



INTERNATIONAL FEDERATION OF  
**CP FOOTBALL**

# Present and Future of Classification in CP-Football

**Dr. Raúl Reina**

Miguel Hernández University





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# Raúl Reina, PhD

**UNIVERSITAS**

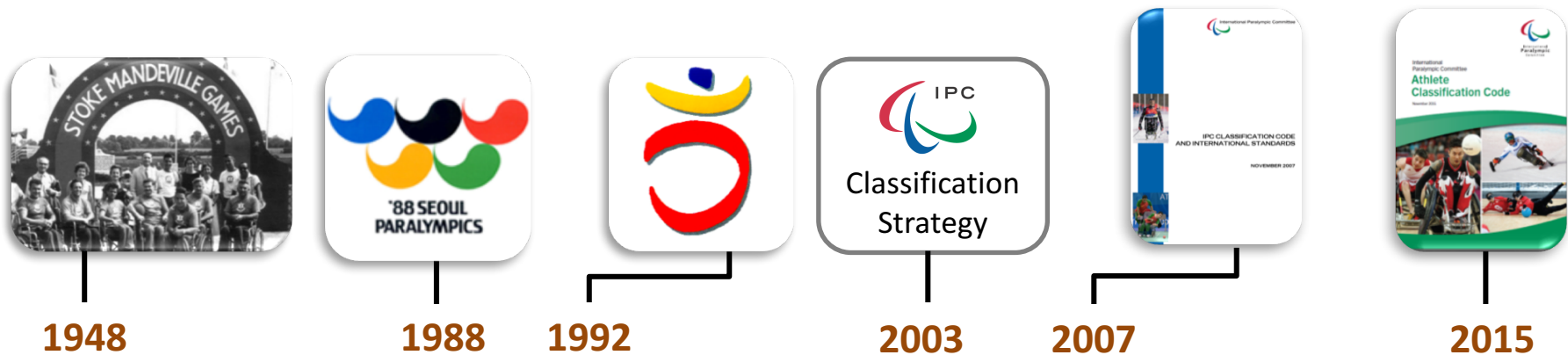


*Miguel Hernández*



- Sport Sciences background
- European Master in APA
- Professor in Adapted Physical Activity and Adapted Sports
  - Sport Sciences Degree
  - Occupational Therapy
  - Masters Programs
- HoC since September 2013





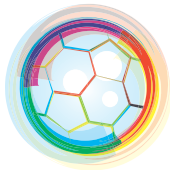
**Medical-Based Classification System**

**Functional Classification Systems**

**Evidence-Based and Sport-Specific Systems**



Adaptado de Hart (2014)  
IPC (2015c)  
Tweedy y Vanlandewijck (2011)



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**sochi.ru**  
**2014**  
paralympic games



**centro de investigación del deporte**  
*Universidad Miguel Hernández de Elche*



ATHLETICS



SWIMMING



POWERLIFTING



SHOOTING



ALPINE SKI / SNOWBOARDING



NORDIC SKI



ICE-SLEDGE HOCKEY



BIATLON

## International Organizations of Sports for Disabled



FOOTBALL-5

GOALBALL

JUDO





# International Federations



PARA-CYCLING



WHEELCHAIR CURLING



PARA-EQUESTRIAN



PARA-ROWING



WHEELCHAIR TENNIS



PARA-ARCHERY



PARA-TRIATHLON



PARA-CANOE



PARA-TABLE TENNIS



SAILING



BOCCIA



WHEELCHAIR RUGBY



WHEELCHAIR BASKETBALL



SITTING VOLLEYBALL



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# Scientific Background

Review

International Paralympic Committee position stand—background and scientific principles of classification in Paralympic sport

S M Tweedy,<sup>1</sup> Y C Vanlandewijck<sup>2</sup>

**Paralympic Sports Medicine and Science**

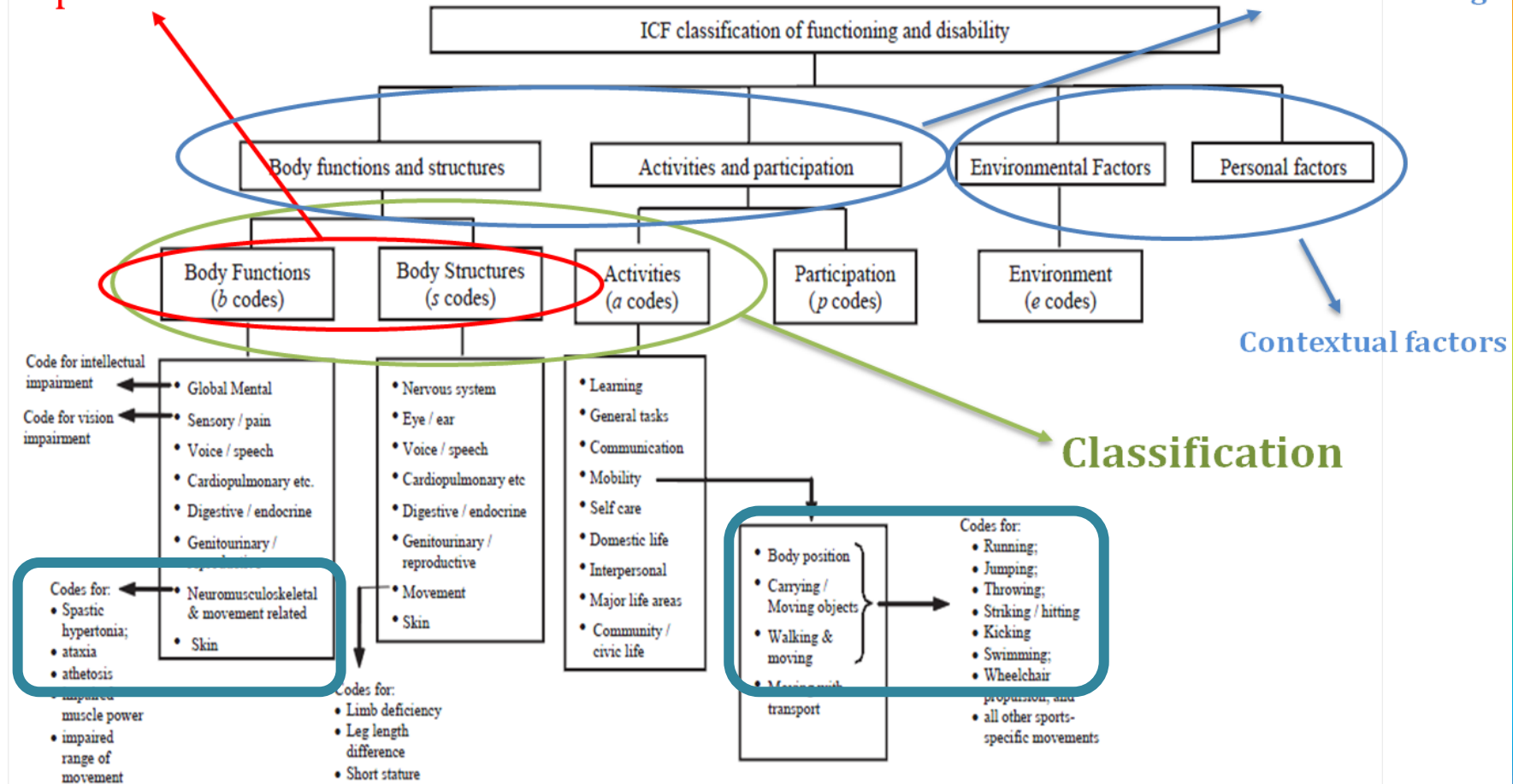
**MOC<sup>2</sup>**

**Paralympic Classification: Conceptual Basis, Current Methods, and Research Update**

Sean M. Tweedy, PhD, Emma M. Beckman, PhD, Mark J. Connick, PhD

Impairment

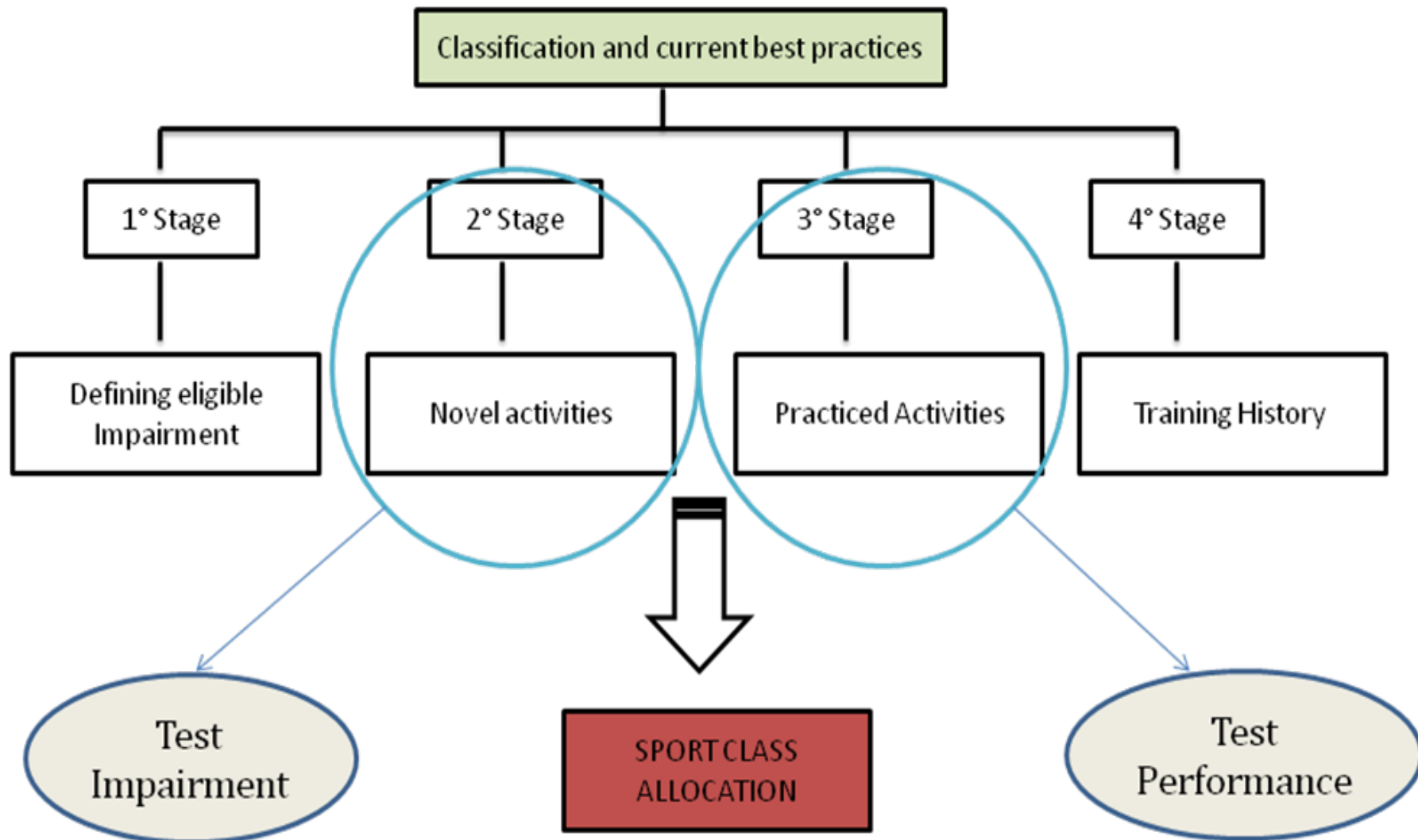
Functioning



**Table 3.1 – Eligible Impairment Types:** In order to compete in disability athletics, a person must be affected by at least one of the impairments listed in first column of this table.

Working descriptor	Examples of health conditions likely to cause such impairments	Impairment as described in the ICF*	Relevant ICF Impairment Codes
Hypertonia (e.g., Hemiplegia, Diplegia / Quadriplegia, Monoplegia)	<u>cerebral palsy</u> , stroke, acquired brain injury, multiple sclerosis	High muscle tone <i>Inclusions:</i> hypertonia / high muscle tone <i>Exclusions:</i> low muscle tone	b735
Ataxia	Ataxia resulting from <u>cerebral palsy</u> , brain injury, Friedreich's ataxia, multiple sclerosis, spinocerebellar ataxia	Control of voluntary movement <i>Inclusions:</i> Ataxia only <i>Exclusions:</i> problems of control of voluntary movement that do not fit description of Ataxia	b760
Athetosis	chorea, athetosis e.g., from <u>cerebral palsy</u>	Involuntary contractions of muscles <i>Inclusions:</i> athetosis, chorea <i>Exclusions:</i> Sleep related movement disorders	b7650
Limb deficiency	Amputation resulting from trauma or congenital limb deficiency (dysmelia).	Total or partial absence of the bones or joints of the shoulder region, upper extremities, pelvic region or lower extremities.	s720, s730, s740, s750 <i>Note:</i> These codes would have the extension .81 or 0.82 to indicate total or partial absence of the structure respectively.









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International  
Paralympic Committee

## **Athlete Classification Code**

November 2015



# International Standards (App. 1st January 2018)

-  Eligible Impairments
-  Athlete Evaluation
-  Classifiers Training and Certification
-  Protest and Appeals
-  Data Protection

# About the Code

- 🌐 IPC vs European Surveillance Terminology
- 🌐 Development of a Code of Conduct
- 🌐 Medical Reports
- 🌐 Intentional Misrepresentation:
  - Coordination testing
  - Small Game Situations in Technical Assessment
  - Training Observation
- 🌐 Evidence based classification – Classification Research
- 🌐 Communications with IPC
- 🌐 Glossary

## MIC:

- MAS 2 in 1 muscle of lower limb  
OR
- MAS 1+ in 2 different muscle groups in de lower limb
- MAS 1+ in 1 muscle of lower limb **AND** MAS 3 in biceps and/or triceps **AND/OR** shoulder muscles. (No MIC for wrist or supination/pronation)
- Sustained clonus in 1 muscle of lower limb.
- Contracture in ankle of at least 0° dorsiflexion (dorsiflexion is not possible) **AND** neurological UMN-signs:
  - o Noticeably brisk reflexes or clear difference in reflexes left vs. right.
  - o Positive uni- or bilateral Babinski

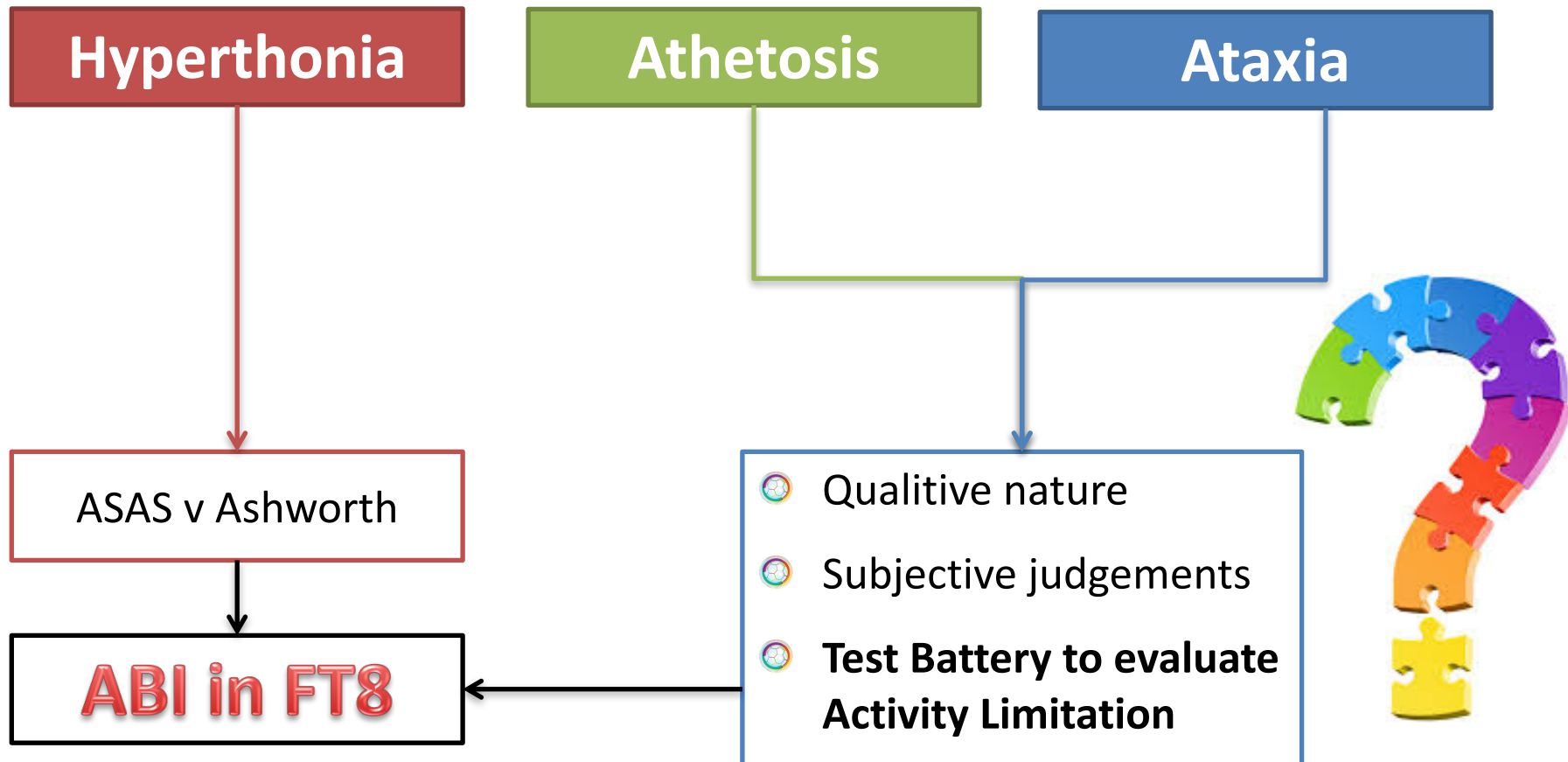
	FT 1	FT 2	FT 3		
<u>Calfs</u>	MAS 1+ / 2	MAS 1+ / 2	MAS 1+ / 2		
Hamstrings	MAS 1+ / 3	MAS 1+ / 2: <u>pop.angle ≥25°</u>	MAS 1+: <u>pop.angle &lt;25°</u>		
Adductors	MAS 1+ / 2				

**NB:** Hamstrings have to be tested with 45° hipflexion

## Additions:

1. When classifiers find spasticity in Q-ceps and/or hipflexors, players can get a lower class after assessing their functionality.  
We don't take these muscles in consideration in the table, because the interrater reliability of testing these muscles is poor. [reference.....]
2. When classifiers find poor selectivity (isolated movements) in the lower limb, players can get a lower class after assessing their functionality.

# Specify Severity of Eligible Impairments





# IS Athlete Evaluation

- 🌐 We dont do diagnosis!
- 🌐 Bring all the equipment for competition
- 🌐 Steps:
  - Eligible Impairment
  - MIC
  - Physical Aseessment
  - Technical Aseessment:
    - SG + Video recording
  - Observation in Competition
    - Includes training





# IS Athlete Evaluation

- First appearance concept
  - Before semi-finals in 16 teams tournaments
  - Including semifinals in 8 teams tournaments
- Reasons for observation in competition
- 🌐 Classification process will be longer in some cases
- 🌐 Re-organization of the classification schedules
- 🌐 Only 1 classification when is posible
- 🌐 To develop:
  - Athlete Evaluation at Non-Competition Venue
  - Remote assessment of eligible impairments



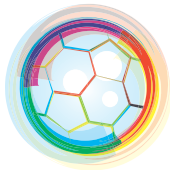
# IS Athlete Evaluation

## STATUS

- Confirmed (C)
  - All class FT8 will change to Review (R)
- Review (R): only in competition
- Review + Fixed Date (RFD):
  - U-18
  - ABI < 6 yr
  - 1 yr between competitions

# IS Classifiers Training and Certification

- Re-certification is necessary/mandatory
- A list of competencies will be required
- Profiles:
  - Doctor/Physio: rehabilitation, neurological background...
  - Tech: football background, sport scientist...
- Pathway:
  - Level 1 → National Activity
  - National/Regional Activity → International Training:
    - Europe
    - Americas
    - Asia/Oceania
    - Afrika?
  - Specific Country Training



# IS Protest and Appeals

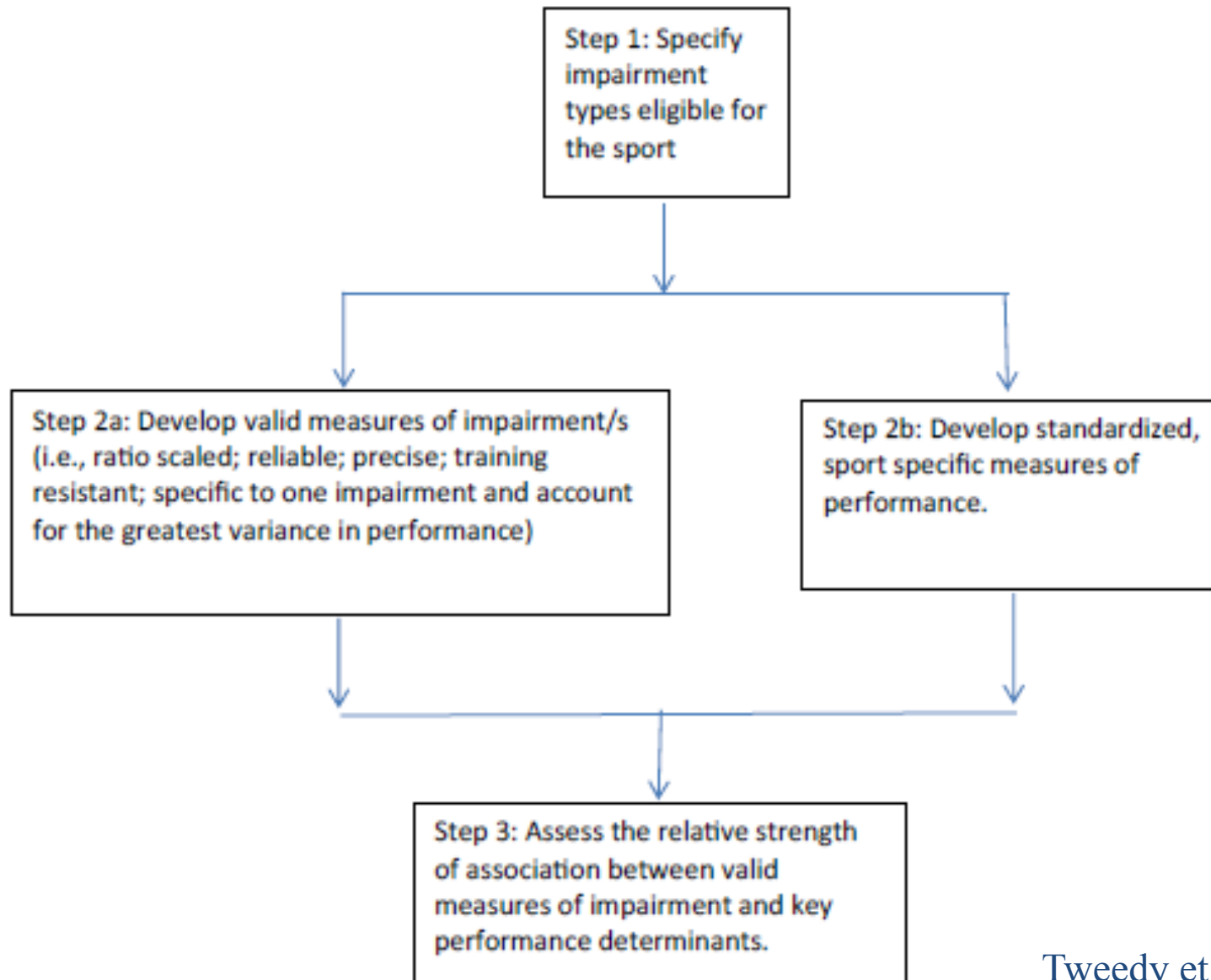
- 🏆 Clear reasons or hard evidence to accept the protest
- 🏆 Protest fee: 150E
- 🏆 Timeline: 1h after communication
  - 5h if Chief Classifier declines the protest
- 🏆 Remote involvement of HoC if it required.
- 🏆 Board of Appeal of Classification (BAC)
  
- 🏆 Panels in competitions:
  - 2/3 panels of 2 + 1 Chief classifier
  - 1 panel of 3
    - No protest available



# IS Data Protection

- 🌐 2 persons have access to Master List
- 🌐 Consent form is mandatory to proceed with classification
- 🌐 Stick-box to consent data for research purposes
- 🌐 Remove/destroy any additional notes when classification process have finished
- 🌐 Copies provision





# Evidence-Based Classification

## 10.2 Classification Research

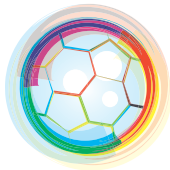
10.2.1 International Sport Federations **must develop sports-specific** Classification Systems through multidisciplinary **scientific research**. Such research must be **evidence-based** and focus on the **relationship between Impairment and key performance determinants**. Athlete input **must be solicited to assist in research and improvement in Classification Systems.**

10.2.2 Classification research must comply with internationally recognised ethical standards and research practices.



International  
Paralympic Committee  
**Athlete  
Classification Code**  
November 2015





INTERNATIONAL FEDERATION OF  
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**ICSEMIS 2016**



centro de  
investigación del  
deporte  
*Universidad Miguel Hernández de Elche*

 **frontiers**  
in Physiology

ORIGINAL RESEARCH  
published: 06 January 2016  
doi: 10.3389/fphys.2015.00409



CrossMark



**AGITUS**  
Foundation



Campayo, Barbado y Reina (2015)

Reina (2015)

## Change of Direction Ability Performance in Cerebral Palsy Football Players According to Functional Profiles

*Raúl Reina<sup>1\*</sup>, Jose M. Sarabia<sup>1</sup>, Javier Yanci<sup>2</sup>, María P. García-Vaquero<sup>1</sup> and María Campayo-Piñas<sup>1</sup>*

<sup>1</sup> Sports Research Centre, Miguel Hernández University, Elche, Spain, <sup>2</sup> Faculty of Physical Activity and Sports Science, University of the Basque Country, UPV/EHU, Vitoria-Gasteiz, Spain

OPEN ACCESS

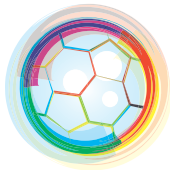
**Edited by:**

Igor B. Mekjavić,  
Jozef Stefan Institute, Slovenia

**Reviewed by:**

Pierre-Marie Leprêtre,  
Université de Picardie Jules Verne,

The aims of the present study were to evaluate the validity and reliability of the two different change of direction ability (CODA) tests in elite football players with cerebral palsy (CP) and to analyse the differences in performance of this ability between current functional classes (FT) and controls. The sample consisted of 96 international cerebral palsy football players (FPCP) and 37 football players. Participants were divided into four different groups according to the International Federation of Cerebral Palsy Football (IFCPF) classes and a control group (CG): FT5 ( $n = 8$ ); FT6 ( $n = 12$ ); FT7 ( $n = 62$ ); FT8 ( $n = 14$ ); and CG ( $n = 37$ ). The reproducibility of Modified Agility Test (MAT) and Illinois Agility Test (IAT) (ICC = 0.82–0.95, SEM = 2.5–5.8%) showed excellent to good values. In two CODA tests, CG performed faster scores compared with FPCP classes ( $p < 0.01$ ,  $d = 1.76$ – $3.26$ ). In IAT, FT8 class comparisons regarding the other classes were: FT5 ( $p = 0.047$ ,  $d = 1.05$ ), FT6 ( $p = 0.055$ ,  $d = 1.19$ ), and FT7



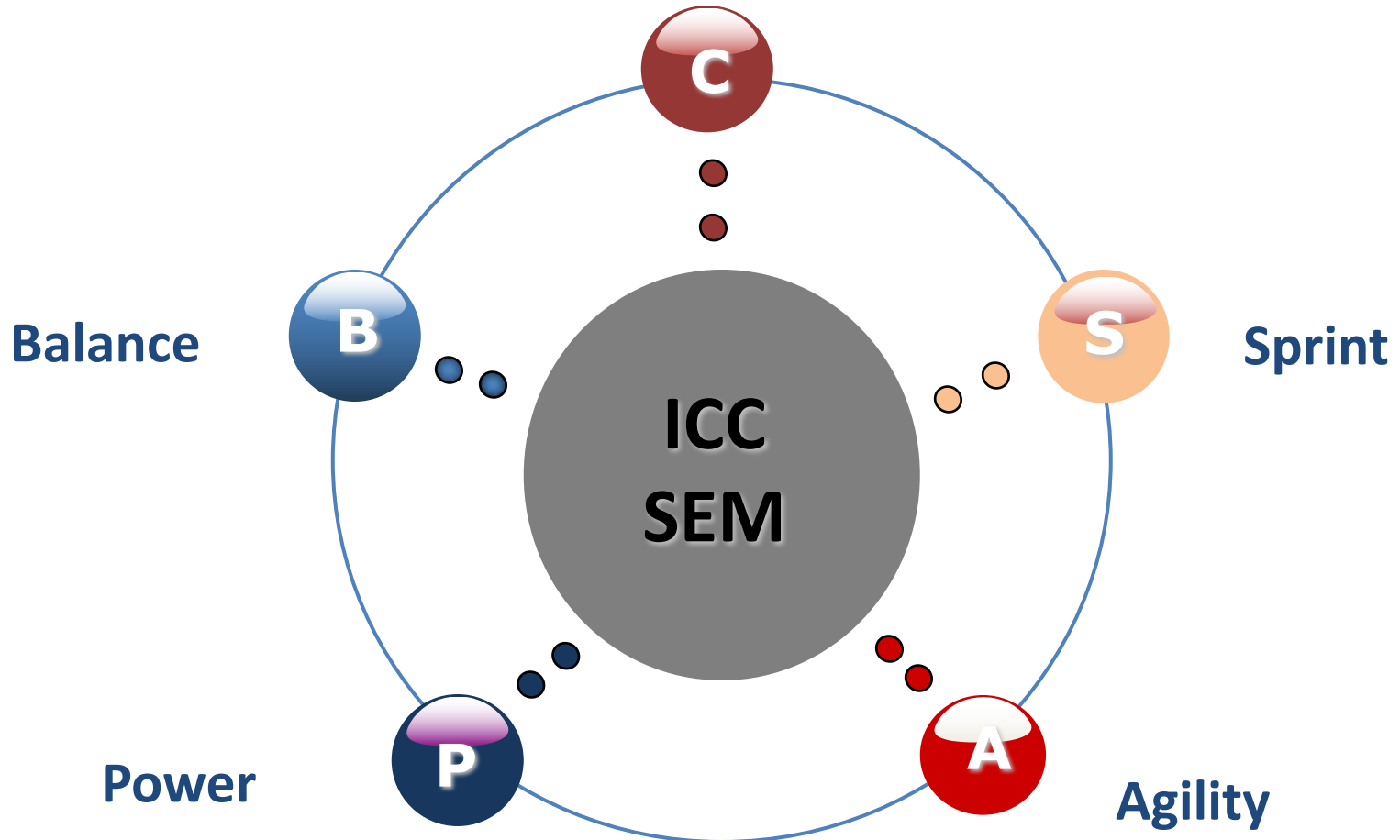
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Maria Campayo  
PhD

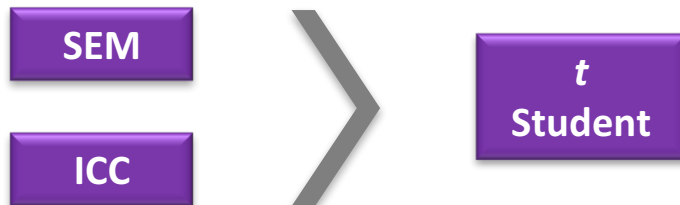


# Research Action N° 1

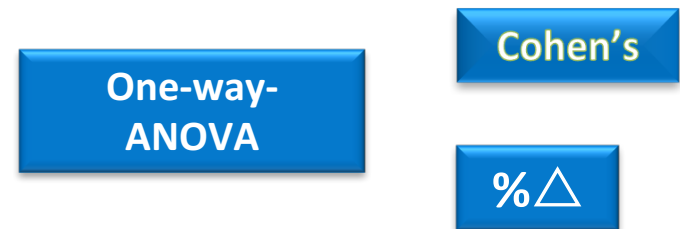
Coordination



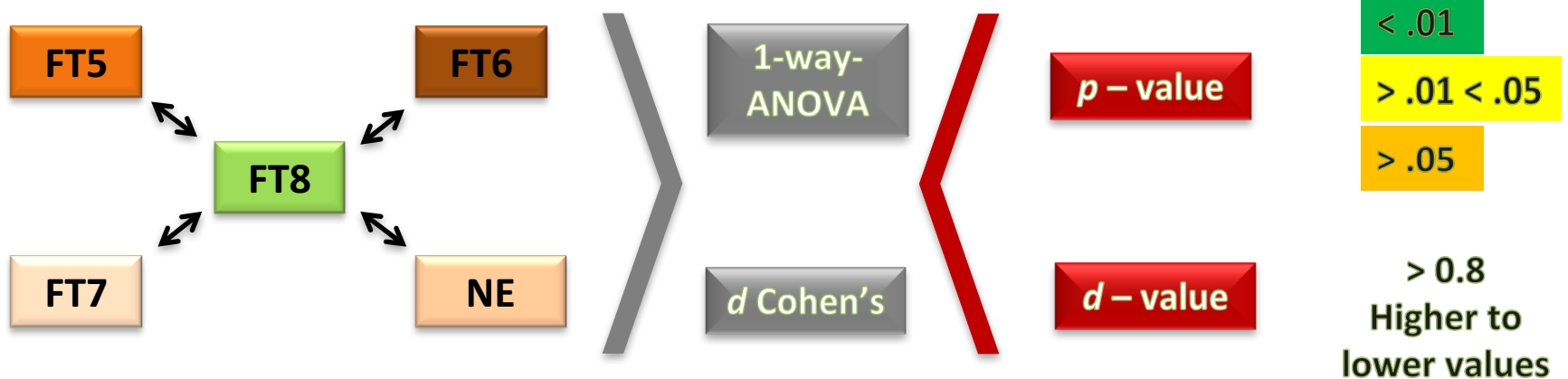
## Reliability Measures



## Differences CP vs NCP



## Between Differences Classes



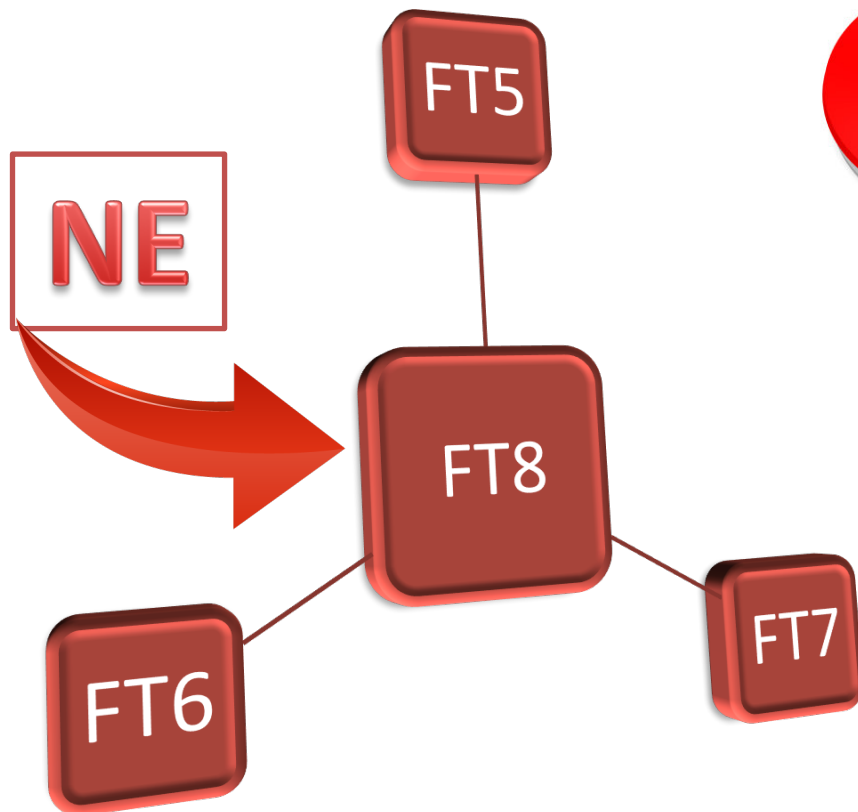




Maria Campayo  
PhD



# Research Action N° 1



Original article

## Towards evidence-based classification in Paralympic athletics: evaluating the validity of activity limitation tests for use in classification of Paralympic running events

E M Beckman, S M Tweedy

University of Queensland, School of Human Movement Studies, Queensland, Australia

Correspondence to: Miss E.M Beckman, University of Queensland, School of Human Movement Studies, Rm 314 Connell Building, St Lucia, Queensland 4072, Australia; ebeckman@hms.uq.edu.au

Accepted 3 September 2009  
Published Online First  
12 October 2009

### ABSTRACT

**Objective:** To classify Paralympic athletes, classifiers use test batteries to obtain an objective, pre-competition estimate of an athlete's training level. Five tests were evaluated to determine which combination explained the maximum variance in running performance in a non-disabled population. A non-disabled sample was required to permit psychometric evaluation of the tests without the confounding influence of impairment, and to provide an indication of normative performance.

**Design:** Sixty-seven non-disabled participants (male and female; mean (SD) age 24.78 (6.53) years) completed a six-test battery comprising a 30 m sprint (criterion activity limitation test) and five supplementary activity limitation tests: standing broad jump, four bounds, 10 m skip, running in place and split jumps.

**Results:** Test reliability was high for all tests (intraclass correlations = 0.80–0.99). Pearson correlations with the 30 m sprint were moderate to strong for standing broad jump (–0.82), four bounds (–0.80) and 10 m skip (0.67), but weaker for split jumps (0.35) and running in place (0.19). Multiple regression indicated that standing broad jump, four bounds and 10 m skip explained 75% of the variance in running performance.

**Conclusions:** The test battery is reliable and valid in the non-disabled population and therefore has potential utility

how much they affect each of the four fundamental activities of Paralympic athletics: running, jumping, throwing and wheelchair propulsion. In the lexicon of the *International Classification of Disability, Functioning and Health*,<sup>2</sup> impairments are classified according to how much activity limitation they cause.<sup>2</sup>

The methods used to assess and classify impairments should be reliable and be based on research indicating how much impairments of varying type, location and severity affect the four core activities of Paralympic athletics. This paper is one of a series that will provide an evidence base for classifying impairments of coordination, range of movement and strength.

Although evidence-based methods for classifying impairments must primarily use valid and reliable measures of impairment, such measures cannot be the sole basis of classification. This is because, although eligible impairments are permanent, many types of impairment are, to varying degrees, responsive to training. For example, while people with incomplete spinal cord injury and spastic hypertonia may have permanently impaired muscle strength, changes in the strength of affected muscle groups can be induced by chronic disuse or





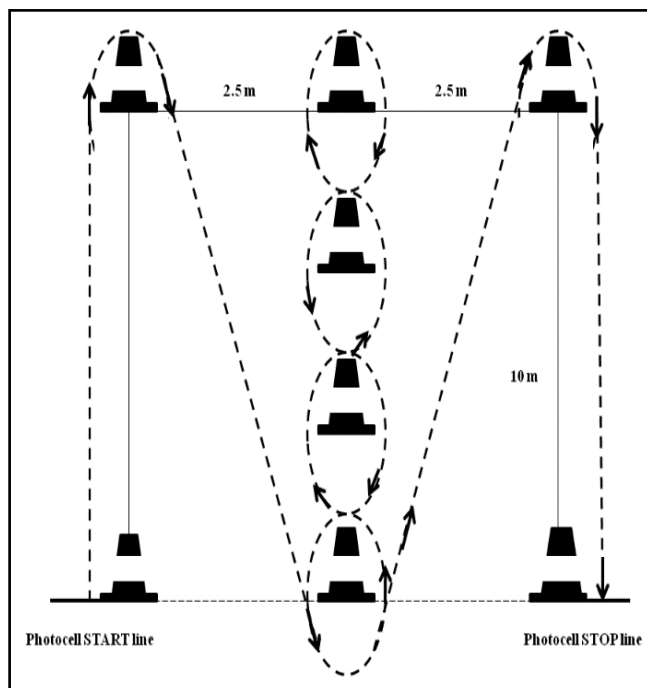
# Further Data Analysis

## **Data Envelopment Analysis (DEA):**

- Classification tool.
- Study the relative efficiency of some “Decision Making Units” (DMUs) that use several inputs to produce several outputs.
- DEA provides useful benchmarking information that can improve performance of inefficient DMUs



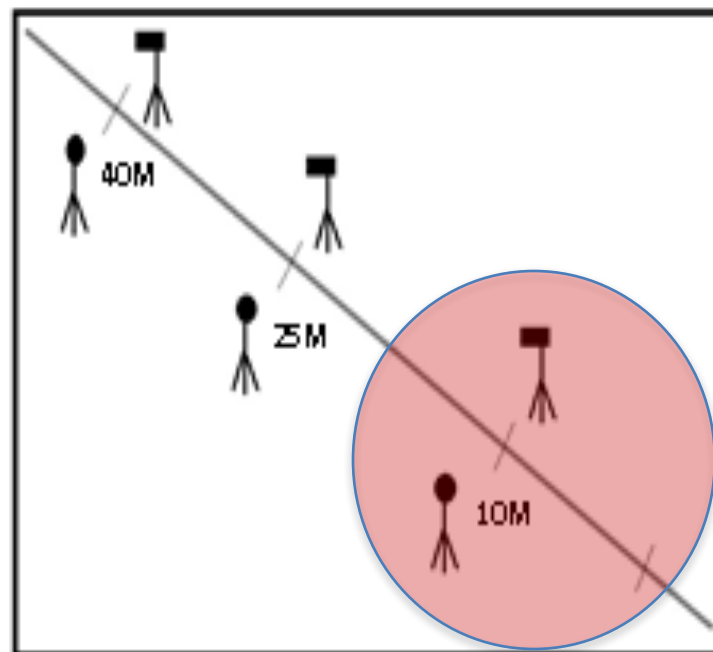
## CODA



**Illinois with Ball**

Reina et al. (2016)

## SPRINT TEST

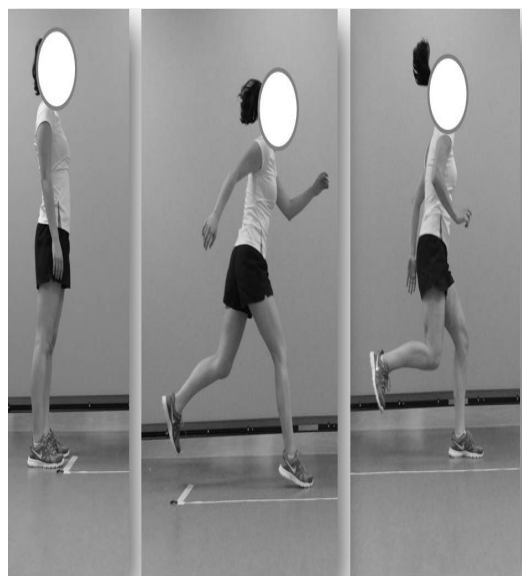


**10m with Ball**

Beckman & Tweedy (2009)\*\*

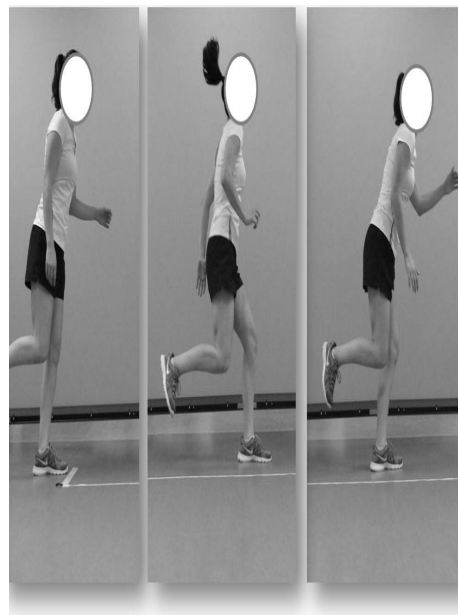


## POWER TEST



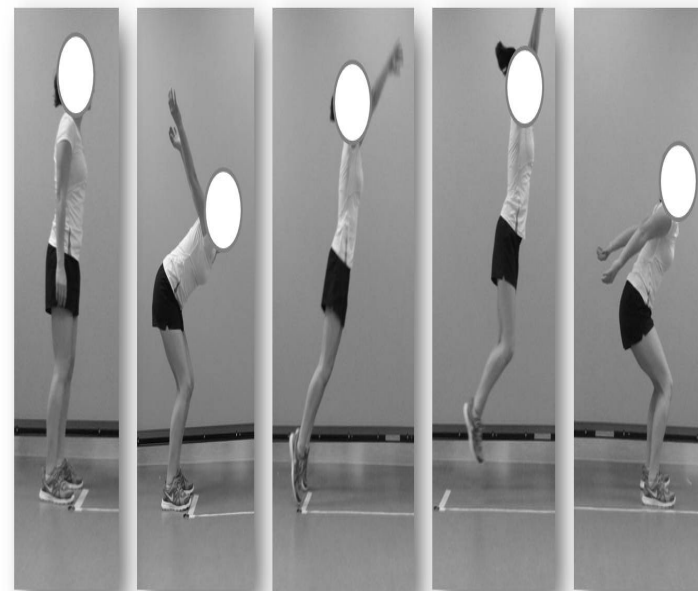
**4 BOUNDS**

Beckman & Tweedy  
(2009)



**TRIPLE HOP - ND**

Munro & Herrington  
(2011)



**STANDING BROAD JUMP**

Cámara, Grande, Mejuto, Los  
Arcos, & Yanci (2013)

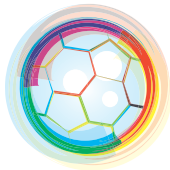


# Further Results

	X1	X2	Y1	Y2	Y3
<u>DMU Code</u>	ILLINOIS_BALL	TP_10BALL	TH_ND	4Bounds	SBJ
C1U4	28.14	2.32	2.16	2.99	1.19
C1U5	30.61	2.95	1.65	2.96	0.92
C1U8	22.64	2.54	1.04	2.58	0.53

56

8 FT8 players ranked in the first 14's



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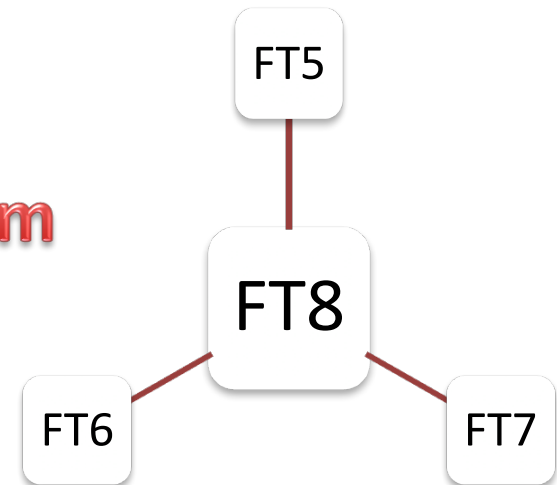
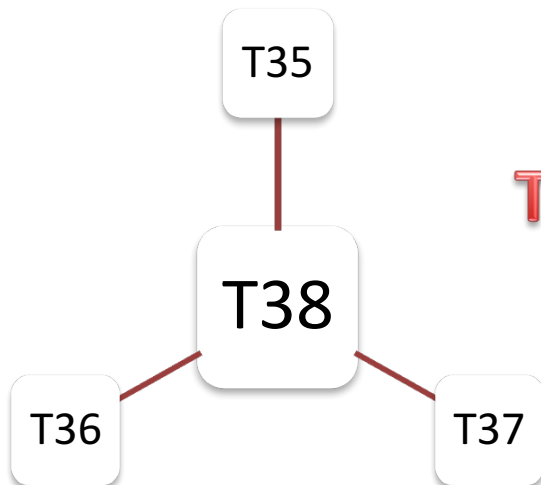
**AGITUS**

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# Research Action

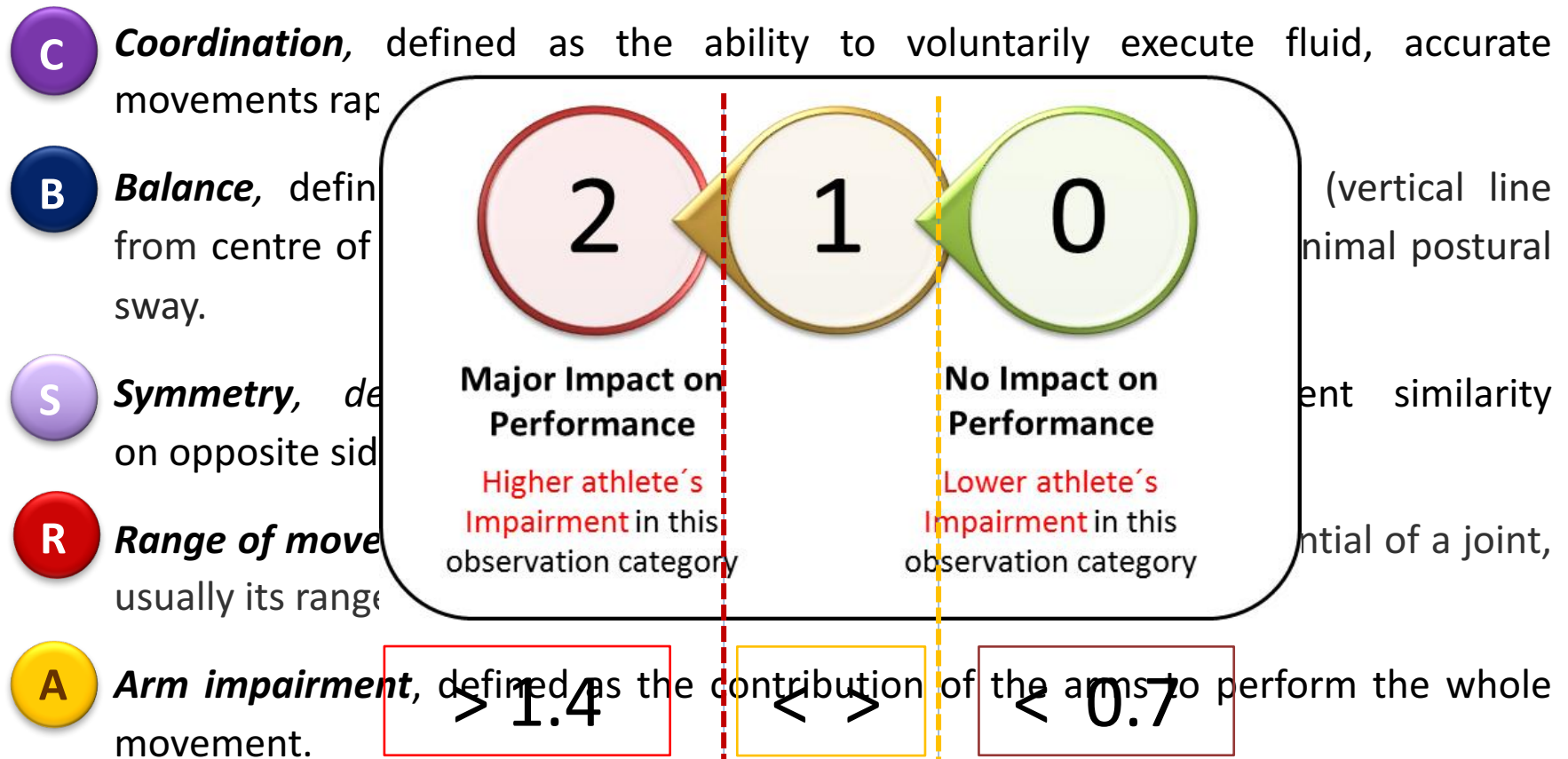
**Improving reliability and validity of current classification methods for athletes in classes T35-T38 and FT5-FT8**

## The Cut-Point Problem



Bicici, Tweedy & Vanlandewijck (2012)

# Results Legend







# Project Outcome



MAT Test

Triple Hop

RHT

- Limited ROM in hips (needed to turn the whole body).
- Poor dynamic running pattern (particularly when running backward)
- Presence of scissor running pattern:
  - Hip and knee flexion
  - Hip adduction and internal rotation
- Performance:
  - Difficulty for stopping and accelerating
  - Difficulty assisting movements of the upper limbs when running
- Poor agility level.



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**Samantha Cammidge**

PhD Candidate



## Research Action N° 3



 3 Board Members


 3 Classifiers



 2 x 15 Players  
Interviewed

 157 Players Survey

 16 Head Coaches  
Interviewed

 45 to 120 minutes

# What do you think about Classification?

# Main Results

- 90% disagree to increase FT8
- 86.53% believes that physical condition influences classification outcome
- 84.91% agrees to increase lower classes
- 83.01% agrees to classify during training
- 75.47% do not agree open the sport to other eligible impairments
- 75% would like the impairment more visible



**+**  
**AMBULANTES**

**MOTOR  
FUNCTION**

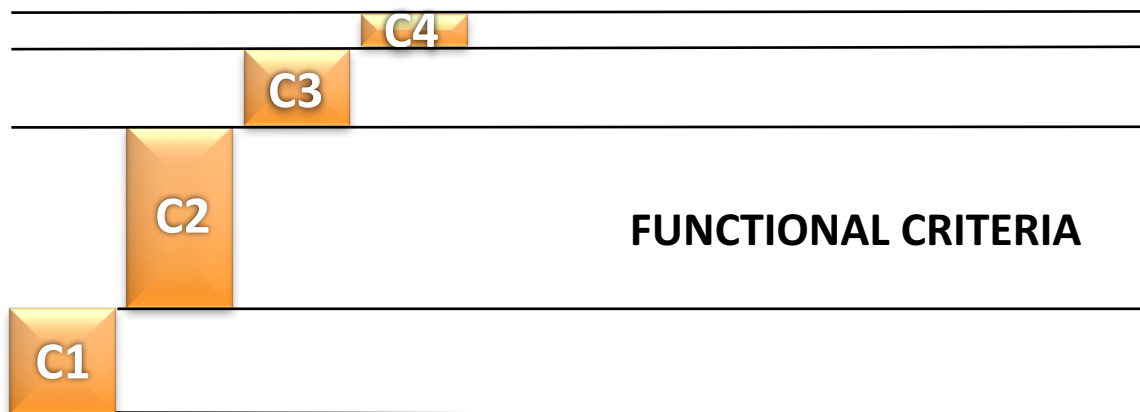
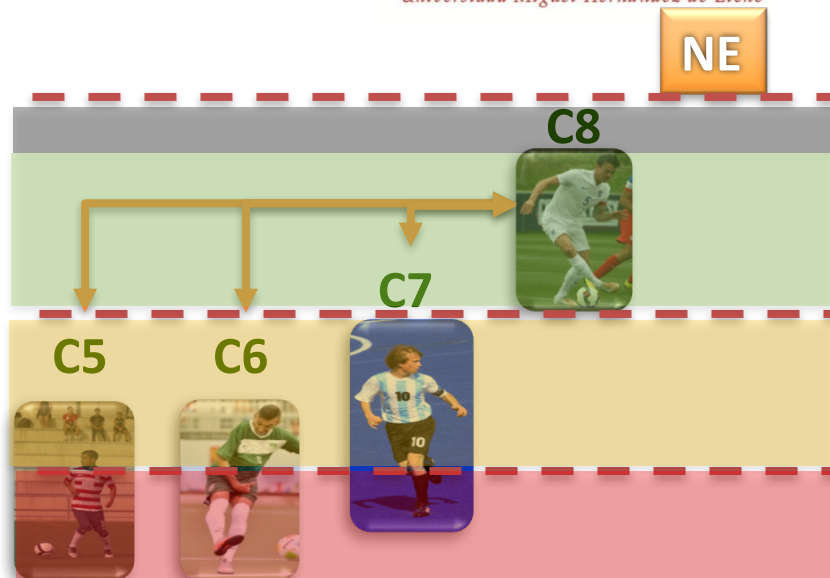
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**ACTIVITY  
LIMITATION**

**Wheelchair  
Users**

**-**

**MEDICAL +  
FUNCTIONAL  
CRITERIA**



**FUNCTIONAL CRITERIA**





# New Proposal

**A = Dyskinesia  
/ Ataxia**

**B = Diplegia**

**C = Hemiplegia**

**FT6**

**FT5**

**FT4**

**FT4**

**FT7**

**3**

**FT8**

**3**

**MIC**





# Theoretical Background

$$2 \text{ Players} \times 1 = 2$$

$$3 \text{ Players} \times 2 = 6$$

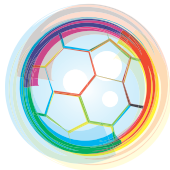
$$2 \text{ Players} \times 3 = 6$$

---

$$14 / 7 \text{ Players}$$

---

$$2 \text{ Mean}$$



# Timeline

- 🏀 Actually:
  - Organization of 3 yr knowledge and notes
  - Scientific papers writing
- 🏀 Next immediate step:
  - Classification Rulebook:
  - Review and Feedback process:
    - Classification Committee
    - NPC 's
    - IPC
    - Board approval





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# Questions to Solve

- 🏈 Application of the New Rulebook
- 🏈 Information to the teams:
  - Status Changes
  - Class Changes
  - Eligibility