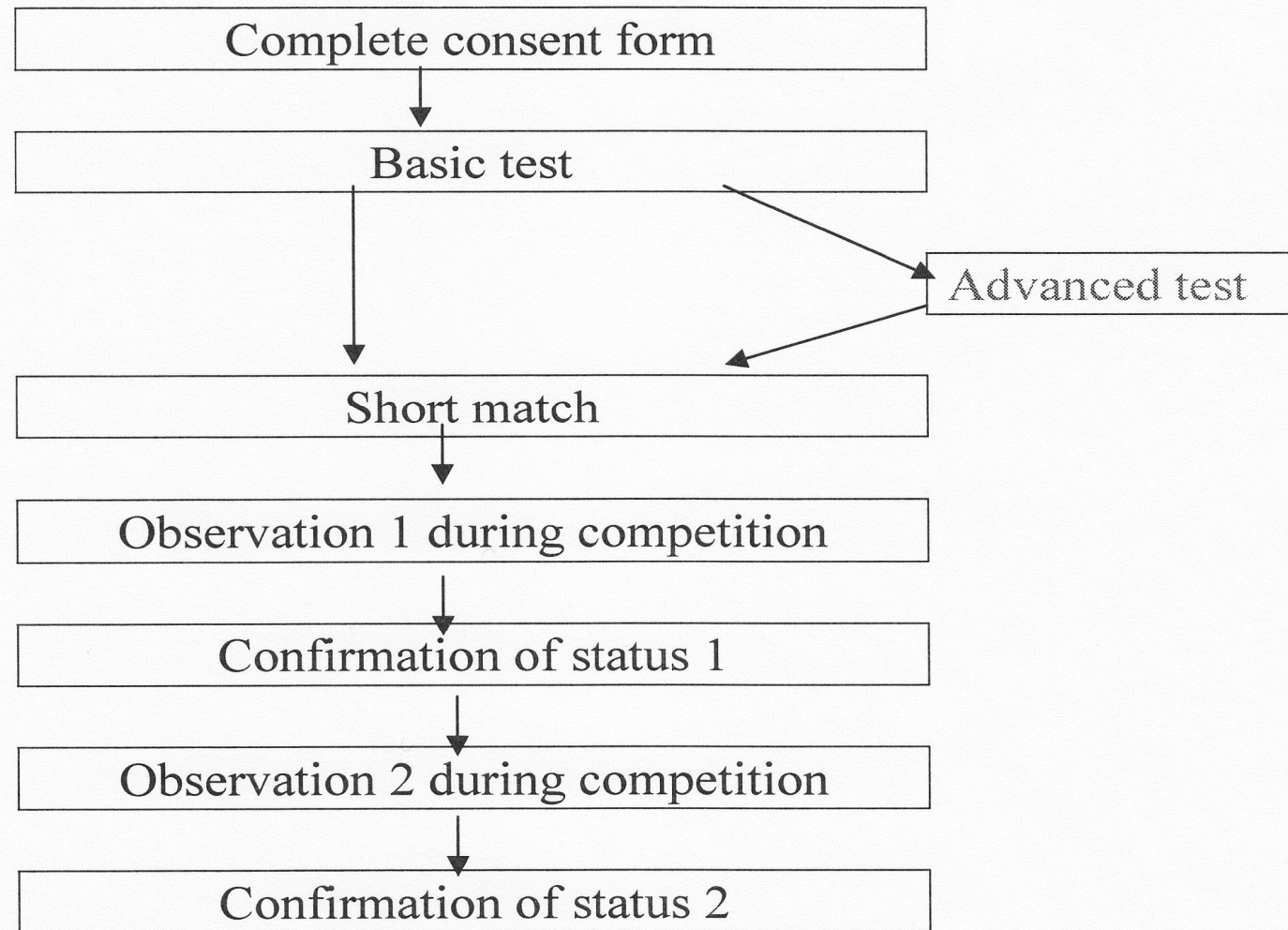- Computer test (generic sport intelligence)

Current classification stages in TT for ID players

- Table tennis specific test
  - <u>Basic TT tests</u>
  - Short match
  - Advanced tests if necessary
  - Observation during competition

Table Tennis Specific Test for ID

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Purpose of the presentation

- To analyze the outcomes of the TT-specific test for elite players with ID

Methods

- 87 international players with ID (56 males and 31 females) were classified using the table tennis specific classification system between Oct 2010 to March 2012

- Data from table tennis specific test (service, return service, basic skills and control)

- Total points in each part:
  - 36 points in service test (6 testing items)
  - 36 points in return service (6 testing items)
  - 36 points in basic skills and control (12 testing items)

Statistical analysis

- Independent t-test to compare male and female players in basic test
- Independent t-test to compare high score (top 27%) and low score (low 27%) players in basic test
- Pearson correlation among training and testing variables
- Use the cut-off point for classifying players with ID or borderline ID

	Males (N=56)	Females (N=31)
Training years	12.5 ± 7.5	10.5 ± 6.8
Training hours per week	10.8 ± 7.2	9.8 ± 6.3
Service score	23.5 ± 6.1	23.4 ± 5.9
Return score	25.6 ± 5.3	23.2 ± 6.4
Basic skills and control score *	26.1 ± 6.9	21.3 ± 8.6
Total testing score *	74.2 ± 16.0	66.7 ± 18.2

	High Group (N=23)	Low Group (N=23)
Training years **	15.7 $\pm$ 7.9	7.9 $\pm$ 7.1
Training hours per week	12.0 $\pm$ 7.4	10.1 $\pm$ 8.0
Service score ***	28.5 $\pm$ 3.4	17.5 $\pm$ 6.2
Return score ***	30.2 $\pm$ 2.8	19.2 $\pm$ 5.4
Basic skills and control score ***	31.9 $\pm$ 3.3	16.5 $\pm$ 7.3
Total testing score ***	90.6 $\pm$ 4.9	48.8 $\pm$ 11.8

Correlation among several training variables and testing results

	Age	Training Years	Training Hours	Service Score	Return Score	S & R Score	Basic Test Score
Training Years	**.60*****						
Training Hours	-.20	-.05					
Service Score	.02	**.23***	.14				
Return Score	.14	**.38****	.13	**.46****			
S & R Score	.09	**.36****	.16	**.86*****	**.85*****	.	
Basic Test Score	-.11	.18	**.36****	**.51****	**.48****	**.58*****	
Total Score	.08	**.35****	.16	**.75*****	**.68*****	**.84*****	**.75*****

Main cut-off points in two components of table tennis tests for borderline players

	Maximal Scores	Cut-Off Scores
Service & Return Service	72	$\geqq 60$
Basic Skills and Control	**12 items are good (i.e. 36 points)**	**$\geqq 8$ items are good & $\geqq 3$ items are reasonable (i.e. $\geqq 30$ points)**
Total Score	**108**	**$\geqq 90$**

Summary for male and female players after the basic tests

		Male (N=56)	Female (N=31)	Total (N=87)
Need advanced test	Yes	13 (23.2%)	1 (3.2%)	**14 (16.1%)**
	No	43 (76.8%)	30 (92.2%)	**73 (83.9%)**
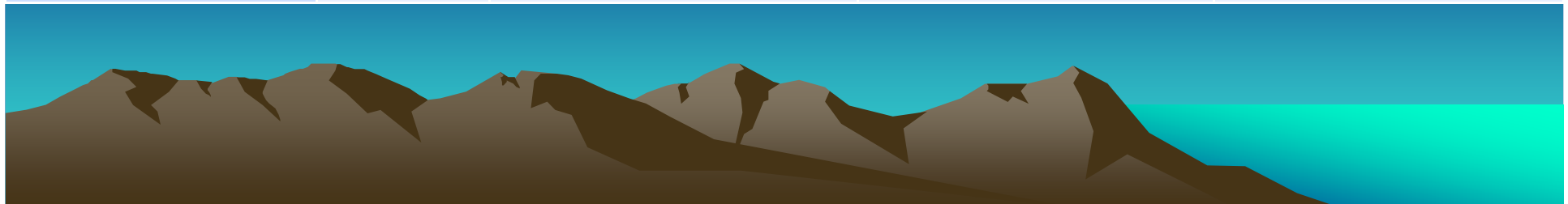
Summary for male and female players after the whole tests

		Male (N=56)	Female (N=31)	Total (N=87)
Borderline	No	49 (87.5%)	30 (96.8%)	79 (90.8%)
	Yes	7 (12.5%)	1 (3.2%)	**8 (9.2%)**
Eligibility	Yes	55 (98.2%)	30 (96.8%)	85 (97.7%)
	No	1 (1.8%)	1 (3.2%)	**2 (2.7%)**

Discussion

- The basic tests can be used to identify most ID players (73 out of 87) who do not need to attend further advanced tests, even without completing the computer test.

- Table tennis is an open-loop and interactive sport. Clearly, we can see standard ID players show weakness in 3S and 3C and table tennis skills in the basic test.

Discussion

- 14 players (about 15%) need to attend the advanced test, short match and further observation to identify whether they are eligible.

- 8 players (about 10%) are in borderline after the full process.

- 2 players who need full information, a lot of observations during competition, and reclassification by the second classification panel to confirm their ineligibility.

Discussion

- Currently, it takes up to 40 minutes to complete the computer test and up to 30 minutes for most players to complete the basic tests in the TT specific tests

- Each standard ID player may need about 70 minutes to finish **one** classification

- For borderline or non-ID players, it may even take about 90 minutes or longer for one classification

- The classification process may be too long and too complicated for players with ID

Discussion

- Generally, most players with ID may only need computer test or basic table tennis test to confirm their eligibility. Thus, we suggest that shorter classification process for standard players with ID should be considered.

- To further investigate the results of computer tests and the table tennis specific tests for borderline players

Conclusion

- The developing process of the table tennis classification system for ID is a challenging task, but the current classification outcomes are quite successful.

- Through the analysis of 87 players, generally, the TT specific test is valid.

- TT specific classification system for ID is appropriate to identify most players with ID

Way forward

- Work still needs to be done to develop the stable and optimal TT-specific classification system for ID, including a scientific evaluation.
- May need to shorten the complicated classification processes, particularly for clear standard ID players
- Need to longitudinally monitor the classification system, particularly follow-up assessment for borderline players
- For other sports to develop sport-specific classification systems for ID athletes

Thanks- People work together to make fair competition