



IPC Athletics Classification Project for Physical Impairments: Final Report - Stage 1

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Sources and authorship

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- **Section 1** – *System Specifications* (pp. 8-10)
- **Section 2** – *Overview of the Classification Process* (pp.11-1)
- **Section 3** – *Eligible Impairment Types* (pp.15-17)
- **Section 4.1** – *Minimum Disability Criteria for Wheelchair Racing, Running and Jumps* (pp.19-31)
- **Sections 5.1** – *Minimum Disability Criteria for Throws* (pp.42-51)
- **Section 6** – *Multiple Sub-minimal impairments* (p.62)
- **Appendix B** – *Rationale for Changes in Criteria for Unilateral Upper Limb Deficiency* (pp. 71-3)
- **Appendix E** – *Manual Muscle Testing for IPC Athletics Classification* (pp. 84-85)

They are based upon outcomes from Stage 1 of the IPC Athletics Classification Project (*Building the Foundations*) conducted by Dr Sean Tweedy and Dr John Bourke with contributions from a panel of 24 experts (see Appendix J for project description and panel membership).

The following sections were written by Dr Sean Tweedy (School of Human Movement Studies, University of Queensland, Australia):

- **Appendix C** – *Assessing Extent of Activity Limitation Resulting from Impairment* (pp. 74-6)

The following Sections are based on previous editions of the IPC Athletics Classification Manual.

- **Section 4.2** – *Class profiles for Wheelchair Racing, Running and Jumps* (pp. 34-43);
- **Section 5.2** – *Class profiles for Throws* (pp. 56 – 66)

Profiles for classes T31-38 and F31-38 were adapted from the 8th edition of the Cerebral Palsy – International Sport and Recreation Association’s *Classification and Sports Rules Manual (2001 – 2004)*.

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Introduction

Background

The *IPC Athletics Classification Project*^a began in 2003 and aims to develop a taxonomically valid, evidence-based system of classification for athletes previously classified under the following systems^b:

- Cerebral Palsy - Sport and Recreation Association (CP-ISRA);
- International Stoke Mandeville Wheelchair Sports Federation (ISMWSF);
- International Sports Organization for the Disabled (ISOD) system for Amputees; and
- ISOD (Les Autres).

The Project has two stages:

Stage 1 - *Building the Foundations* (recently completed); and

Stage 2 – *Developing evidence-based class profiles*, (recently commenced).

In summary, the aims of Stage 1 were to develop a framework for classification that was taxonomically valid – taxonomy being the science of classification – and describe minimum disability criteria that were consistent with the framework. Stage 1 has been completed and the outcomes have been included in this report. However Stage 1 did not aim to change the actual class profiles – accredited classifiers who scan Sections 4.2 and 5.2 will notice relatively few substantive changes in this area. While aim of these class profiles is generally consistent with the new framework, they were developed based on expert opinion, rather than empirical evidence. Currently reliance on expert opinion is essential because relevant empirical research is not available. However, because classification is such an important aspect of Paralympic Athletics, the IPC Athletics Sports Technical Committee (STC) is committed to replacing these opinion-based class profiles with ones that are based on scientific evidence. The research needed to develop these evidence-based class profiles will be undertaken in Stage 2, which has just commenced. A more detailed description of both stages of the project is presented in Appendix J.

Main changes presented in this report

The most significant changes to classification contained in this report are as follows:

- Changed language structure and purpose (see Sections 1, 2 & 3): These changes provide clarity about the structure of the system and what its aims are (and are not). For example, Section 1.2 accurately describes the conceptual basis of classification in IPC Athletics – the system aims to place athletes into classes according to how much their impairment affects their performance. If this aim is achieved, the athletes who succeed will be those who are the most talented and / or most thoroughly prepared, not simply those who are “less disabled” than their competitors. This aim is in-keeping with the spirit of Paralympic sport and, importantly, is consistent with the Classification Code (14).

Previous classification manuals have indicated that athletes were classified according to “function”, “innate potential” or “performance potential”. However these statements are misleading – if athletes were actually classified on this basis, the athletes who succeeded would not necessarily be the most talented and best prepared, and this is against the spirit of Paralympic sport (Sections 1.1 and 1.2 expand this case);

- Changed minimum disability criteria: the new minimum disability criteria are presented in Sections 4.1 and 5.1. In the previous system, minimum disability criteria were simple and clear, but their validity was questionable – people who had impairments that caused negligible difficulty in athletics were permitted to compete and, just as importantly, some people who had impairments that had a significant, adverse impact on athletics were excluded. This is clearly no longer acceptable. The minimum disability criteria in this system permits people to compete if they have an eligible physical impairment^c that impacts on athletic performance, but excludes those that don’t have such impairments. Appendix A presents “Changes at a Glance”

^a The original project was called the *Disability Athletics Classification Project*. It was changed to the *IPC Athletics Classification Project* following written endorsement from the IPC.

^b Note the project does not address classification for athletes previously classified by IBSA or INAS-FID. Issues related to the validity of these systems are being addressed in separate projects.

^c Note: Terms in verdana font are defined in Section 7 – Glossary

Stakeholders in IPC Athletics should have great confidence in the changes presented in this report: they are based on the best published science and were developed with input from more than 20 highly respected experts in Paralympic Athletics, including senior classifiers, international athletes and coaches and published sports scientists (see Appendix J for an overview, including a full list of expert contributors). Prior to submission to the Governing Board, the report was revised based on feedback from IPC Athletics STC, IPC member nations and the IPC Athletics Summit (Feb 2009, Bonn, Germany).

It is acknowledged that changes presented in this report will have a significant impact on some individuals, and the STC is committed to developing timelines and transition policies that strike a balance between moving forward with the current agenda and minimising the disruption to individuals.

The future – Stage 2 of the Classification project


As mentioned, Stage 2 of the Classification project has just commenced and will be led by Dr Sean Tweedy, together with Prof. Yves Vanlandewijck (Chairman of the IPC Sports Science Committee). The project aims to develop evidence-based class profiles that will replace those currently used (presented in Sections 4.2 and 5.2). This Stage of the project has been independently reviewed by the Australian Research Council who confirmed that the methods are scientifically sound and have a realistic prospect of leading to practical outcomes.

When the work is complete, recommendations will be made that are likely to entail fundamental changes to the classification process and outcomes. While athletes will still be physically assessed, the core of the process will be a set of standardised test batteries comprising tests that are quantifiable and developed specifically to evaluate how much factors such as loss of range of movement, loss of strength and increased muscle tone impact on a person's ability to run, throw, jump or push a wheelchair. The classification outcome will also be different – the number and composition of classes is likely to be significantly altered in many instances. Consequently the old names – T31-T54 and F31-F58 – will no longer be appropriate.

It is important to note that all recommendations for changes to classification resulting from the research will be subject to review by the IPC and due process will be followed at all times. The IPC is acutely aware of the impact that these fundamental changes will have on athletes and coaches and will ensure that there will be plenty of lead time between when changes are approved and when they are implemented. Phase 2 of the research is not scheduled to finish until 2012, so none of the changes will be implemented before the London Paralympic Games.

How you can help

To find the best tests we will need as many people as possible to take part in the study – the more people who participate, the more confident we can be that the final test battery is valid. We will also need a great variety of athletes: from novices to medal winning Paralympians; athletes from Africa, Asia, Europe, the Americas and Oceania; males and females; as well as throwers, runners, jumpers and wheelchair racers. Therefore we take this opportunity to urge all members of the Paralympic Family – athletes, coaches and administrators – to respond positively if you are approached to participate. Take part in the testing so that we can build the best possible system – one that encourages Paralympic athletes to pursue sporting excellence and truly reflect the Paralympic spirit.



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1. System Specifications

Throughout this section key terms are printed in verdana font and definitions for these terms are presented in the Glossary. These specifications meet the requirements for a taxonomically valid system of classification, described previously (19, 20).

1.1. Background and purpose

Compared to people with intact body structures and functions, people with physical impairments have a competitive disadvantage in the sport of athletics. The overall purpose of the IPC Athletics Classification System for Physical Impairments (from here on referred to as ‘the System’) is to provide a framework for competition for people with health conditions that cause physical impairments. More specifically, this System has a twofold purpose:

1. Define eligibility: To be eligible to compete in IPC Athletics, athletes must have an impairment that:

- i. Is one of the eight eligible types of impairment (see Section 3)? Only these eight eligible types of impairment are classified in this system;
- ii. Is permanent in nature (i.e., will not resolve in the foreseeable future regardless of physical training, rehabilitation or other therapeutic interventions);
- iii. Causes a sufficient level of activity limitation: Simply having an eligible *type* of impairment is not sufficient; to be eligible the impairment must cause a reasonable degree of difficulty in athletics. These criteria are called Minimum Disability Criteria and are described in detail in Section 4.1 (wheelchair racing, running and jumps) and Section 5.1 (Throws).

2. Minimize the impact of impairment on the outcome of competition:

The second purpose of this system is to minimize the impact that eligible impairments have on the outcome of competition. In other words, the system aims to ensure that competitive success in Paralympic Athletics is determined by the same factors as non-disabled athletics. Athletes should succeed because they have the most favorable combination of anthropometric, physiological, and psychological attributes and have enhanced them to best effect by legitimate means such as training, diet, event technique, and legal technical aids (e.g., strapping and/or prosthetics, equipment design). Paralympic athletes should not succeed simply because they have an impairment that causes less difficulty in athletic performance than the impairments of their competitors.

1.2. Conceptual basis of the System

Taxonomy is the science of how to classify, its principles, procedures and rules (7). As far as possible the principles of taxonomy have been applied in the development of the System. According to taxonomy, classification is defined as a procedure in which a single group of entities (or units) are ordered into a number of smaller groups (or classes) on the basis of observable properties that they have in common (2, 7). In this system:

- the unit that is classified is impairment. This System does not classify athletes, it classifies the impairment that an athlete has^d;
- the observable property common to all impairments classified in this system is that they adversely affect the biomechanical execution of athletic disciplines including running, throwing and jumping (19, 20). In the language of the ICF, the impairments cause activity limitations in athletics.

Conceptually, in order to minimize the impact of impairment on the outcome of competition, the System should aim to place athletes into classes according to the extent of activity limitation caused by their

^d For ease of communication it is common to refer to “classifying athletes”. However from a conceptual perspective it is important that classifiers understand that they are classifying impairments, not athletes. This distinction is taxonomically consistent with the ICF and is important because it reinforces that each athlete is a unique, sentient human whose diversity and individuality cannot be captured by assigning them a label or class.

impairments (20). In general, people with impairments that cause a small degree of activity limitation will compete together, as will people with impairments that cause a large degree of activity limitation. An alternative way of saying this is athletes will be placed into classes according to how much their impairment impacts on athletic performance.

A number of other phrases have previously been used to describe the conceptual basis of classification in Paralympic sports. Table 1.1 identifies some of the main ones and illustrates why they are not suitable for achieving the purposes of this system.

Table 1.1: Statements regarding the conceptual basis of classification and why they are unsuitable for this System

Conceptual basis	Why such a conceptual basis is unsuitable for this System
Place athletes into classes according to their degree of function^c	Although function is affected by impairment, a range of other factors also affect how well a person functions. These factors include age, fitness, and motivation. A person who is old, unfit and unmotivated will not function as well as when they were young, fit and motivated. Moreover, we know that training affects function – if it did not, then athletes would not train! If an athlete was placed into a class according to function, then an athlete who trained hard and improved their function could be placed in a more functional class (training → improved function → higher class). A principle of this System is that training is a legitimate means by which athletes can gain a competitive advantage and, therefore, classifying athletes according to their degree of function is not a suitable conceptual basis for this System.
Place athletes into classes according to their degree of performance potential or innate potential	The performance potential or innate potential of an athlete is determined by an array of natural attributes including, but not limited to, impairment. For example in discus, performance potential or innate potential is obviously influenced by impairment but is also enhanced by increased standing height, arm span and a high percentage of fast twitch muscle fibres. If athletes were classified according to such constructs, then tall athletes with long arms and an ideal muscle composition would compete in higher classes than short, endurance-type athletes. A principle of this system is that athletes with the best combination of natural attributes should have a competitive advantage over others; therefore classifying athletes according to their performance potential is not a suitable conceptual basis for this System.
Place athletes into classes according to their movement potential	If movement potential is defined as the “potential to contract muscles which will then cause active movements of the limbs and trunk” then athletes with less movement potential would go into lower classes than those with more movement potential. Because of this, movement potential is a suitable conceptual basis for systems which classify impairments that cause a deficit of movement (such as spinal cord injury, limb deficiency or impaired range of movement). However it is not suitable basis for Systems that classify impairment types that do not cause a deficit of movement or which may cause an excess of movement (viz. athetosis, ataxia). Therefore, movement potential is not a suitable conceptual basis for this System.

^c In the Glossary it is pointed out that, in the *ICF*, the term function is a very general umbrella term and for this reason its use is largely avoided in this System.

1.3. Relationship with the International Classification of Functioning, Disability & Health

The language and taxonomic structure of this System derive from the International Classification of Functioning Disability and Health (ICF), published in 2001 by the World Health Organisation (23). The ICF is an international standard for describing the functioning and disability associated with health and a detailed taxonomic rationale for linking the System to the ICF has been presented previously (20). In summary utilization of the ICF language and structure has several advantages:

- the concepts of functioning and disability are contemporary and internationally accepted;
- the definitions for key terms are clear, unambiguous and internationally accepted;
- the key terms and concepts of the ICF are described in six languages – English, French, Spanish, Russian, Chinese and Arabic – and therefore people from a range of non-English speaking backgrounds can learn about some of the key aspects of this System in their own language, thereby removing a significant barrier to the international understanding of the System. For more information, and to obtain copies of the ICF, visit <http://www.who.int/classifications/icf/site/icftemplate.cfm>.

Terms from the ICF that are of importance in this System are presented in the Glossary

1.4. Compliance with the IPC Classification Code

At the time of writing the taxonomic features of this System were consistent with the International Paralympic Committee Classification Code (14), specifically:

- Use of the language of the International Classification of Functioning Disability and Health (ICF) published by the World Health Organization in 2001 (described below – see Language and Structure);
- Eligibility for the System is described in terms of impairment
- Aiming to place athletes into classes according to the extent of activity limitation that results from impairment;

Because the System has a sound basis in the science of taxonomy, IPC Athletics is in a strong position to comply with Section 14.2 – Classification Research.

2. Overview of the classification process

This section presents an overview of the classification process, from the point at which an athlete presents for classification through to all the possible exit points from the process. The text below relates to Figure 2.1 on the next page. In the Figure, the parts of the classification process that have changed are above the dashed line. Below the dashed line are the class profiles, which are largely unchanged, except those that are affected by the new minimum disability criteria.

Box #1

The first decision the classification team must make is whether the athlete has an eligible type of impairment. There are eight eligible types of impairment and these are presented in Section 3. An athlete who does not have at least one of the eligible impairment types is not eligible to compete in this classification system. Athletes without an eligible impairment type but who have either a vision impairment or an intellectual disability may be eligible to compete in IPC Athletics but are classified using different systems.

Boxes #2, #3 and #4

The next decisions revolve around what event the athlete does. Athletes who either run, jump or race a wheelchair must meet the criteria in Section 4.1 – Minimum Disability Criteria for Wheelchair Racing, Running and Jumping. Athletes who throw (shot put javelin, discus or club) must meet the criteria in Section 5.1 – Minimum Disability Criteria for Throws. The implication is that an athlete who is eligible for throwing events may not be eligible for running, jumping or wheelchair racing.

Boxes #5 - #10

Athletes who meet the minimum disability criteria for Wheelchair Racing, Running and Jumps may compete in either wheelchair racing OR running and jumping events, but not both. Athletes who race in wheelchairs who are affected principally by hypertonia, ataxia or athetosis will compete in Classes T31-34 (Box 6); those principally affected by limb deficiency, impaired muscle power, range of movement or leg length difference will compete in classes T51-54 (Box 7).

Athletes who run or jump and are affected principally by hypertonia, ataxia or athetosis will compete in Classes T35-38 (Box 9); those principally affected by limb deficiency, impaired muscle power, range of movement, leg length difference or short stature will compete in classes T40 - 46 (Box 10).

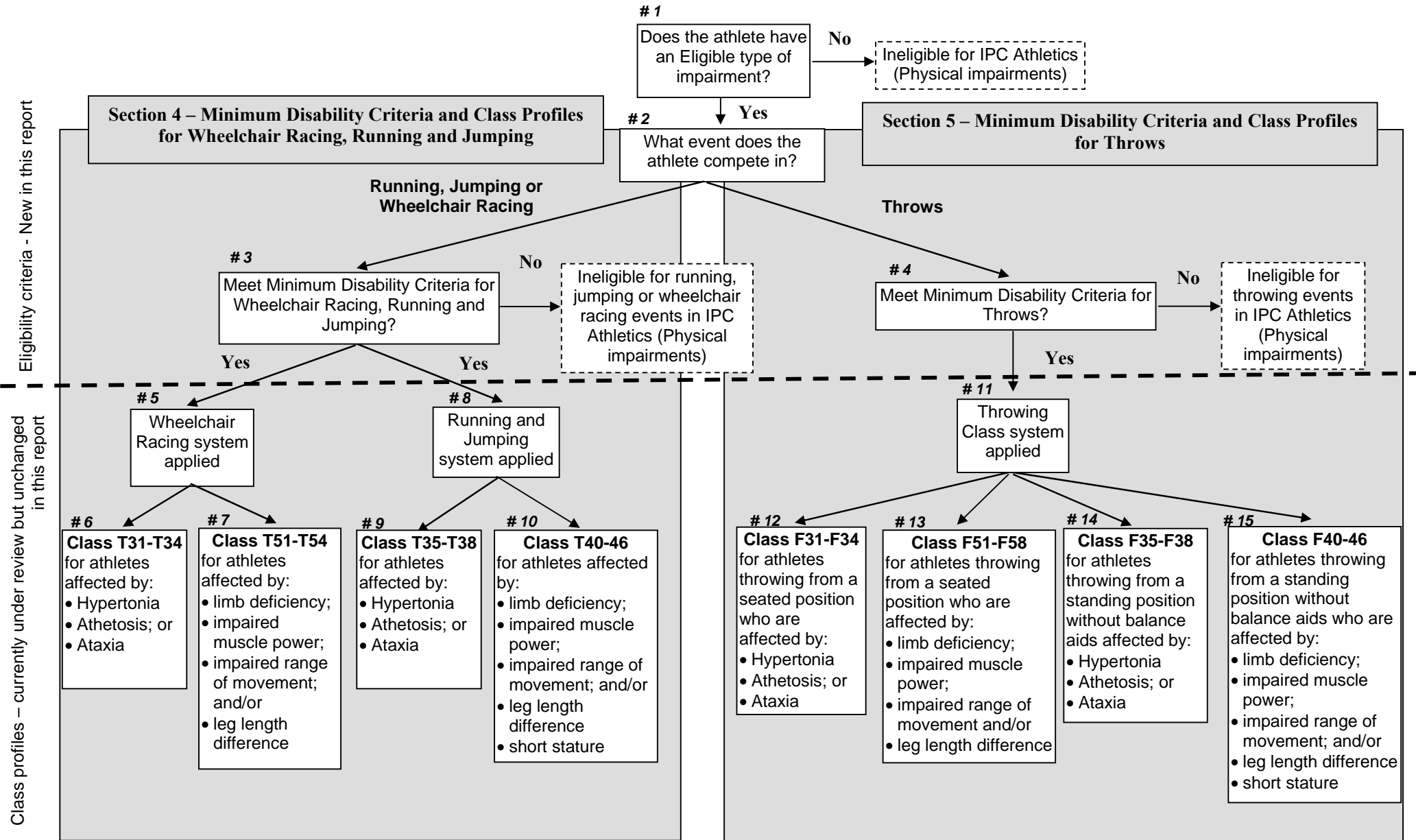
Boxes #11 - #15

Athletes who meet the minimum disability criteria for Throws and who throw from a seated position will compete in Classes F31-34 if they are affected principally by hypertonia, ataxia or athetosis (Box 12) or in classes F51-58 if they are principally affected by limb deficiency, impaired muscle power, range of movement or leg length difference (Box 13).

Athletes who throw from a standing position without balance aids and who are principally affected by hypertonia, ataxia or athetosis will compete in classes 35-38 (Box 14) and those affected principally by limb deficiency, impaired muscle power, impaired range of movement, leg length difference or short stature will compete in classes F40-46 (Box 15).

The system for allocating classes, represented by the boxes below the dashed line, is currently undergoing a comprehensive review in the period prior to the London Paralympic Games, with the aim of improving the evidence base for these processes (for more detail see Appendix J – Overview of the IPC Athletics Research Plan).

FIGURE 2.1: Overview of the classification process for the IPC Athletics Classification System for Physical Impairments



The remainder of this section presents the classification process for all competitions recognized by IPC Athletics, including the Paralympic Games, World Championships and Regional Championships (e.g. European Championships, Arafura Games).

For each IPC Athletics recognized competition, IPC Athletics STC will appoint a team of classifiers and select one of the team members to be the Chief Classifier for that event. The members of the classification team who are specialists in classification of physical impairments will be divided into classification panels, with the optimal composition of a classification panel being:

- Medical doctor
- Therapist (physiotherapist or occupational therapist); and
- Sports technical person (sports scientist, coach or athlete).

When panels of two are utilised, each panel should comprise two types of classifiers - a medical (doctor, physiotherapist, occupational therapist or other approved health professional) and a technical (Physical education teacher, sports scientist, athlete, coach).

When entries for an event are received, the Organising Committee (OC) will send a list of all athletes entered for the competition to the IPC Athletics Sports Manager. The entry list will be checked against the IPC Athletics Athletes Database and each athlete will be assigned one of three notations for that competition:

- (N): indicating the athlete is New (i.e., has not been through the international classification process previously and does not have an international classification);
- (R): indicating the athlete is under Revision (i.e., has been through the international classification process but must be classified again because their condition is progressive or because they were borderline and there was lack of certainty about their classification); and
- (C): indicating that the athlete has a classification that has been Confirmed by an IPC Athletics Panel. Note that (C) is the same status as the former status of permanent (P).

Based on the annotated list, the OC will prepare a schedule for classification in conjunction with the Chief Classifier. The prepared schedules should take account of the arrival times of countries and the OC will notify the countries of their schedule for classification.

At IPC Athletics recognized competitions, classification is a three stage process and all athletes with an (N) or (R) notation are required to present for Stage1 – Examination. Athletes with the (C) notation are not required to undergo the classification process.

Stage1 – Examination: This stage entails assessment of impairment, novel motor tasks and movements that are closely related to the movements required in the sport. Three outcomes are possible from this stage:

- No class is assigned for the competition and the Athlete proceeds to Stage 2;
- A class is assigned for the purposes of the current competition and the Athlete proceeds to Stage 3;
- An athlete suspected of not complying with the Athlete’s Code of Conduct will be referred to the Chief Classifier for assessment by a second panel. If the second panel confirms that the athlete is not cooperating, the athlete will be assigned the notation IM and will take no further part in the competition. The athlete is subject to a penalty of two years suspension from the sport.

Stage 2 – Sports-specific assessment: this entails observation and assessment of the athlete performing the event/s for which they are entered. Performance should be under conditions and at an intensity that are as close as possible to competition conditions. For example seated throwers should throw from their throwing stool with the correct implement weight with the chair secured as it will be for competition and following an appropriate warm-up, preferably supervised by their coach. The athlete / athlete’s team is responsible for provision of athlete-specific equipment (e.g., running spikes, throwing stool etc). Classifiers should be in possession of the personal best performance of athletes when conducting this stage of the process. Not all athletes are required to attend Stage 2 of classification. There are 2 possible outcomes from this stage:

- A class is assigned for the purposes of the current competition and the Athlete proceeds to Stage 3

- An athlete suspected of not complying with the Athlete’s Code of Conduct will be referred to the Chief Classifier for assessment by a second panel. If the second panel confirms that the athlete is not cooperating, the athlete will be assigned the notation IM and will take no further part in the competition. The athlete is subject to a maximum penalty of two years suspension from the sport

At least twice each day a Classification report will be prepared, presenting a list of all the athletes that have been assigned a class for the purposes of competition. The report will be submitted by the Chief Classifier to the OC (or designated representative) and the OC will be responsible for making the report public (usually by displaying it at the classification venue and/or Technical Information Centre). The classification report will include the classification outcome and the time at which the classification report was posted. Any protest regarding these classifications must be lodged with the Chief Classifier within six hours of the publication of the Classification report (for full details on Protest Procedures, see Appendix G). The classification report from each session will also be used to amend the entry list and start lists for each event, as well as to update the IPC Athletics database.

Stage 3 - Review in competition: When the athlete first performs in the competition they should be observed by the classification panel that performed Stages 1 and 2. Note that this stage must be completed for ALL athletes with (N) and (R) notations. There are three possible outcomes from this Stage:

- **Athlete assigned (R) status:** this indicates that the classification assigned in previous stages stands for the purpose of the current competition and the results of the event can be ratified, including any records set or medals won by the athlete. The (R) notation will be entered on the IPC database indicating that the athlete is still under review and is required to present for classification at their next IPC recognized competition;
- **Athlete assigned (C) status:** this indicates that the classification assigned in previous stages stands for the purpose of the current competition and future events. The results of the event taking place can be ratified, including any records set or medals won by the athlete. The notation (C) will be entered on the IPC database and the athlete will not be required to attend the classification process at any future IPC recognized competitions. Note that for international competition athletes should only receive a (C) notation after Stage 3.
- **Athlete class protested:** The third possibility is that the classification panel observes movements and actions that are inconsistent with the class that they have been assigned for the purposes of competition. Note that this does not necessarily imply that the athlete has not been compliant. Under these circumstances the classification panel that classified the athlete will notify the Chief Classifier within 30 minutes of the observed performance. If the panel’s recommendation is supported by the Chief Classifier, protest proceedings will be initiated (for details of the conduct of this process, see Protests During Competition in Appendix G). The protest outcome will determine the action required:
- **If the protest is upheld:**
 - the athlete’s results for that event will not stand, records set by the athlete will be amended and medals won by the athlete returned;
 - the athlete will be assigned a new class and a new notation – either (C) or (R);
 - where possible, the athlete will be permitted to compete in the same events for which they have been entered, but in their new class. This will not be possible if the event has already been conducted or if the event is not on the competition program;
- **If the protest is overturned:**
 - the athlete’s results for that competition will stand, including any records they have set or medals they have won;
 - the athlete will be assigned one of the following notations which should be entered on the IPC database – either (C) or (R);
 - the athlete can compete in all other events for that class for which they have been entered.
- If the Protest Panel determines that the athlete is not cooperating or has been deliberately uncooperative or deceptive at any time during the classification process; the athlete will be assigned the notation (IM) and will be disqualified from taking any further part in the competition. The athlete is subject to a maximum penalty of two years suspension from the sport.

A full description of all avenues for protesting classification in IPC Athletics is presented in Appendix G.

3. ELIGIBLE IMPAIRMENT TYPES

3.1. The 8 Eligible Impairment Types

Eight types of impairment are classified in the IPC Athletics Classification System for Physical Impairments as presented in Table 3.1. As a ready-reference the first column provides the best guide. Note that the impairments presented must result directly from a health condition (e.g., trauma, disease, or dysgenesis), examples of which are presented in column 2. Impaired muscle power resulting from disuse (e.g., due to pain, hysterical conversion) is not eligible.

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)	cerebral palsy, 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 cerebral palsy, 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 cerebral palsy	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.
Impaired Passive Range of Movement (PROM)	arthrogryposis, ankylosis, scoliosis	Joint mobility <i>Exclusions:</i> hypermobility of joints.	b7100 – b7102
Impaired muscle power	spinal cord injury, muscular dystrophy, brachial plexus injury, Erb palsy, polio, Spina bifida, Guillain-Barré syndrome	Muscle power	b730
Leg length difference	congenital or traumatic causes of bone shortening in one leg	Aberrant dimensions of bones of right lower limb OR left lower limb <i>Inclusions:</i> shortening of bones of one lower limb <i>Exclusions:</i> shortening of bones of both lower limbs; any increase in dimensions	s75000, s75010, s75020 <i>Note:</i> for coding purposes aberrant dimensions of bones of right lower limb is indicated by addition of the qualifying code .841 and in the left lower limb, .842

Short stature	Achondroplasia or other	Aberrant dimensions of bones of upper and lower limbs or trunk which will reduce standing height	s730.343, s750.343, s760.349
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*For further information on ICF codes, including how to obtain a copy of the ICF, visit the website at <http://www.who.int/classifications/icf/site/icftemplate.cfm>.

3.2. Exclusions

Some specific exclusions are identified in Table 3.1 and others are noted in the list below. Note that if an impairment is listed as an exclusion, this means that people with those impairments and only those impairments cannot be classified in this System. For instance, *cardiovascular impairment* is listed as an exclusion (see below). This indicates that a person with *only* a cardiovascular impairment cannot be classified in this System. However a person who was affected by hypertonia and also had a cardiovascular impairment *would* be eligible for this System because hypertonia is an eligible impairment. However such an athlete's class should only reflect the extent of activity limitation resulting from the eligible impairment type (hypertonia) and not ineligible types of impairment. Vision impairment would be another example. People who have vision impairments (as people with brain injury sometimes do) may compete in this system, but only if they also have an eligible impairment (e.g., hypertonia or ataxia).

The following impairments are exclusions in this System:

- Mental functions (b140-189), for example impairments of:
 - i. psychomotor control (b1470) – mental functions that regulate speed of behavior or response time that involves both motor and psychological components;
 - ii. quality of psychomotor functions (b1471) – mental functions that produce nonverbal behavior in the proper sequence and character of its subcomponents, such as hand and eye coordination or gait;
 - iii. visuospatial perception (b1565) – mental functions involved in distinguishing by sight the relative position of objects in the environment or in relation to oneself;
 - iv. higher-level cognitive functions required for organization and planning movement (b1641);
 - v. mental functions required for sequencing and coordinating complex, purposeful movements (b176).
- Hearing functions (b230-249);
- Pain (b280 – b289);
- Joint stability (b715), such as unstable shoulder joint, dislocation of a joint;
- Muscle endurance functions (b740);
- Motor reflex functions (b750)
- Involuntary movement reaction functions (b755);
- Tics and mannerisms (b7652), Stereotypies and motor perseveration (b7653)
- Cardiovascular functions (b410-429)
- Respiratory functions (b440-449)

Appendix C presents guidelines for assessing extent of activity limitation resulting from impairment, including:

- assessment of athletes affected by pain
- assessment of athletes with progressive health conditions
- assessment of athletes who are young, inexperienced or recently injured.

4. MINIMUM DISABILITY CRITERIA and CLASS PROFILES FOR WHEELCHAIR RACING, RUNNING AND JUMPING

4.1. Minimum Disability Criteria for wheelchair racing, running and jumping

Not all athletes with an eligible impairment type (presented in Section 3) are permitted to compete in wheelchair racing, running and jumping in IPC Athletics. To be eligible the athlete's impairment must also cause sufficient activity limitation in running. The General Standard for what constitutes sufficient activity limitation is as follows:

An athlete may compete in wheelchair racing or running or jumping events in Paralympic Athletics if they have a permanent impairment that alters the biomechanical execution of the running action in a way that is demonstrable and which will adversely affect performance.

The effect of the impairment is considered without aids or prosthetics.

The remainder of this section presents the operational descriptions of the eight impairment types that meet this General Standard.

4.1.1. Hypertonia

Hypertonia is defined as increased muscle tone which is caused by central nervous system impairment and which results in increased resistance to passive lengthening of the muscle (8). One of the following types of hypertonia must be clearly clinically detectable – i.e., grade 1 on the Ashworth scale – at the wrist, elbow, shoulder, ankle, knee or hip

- a. **Spastic Hypertonia:** which is defined as a velocity dependent resistance to passive movement with a clasp-knife type of resistance (8). Clasp-knife resistance is resistance that is initially high and followed by a sudden relaxation. Velocity-dependence indicates as the speed of the passive movement increases, the resistance becomes greater and starts earlier in the range.

Spastic hypertonicity tends to predominate in the antigravity muscles particularly the flexors of the arms and extensors of the legs and may affect certain parts of the body more than others. In classification, testing for spastic hypertonicity involves rapid, passive movement through the principal ranges of movement at the wrist, elbow, shoulder, ankle, knee or hip and people with clearly clinically detectable spastic hypertonicity are eligible.

When testing for spastic hypertonicity at the ankle or wrist, clonus may be elicited. Clonus is rapid, involuntary alternation of muscle contraction and relaxation and typically occurs in the ankle plantarflexors in response to rapid, passive dorsiflexion or the wrist flexors in response to rapid, passive wrist extension. Clonus that lasts for 4 beats or more and which can be reliably reproduced during a single classification session (i.e., is non-damping clonus) is considered to indicate presence of spastic hypertonicity that meets the general standard and such people are eligible.

- b. **Rigidity:** which is defined as a heightened resistance to passive movement of a limb that is independent of the velocity of stretch and relatively uniform throughout the range of motion of that limb (8). The uniform resistance is often referred to as 'lead pipe' type of resistance. Usually has a predominant pattern with a flexor pattern being more common.
- c. **Dystonia:** which is resistance to passive movement that may be focal (affecting muscles of one limb or joint) or general (affecting the whole body). Contractions are powerful and sustained and cause twisting or writhing of the affected areas^f. The pattern is highly variable – contractions may be fast or slow; painful or not; and the direction of greatest resistance may change regularly (e.g., a limb may move regularly from an extreme flexion pattern to an extreme extension pattern) (8, 17).

^f As the description indicates, dystonia may equally be classified as a type of hypertonia OR a type of involuntary movement pattern.

A person who does not have one of the three types of hypertonia – spastic, rigidity or dystonia – is not eligible. The classification team should satisfy themselves that the resistance to passive lengthening of the muscle is due to central nervous system impairment and the following signs may be useful in this regard:

- Presence of non-damping clonus on the side on which the tone is increased;
- Abnormally brisk reflexes in the limb in which the tone is increased;
- Mild atrophy in the limb in which the tone is increased
- Positive Babinski on the side on which the tone is increased;

4.1.2. Ataxia

Ataxia refers to an unsteadiness, incoordination or clumsiness of volitional movement (8) and eligible ataxias must result from either motor or sensory nervous system dysfunction. Motor ataxias most frequently result from malformation or damage to the cerebellum and are often associated with hypotonia (8). Motor ataxias are poorly compensated for by visual input. Sensory ataxias most frequently result from lower motor neuron damage or spinal cord disease, affecting vestibular function or proprioceptive function. Visual input can help compensate for sensory ataxia and so sensory ataxias are often more evident when eyes are closed (8).

When evaluating an athlete the classification team should be satisfied that the ataxic movement is demonstrable and clearly evident during classification and that the observed ataxia is due to motor or sensory nervous system dysfunction as described. Clearly evident means that characteristically ataxic movement should be observable during at least one of the following tests of voluntary movement:

- finger-to-nose test (athlete touching own nose from the crucifix position);
- finger-to-finger test (classifier presents their index finger and asks the athlete to touch it with their own index finger);
- toe-to-finger test (classifier presents their index finger and asks the athlete to touch it with their toe);
- heel draw test (i.e., draw the heel of one leg along the length of the contralateral shin, from ankle to knee and then in the reverse direction);
- straight line heel-to-toe walking;
- walking

4.1.3. Athetosis

Athetosis refers to unwanted movement and posturing resulting from damage to motor control centres of the brain, most frequently the basal ganglia (8). When evaluating an athlete the classification team should satisfy themselves that athetosis is clearly evident and that it is neurological in origin. Clearly evident athetosis is unwanted movement and posturing that is characteristically athetoid and is observable as at least one of the following:

- involuntary movement of the fingers or upper extremities despite the person trying to remain still
- involuntary movement of the toes or lower extremities despite the person trying to remain still.
- inability to hold the body still – swaying of the body. Swaying should not be due to other neurological deficits such as vestibular or proprioceptive impairments and therefore should not be exacerbated by closing of the eyes;
- characteristic athetoid posturing.

4.1.4. Limb deficiency

Limb deficiency is described in terms of upper and lower limb

4.1.4.a. Limb deficiency – Lower limb

Complete unilateral amputation of half the length of the foot (i.e., measured on the non-amputated foot from the tip of the great toe to the posterior aspect of calcaneus)[§] or equivalent congenital limb deficiency.

4.1.4.b. Limb Deficiency – Upper Limb

4.1.4.b.i. Upper Limb deficiency – eligible for all running (100m – marathon) and jumping (long jump and high jump) events

The types of upper limb deficiency described below meet the General Standard presented on p. 18 and are eligible for ALL running and jumping events offered by IPC Athletics:

- Unilateral amputation, through or above elbow;
- Bilateral amputation through or above wrist (i.e., no carpal bones present in either wrist). Arthrodesed wrist joints are not eligible.
- Unilateral dysmelia in which the length of the affected arm measured from acromion to wrist is equal in length or shorter than the humerus of the unaffected arm (i.e., the length of the hand is not taken into account).
- Bilateral dysmelia in which the combined length of the upper limbs measured from acromion to finger tip is $\leq 0.646 \times$ standing height; that is the length of a normal humerus ($0.193 \times$ standing height) + length of a normal arm ($0.453 \times$ standing height). Both values from Contini (5).

4.1.4.b.ii. Upper Limb deficiency – eligible ONLY for running events from 100m to 400m and jumping (long jump and high jump) events

The types of upper limb deficiency described below DO NOT meet the General Standard presented on p. 18, but have been judged to *alter the biomechanical execution of the crouch start or jumping actions in a way that is demonstrable and which will adversely affect performance*. Athletes with impairments that meet the criteria below but not the criteria in 4.1.4.b.i are ONLY be eligible for 100 – 400m, long jump and high jump (i.e., not running events greater than 400m). The criteria are:

- Unilateral amputation, through or above wrist (i.e., no carpal bones present in affected limb). Arthrodesed wrist joint is not eligible.
- Unilateral dysmelia in which the length of the affected arm measured from acromion to finger tip is equal in length or shorter than the combined length of the humerus and the radius of the unaffected arm.
 - Measuring unaffected arm: For people who can fully extend the elbow, the combined length of humerus and radius can be a single measure of the distance from the acromion to the radial styloid. When full elbow extension cannot be achieved, humerus length (from acromion to superior head of radius) and radius length (from head of radius to radial styloid, measured with hand supinated) should be measured separately and then summed.
 - Measuring affected arm: Length of arm from acromion to finger tip – the length of the hand IS taken into account in this criterion.
- Bilateral dysmelia in which the combined length of the upper limbs measured from acromion to finger tip is $\leq 0.674 \times$ standing height; that is the length from acromion to radial styloid in a normally proportioned body (0.337) multiplied by 2. Values from Contini (5).

NOTE: Minimum disability criteria for upper limb deficiency are relatively unchanged for 100-400m as well as long jump and high jump, but are much more conservative in running events above 400m. Appendix B provides a detailed rationale for these changes.

[§] In surgical terms this description equates closely to a Lisfranc's amputation

4.1.5. Impaired Passive range of movement (PROM)

4.1.5.a. General points

Method of assessment: Unless otherwise indicated, PROM should be assessed using the protocols described by Clarkson (3). In brief, measurement of PROM requires the athlete to relax completely while the classifier moves the joint of interest through the available range. The athlete is relaxed and is not attempting voluntary movement during these tests. Active range of movement or AROM (i.e., where the athlete is asked to move the joint themselves, without assistance) is assessed as a component of conventional muscle power testing (see section on testing muscle power in this document).

Approach used in development: The development of these criteria is based upon research indicating the range of movement required for sprinting (10, 15, 16).

4.1.5.b. Impaired PROM - Lower limb

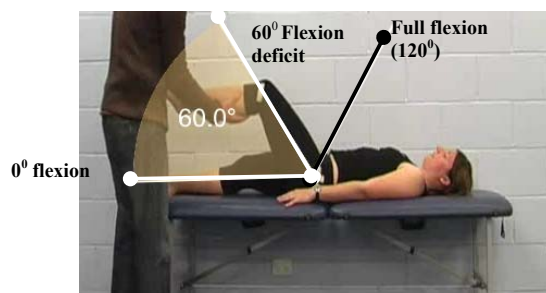
An athlete who has impaired PROM in the lower limbs may be eligible to compete in disability athletics in one of two ways. They may have impaired PROM that meets:

- **one** of the **5 primary** criteria presented in 4.1.5.b.i; OR
- **two** of the **5 secondary** criteria presented in 4.1.5.b.ii.

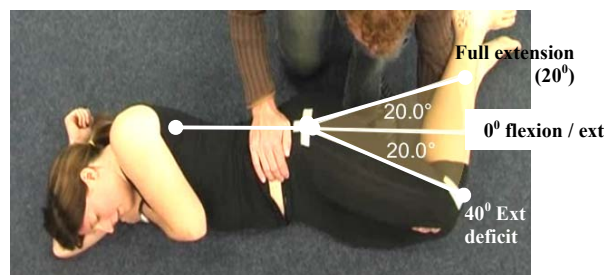
Primary and secondary criteria are presented below.

4.1.5.b.i. Primary Criteria for impaired PROM - Lower limb

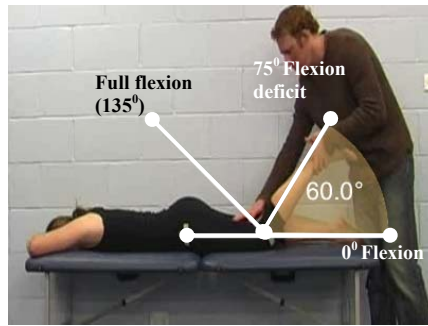
Athletes are eligible if they meet ONE OR MORE of the following criteria



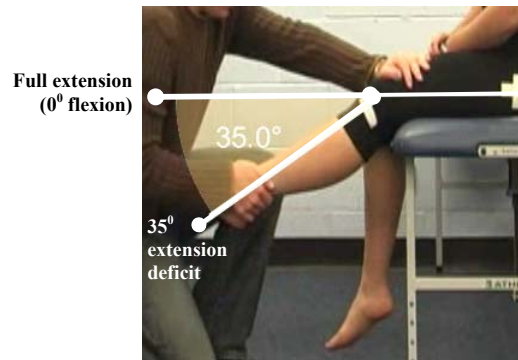
Primary Criterion #1 – Hip flexion deficit of $\geq 60^\circ$. The figure shows normal anatomical range of 120° hip flexion (11) and the maximum amount of hip flexion ROM that is permissible in order to meet this criterion (60° hip flexion).



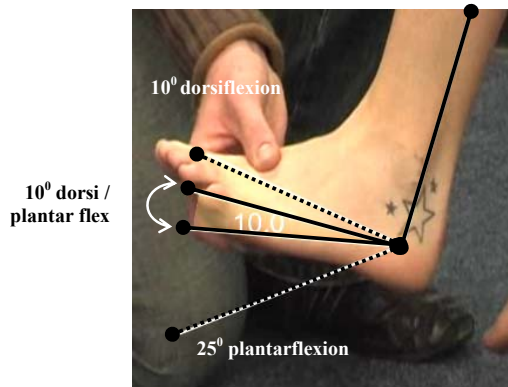
Primary Criterion #2 – Hip Extension deficit of $\geq 40^\circ$. The figure shows normal anatomical range of 20° hip extension (11). The neutral position (0°) is also shown, as is the maximum amount of hip extension ROM that is permissible in order to meet this criterion (40° hip extension deficit).



Primary Criterion #3 – Knee Flexion deficit of $\geq 75^{\circ}$. The figure shows normal anatomical range of 135° knee flexion (11) and the maximum amount of knee flexion ROM that is permissible in order to meet this criterion (60° knee flexion).



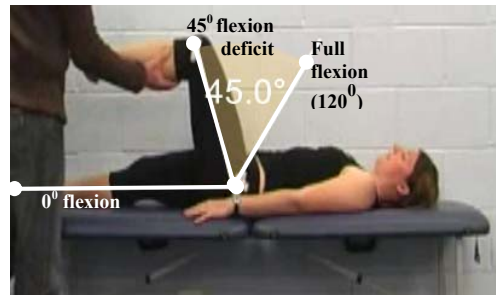
Primary Criterion #4 – Knee Extension deficit of $\geq 35^{\circ}$. The figure shows normal knee extension range – i.e., 0° flexion (11) and the maximum amount of knee extension ROM that is permissible in order to meet this criterion (extension deficit of 35°).



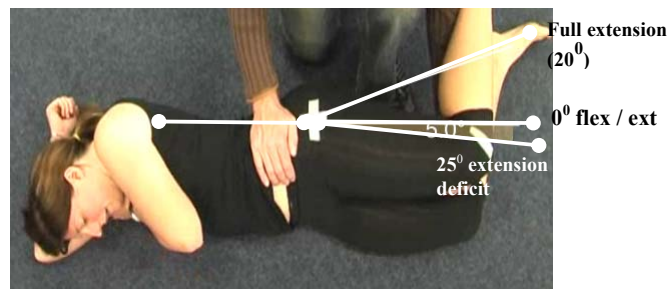
Primary Criterion #5 – Less than or equal to 10° ankle dorsi / plantarflexion available in the range between 10° dorsiflexion and 25° plantar flexion. Test conducted with knee in 90° . The outer (dashed) lines in the figure show 10° dorsiflexion and 25° plantar flexion – this range was chosen because it is the range of ankle movement used in running (15, 16). The inner lines show an example of a 10° arc within this range – this is the maximum PROM is that is permissible in order to meet this criterion. Normal anatomical PROM is not shown in the figure but is 20° dorsiflexion to 45° plantar flexion (11).

4.1.5.b.ii. Secondary Criteria impaired PROM (Lower limb)

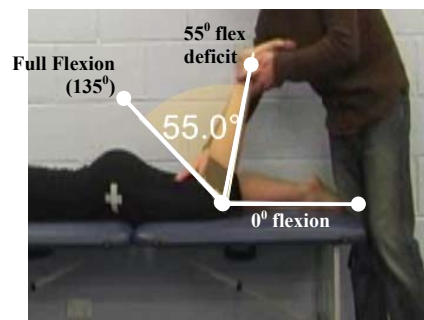
Athletes are eligible if they meet TWO OR MORE of the following secondary criteria



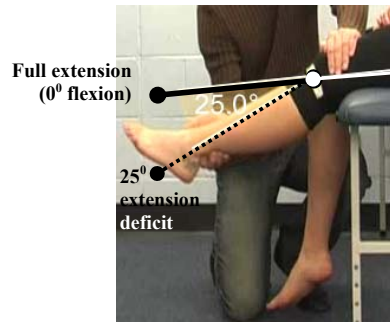
Secondary Criterion #1 – Hip flexion deficit of $\geq 45^{\circ}$ but $< 60^{\circ}$. The figure shows normal anatomical range of 120° hip flexion (11) as well as a 45° flexion deficit – the maximum amount of hip flexion ROM that is permissible in order to meet this criterion. Athletes with $\geq 60^{\circ}$ loss of flexion meet the primary criterion for loss of hip PROM.



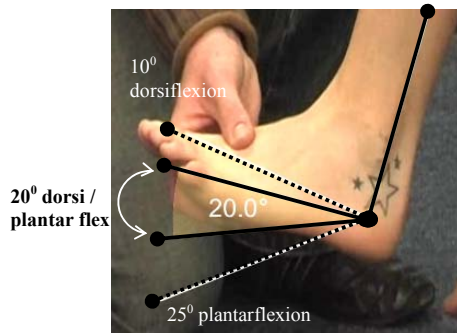
Secondary Criterion #2 – Hip extension deficit of $\geq 25^{\circ}$ but $< 40^{\circ}$. The figure shows normal anatomical range of 20° hip extension (11) as well as the neutral position and a 25° extension deficit (i.e., 5° flexion, just in front of the 0° line). A 25° deficit is the maximum amount of hip extension that is permissible in order to meet this criterion. Athletes with $\geq 40^{\circ}$ loss of extension meet the primary criterion for loss of hip PROM.



Secondary Criterion #3 – Knee flexion deficit of $\geq 55^{\circ}$ but $< 75^{\circ}$. The figure shows normal anatomical range of 135° knee flexion (11) as well as 0° flexion and a 55° flexion deficit – the maximum amount of knee flexion that is permissible in order to meet this criterion. Athletes with $\geq 75^{\circ}$ loss of extension meet the primary criterion for loss of hip PROM.



Secondary Criterion #4 – Knee Extension deficit of $\geq 25^{\circ}$ but $< 35^{\circ}$. The figure shows normal knee extension range – i.e., 0° flexion (11) as well as a 25° extension deficit, the maximum amount of knee extension that is permissible in order to meet this criterion. Athletes with $\geq 35^{\circ}$ loss of extension meet the primary criterion for loss of knee PROM.

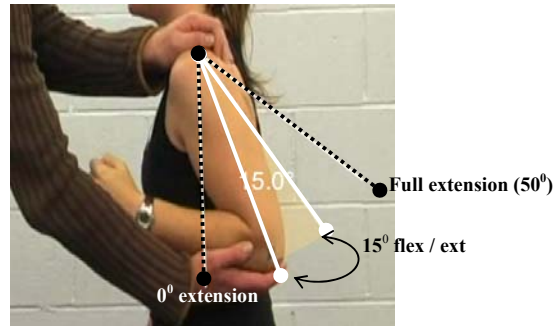


Secondary Criterion #5 – Less than or equal to 20° ankle dorsi / plantarflexion available in the range between 10° dorsiflexion and 25° plantar flexion. Test conducted with knee in 90° . The outer (dashed) lines in the figure show 10° dorsiflexion and 25° plantar flexion – this range was chosen because it is the range of ankle movement used in running (15, 16). The inner lines show an example of a 20° arc within this range – this is the maximum PROM is that is permissible in order to meet this criterion. Athletes with $\leq 10^{\circ}$ PROM available meet the primary criterion for ankle PROM.

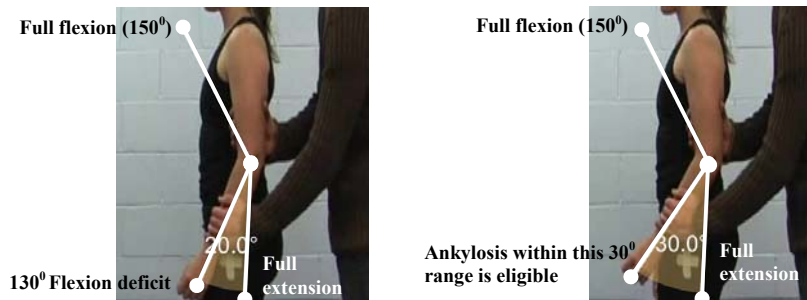
4.1.5.c. Impaired PROM - Upper limb

4.1.5.c.i. Impaired PROM – eligible for all running (100m – marathon) and jumping (long jump and high jump) events

Athletes meeting ONE OR MORE of the following two upper limb criteria meet the General Standard presented on p. 18 and are eligible for ALL running and jumping events offered by IPC Athletics:



Criterion #1 – Less than or equal to 15° shoulder extension available in the range between neutral and 50° extension. The outer (dashed) lines indicate 0° flexion and 50° extension – the range of shoulder movement used in running (10, 15, 16). The inner lines show an example of a 15° arc within this range – this is the maximum PROM is that is permissible in order to meet this criterion. Normal anatomical PROM is not shown in the figure but is 180° flexion 50° extension (11).

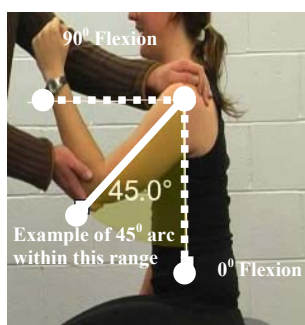


Criterion #2 – Elbow flexion deficit of $\geq 130^\circ$ OR ankylosis in any position in the range 0-30° flexion. The top left figure shows full elbow extension and a flexion deficit of 130° (i.e., max. elbow flexion of 20° from full extension) as well as full flexion of 150°. 20° flexion from full extension is the maximum amount of flexion permissible in order to meet this criterion. The top right figure shows the range in which ankylosis will meet this criterion (from full extension to 30° flexion). Ankylosis outside this range is not eligible. The range of movement used in running is from 80° flexion to 120° flexion (10, 15, 16).

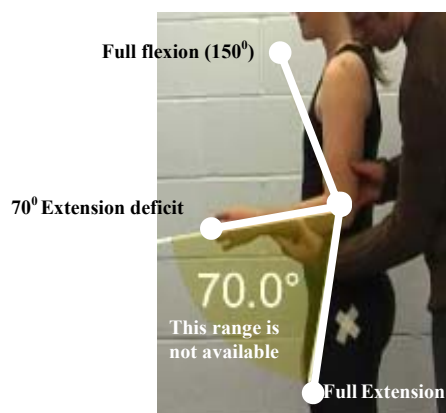
Note: Wrist and fingers are not assessed – athletes with only impairment of wrist ROM are not eligible.

4.1.5.c.ii. Impaired PROM – eligible ONLY for running events from 100m to 400m and jumping (long jump and high jump) events

The types of upper limb deficiency described below DO NOT meet the General Standard presented on p. 18, but have been judged to *alter the biomechanical execution of the crouch start or jumping actions in a way that is demonstrable and which will adversely affect performance*. Athletes with impairments that meet the criteria below but not the criteria in 4.1.5.c.i are ONLY be eligible for 100 – 400m, long jump and high jump (i.e., not running events greater than 400m). The criteria are:



Criterion #1 – Less than or equal to 45° shoulder flexion available in the range between neutral and 90° flexion. The outer (dashed) lines indicate 0° flexion and 90° flexion. The inner lines show an example of a 45° arc within this range – this is the maximum PROM is that is permissible in order to meet this criterion. Normal anatomical PROM is not shown in the figure but is 180° flexion to 50° extension (11).



Criterion #2 – Elbow extension deficit of $\geq 70^\circ$ or ankylosis of the elbow $\geq 80^\circ$ flexion. The outer lines in the figure indicate full elbow flexion (150°) and full elbow extension. The middle line shows an extension deficit of 70° (indicated in the picture). Ankylosis in 80° elbow flexion or a greater amount of flexion will also meet this criterion.

NOTE: Minimum disability criteria for upper limb impairments of PROM are generally more conservative than previously. The following impairments of PROM were previously eligible but are no longer:

- Shoulder flexion of $\leq 135^\circ$;
- Elbow extension deficit of 45° ;
- Wrist ankylosis

This is because these impairments do not have a sufficiently adverse impact on the biomechanical execution of running, jumping or crouch start.

4.1.6. Impaired Muscle Power

4.1.6.a. General points

Classifiers should satisfy themselves that impaired muscle power results from injury or pathological deficits in the neuromusculoskeletal system and not from chronic disuse.

Method of assessment: Muscle power will be assessed according to the Daniels and Worthingham (D&W) scale published in the 2002 (11). The scale has 6 levels, from 0-5:

- 5: normal muscle power through available ROM
- 4: active movement through available ROM, against gravity plus some resistance
- 3: active movement through full available ROM against gravity but no resistance
- 2: active movement with gravity eliminated (some movement against gravity may be possible, but not full range);
- 1: trace muscle activity but no movement of the limb
- 0: No muscle activity

NOTE: While manual muscle testing methods in this System are based upon the published D&W text (11), some elements have been modified in order to make the grades more relevant to the sport of athletics. These modifications are described in some detail in Appendix E.

Approach used in development: Not all muscle actions make an equal contribution to running (for example, hip extension is much more important to running performance than hip adduction). Therefore criteria have been developed for the major individual muscle actions of both the lower limb and upper limb (e.g., impaired power for hip flexion, hip ext, shoulder extension etc). The main muscles actions of the upper and lower limbs have been divided into three categories:

- “principal” – those muscle actions making direct or major contribution to the generation of forward momentum;
- “supporting” – muscle actions contributing indirectly to generation of forward momentum by stabilizing segments or providing counter-rotational movements;
- “minimal impact” – muscle actions which would be unlikely to meet the general standard, even if they were severely weakened.

Because Principal muscle actions are more important, fewer muscle grade points need to be lost from these actions in order to meet the General standard, than the Supporting muscle actions.

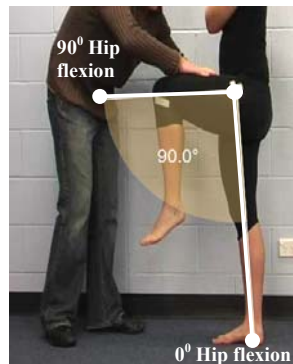
4.1.6.b. Impaired muscle power - Lower limb

An athlete who has impaired muscle power in the lower limbs may be eligible to compete in disability athletics in one of two ways. They may have impaired muscle power that meets:

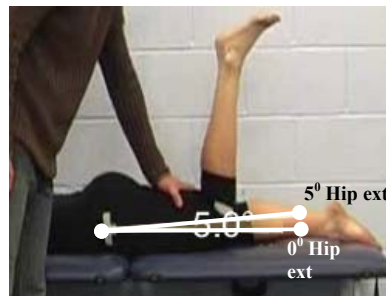
- **One** of the **7 primary** criteria presented in 4.1.6.b.i; OR
- Two or more of **5 secondary** criteria presented in 4.1.6.b.ii.

Primary Criteria for impaired muscle power (lower limb)

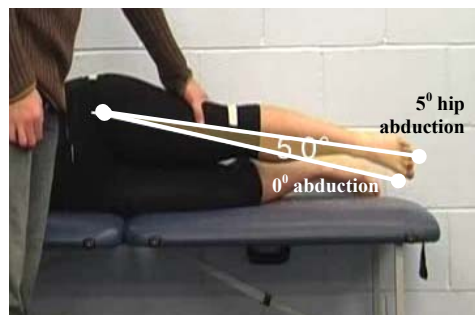
Athletes are eligible if they meet ONE OR MORE of the following criteria



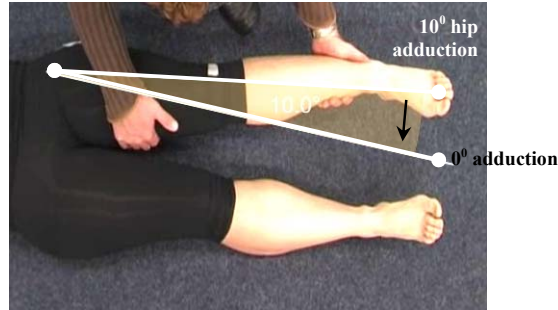
Primary Criterion #1 – Hip flexion loss of 3 muscle grade points (muscle grade of two). The figure shows manual resistance being applied at 90° hip flexion. To meet this criterion the athlete should not be able to actively flex the hip to 90° against gravity OR, if PROM is <90°, should not be able to actively flex through available PROM.



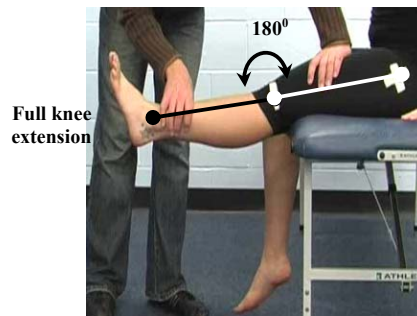
Primary Criterion #2 – Hip extension loss of 3 muscle grade points (muscle grade of two). The figure shows manual resistance being applied at 5° hip extension. To meet this criterion the athlete should not be able to actively extend the hip 5° against gravity.



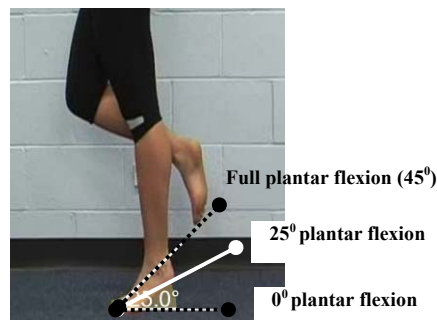
Primary Criterion #3 – Hip Abduction loss of 3 muscle grade points (muscle grade of two). The figure shows manual resistance being applied at 5° hip abduction. To meet this criterion the athlete should not be able to actively Abduct the hip 5° against gravity.



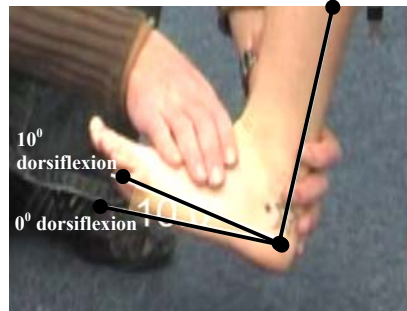
Primary Criterion #4 – Hip Adduction loss of 4 muscle grade points (muscle grade of one). The figure shows the athlete in a gravity eliminated position for adduction and the examiner has moved the leg into 10° of abduction. To meet this criterion the athlete should not have any active adduction in the direction of the arrow.



Primary Criterion #5 – Knee extension loss of 3 muscle grade points (muscle grade of two). The figure shows manual resistance being applied at full knee extension (0° flexion). To meet this criterion the athlete should not be able to fully extend the knee against gravity OR, if knee extension is restricted, should not be able to actively extend through available PROM.



Primary Criterion #6 – Ankle plantar flexion loss of 3 muscle grade points (muscle grade of two). The outer (dashed) lines on the figure show 0° plantar flexion and 45° plantar flexion (normal anatomical AROM). The centre line shows the athlete raising her heel in 25° plantar flexion. In the Daniels and Worthingham system plantar flexion is tested differently to all other muscle groups (11). Below is the method with the range of movement adjusted from full anatomical to 25° (the ROM required for running). **Grade 5 = can do 20** single leg heel rises to 25°; **Grade 4 = can do 10-19** single leg heel rises to 25°; **Grade 3 = can do 1-9** single leg heel rises to 25°; **Grade 2 = can't complete 1** heel rise to 25°. In lying may complete full ROM with resistance. **Grade 1 =** in lying, trace muscle activity but no actual movement



Primary Criterion #7 – At least two of the following three muscle actions must have a loss of 3 points each: Ankle Dorsiflexion, Ankle Eversion, and Ankle Inversion. Test conducted in sitting, knee in 90°. The top left figure shows inversion and eversion and the top right shows 0° dorsiflexion and 10° dorsiflexion. To meet this criterion the athlete must not be able to perform two of the following movements:

- Active eversion through available PROM;
- Active inversion through available PROM;
- Active dorsiflexion to 10°.

Muscle power in knee flexion is not expressly examined as an independent criterion. Knee flexors are active in late swing and act to retard forward swing of the leg. Impaired power would only result in a more rapid knee extension prior to contact and therefore this is not important. Moreover the main knee flexors contribute to other Principal muscle actions - Hamstrings perform hip extension and Gastrocnemius plantar flexes – so any weakness in these muscles will be reflected in assessment of those actions.

4.1.6.b.i. Secondary Criteria for impaired muscle power (lower limb)

An athlete will be eligible to compete in wheelchair racing or running and jumps if they lose a total of 6 muscle grade points in the following 5 “principal” muscle actions^h:

- Hip Flexion
- Hip Abduction
- Ankle Plantar Flexion
- Hip Extension
- Knee Extension

Two of the movements must have a loss of 2 points (i.e., a combination of 4 x 1 point losses and 1x 2 point loss would not meet this criterion').

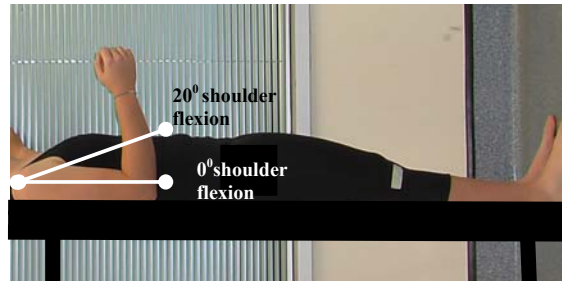
^h Only the “Principal” muscle actions were considered in the combined impairment criterion since decreases in the power of these actions would be cumulative, decreasing the overall propulsion the athlete is able to generate.

ⁱThis is principally because, according to the authors of the Daniel’s and Worthingham muscle testing manual, the grade of 4 is the most difficult to grade reliably, due to the subjectivity of deciding whether resistance is “normal” or “below normal”)

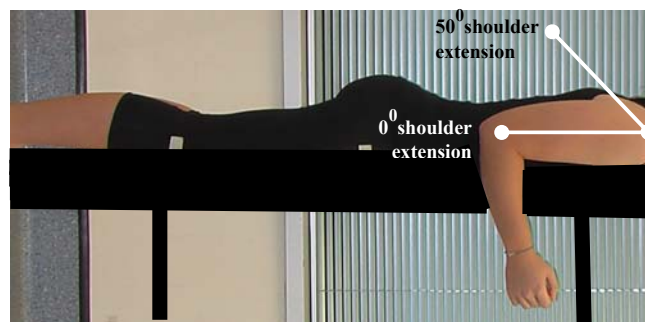
4.1.6.c. Impaired muscle power - Upper limb

4.1.6.c.i. Impaired muscle power – eligible for all running (100m – marathon) and jumping (long jump and high jump) events

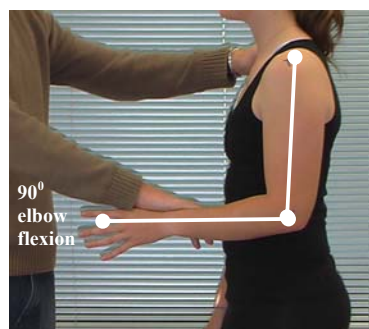
Athletes meeting ONE OR MORE of the following three upper limb criteria meet the General Standard presented on p. 18 and are eligible for ALL running and jumping events offered by IPC Athletics:



Criterion #1 – Shoulder flexion loss of 3 muscle grade points (muscle grade of two). The figure shows the athlete lying in supine with the shoulder in 0° flexion and a line representing 20° flexion. To meet this criterion the athlete should not be able to flex the shoulder to 20° OR if shoulder PROM is <20°, should not be able to actively flex through available PROM.



Criterion #2 – Shoulder extension loss of 3 muscle grade points (muscle grade of two). The figure shows the athlete lying prone, shoulder in 0° extension and a line representing 50° extension. To meet this criterion the athlete should not be able to extend the shoulder to 50° OR if shoulder PROM is <50°, should not be able to actively extend through available PROM.



Criterion #3 – Elbow flexion loss of 3 muscle grade points (muscle grade of two). The figure shows manual resistance applied at 90°. To meet this criterion the athlete should not be able to actively flex the elbow to 90° against gravity OR, if PROM is <90°, should not be able to actively flex through full available PROM.

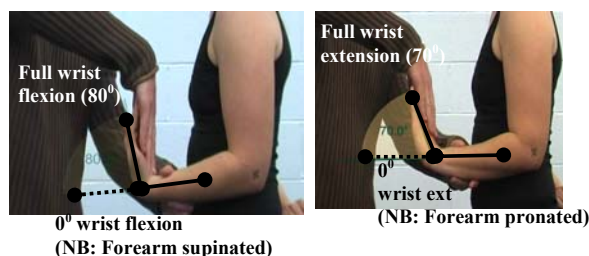
Note: Elbow extension and muscle power of the wrist and fingers are not assessed.

4.1.6.c.ii. Impaired muscle power – eligible ONLY for running events from 100m to 400m and jumping (long jump and high jump) events

The types of upper limb deficiency described below DO NOT meet the General Standard presented on p. 18, but have been judged to *alter the biomechanical execution of the crouch start or jumping actions in a way that is demonstrable and which will adversely affect performance*. Athletes with impairments that meet the criteria below but not the criteria in 4.1.6.c.i are ONLY be eligible for 100 – 400m, long jump and high jump (i.e., not running events greater than 400m). The criteria are:



Criterion #1 – Loss of 3 muscle grade points in elbow extension (i.e., grade 2 elbow extensors). The figure shows manual resistance applied at full elbow extension, with the shoulder fully flexed. To meet this criterion the athlete should not be able to actively fully extend the elbow against gravity OR, if PROM is restricted, should not be able to actively extend through available PROM.



Criterion #2 – a loss of 3 muscle grade points (i.e., muscle grade of 2) in wrist flexion AND wrist extension. This criterion has two parts – athletes must meet both parts to meet the criterion.

Wrist flexion: The figure in the top left shows manual resistance being applied at 80° wrist flexion. To meet this criterion the athlete should not be able to actively flex the wrist 80° against gravity OR, if wrist PROM is <80° flexion, should not be able to actively flex through available PROM;

AND

Wrist Extension: The figure second from the left shows manual resistance being applied at 70° wrist extension. To meet this criterion the athlete should not be able to actively extend the wrist 70° against gravity OR, if wrist PROM is <70° extension, should not be able to actively extend through available PROM.

NOTE: Minimum disability criteria for upper limb impairment of muscle power are relatively unchanged for 100-400m as well as long jump and high jump, but are much more conservative in running events

above 400m. The following impairments of muscle power were previously eligible for events above 800m but are no longer:

- Wrist: grade 2 muscle power in wrist flexion, extension.

This is because this impairment does not have a sufficiently adverse impact on the biomechanical execution of the running action.

4.1.7. Leg length difference

The difference in length between right and left legs should be at least 7cm. To measure, the athlete should lie supine with legs relaxed and fully extended. Measure from anterior superior iliac spine to the tip of the medial malleolus on each leg and then compare.

4.1.8. Short stature

To be eligible for class T40, T41, F40 or F41, an athlete must be > 18 yrs of age.

Males

Maximum standing height permitted is 145cm, which is 2 standard deviations above the mean standing height for male achondroplastic dwarves (12). The maximum arm length permitted is 66cm, measured from the acromion to the tip of the longest finger of the longest arm. The measure should be taken regardless of elbow contracture because the effective length of the arm is reduced by such an impairment. This arm length is proportionate for a male of standing height 145cm (5) and approximately 2 standard deviations above the mean arm length for a male achondroplastic dwarf of 145cm. The sum of standing height + length of longest arm must be ≤ 200 cm.

To be eligible for T41, male athletes must meet all of the following criteria:

- Standing height <145cm; AND
- Arm length <66cm; AND
- Sum of standing height plus arm length <200cm.

Females

Maximum standing height permitted is 137cm, which is 2 standard deviations above the mean standing height for female achondroplastic dwarves (12). The maximum arm length permitted is 63cm, measured from the acromion to the tip of the longest finger of the longest arm. The measure should be taken regardless of elbow contracture because the effective length of the arm is reduced by such an impairment. This arm length is proportionate for a female of standing height 137cm (5) and approximately 2 standard deviations above the mean arm length for a female achondroplastic dwarf of 137cm. The sum of standing height + length of longest arm must be ≤ 190 cm.

To be eligible for T41, female athletes must meet all of the following criteria:

- Standing height <137cm; AND
- Arm length <63cm; AND
- Sum of standing height plus arm length <190cm.

4.2. Class profiles for wheelchair racing, running and jumps

Note that previously, athletes competing in long jump or high jump were allocated a class that was preceded by the letter “F” – for example F44. In this system athletes competing in jumps will receive a class preceded by the letter “T” – for example T44.

4.2.1. Wheelchair racing class profiles for athletes affected by hypertonia, athetosis or ataxia

Note: In classes T31 to T34, spasticity grades refer to the Ashworth scale (1) , reproduced below

Grade 0:	No increase in tone
Grade 1:	Slight increase in tone giving a “catch” when the limb is flexed or extended
Grade 2:	More marked increase in tone, but limb is easily flexed
Grade 3:	Considerable increase in tone with passive movement difficult
Grade 4:	Limb rigid in flexion or extension

4.2.1.a. Class T31

Propels wheelchair more efficiently with the feet than with arms (old CP2 – Lower)

Quadriplegic - Severe to moderate involvement. Spasticity Grade 3+ to 3 with or without athetosis. Severe athetoid or quadriplegic with more function in less affected side. Poor functional strength in all extremities and trunk but able to propel a wheelchair with feet.

Lower Extremities-A demonstrable degree of function in one or both lower limbs allowing propulsion of the wheelchair automatically qualifies individual as a Class T31. If the classification team determines that the upper limb function is more appropriate for T33 or higher then the athlete does not qualify as Class T31, however an athlete with arm function equivalent to class T32 may choose to propel the chair with their feet. Class T31 athletes can sometimes ambulate but never run functionally.

Static trunk control is fair. Dynamic trunk control is poor as demonstrated by the obligatory use of upper extremities and/or head to assist in returning to the mid-line (upright position).

Upper extremities. Hand severe to moderate involvement. Spasticity Grade 3.

4.2.1.b. Class T32

Quadriplegic -Severe to moderate involvement. Spasticity Grade 3+ to 3 with or without athetosis. Severe athetoid or quadriplegic with more function in less affected side. Poor functional strength in all extremities and trunk but able to functionally propel a wheelchair with arms. Class 32 athletes can sometimes ambulate but never run functionally.

Static trunk control is fair. Dynamic trunk control is poor as demonstrated by the obligatory use of upper extremities and/or head to assist in returning to the mid-line (upright position).

Upper extremities. Hand severe to moderate involvement. Spasticity Grade 3.

A Class 32 athlete often has a cylindrical or spherical grasp, and can demonstrate sufficient dexterity to manipulate and throw a ball, but will exhibit poor grasp and release. Throwing motions must be tested for effects on hand function. Wheelchair propulsion with upper extremities is also demonstrable. Active range of movement is moderately to severely impaired, thus hand function is the key.

Class 32 athletes with athetosis may demonstrate fair rotation during throwing with unreliable release. For athletes with spasticity or athetosis the trunk makes a very limited contribution to propulsion of the implement.

4.2.1.c. Class T33

Quadriplegic, triplegic, severe hemiplegic – Moderate (asymmetric or symmetric) quadriplegic or severe hemiplegic in a wheelchair with almost full functional strength in dominant upper extremity. It is rare for an athlete with athetosis to be included within this class unless he/she presents with a predominantly hemiplegic or triplegic profile with almost full function in the dominant upper limb. Can propel a wheelchair independently.

Lower extremities-spasticity Grade 4 to 3-some demonstrable function can be observed during transfer. May be able to ambulate with assistance or assistive devices but only for short distances.

Trunk control-fair trunk control is shown when pushing chair, but forward trunk movement is often limited to extensor tone during forceful pushing. Some trunk movement can be noted also in throwing for postural correction, but throwing motions are mostly from the arm. This is a major factor in non-ambulatory capability – rotation is limited. Spasticity Grade 2+.

Upper extremities-moderate limitation spasticity Grade 2+ in dominant arm shown as limitation in extension and follow through.

Hand function-dominant hand may demonstrate cylindrical and spherical grasp, with poor finger dexterity demonstrable in release of shot and discus.

In order to differentiate between Class T33 and T34, trunk mobility in propulsion of the chair, and hand function are important. If an athlete demonstrates a very poor ability to use rapid trunk movements in the pushing motion, or significant asymmetry in the arm action or grasp and release which impedes the development of forward momentum, he/she is a Class T33. An athlete using only one arm for wheelchair propulsion may have long strokes and rapid grasp and release in the dominant arm and still be Class T33.

4.2.1.d. Class T34

Diplegic – Moderate to Severe involvement. Good functional strength with minimal limitation or control problems noted in upper limbs and trunk.

Lower Extremities-Moderate to severe involvement in both legs Spasticity Grade 4 to 3 usually rendering them non-functional for ambulation over long distances without the use of assistive devices. A wheelchair is usually the choice for sport.

Trunk-spasticity Grade 2 to 1. Minimal limitation of trunk movements when wheeling and throwing. In some athletes fatigue can increase spasticity which can be overcome with proper positioning. When standing, poor balance is obvious even using assistive devices.

Upper extremities – the upper limbs often show normal functional strength.

Minimal limitation of range of movement may be present but close to normal follow through and propulsion is observed when throwing or wheeling.

Hand function-normal cylindrical/spherical opposition and prehensile grasp is seen in all sports. Limitation if any is usually apparent only during rapid fine motor tasks. It should be remembered that diplegia implies that there is more spasticity in the lower than the upper extremities. Some involvement spasticity Grade 2+ to 1 can be seen particularly in functional movements of the hands, arms and trunk.

When propelling the chair the athlete is able to perform long and forceful strokes, with rapid grasp and release, although fine movements of the hands may be affected. During propulsion these fine movements are not essential. Strong trunk movements in forward and backward direction support the arm strokes. If these movements do not occur the trunk is well balanced and forms a stable base for the arm movements. When the wheelchair makes a curve, the trunk follows the wheelchair without disturbance of balance.

4.2.2. Wheelchair racing class profiles for athletes affected by limb deficiency, impaired PROM, impaired muscle power or leg length difference

The class profiles for athletes in these groups are written in terms of the muscle power that an athlete is likely to have. If an athlete has an impairment that is not directly related to impaired muscle power (e.g., loss of range of movement, amputation) then it is important to use judgement and experience try to match this impairment with the most appropriate class profile.

4.2.2.a. Class T51

These athletes will usually have elbow flexion and wrist dorsiflexion muscle power to grade 5, a decrease of shoulder muscle power especially pectoralis major, and triceps muscle power from grade 0-3.

Use elbow flexors and wrist dorsiflexors for propulsion. Sit in an upright position with knees under the chin. Have large push rims. Equivalent activity limitation to person with complete cord injury at cord level C5-6.

4.2.2.b. Class T52

These athletes will usually have normal shoulder, elbow and wrist muscle power, poor to normal muscle of the finger flexors and extensors with there being wasting of the intrinsic muscles of the hands.

Use shoulders, elbows and wrist for propulsion. Usually have no trunk function. May use gloving techniques similar to the next two classes. Equivalent activity limitation to person with complete cord injury at cord level C7-8

4.2.2.c. Class T53

These athletes will have normal arm muscle power with no abdominal or lower spinal muscle activity.

Use different techniques to compensate for lack of abdominal musculature including lying horizontal.

When the paces quickens in a race, their acceleration is slower than the T54 class. In general when acceleration occurs, the trunk rises off the legs due to a lack of abdominal muscles to hold the trunk down.

Usually have to interrupt the pushing cycle to adjust the compensator. Equivalent activity limitation to person with complete cord injury at cord level T1-7.

4.2.2.d. Class T54

These athletes will have normal arm muscle power with a range of trunk muscle power extending from partial trunk control to normal trunk control. Athletes who compete in this group may have significant leg muscle power.

These athletes have reasonable to normal trunk control which allows them to hold their trunk down when the propulsion force is applied to the push rim. Usually do not interrupt the pushing cycle to adjust the compensator. Can shift direction of the chair by sitting up and applying a trunk rotational force to the chair. Equivalent activity limitation to person with complete cord injury at cord level T8-S4.

Athletes competing in this class must meet one or more of the minimum disability criteria presented in Section 4.1.4 (limb deficiency), 4.1.5 (impaired PROM) and 4.1.6 (impaired muscle power) or 4.1.7 (leg length difference).

4.2.3. Running and jumping class profiles for athletes affected by hypertonia, athetosis or ataxia

Note: In classes T35 to T38, spasticity grades refer to the Ashworth scale (1) , reproduced below

Grade 0:	No increase in tone
Grade 1:	Slight increase in tone giving a “catch” when the limb is flexed or extended
Grade 2:	More marked increase in tone, but limb is easily flexed
Grade 3:	Considerable increase in tone with passive movement difficult
Grade 4:	Limb rigid in flexion or extension

4.2.3.a. Class T35

Diplegic – Moderate involvement. This individual may require the use of assistive devices in walking but not necessarily when standing or throwing. A shift of centre of gravity may lead to loss of balance. A Triplegic may appear in this Class.

Lower extremities-spasticity Grade 3 to 2. Involvement of one or both legs which may require assistive devices for walking. A Class T35 athlete must have sufficient function to run on the track. Athletes who can perform this task but with difficulty should consider competing in wheelchair racing in Class T34. Balance - usually has normal static balance but exhibits problems in dynamic balance e.g. attempting a spin or throwing forcefully.

Upper extremities. This is an area where variation occurs. Some moderate to minimal limitation in upper extremities can often be seen particularly when throwing, but strength is within normal limits. Hand function – normal cylindrical/spherical, opposition and prehensile grasp and release in the dominant hand is seen in all sports.

4.2.3.b. Class T36

Athetoid or Ataxic – moderate involvement. The athlete ambulates without assistive devices. Athetosis is the most prevalent factor, although some ambulant spastic quadriplegics (i.e. more arm involvement than in ambulant diplegics), may fit this Class. Athetosis means unsteady (writhing), not having the capability to remain still. All four limbs will usually show functional involvement in sports movements. Class T36 athletes have more control problems in upper limbs than Class 35 athletes, although the T36 athlete usually has better function in lower limbs particularly when running.

Lower extremities. Function can vary considerably depending on the sports skill involved, from poor, laboured, slow walking to a running gait, which often shows better mechanics. There can be a marked contrast between the walking athetoid with uncoordinated gait and the smooth even paced co-coordinated running/cycling action. Cyclical movements however are much better performed like cycling, running and free-style swimming.

Balance. May have good dynamic balance compared with static balance. Spasticity is common in Class 36 athletes and should not be a reason for placement in Class 35.

Upper extremities and hand control-grasp and release can be significantly affected when throwing in the moderate to severe athetoid athlete. The more spasticity present, the greater the limits on follow through and maintenance of balance after throwing.

For the T36 athlete, holding the ‘set’ position may present difficulties (e.g. false starts). Explosive movements also are difficult to perform. This is demonstrated in the long jump where an athlete may have good speed but the height from the board is poor and subsequently the distance covered is rather limited.

4.2.3.c. Class T37

This Class is for the true ambulant hemiplegic athlete. A Class T37 athlete has spasticity Grade 3 or 2 in one half of the body. They walk without assistive devices but often with a limp due to spasticity in the lower limb. Good functional ability in dominant side of the body.

Lower extremities – hemiplegia spasticity Grade 3 to 2. Dominant side has better development and good follow through movement in walking and running. Athlete has difficulty walking on his heels and has significant difficulty with hopping on the impaired leg. Side stepping towards the impaired side is also affected. Athletes with moderate minimal athetosis do not fit into this Class.

Upper extremities – arm and hand control is only affected in the non-dominant side. There is good functional control on the dominant side.

In walking the Class T37 athlete demonstrates a limp on the affected side. While running the limp may disappear almost totally. The reason is that in walking the leg support during stance phase begins with a heel strike. This is the most difficult action for persons with a spastic paresis. In running only the forefoot hits the ground, providing support and push off. The tight calf muscle in the Class T37 athletes facilitates the push off, and heel strike is not necessary. Thus a more normal looking running pattern.

The Class T37 athlete demonstrates a weakness in knee pick up in sprinting and an asymmetrical stride length due to lack of full forward pelvic rotation and hamstring spasticity decelerating the lower leg too rapidly on the involved side.

4.2.3.d. Class T38

This class is for the athletes who are affected by hypertonia, ataxia or athetosis which causes sufficient activity limitation to meet the General Standard for running. The criteria for these impairments are presented in Section 4.1.1 (hypertonia), 4.1.2 (ataxia) and 4.1.3 (athetosis).

Comparison with Class T38 pre-2008: Because of the requirement for “clearly clinically detectable hypertonia at the wrist, elbow, shoulder, ankle, knee or hip”, some athletes previously eligible for Class 38 will no longer be eligible. For example, athletes without clinically detectable hypertonicity but who had unilateral Babinski and mild atrophy (one major sign and one minor sign in the old system) were previously eligible. Such impairments will no longer be eligible for IPC Athletics because it was decided that such impairments would not meet the General Standard for Running (see Section 4.1).

4.2.3.e. Special note Class T35/F36

Quadriplegic - athetoid or ataxic with spasticity. Moderate involvement.

Lower extremities - spasticity Grade 3 or 2. Involvement of both legs and with sufficient function to run on the track. Usually has good static balance but exhibits problems in dynamic balance activities.

Upper extremities - athetosis is the most prevalent factor and athlete demonstrates significantly more control problems than the T/F35 athlete. Hand control, grasp and release are affected when throwing.

By splitting classes athletes who fit this profile are able to run with T35 track athletes and throw with F36 athletes.

4.2.4. Running and jumping class profiles for athletes affected by limb deficiency, impaired PROM, impaired muscle power, leg length difference or short stature

4.2.4.a. Class T40

To be eligible for class T40 an athlete must be > 18 yrs of age.

Males

Maximum standing height permitted is 130cm, which is the mean standing height for male achondroplastic dwarves (12). The maximum arm length permitted is 59cm, measured from the acromion to the tip of the longest finger of the longest arm. The measure should be taken regardless of elbow contracture because the effective length of the arm is reduced by such an impairment. This arm length is proportionate for a male of standing height 130cm (5) and approximately 2 standard deviations above the mean arm length for a male achondroplastic dwarf of 130cm. The sum of standing height + length of longest arm must be \leq 180cm.

To be eligible for T40 males must meet all of the following criteria:

- Standing height \leq 130cm; AND
- Arm length \leq 59cm; AND
- Sum of standing height plus arm length $<$ 180cm.

Athletes who are \leq 130cm but who do not meet either of the other two criteria are eligible for class T41.

Females

Maximum standing height permitted is 125cm, which is the mean standing height for female achondroplastic dwarves (12). The maximum arm length permitted is 57cm, measured from the acromion to the tip of the longest finger of the longest arm. The measure should be taken regardless of elbow contracture because the effective length of the arm is reduced by such an impairment. This arm length is proportionate for a female of standing height 125cm (5) and approximately 2 standard deviations above the mean arm length for a female achondroplastic dwarf of 125cm. The sum of standing height + length of longest arm must be \leq 173cm.

To be eligible for T40, female athletes must meet all of the following criteria:

- Standing height \leq 125cm; AND
- Arm length \leq 57cm; AND
- Sum of standing height plus arm length $<$ 173cm.

Athletes who are \leq 125cm but who do not meet either of the other two criteria are eligible for class T41.

4.2.4.b. Class T41

To be eligible for class T41 an athlete must be > 18 yrs of age.

Males

Maximum standing height permitted is 145cm, which is 2 standard deviations above the mean standing height for male achondroplastic dwarves (12). The maximum arm length permitted is 66cm, measured from the acromion to the tip of the longest finger of the longest arm. The measure should be taken regardless of elbow contracture because the effective length of the arm is reduced by such an impairment. This arm length is proportionate for a male of standing height 145cm (5) and approximately 2 standard deviations above the mean arm length for a male achondroplastic dwarf of 145cm. The sum of standing height + length of longest arm must be \leq 200cm.

To be eligible for T41, male athletes must meet all of the following criteria:

- Standing height \leq 145cm; AND
- Arm length \leq 66cm; AND
- Sum of standing height plus arm length \leq 200cm.

Females

Maximum standing height permitted is 137cm, which is 2 standard deviations above the mean standing height for female achondroplastic dwarves (12). The maximum arm length permitted is 63cm, measured from the acromion to the tip of the longest finger of the longest arm. The measure should be taken regardless of elbow contracture because the effective length of the arm is reduced by such an impairment. This arm length is proportionate for a female of standing height 137cm (5) and approximately 2 standard deviations above the mean arm length for a female achondroplastic dwarf of 137cm. The sum of standing height + length of longest arm must be ≤ 190 cm.

To be eligible for T41, female athletes must meet all of the following criteria:

- Standing height ≤ 137 cm; AND
- Arm length ≤ 63 cm; AND
- Sum of standing height plus arm length ≤ 190 cm.

Comparison with pre-2008: Prior to 2007 there was no running class for people of short stature – there was only one class for people of short stature – F40 – and it was for field events only. Clearly people with a health condition causing short stature that meets these criteria will have difficulty in running. A more detailed explanation of why two classes were created and how the criteria were decided upon is in Section 5.2.4.b. Note that not everyone who was previously eligible for the F40 class will be eligible for T40, because the criteria have been changed so that there is a maximum permissible arm length and some athletes will be excluded because their arms are too long.

4.2.4.c. General Comment classes T42 – 46

The class profiles for athletes in these groups are written principally in terms of limb deficiency. If an athlete has an impairment other than limb deficiency (e.g., loss of muscle power) then it is important to use judgement and experience to try to match this impairment with the most appropriate class profile.

4.2.4.d. Class T42

Single above knee amputees and athletes with other impairments that are comparable to a single above knee amputation. This includes athletes with loss of muscle power in the lower limbs consistent with Class F57 or F58 class.

Comparison with Class T42 pre-2008: Changes in minimum disability criteria for the lower limbs means that there will be a greater variety of impairment presentations and, until the next phase of research is completed, classifiers will have to judge whether the activity limitations they cause are closer to those caused by single above knee amputations (T42), single below knee amputations (T44) or double below knee amputations (T43).

4.2.4.e. Class T43

Double below knee amputees and other athletes with impairments that are comparable to a double below knee amputation. This includes athletes with loss of muscle power in the lower limbs consistent with Class F57 or F58.

To calculate maximum prosthetic length, the following procedure should be followed:

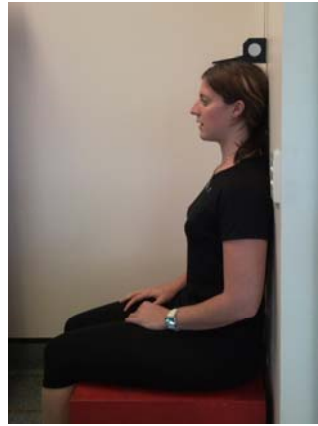
For Males

- a. Measure sitting height as indicated in the figure below - this length is $0.52 \times$ standing height (5);
- b. To calculate expected standing height, divide sitting height by 0.52.
- c. Have the athlete don the prosthetics they will compete in and measure their standing height. This measurement should be less than or equal to calculated standing height. Athletes are not permitted to compete in prosthetics which increase standing height beyond the calculated standing height.

SPECIAL NOTE: Competition organisers should have systems in place to ensure that athletes in this class compete using the same prosthetics used in classification (e.g., a unique, indelible mark or stamp placed on both prostheses at the time of classification). Without this procedure, the classification can be circumvented.

For Females

Follow the same procedure but use 0.533 as the conversion factor (5).



Measuring sitting height: Athlete sits fully erect on a backless box with back and head against a wall, thighs parallel to the ground, neck in neutral position (not flexed or extended), eyes facing straight ahead. The height of the highest point of the head is marked against the wall and sitting height is the distance from seat surface to the mark on the wall.

Comparison with Class T43 pre-2008: Changes in minimum disability criteria for the lower limbs means that there will be a greater variety of impairment presentations and, until the next phase of research is completed, classifiers will have to judge whether the activity limitations they cause are closer to those caused by single above knee amputations (T42), single below knee amputations (T44) or double below knee amputations (T43).

4.2.4.f. Class T44

This class is for any athlete with a lower limb impairment/s that meets minimum disability criteria for:

- lower limb deficiency (section 4.1.4.a);
- impaired lower limb PROM (section 4.1.5.b);
- impaired lower limb muscle power (section 4.1.6.b); or
- leg length difference (section 4.1.7).

Comparison with Class T44 pre-2008: Minimum disability criteria for lower limb impairments are more relaxed in this System than they were prior to 2007 because it was felt that there were impairments that did not meet minimum disability criteria in the previous system but which most definitely met the General Standard for Running (see 4.1). Following are previous minimum disability criteria with some examples of how they have been relaxed in this system:

- Through ankle amputation was previously required but it was decided that through foot amputation – either bilateral or unilateral – would affect running (see 4.1.4a for exact wording);
- Loss of 10 muscle power points in the lower limbs was previously required. However it was decided that, depending how important a given muscle group was to running, loss of as few as 3 points would affect running (e.g., a person with grade 2 hip flexors in one leg). Some people with muscle power loss of 10 points will be in T43 or T42. See section 4.1.6b for a full list;

- Range of movement criteria has been adjusted but not significantly (see Section 4.1.5b). Main adjustments were inclusion of knee flexion deficits (previously only knee extension deficits were permitted) and people with very limited PROM in the ankle (previously it was required that the ankle be ankylosed).

4.2.4.g. Class T45

Athletes with BILATERAL upper limb impairment where BOTH limbs meet the relevant unilateral criteria described for upper limb deficiency (Section 4.1.4.b.i), impaired upper limb ROM (Section 4.1.5.c.i) or impaired upper limb muscle power (Section 4.1.6.c.i) may compete in this class for all running and jumping events.

Note the following:

- Athletes with BILATERAL impairment meeting the bilateral criteria described for upper limb deficiency in Section 4.1.4.b.ii will compete in class T46 and are eligible to compete in all running and jumping events;
- Athletes with following bilateral impairment will compete in class T46, but are not eligible to compete in running events over 400m: bilateral dysmelia in which the combined length of the upper limbs measured from acromion to finger tip is $\leq 0.674 \times$ standing height; that is the length from acromion to radial styloid in a normally proportioned body (0.337) multiplied by 2 (see Section 4.1.4.b.ii).

Comparison with Class T45 pre-2008: This class will still be for bilateral upper limb impairment, but athletes with mild upper limb impairment will compete in T46 and more severe – equivalent to bilateral through elbow amputation or above – will compete in T45.

4.2.4.h. Class T46

The following athletes compete in class T46 for all running and jumping events:

- Athletes with UNILATERAL upper limb impairment that meets the relevant unilateral criteria described for upper limb deficiency (Section 4.1.4.b.i), impaired upper limb ROM (Section 4.1.5.c.i) or impaired upper limb muscle power (Section 4.1.6.c.i);
- Athletes with BILATERAL impairment meeting the bilateral criteria described for upper limb deficiency in Section 4.1.4.b.i.

The following athletes compete in class T46, but are not eligible to compete in track events over 400m.

- Athletes with unilateral upper limb impairments which meets the criterion described in Section 4.1.4.b.ii (limb deficiency), Section 4.1.5.c.ii (impaired PROM) or Section 4.1.6.c.ii (impaired muscle power);
- Athletes with BILATERAL dysmelia in which the combined length of the upper limbs measured from acromion to finger tip is $\leq 0.674 \times$ standing height; that is the length from acromion to radial styloid in a normally proportioned body (0.337) multiplied by 2 (see Section 4.1.4.b.ii).

NOTE: Athletes with BILATERAL upper limb impairment where BOTH limbs meet the relevant unilateral criteria described for upper limb deficiency (Section 4.1.4.b.i), impaired upper limb ROM (Section 4.1.5.c.i) or impaired upper limb muscle power (Section 4.1.6.c.i) compete in class **T45**.

Comparison with Class T46 pre-2008: Minimum disability criteria for upper limb impairments are generally more conservative. The following impairments were previously eligible for all events. In the current system impairments marked (*) are eligible for all events except running events over 400m, and those marked (†) are not eligible at all:

- Single below elbow amputations*;
- Wrist: grade 2 muscle power in wrist flexion, extension, radial and ulna flexion in one limb*;
- Shoulder flexion of $\leq 135^{\circ}$ in one limb[†];
- Elbow extension deficit of 45° in one limb[†];
- Wrist ankylosis in one limb[†]

For further information on the decision regarding unilateral amputation, see Appendix B.

5. MINIMUM DISABILITY CRITERIA and CLASS PROFILES FOR THROWS

Note that previously, athletes competing in long jump or high jump were allocated a class that was preceded by the letter “F” – for example F44. In this system athletes competing in jumps will receive a class preceded by the letter “T” – for example T44.

5.1. Minimum Disability Criteria for Throws

Not all athletes with an eligible impairment type (presented in Section 3) are permitted to compete in throwing events in IPC Athletics. To be eligible the athlete's impairment must also cause sufficient activity limitation in throwing. The General Standard for what constitutes sufficient activity limitation is as follows:

An athlete may compete in throwing events in Paralympic Athletics if they have a permanent impairment that alters the biomechanical execution of the preparation, delivery or follow-through phases of the throw in a way that is demonstrable and which will adversely affect performance.

The effect of an impairment is considered without aids or prosthetic devices.

The remainder of this section presents the operational descriptions of the impairment types that meet this General Standard.

5.1.1. General approach

The following Minimum Disability Criteria are exactly the same for throws as for running:

- Hypertonia (see section 4.1.1)
- Ataxia (see section 4.1.2);
- Athetosis (see section 4.1.3);
- Limb deficiency – lower limb (4.1.4.a);
- Impaired PROM – Lower limb (4.1.5.b);
- Impaired Muscle Power – Lower limb (4.1.6.b)
- Leg length difference (4.1.7)
- Short stature (4.1.8)

The following Minimum Disability Criteria are different for throws than for running, and these are presented below:

- Limb deficiency – upper limb;
- Impaired PROM – upper limb;
- Impaired Muscle Power – upper limb;

Notes on the development of minimum disability criteria for upper limb impairment in throws: The criteria have been developed on the principle that athletes with upper limb impairments will be classified as if they throw with their least impaired arm. In practice, athletes will be permitted to throw with their more impaired arm if they wish to, but they will be classified as if they throw with their least impaired arm. In other words, it is expected athletes will choose a technique that will minimise the extent of activity limitation that their impairment causes. If they choose a technique which increases the activity limitation caused by their impairment (e.g., they throw with an impaired hand when they have an unimpaired hand) this decision will not influence the classification process. There are two divisions for athletes with upper limb impairments:

- Unilateral upper limb impairments: For athletes with one limb affected by limb deficiency, impaired PROM or impaired muscle power. MDC are presented in Section 5.1.2;
- Bilateral upper limb impairments: For athletes with both limbs affected by limb deficiency, impaired PROM or impaired muscle power. MDC are presented in Section 5.1.3.

Figure 5.1 (p.55) presents a decision tree which illustrates how upper limb minimum disability criteria for throws should be applied.

5.1.2. Criteria for UNILATERAL Upper limb impairment

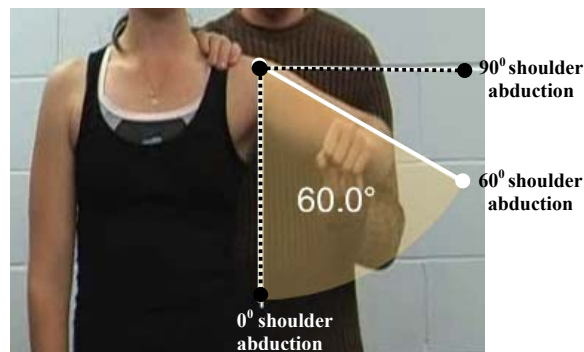
An athlete with a unilateral impairment must have one arm that meets the criteria below for limb deficiency (5.1.2.a), impaired PROM (5.1.2.b), or impaired muscle power (5.1.2.c); otherwise they are ineligible for competition.

5.1.2.a. Limb Deficiency

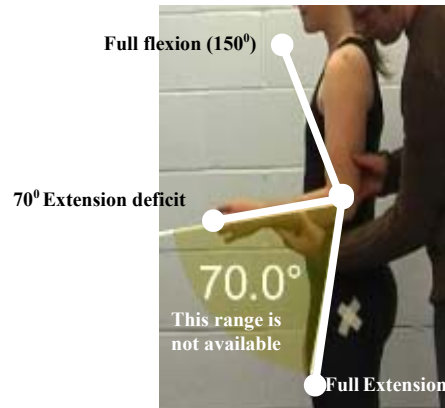
- Unilateral amputation, through or above wrist (i.e., no carpal bones present in affected limb).
Arthrodesed wrist joint is not eligible.
- Unilateral dysmelia in which the length of the affected arm measured from acromion to finger tip is equal in length or shorter than the combined length of the humerus and the radius of the unaffected arm.
 - Measuring unaffected arm: For people who can fully extend the elbow, the combined length of humerus and radius can be a single measure of the distance from the acromion to the radial styloid. When full elbow extension cannot be achieved, humerus length (from acromion to superior head of radius) and radius length (from head of radius to radial styloid, measured with hand supinated) should be measured separately and then summed.
 - Measuring affected arm: Length of arm from acromion to finger tip – the length of the hand IS taken into account in this criterion. If full elbow extension cannot be achieved, humerus length (from acromion to superior head of radius) and radius + hand length (from head of radius to tip of longest finger) should be measured separately and then summed.

5.1.2.b. Impaired PROM

Athletes are eligible for throws events if they have a unilateral upper limb impairment of PROM that meets ONE OR MORE of the following criteria.



Criterion #1 - shoulder abduction $\leq 60^{\circ}$ available in the range between 0° and 90° abduction. The dashed lines in the figure show 0° shoulder abduction and shoulder abduction to 90° . It also shows 60° abduction, the maximum amount of PROM that is permissible in order to meet this criterion.



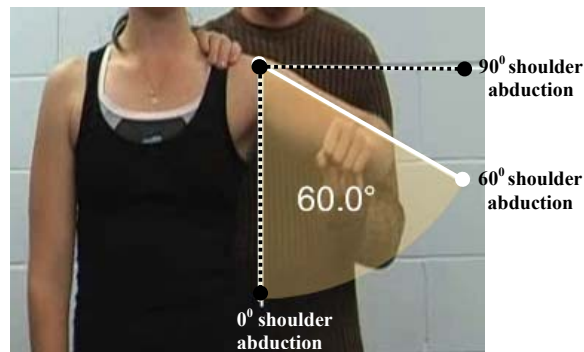
Criterion #2 – Elbow extension deficit of $\geq 70^{\circ}$ or ankylosis of the elbow $\geq 80^{\circ}$ flexion. The outer lines in the figure indicate full elbow flexion (150°) and full elbow extension. The middle line shows an extension deficit of 70° (indicated in the picture). Ankylosis in 80° elbow flexion or a greater amount of flexion will also meet this criterion.

NOTE: Minimum disability criteria for unilateral upper limb impairments of PROM are more conservative than they were previously. The following impairments were previously eligible but are no longer:

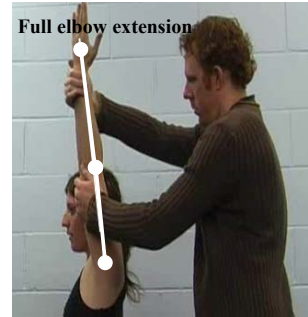
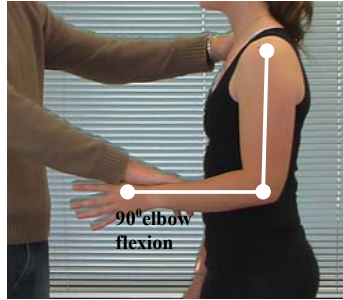
- Shoulder flexion of $\leq 135^{\circ}$;
- Elbow extension deficit of 45° ;
- Wrist ankylosis

5.1.2.c. Impaired Muscle Power

Athletes are eligible for throws events if they have a unilateral upper limb impairment of muscle power that meets ONE OR MORE of the following criteria



Criterion #1 – Shoulder abduction loss of 3 muscle grade points (i.e., grade 2 shoulder abductors). The dashed lines in the above figure show 0° abduction and 90° abduction. The solid line shows manual resistance being applied at 60° shoulder abduction. To meet this criterion the athlete should not be able to abduct to 60° OR, if PROM is $<60^{\circ}$, should not be able to actively abduct through available PROM.



Criterion #2 – Loss of 2 muscle grade points in elbow flexion AND extension (i.e., grade 3 elbow extensors and flexors). This criterion has two parts – athletes must meet both parts to meet the criterion.

- The top left figure shows manual resistance being applied at 90° elbow flexion. To meet the first part of this criterion the athlete should not be able to flex to 90° and hold against resistance OR, if PROM is <90°, should not be able to flex through available PROM and hold against resistance.
- The top right figure shows manual resistance being applied at full elbow extension. To meet the second part of this criterion the athlete should not be able to go to full extension and hold against resistance OR, if PROM is less than full extension, should not be able to extend through available PROM and hold against resistance.

Minimum disability criteria for unilateral upper limb impairments are generally more conservative than they were previously. The following impairments were previously eligible but are no longer:

- Wrist: grade 2 muscle power in wrist flexion, extension, radial and ulna flexion in one upper limb; This is because this impairment does not have a sufficiently adverse impact on the biomechanical execution of the throwing action

5.1.3. Criteria for BILATERAL upper limb impairment

To be eligible to compete in classes for athletes with bilateral upper limb impairments athletes must have one of the following patterns of impairment:

- **Class F45a:** One arm meets the criteria from 5.1.2.a, 5.1.2.b, or 5.1.2.c AND one arm that meets criteria from 5.1.3.a, 5.1.3.b, or 5.1.3.c;
- **Class F45b:** BOTH arms meet the criteria from 5.1.3.a, 5.1.3.b, or 5.1.3.c.

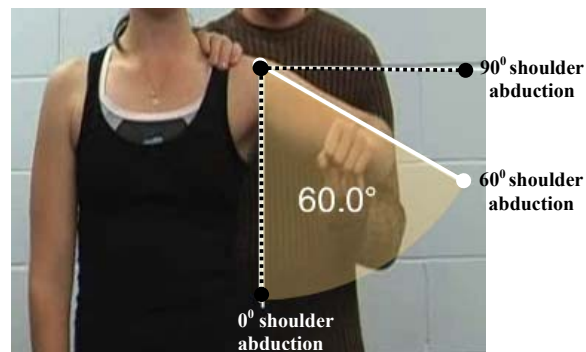
Not eligible for competition: Athletes with one arm that meets criteria from 5.1.3.a, 5.1.3.b, or 5.1.3.c and one arm that is impaired but does not meet the criteria for 5.1.3.a, 5.1.3.b, or 5.1.3.c.

5.1.3.a. Limb deficiency – upper limb

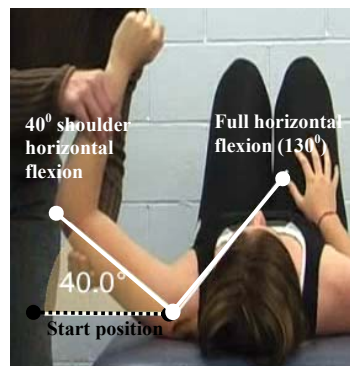
Complete amputation of at least 4 digits (excluding or including the thumb) from AT LEAST the metacarpo-phalangeal joint OR amputation of thumb and thenar eminence OR equivalent congenital deformity.

5.1.3.b. Impaired PROM - upper limb

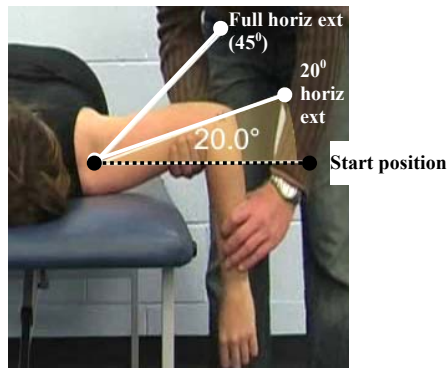
In order to be eligible, athletes with bilateral upper limb impairments must have AT LEAST one arm that meets one or more of the following six criteria for impaired PROM.



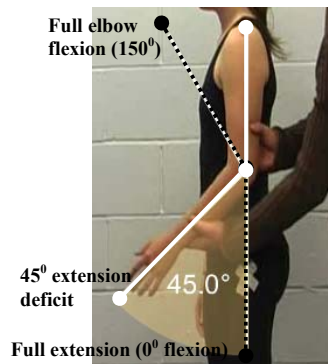
Criterion #1 - shoulder abduction $\leq 60^\circ$. The dashed lines in the figure show 0° shoulder abduction and shoulder abduction to 90° . The solid line is at 60° abduction, the maximum amount of PROM that is permissible in order to meet this criterion.



Criterion #2 – Shoulder horizontal flexion of $\leq 40^\circ$. The dashed line in the figure shows the start position for testing (supine lying, shoulder abducted to 90° , humerus supported by bench, elbow flexed to 90° , forearm at 90° to the horizontal, fingers pointing to the sky). The solid lines represent normal anatomical range for horizontal shoulder flexion (130°), as well as 40° horizontal flexion, the maximum horizontal flexion permissible in order to meet this criterion.

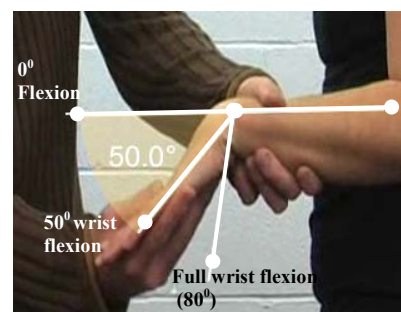
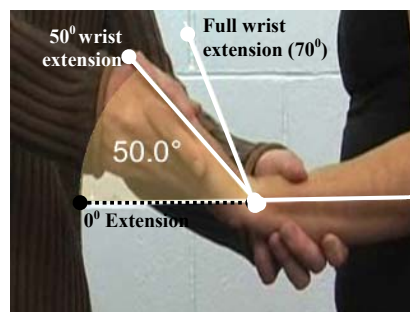


Criterion #3 – Shoulder horizontal extension of $\leq 20^{\circ}$. The dashed line in the figure shows the start position for testing (prone lying, shoulder abducted to 90° , humerus supported by bench, elbow flexed to 90° , forearm at 90° to the horizontal, fingers pointing to the floor). It also shows normal anatomical range for horizontal shoulder extension of 45° (11), as well as 20° horizontal extension, the maximum horizontal extension permissible in order to meet this criterion.

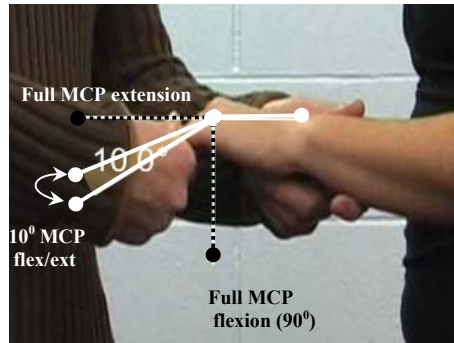


Criterion #4 – Elbow extension deficit of $\geq 45^{\circ}$ or ankylosis in any position* The dashed lines in the figure are full elbow flexion (150°) and full extension (0°). The solid line represents an extension deficit of 45° , the maximum amount of elbow extension that is permissible in order to meet this criterion.

***SPECIAL NOTE:** athletes meeting only this criterion are not eligible for the discus. In order for athletes with only impaired elbow PROM to be eligible for the discus the elbow must be ankylosed between 150° and 80° flexion.



Criterion #5 – Wrist ankylosed in $\geq 50^{\circ}$ flexion or extension. The dashed line in top left figure is 0° extension and the solid lines represent 50° extension and full wrist extension (70°). A person with a wrist ankylosed in 50° - 70° is eligible. The dashed line in top right figure is 0° flexion and the solid lines represent 50° flexion and full wrist flexion (80°). A person with a wrist ankylosed in 50° - 80° is eligible.



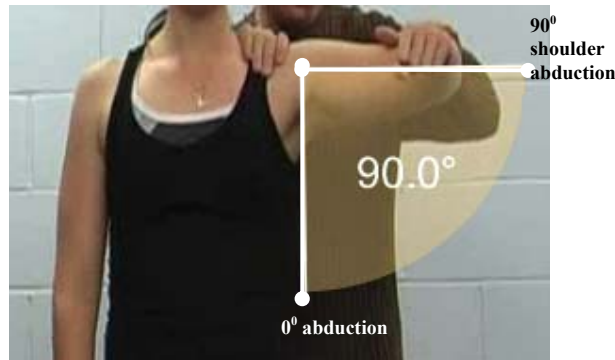
Criterion #6 – any four digits with $\leq 10^{\circ}$ of flexion / extension at the metacarpo-phalangeal joint. The outer (dashed) lines in the figure proscribe normal anatomical range, from full extension to 90° flexion (11). The inner lines show an example of a 10° arc within this range. This amount of movement may occur anywhere in the range but 10° is the maximum PROM that is permissible in order to meet this criterion.

5.1.3.c. Impaired muscle power - upper limb

Athletes with bilateral upper limb muscle power impairments may be eligible to compete in IPC athletics if they meet EITHER one of the seven **primary** criteria presented in 5.1.3.c.i OR the **secondary** criteria presented 5.1.3.c.ii.

5.1.3.c.i. Primary Criteria for impaired muscle power (upper limb)

Athletes are eligible if they meet ONE OR MORE of the following criteria



Criterion #1 – Shoulder abduction loss of 3 muscle grade points (i.e., grade 2 shoulder abductors). The figure shows manual resistance being applied at 90° shoulder abduction. To meet this criterion the athlete should not be able to abduct to 90° OR, if PROM is $<90^{\circ}$, should not be able to actively abduct through available PROM.



Criterion #2 – Shoulder Horizontal Flexion loss of 3 muscle grade points (i.e., muscle grade of two).

The dashed line in the figure shows the start position for testing (supine lying, shoulder abducted to 90°, humerus supported by bench, elbow flexed to 90°, forearm at 90° to the horizontal, fingers pointing to the sky). The solid lines represent 60° horizontal shoulder flexion and full horizontal flexion (130°). To meet this criterion the athlete should not be able to do one of the following (to be tested in order):

- i. horizontally flex to 90°;
- ii. hold the arm at 60° horizontal flexion

If PROM is <90° but >60°, the athlete should not be able to horizontally flex actively through available PROM to 60°. If horizontal flexion is <60° the athlete should not be able to horizontally flex actively through available PROM.

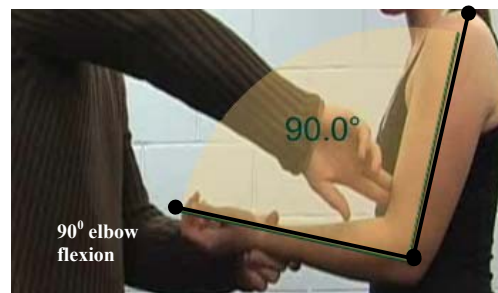


Criterion #3 – Shoulder Internal Rotation loss of 3 muscle grade points (i.e., muscle grade of two).

The figure shows the start position for testing (prone lying, shoulder abducted to 90°, humerus supported by bench, elbow flexed to 90°, forearm at 90° to the horizontal, fingers pointing to the floor). It also shows manual resistance being applied at 60°. To meet this criterion the athlete should not be able to internally rotate to 60° OR, if PROM is < 60°, should not be able to actively internally rotate through available PROM.



Criterion #4 – Shoulder External Rotation loss of 4 muscle grade points (i.e., muscle grade of 1). The figure shows the start position for testing (prone lying, shoulder abducted to 90° , humerus supported by bench, elbow flexed to 90° , forearm at 90° to the horizontal, fingers pointing to the floor). To meet this criterion the athlete should not be able to demonstrate any active external rotation (external rotation is movement in the direction of the arrow).

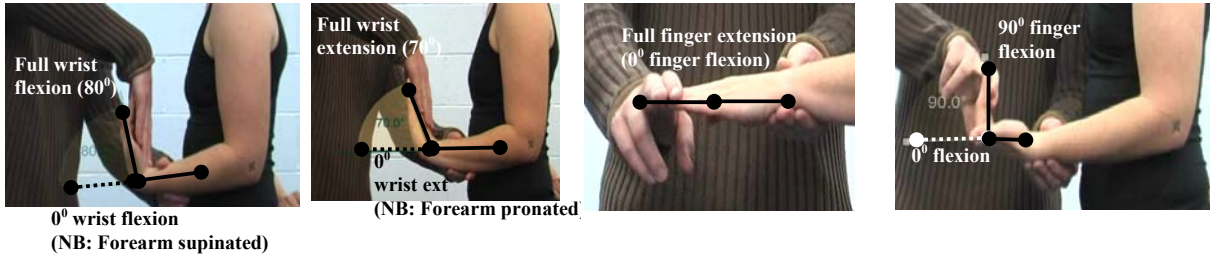


Criterion #5 – Elbow flexion loss of 4 muscle grade points (i.e., muscle grade of 1). The figure shows the classifier supporting the wrist of the athlete so that the elbow is in 90° flexion. The athlete is asked to flex the elbow. To meet this criterion there should be no active elbow flexion in this position.



Criterion #6 – Elbow extension loss of 3 muscle grade points (i.e., muscle grade of two)*. The figure shows manual resistance being applied at full elbow extension. To meet this criterion the athlete should not be able to go to full extension against gravity OR, if elbow PROM restricted, should not be able to extend through available PROM.

* SPECIAL NOTE: athletes who meet only this criterion are only eligible for the shot and javelin. They are NOT eligible for discus as this impairment causes minimal activity limitation in this throwing action.



Criterion #7 – Any two of the following four muscle actions must have a loss of 3 muscle grade points (i.e., muscle grade of 2):

- Wrist flexion;
- Wrist extension;
- Finger extension;
- Finger flexion.

Wrist flexion: The figure in the top left shows manual resistance being applied at 80° wrist flexion. To meet this criterion the athlete should not be able to actively flex the wrist 80° against gravity OR, if wrist PROM is <80° flexion, should not be able to actively flex through available PROM;

Wrist Extension: The figure second from the left shows manual resistance being applied at 70° wrist extension. To meet this criterion the athlete should not be able to actively extend the wrist 70° against gravity OR, if wrist PROM is <70° extension, should not be able to actively extend through available PROM;

Finger extension: The figure third from the left shows manual resistance being applied at full finger extension. To meet this criterion the athlete should not be able to actively extend the fingers 90° against gravity OR, if finger PROM is <90° extension, should not be able to actively extend through available PROM;

Finger flexion: The figure fourth from the left shows manual resistance being applied at 90° finger flexion. To meet this criterion the athlete should not be able to actively flex the fingers 90° against gravity OR, if finger PROM is <90° flexion, should not be able to actively flex through available PROM.

5.1.3.c.ii. Secondary Criteria for impaired muscle power (upper limb)

Athletes are eligible if they meet the following criteria: Total loss of four points from the following shoulder and elbow movements:

- Shoulder abduction;
- Shoulder horizontal flexion
- Shoulder internal / external rotation
- Elbow extension

Special notes:

- A loss of 1 point for four movements is NOT eligible – at least one movement must have a loss of 2 points
- When evaluating eligibility for the discus, the elbow is not assessed.

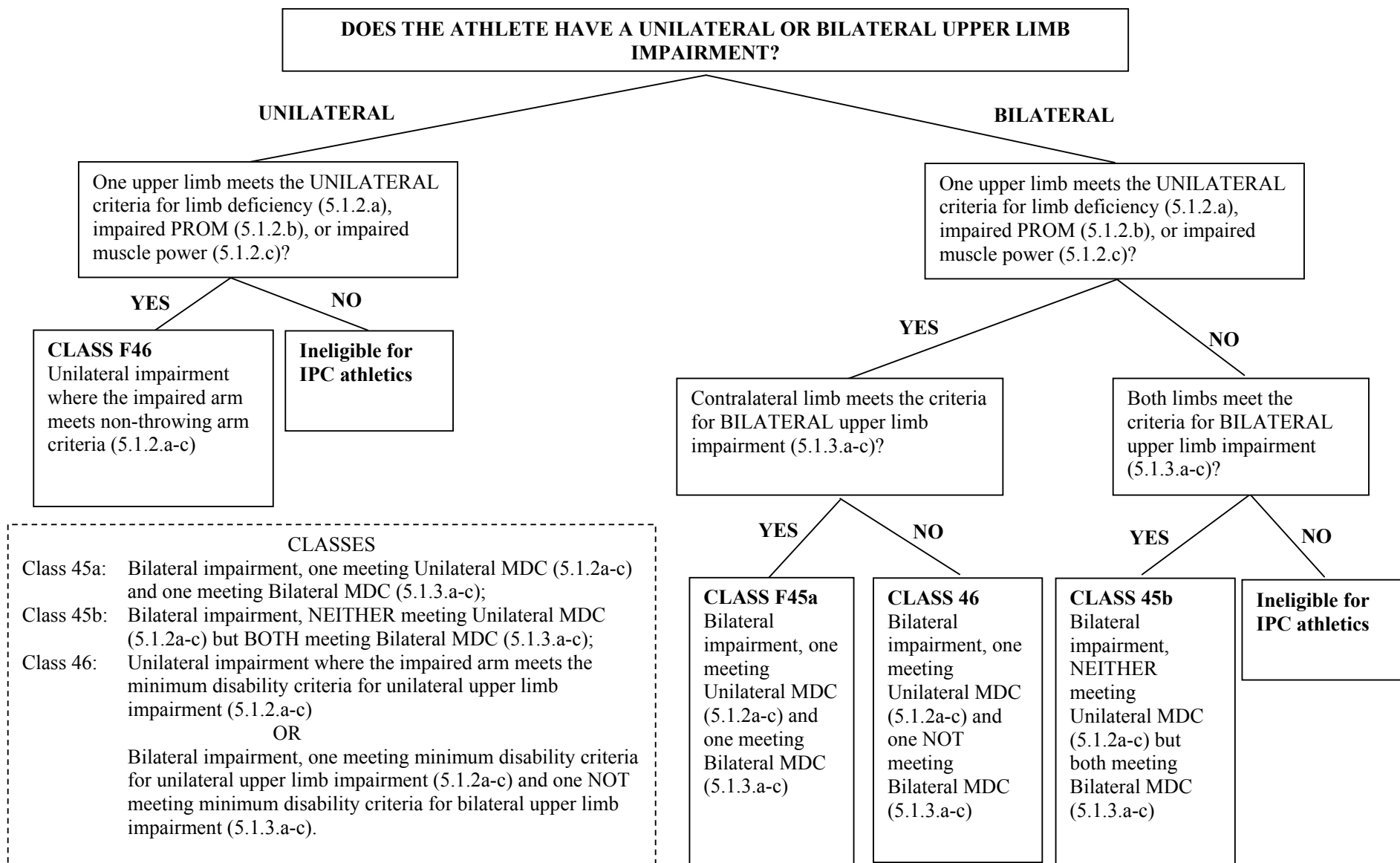


Figure 5.1: Decision tree for classifying athletes with upper limb impairments resulting from limb deficiency, impaired muscle power or impaired range of motion

5.2. Class profiles for Throws

5.2.1. Class profiles for athletes who throw from a seated position who are affected by hypertonia, athetosis or ataxia

Note: In classes F31 to F34, spasticity grades refer to the Ashworth scale (1), reproduced below

Grade 0:	No increase in tone
Grade 1:	Slight increase in tone giving a “catch” when the limb is flexed or extended
Grade 2:	More marked increase in tone, but limb is easily flexed
Grade 3:	Considerable increase in tone with passive movement difficult
Grade 4:	Limb rigid in flexion or extension

5.2.1.a. Class F31

Quadriplegic - Severe involvement. Spasticity Grade 4 to 3+, with or without athetosis or with poor functional range of movement and poor functional strength in all extremities and trunk OR the severe athetoid with or without spasticity with poor functional strength and control. Dependent on a power wheelchair or assistance for mobility. Unable to functionally propel a wheelchair. Lower extremities-considered non-functional in relation to any sport due to limitation in range of movement strength and/or control. Minimal or involuntary movement would not change this person’s class.

Trunk control-static and dynamic trunk control very poor or non-existent. Severe difficulty adjusting back to mid-line or upright position when performing sports movements. Upper extremities-severe limitation in functional range of movement or severe athetosis are the major factors in all sports and reduced throwing motion with poor follow through is evident. Opposition of thumb and one finger may be possible allowing athlete to grip.

Field class F31 determined clearly by the very poor hand function in handling club, shot or discus, in conjunction with throwing motion. A person could have adequate hand function statically but may have less function when throwing due to athetoid involvement or spasticity.

5.2.1.b. Class F32

Quadriplegic -Severe to moderate involvement. Spasticity Grade 3+ to 3 with or without athetosis. Severe athetoid or quadriplegic with more function in less affected side. Poor functional strength in all extremities and trunk but able to propel a wheelchair.

Class F32 athletes can sometimes ambulate but never run functionally.

Static trunk control is fair. Dynamic trunk control is poor as demonstrated by the obligatory use of upper extremities and/or head to assist in returning to the mid-line (upright position).

Upper extremities. Hand severe to moderate involvement. Spasticity Grade 3.

A Class F32 athlete often has a cylindrical or spherical grasp, and can demonstrate sufficient dexterity to manipulate and throw a ball, but will exhibit poor grasp and release. Throwing motions must be tested for effects on hand function. Wheelchair propulsion with upper extremities is also demonstrable. Active range of movement is moderately to severely impaired, thus hand function is the key.

Upper extremity athletes with athetosis may demonstrate fair rotation during throwing with unreliable release. For athletes with spasticity or athetosis the trunk makes a very limited contribution to propulsion of the implement.

5.2.1.c. Class F33

Quadriplegic. Triplegic, severe hemiplegic – Moderate (asymmetric or symmetric) quadriplegic or severe hemiplegic in a wheelchair with almost full functional strength in dominant upper extremity. It is rare for an athlete with athetosis to be included within this class unless he/she presents with a predominantly hemiplegic or triplegic profile with almost full function in the dominant upper limb. Can propel a wheelchair independently.

Lower extremities-spasticity Grade 4 to 3-some demonstrable function can be observed during transfer. May be able to ambulate with assistance or assistive devices but only for short distances.

Trunk control-fair trunk control is shown when pushing chair, but forward trunk movement is often limited due to extensor tone during forceful pushing. Some trunk movement can be noted also in throwing for postural correction, but throwing motions are mostly from the arm. This is a major factor in non-ambulatory capability – rotation is limited. Spasticity Grade 2+.

Upper extremities-moderate limitation spasticity Grade 2+ in dominant arm shown as limitation in extension and follow through.

Hand function-dominant hand may demonstrate cylindrical and spherical grasp, with poor finger dexterity demonstrable in release of shot and discus.

Class F33 / 34 differentiation: Sometimes a hemiplegic athlete with spasticity Grade 4 to 3 in non-dominant arm and near normal function in the dominant arm (i.e., an asymmetric diplegic athlete) is more appropriate in Class 34. However, a close look should be given to the trunk movement, as it is often the determining factor. In all cases movement, follow through and release are ultimate considerations. Split classes can sometimes occur in these cases (i.e., F34, T33).

5.2.1.d. Class F34

Diplegic – Moderate to Severe involvement. Good functional strength with minimal limitation or control problems noted in upper limbs and trunk.

Lower Extremities-Moderate to severe involvement in both legs Spasticity Grade 4 to 3 usually rendering them non-functional for ambulation over long distances without the use of assistive devices. A wheelchair is usually the choice for sport.

Trunk-spasticity Grade 2 to 1. Minimal limitation of trunk movements when wheeling and throwing. In some athletes fatigue can increase spasticity which can be overcome with proper positioning. When standing, poor balance is obvious even using assistive devices.

Upper extremities – the upper limbs often show normal functional strength.

Minimal limitation of range of movement may be present but close to normal follow through and propulsion is observed when throwing or wheeling.

Hand function-normal cylindrical/spherical opposition and prehensile grasp is seen in all sports. Limitation if any is usually apparent only during rapid fine motor tasks. It should be remembered that diplegia implies that there is more spasticity in the lower than the upper extremities. Some involvement spasticity Grade 2+ to 1 can be seen particularly in functional movements of the hands, arms and trunk.

In throwing events the trunk has to make a complicated, forceful and rapid movement. This movement is complicated because it requires co-ordination of rotation, forward and sideways bending (more complicated than required for propulsion). Because of the slight spasticity in trunk muscles and the negative influence of the spastic legs, some disturbances may be seen when force and speed are required. Slight weakness in fine movements may present problems during the release of a discus and to a lesser extent a javelin. There is even less of a problem with shot.

Split classification between Class 34 and Class 35 in FIELD is considered a matter of preference for athletes if they are eligible functionally. The hemiplegic in a wheelchair with one functional arm and a free moving trunk is a Class 34 for field events (see also Class 33 Field).

5.2.2. Class profiles for athletes throwing from a seated position who are affected by limb deficiency, impaired PROM, impaired muscle power or leg length difference

The class profiles for athletes in these groups are written in terms of the muscle power that an athlete is likely to have. If an athlete has an impairment that is not directly related to impaired muscle power (e.g., loss of range of movement, amputation) then it is important to use judgement and experience try to match this impairment with the most appropriate class profile.

5.2.2.a. Class F51

These athletes will usually have elbow flexion and wrist dorsiflexion muscle power to grade 5, a decrease of shoulder muscle power, and triceps muscle power grade 0-3.

Usually use elbow flexors to propel the implement. Hold the club between the fingers and the discus with the hand facing upwards. Equivalent activity limitation to person with complete cord injury at cord level C5-6

5.2.2.b. Class F52

These athletes will have good shoulder muscle power, almost normal elbow muscle power, good wrist muscle power but finger flexor and extensor muscle power will be at a maximum grade 3.

Usually have difficulty gripping with non throwing arm.

Have no functional finger flexors leading to difficulties gripping all throwing implements. Usually there is no finger contact with the shot put, a lack of control of the discus unless there are finger contractures, and may hold the javelin between the digits of the hand including the index finger and the thumb.

Equivalent activity limitation to person with complete cord injury at cord level C7

5.2.2.c. Class F53

These athletes will have is normal shoulder, elbow and wrist muscle power, good or normal muscle power of the finger flexors and extensors with there being wasting of the intrinsic muscles of the hands.

Usually have good grip function in the non throwing hand. Usually can grip the throwing implement normally and can impart force to the implement when throwing. Equivalent activity limitation to person with complete cord injury at cord level C8

5.2.2.d. Class F54

These athletes will have normal arm muscle power with no abdominal or lower spinal muscle activity.

Usually have normal control of the implement when throwing. Have no active trunk movements when throwing. May generate the throwing movement by a forceful movement of the non throwing arm.

Equivalent activity limitation to person with complete cord injury at cord level T1-7

5.2.2.e. Class F55

These athletes will have normal arm muscle power. They may have partial or completely normal trunk muscle power. They may have a flicker of movement in the hip flexors.

Three trunk movements may be seen in this class. They include (a) an upwards movement off the back of the chair, (b) a degree of movement backwards and forwards, and (c) a degree of rotation.

Equivalent activity limitation to person with bilateral hip disarticulations or complete cord injury at cord level T8-L1

5.2.2.f. Class F56

These athletes will have normal arm and trunk muscle power. They will have hip flexor and hip adductor muscle activity, knee extensor muscle activity, and up to grade 3 power in the medial hamstring (knee flexor).

Usually have normal trunk control in the upwards, backwards and forwards, and rotation movements. May use hip flexors to reinforce forward movement in the process of throwing. Trunk rotation is best seen in the discus event.

Equivalent activity limitation to person with bilateral high above knee amputees (The femoral length will be less than half the distance measured between the point of the elbow and the tip of the middle finger)
OR complete spinal cord lesion at L2-4

5.2.2.g. Class F57

These athletes will have normal arm and trunk muscle power. They will have hip flexor, adductor and hip abductor muscle activity, knee flexor and extensor muscle activity and some activity of the ankle dorsiflexors and plantar flexors muscles.

Have the ability to actively move from side to side due to hip abductor muscle power. With appropriate strapping techniques, can use hip adductors and abductors to supplement the propulsion of the implement. Bilateral above knee amputees with a long residual limb (i.e., the amputation level being through the lower half of the femur). The length of the residual femur will be greater than half of the length measured between the point of the elbow and the tip of the middle finger

Equivalent activity limitation to person with unilateral hip disarticulation with one unimpaired lower limb
OR complete spinal cord lesion at L5

5.2.2.h. Class F58

Athletes competing in this class must meet one or more of the following minimum disability criteria:

- Muscle power: a loss of 10 muscle grade points in the lower limbs
- Limb deficiency: unilateral below knee amputation;
- A loss of PROM judged to be equivalent to either of these criteria.

These athletes will have normal arm and trunk muscle power with hip flexor, extensor, abductor and adductor muscle activity. There will be knee flexor and extensor muscle activity and ankle dorsiflexor and plantar flexor muscle activity. Usually can drive upwards using hip extensor muscle power during the propulsion of the implement. People with following diagnoses fit this class: complete cord injury at cord level S1-4; unilateral above or below knee amputee or bilateral below knee amputee.

Comparison with Class F58 pre-2008: There is no change in this System compared with the previous system – minimum disability criteria for this class are still:

- Muscle power: a loss of 10 muscle grade points in the lower limbs
- Limb deficiency: unilateral or bilateral below knee amputation;
- A loss of PROM judged to be equivalent to either of these criteria.

5.2.3. Throwing class profiles for athletes throwing from a standing position without balance aids who are affected by hypertonia, athetosis or ataxia

Note: In classes T31 to T34, spasticity grades refer to the Ashworth scale (1) , reproduced below

Grade 0:	No increase in tone
Grade 1:	Slight increase in tone giving a “catch” when the limb is flexed or extended
Grade 2:	More marked increase in tone, but limb is easily flexed
Grade 3:	Considerable increase in tone with passive movement difficult
Grade 4:	Limb rigid in flexion or extension

5.2.3.a. Class F35

Diplegic – Moderate involvement

This individual may require the use of assistive devices in walking but not necessarily when standing or throwing. A shift of centre of gravity may lead to loss of balance. A Triplegic may appear in this Class.

Lower extremities-spasticity Grade 3 to 2. Involvement of one or both legs which may require assistive devices for walking. A Class 35 athlete may have sufficient function to run on the track. If function is insufficient Class 34 may be more appropriate. Balance - usually has normal static balance but exhibits problems in dynamic balance e.g. attempting a spin or throwing forcefully.

Upper extremities. This is an area where variation occurs. Some moderate to minimal limitation in upper extremities can often be seen particularly when throwing, but strength is within normal limits. Hand function – normal cylindrical/spherical, opposition and prehensile grasp and release in the dominant hand is seen in all sports.

When throwing the major problem is dynamic balance and function when standing in sport with or without assistive devices. Class F35 athletes may use a run up in field events.

5.2.3.b. Class F36

Athetoid or Ataxic – Moderate involvement. The athlete ambulates without assistive devices. Athetosis is the most prevalent factor, although some ambulant spastic quadriplegics (i.e. more arm involvement than in ambulant diplegics), may fit this Class. Athetosis means unsteady (writhing), not having the capability to remain still. All four limbs will usually show functional involvement in sports movements. Class 36 athletes have more control problems in upper limbs than Class 35 athletes, although the former usually have better function in lower limbs particularly when running.

Lower extremities. Function can vary considerably depending on the sports skill involved, from poor, laboured, slow walking to a running gait, which often shows better mechanics. There can be a marked contrast between the walking athetoid with uncoordinated gait and the smooth even paced co-coordinated running/cycling action. Cyclical movements however are much better performed like cycling, running and free-style swimming.

Balance. May have good dynamic balance compared with static balance. Spasticity is common in Class 36 athletes and should not be a reason for placement in Class 35.

Upper extremities and hand control-grasp and release can be significantly affected when throwing in the moderate to severe athetoid athlete. The more spasticity present, the greater the limits on follow through and maintenance of balance after throwing.

Throwing events require explosive movement and because of instability and poor balance F36 athletes often have difficulty demonstrating explosive power. This is particularly obvious in shot-put. Athletes with ataxia may demonstrate these problems to a lesser extent as intention tremor is stabilised with the weight of the implement. A run up in the javelin is possible.

5.2.3.c. Class F37

This Class is for the true ambulant hemiplegic athlete. A Class F37 athlete has spasticity Grade 3 or 2 in one half of the body. They walk without assistive devices but often with a limp due to spasticity in the lower limb. Good functional ability in dominant side of the body.

Lower extremities – hemiplegia spasticity Grade 3 to 2. Dominant side has better development and good follow through movement in walking and running. Athlete has difficulty walking on his heels and has significant difficulty with hopping on the impaired leg. Side stepping towards the impaired side is also affected. Athletes with moderate minimal athetosis do not fit into this Class.

Upper extremities – arm and hand control is only affected in the non-dominant side. There is good functional control on the dominant side.

In walking the Class F37 athlete demonstrates a limp on the affected side. While running the limp may disappear almost totally. The reason is that in walking the leg support during stance phase begins with a heel strike. This is the most difficult action for persons with a spastic paresis. In running only the forefoot hits the ground, providing support and push off. The tight calf muscle in the Class F37 athletes facilitates the push off, and heel strike is not necessary. Thus a more normal looking running pattern.

In throwing events the F37 athlete often demonstrates hip flexion on the affected side instead of hyperextension. Trunk rotation during a throwing action also indicates a loss of fluency. In javelin throwing the transfer from run up to throwing phase demonstrates these difficulties clearly.

5.2.3.d. Class F38

Minimal involvement. This class is for the athletes who are affected by hypertonia, ataxia or athetosis which causes sufficient activity limitation to meet the General Standard for running. The criteria for these impairments are presented in Section 4.1.1 (hypertonia), 4.1.2 (ataxia) and 4.1.3 (athetosis).

Comparison with Class 38 pre-2008: Because of the requirement for “clearly clinically detectable hypertonia at the wrist, elbow, shoulder, ankle, knee or hip” Some athletes previously eligible for Class 38 will no longer be eligible. For example, athletes without clinically detectable hypertonicity but who had unilateral Babinski and mild atrophy (one major sign and one minor sign in the old system) were previously eligible. Such impairments will no longer be eligible for IPC Athletics because it was decided that such impairments would not meet the General Standard for Throws (see Section 5.1).

5.2.3.e. Special note Class T35/F36

Quadriplegic - athetoid or ataxic with spasticity. Moderate involvement.

Lower extremities - spasticity Grade 3 or 2. Involvement of both legs and with sufficient function to run on the track. Usually has good static balance but exhibits problems in dynamic balance activities.

Upper extremities - athetosis is the most prevalent factor and athlete demonstrates significantly more control problems than the T/F35 athlete. Hand control, grasp and release is affected when throwing.

By splitting classes athletes who fit this profile are able to run with T35 track athletes and throw with F36 athletes.

5.2.4. Class profiles for athletes throwing from a standing position with out balance aids who are affected by limb deficiency, impaired PROM, impaired muscle power, leg length difference or short stature.

5.2.4.a. Class F40

To be eligible for class F40 an athlete must be > 18 yrs of age.

Males

Maximum standing height permitted is 130cm, which is the mean standing height for male achondroplastic dwarves (12). The maximum arm length permitted is 59cm, measured from the acromion to the tip of the longest finger of the longest arm. The measure should be taken regardless of elbow contracture because the effective length of the arm is reduced by such an impairment. This arm length is proportionate for a male of standing height 130cm (5) and approximately 2 standard deviations above the mean arm length for a male achondroplastic dwarf of 130cm. The sum of standing height + length of longest arm must be ≤ 180 cm.

To be eligible for F40 males must meet all of the following criteria:

- Standing height ≤ 130 cm; AND
- Arm length ≤ 59 cm; AND
- Sum of standing height plus arm length < 180 cm.

Athletes who are ≤ 130 cm but who do not meet either of the other two criteria are eligible for class T41.

Females

Maximum standing height permitted is 125cm, which is the mean standing height for female achondroplastic dwarves (12). The maximum arm length permitted is 57cm, measured from the acromion to the tip of the longest finger of the longest arm. The measure should be taken regardless of elbow contracture because the effective length of the arm is reduced by such an impairment. This arm length is proportionate for a female of standing height 125cm (5) and approximately 2 standard deviations above the mean arm length for a female achondroplastic dwarf of 125cm. The sum of standing height + length of longest arm must be ≤ 173 cm.

To be eligible for F40, female athletes must meet all of the following criteria:

- Standing height ≤ 125 cm; AND
- Arm length ≤ 57 cm; AND
- Sum of standing height plus arm length < 173 cm.

Athletes who are ≤ 125 cm but who do not meet either of the other two criteria are eligible for class T41.

5.2.4.b. Class F41

To be eligible for class T41 an athlete must be > 18 yrs of age.

Males

Maximum standing height permitted is 145cm, which is 2 standard deviations above the mean standing height for male achondroplastic dwarves (12). The maximum arm length permitted is 66cm, measured from the acromion to the tip of the longest finger of the longest arm. The measure should be taken regardless of elbow contracture because the effective length of the arm is reduced by such an impairment. This arm length is proportionate for a male of standing height 145cm (5) and approximately 2 standard deviations above the mean arm length for a male achondroplastic dwarf of 145cm. The sum of standing height + length of longest arm must be ≤ 200 cm.

To be eligible for F41, male athletes must meet all of the following criteria:

- Standing height $\leq 145\text{cm}$; AND
- Arm length $\leq 66\text{cm}$; AND
- Sum of standing height plus arm length $\leq 200\text{cm}$.

Females

Maximum standing height permitted is 137cm, which is 2 standard deviations above the mean standing height for female achondroplastic dwarves (12). The maximum arm length permitted is 63cm, measured from the acromion to the tip of the longest finger of the longest arm. The measure should be taken regardless of elbow contracture because the effective length of the arm is reduced by such an impairment. This arm length is proportionate for a female of standing height 137cm (5) and approximately 2 standard deviations above the mean arm length for a female achondroplastic dwarf of 137cm. The sum of standing height + length of longest arm must be $\leq 190\text{cm}$.

To be eligible for F41, female athletes must meet all of the following criteria:

- Standing height $\leq 137\text{cm}$; AND
- Arm length $\leq 63\text{cm}$; AND
- Sum of standing height plus arm length $\leq 190\text{cm}$.

Comparison with Class F40 pre-2008: Previously, for people of short stature there was only one class for males and one for females and the criteria for males was standing height $\leq 145\text{cm}$ and for females, standing height of $\leq 140\text{cm}$. Achondroplasia is the most common health condition causing short stature and the vast majority of people competing in the old F40 classes were achondroplastic dwarves. The height criteria that had been set were 2 standard deviations above the mean standing height for achondroplastic males (12) and slightly more than 2 standard deviations above mean for females – 2 SD above the mean is 137cm (12). Because the maximum standing height was set relatively high, many achondroplastic dwarves were at a competitive disadvantage. For example, the mean height for achondroplastic males is 130cm, 15cm shorter than those just meeting minimum disability criteria. To minimise the impact of impairment on the outcome of competition a second class has been created which is based on the mean standing height for achondroplastic dwarves (males and females). An arm length criterion was created for each class because one of the features of Achondroplasia is disproportionately short arms, an impairment which has a significant impact on the activity limitation in throwing. The arm length criterion ensures that Achondroplastic dwarves are not disadvantaged in comparison with others in the class. This initiative will increase the number of people who can compete in IPC Athletics.

Note that inclusion of an arm length criterion means that not everyone who was previously eligible for the F40 class will be eligible for T40 - some athletes will be excluded because their arms are too long.

5.2.4.c. General Comment classes F42 – 46

The class profiles for athletes in F42 - 46 are written principally in terms of limb deficiency. If an athlete has an impairment other than limb deficiency (e.g., loss of muscle power) then it is important to use judgement and experience to try to match this impairment with the most appropriate class profile.

5.2.4.d. Class F42

Single above knee amputees and athletes with other impairments that are comparable to a single above knee amputation. This includes athletes with loss of muscle power in the lower limbs consistent with Class F57 or F58 class.

Comparison with Class F42 pre-2008: Changes in minimum disability criteria for the lower limbs means that there will be a greater variety of impairment presentations and, until the next phase of research is completed, classifiers will have to judge whether the activity limitations they cause are closer to those caused by single above knee amputations (F42), single below knee amputations (F44) or double below knee amputations (F43).

5.2.4.e. Class F43

Double below knee amputees and other athletes with impairments that are comparable to a double below knee amputation. This includes athletes with loss of muscle power in the lower limbs consistent with Class F57 or F58

To calculate maximum prosthetic length, the following procedure should be followed:

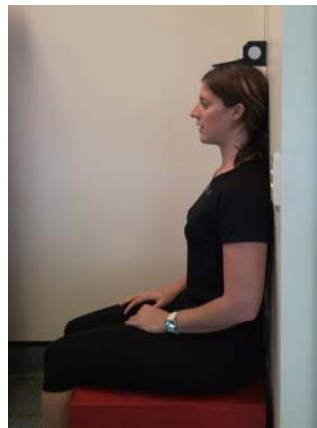
For Males

- a. Measure sitting height as indicated in the figure below - this length is 0.52 x standing height (5);
- b. To calculate expected standing height, divide sitting height by 0.52.
- c. Have the athlete don the prosthetics they will compete in and measure their standing height. This measurement should be less than or equal to calculated standing height. Athletes are not permitted to compete in prosthetics which increase standing height beyond the calculated standing height.

SPECIAL NOTE: Competition organisers should have systems in place to ensure that athletes in this class compete using the same prosthetics presented in classification (e.g., a unique, indelible mark or stamp placed on both prostheses at the time of classification).

For Females

Follow the same procedure but use 0.533 as the conversion factor (5).



Measuring sitting height: Athlete sits fully erect on a backless box with back and head against a wall, thighs parallel to the ground, neck in neutral position (not flexed or extended), eyes facing straight ahead. The height of the highest point of the head is marked against the wall and sitting height is the distance from seat surface to the mark on the wall.

Comparison with Class T43 pre-2008: Changes in minimum disability criteria for the lower limbs means that there will be a greater variety of impairment presentations and, until the next phase of research is completed, classifiers will have to judge whether the activity limitations they cause are closer to those caused by single above knee amputations (F42), single below knee amputations (F44) or double below knee amputations (F43).

5.2.4.f. Class F44

This class is for any athlete with lower limb impairment/s that meets minimum disability criteria for:

- lower limb deficiency (section 4.1.4.a);
- impaired lower limb PROM (section 4.1.5.b);
- impaired lower limb muscle power (section 4.1.6.b); or
- leg length difference (section 4.1.7).

Comparison with Class F44 pre-2008: Minimum disability criteria for lower limb impairments are more relaxed in this System than they were prior to 2007 because it was felt that there were impairments that did not meet minimum disability criteria in the previous system but which most definitely met the General Standard for Throwing (See 5.1). Following are previous minimum disability criteria with some examples of how they have been relaxed in this system):

- Through ankle amputation was previously required but it was decided that through foot amputation – either bilateral or unilateral – would affect throwing (see 4.1.4a for exact wording of criterion);
- Loss of 10 muscle power points in the lower limbs was previously required. However it was decided that, depending how important a given muscle group was to throwing, loss of as few as 3 points would be sufficient (e.g., a person with grade 2 hip flexors in one leg). Some people with muscle power loss of 10 points will be in T43 and T42. See section 4.1.6b for a full list;
- Range of movement criteria has been adjusted but not significantly (see Section 4.1.5b). Main adjustments were inclusion of knee flexion deficits (previously only knee extension deficits were permitted) and people with very limited PROM in the ankle (previously it was required that the ankle be ankylosed).

5.2.4.g. Class F45a

Bilateral impairment, one meeting unilateral minimum disability criteria (5.1.2a-c) and one meeting bilateral MDC (5.1.3.a-c).

Comparison with pre-2008 classification system: Previously there was no throwing class for people with bilateral upper limb impairments. This system provides such people – who obviously have impairments that cause activity limitation in throwing – with a competitive opportunity.

5.2.4.h. Class F45b

Bilateral impairment, NEITHER meeting unilateral minimum disability criteria (5.1.2a-c) but BOTH meeting Bilateral minimum disability criteria (5.1.3.a-c).

Comparison with pre-2008 classification system: Previously there was no throwing class for people with bilateral upper limb impairments. This system provides such people – who obviously have impairments that cause activity limitation in throwing – with a competitive opportunity.

5.2.4.i. Class F46

Athletes in this class may be eligible in one of two ways:

- Unilateral impairment where the impaired arm meets the minimum disability criteria for unilateral upper limb impairment (5.1.2.a-c); OR
- Bilateral impairment, one meeting minimum disability criteria for unilateral upper limb impairment (5.1.2a-c) and one NOT meeting minimum disability criteria for bilateral upper limb impairment (5.1.3.a-c).

Comparison with Class F46 pre-2008: Minimum disability criteria for upper limb impairments are much more conservative in this system than they were prior to 2007. The following unilateral upper limb impairments were previously eligible but were judged not to meet the General Standard for Throwing and are therefore no longer eligible:

- Single below elbow amputations;
- Single wrist with grade 2 muscle power in wrist flexion, extension, radial and ulna flexion;
- Single shoulder with flexion of $\leq 135^{\circ}$;
- Single elbow extension deficit of 45° ;
- Single wrist ankylosis.

6. Multiple sub-minimal impairments

The minimum disability criteria presented in Section 4.1 and 5.1 cover all possible presentations of athletes with a single impairment type (e.g., hypertonia **or** impaired muscle power) for running and throwing respectively. In the vast majority of cases, athletes that do not meet these criteria are not eligible for IPC athletics. Very occasionally an athlete will present with two or more impairments, none of which meet the minimum disability criteria, but the athlete may, in the opinion of the panel, meet the general standard (i.e., the combined effect of the athlete's impairments will adversely impact on the biomechanical execution of either running or throwing).

With the introduction of the scientific basis of disability criteria in IPC athletics and, in particular, the clear expression of the primary and secondary minimum disability criteria, the relative indications and frequency of this occurrence have diminished. Therefore, classification panels should deliberate carefully before making an athlete eligible on the basis of multiple sub-minimal impairments.

When considering whether to include an athlete with multiple sub-minimal impairments, the classification panel should follow these guidelines:

- A complete and accurate assessment of the athletes impairments must be performed and be recorded on the classification sheet;
- The classification panel must observe the athlete performing the sports movement in conditions simulating competition (i.e., full warm-up, correct implement weight, competitive surface, shoes, and official commands etc). Other component motor tasks may also help in this assessment. On the basis of their observations the panel must be satisfied that the impairments demonstrably impact on the biomechanical execution of either running and/or throwing and that the extent of this impact warrants inclusion;
- Any classification panel applying the criterion must be unanimous in its decision;
- Because there is an element of subjectivity in this assessment, athletes that become eligible under this criterion must always be observed in competition for confirmation of the decision.
- Athletes who become eligible under this criterion must always be reviewed at a subsequent competition at least once. Such athletes may only receive CPS status after review at the second event by a level 2 classification team.

7. GLOSSARY

The ICF: the ICF is the acronym for the International Classification of Functioning Disability and Health (ICF), published in 2001 by the World Health Organisation (23). The ICF is an international standard for describing the functioning and disability associated with health

Health Conditions are diseases, disorders and injuries and are classified in the ICD-10 (22). Cerebral palsy, Spina bifida and multiple sclerosis are examples of health conditions;

Body functions are the physiological functions of body systems (e.g., cardiovascular functions and sensory functions). The body functions of central concern in this System are neuromusculoskeletal in nature, and include muscle power, muscle tone and joint range of movement;

Body structures are anatomical parts of the body such as organs and limbs and their components. The body structures of central concern in this system are those related to movement and include the motor centers of the brain and spinal cord, as well as the upper and lower limbs;

Impairments are problems with body functions or body structures (see above for definitions of these terms). A person with a contracture at the right elbow would be described as having *impaired* range of movement. In this system, there are eight eligible impairment types, which are presented in Table 3.1, together with relevant ICF codes;

Activity: an activity is the execution of a task or action by an individual;

Activity limitations are difficulties an individual may have in executing an activity. The activities of importance in this system are the athletic disciplines – **running, wheelchair propulsion, throwing and jumping**. A person who has difficulty running is said to have an *activity limitation* in running.

Physical impairments: for the purposes of this system, *Physical Impairments* is the collective term for the eligible impairment types which are presented in Table 3.1. It has previously been established that these impairments cause *activity limitations* that are **biomechanical** in nature – that is they adversely affect the biomechanical execution of athletic skills (19) – and that therefore there is a sound taxonomic basis for including them in the same classification system. Because these Physical impairments cause biomechanical difficulties, this makes them different from other impairment types (e.g., vision impairment, intellectual disability) which do not.

Function and disability: In the ICF the terms “function” and “disability” are non-specific umbrella terms that refer to several components of the ICF (e.g., function can refer to physiological function, the ability to perform an activity or functioning of a person in the community). To minimize ambiguity these terms are avoided as far as possible in the description of this system.

Handicap: The term “handicap” is not used in the ICF because of its pejorative connotations in English.

8. REFERENCES

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APPENDIX A – CHANGES AT A GLANCE

Although the class profiles in this report have remained largely unchanged, there have been some changes made. Some classes have been affected by the changes in minimum disability criteria which were changed so that only people with impairments that cause a problem with the biomechanical execution of the sport are eligible. Table A.1 shows the classes that have been affected. In some cases this has meant increasing the number of people who are eligible for IPC Athletics. However it has also meant that some people who are were previously eligible are no longer.

Note that this Table only provides a guide to the changes – for a better understanding of the changes made and why they were made, the Table should be read in conjunction with the minimum disability criteria identified in the 3rd column, as well as the appropriate class profiles (presented in Section 4.2 and 5.2). All of the classes that have changed have had an explanatory note added to the class profile in the report which describes how the current class profile differs from the previous one (pre-2008). Appendix B provides a rationale for making unilateral upper limb deficiency criteria more conservative.

Table A.1 – Principle classes affected by changes in minimum disability criteria

Class	Number of eligible athletes (↑ = increase; ↓ = decrease; X = no change)	Minimum disability criteria – Relevant section reference
T38, F38*	X	4.1.1 - 4.1.3 (hypertonia, ataxia and athetosis)
T/F40	↓	4.1.8 (Short Stature)
T/F44	↑	4.1.4.a (Limb def) ; 4.1.5.b (PROM); 4.1.6.b (Muscle Power); 4.1.7 (leg length)
T46	↓	4.1.4.b (Limb def); 4.1.5.c (PROM); 4.1.6.c (Muscle Power)
F46	↓	5.1.2.a (Limb def); 5.1.2.b (PROM); 5.1.2.c (Muscle Power)
T54	↑	4.1.4.a (Limb def) ; 4.1.5.b (PROM); 4.1.6.b (Muscle Power); 4.1.7 (leg length)

*Feedback from some NPCs indicated that they believed the minimum disability criterion for hypertonicity had become more conservative. In fact, the criterion has simply been changed so as to clarify that eligibility requires presence of grade 1 spasticity, together with confirmatory signs of upper motor neuron lesion.

There have also been some classes added to the system and these are presented in Table A.2. Athletes in the dwarf classes were previously eligible, so there is no net increase in the number of eligible athletes (reasons are expanded on in the note following the class profile). Classes for athletes with bilateral upper limb impairments have also been created.

Table A.2 – New classes in the system

Class	Number of eligible athletes (↑ = increase; ↓ = decrease; X = no change)	Class Profiles – Relevant section reference
T/F40 - 41	X	Track: 4.2.3.a and 4.2.3.b; Field: 5.2.4.a and 5.2.4.b
F45a	↑	5.2.4.g
F45b	↑	5.2.4.h

APPENDIX B – RATIONALE FOR CHANGES IN CRITERIA FOR UNILATERAL UPPER LIMB DEFICIENCY

Up to and including the 2008 Beijing Paralympic Games, the minimum disability criterion for unilateral upper limb deficiency in IPC Athletics was amputation through or above the WRIST joint. Participants meeting this criterion were eligible to compete in all IPC Athletics events.

In this report the criterion for unilateral upper limb deficiency remains the same for events 100m-400m and the jumping events – amputation through or above wrist. However the criterion for running events over 400m has been changed to through or above ELBOW. The purpose of this Appendix is to provide a background and rationale for the new criteria.

Background:

The IPC Athletics Classification project commenced in 2003 and is described in detail in Appendix J. One of the aims of Stage 1 of the project was to develop Athletics-specific minimum disability criteria which restricted eligibility to athletes who had an impairment causing activity limitation in the activities of running, jumping or throwing. This aim is consistent with Section 5.1 of the Classification Code (14).

Once concluded, results from Stage 1 were presented to a number of forums including the IPC Athletics Sports Technical Committee, IPC member nations of good standing (N = 160) and the IPC Athletics Summit, held in February 2009 in Bonn, Germany. Feedback from these forums was used to modify outcomes from Stage 1 and this report is the consolidated product of feedback from all of the forums.

To develop Athletics-specific minimum disability criteria required two steps:

1. Identification of key activities: identify key activities that would impact performance for sprints, jumps, middle/long distance running and throws. In this context an activity is a movement with a distinct biomechanical pattern and unique performance determinants;
2. Operational description of upper limb deficiency for each activity: a description of upper limb amputation that would affect *the biomechanical execution of those activities in a way that was demonstrable and which would adversely affect performance.*

The outcomes of the process and rationale are reported for four groups of events:

1. Sprints (100m, 200m and 400m);
2. Jumps (high jump and long jump);
3. Throws (javelin, shot put, discus); and
4. Middle / long distance (running events over 800m).

1. Sprints (100m, 200m and 400m)

Key Activities: Rule 162.4 of the International Association of Athletics Federations (IAAF) states that the crouch start is mandatory in the sprint events (13). Therefore, sprint events can be said to comprise two key activities – the crouch start and running.

It was decided that although through wrist amputation would not impact upon running (see *Middle/Long distance running* for rationale), such an impairment would cause an asymmetry in the “set” position that would adversely affect the biomechanics of the crouch start^j, and that the magnitude of this adverse effect was sufficient to keep through wrist amputation as the minimum disability criterion for the sprint events.

2. Long Jump and high jump.

Key activities: Both jumps comprise four broad activities – run up, take-off, flight and landing (9).

^j As indicated in 4.1 and 5.1, the activity limitation resulting from impairment is assessed without the influence of aids or prosthetics.

It was decided that although through wrist amputation would not impact upon run-up (see *Middle/Long distance running* for rationale), such an impairment would cause an asymmetry and reduced lift from the affected arm during take-off, and that the magnitude of this adverse effect was sufficient to keep through wrist amputation as the minimum disability criterion for the jump events.

3. Throws

Key activities: In general the throws comprise three activities – preparation, delivery and follow-through (9).

It was decided that the through wrist amputation would impact on the throw, reducing the capacity of the non-throwing arm to contribute to the rapid acceleration of the shoulder girdle through the delivery phase and through to the end of the follow-through. Although the data in the Table B.1 (below) should be interpreted cautiously – comparing world records from different classes is not always valid – they suggest that the impact of a through-wrist amputation (minimum disability criterion for class T46) may be at least as large as through-ankle amputation (minimum disability criterion for class T44).

Table B.1: World records in IPC Athletics throwing events for F44 (below knee amputees), and F46 (unilateral upper limb amputees) as at January 2008

	Class	Shot put (m)	Discus (m)	Javelin (m)
Men	F44	17.89	55.53	57.60
	F46	14.87	49.85	62.15
Women	F44	12.58	42.38	40.51
	F46	11.93	42.12	39.23

4. Middle-long distance events

Key Activity: Running only

In relation to the contribution of arms to running performance, Hinrichs has published the best accepted work. He concluded that "the arms do not generally contribute to propulsion" (10) pp. 128. Although they don't have a propulsive role, they perform 2 other functions (Hinrichs, 1990, pp. 128):

- Lift: the arms contribute about 7% of the lift of the body in fast running. The loss of an entire forearm and hand (as in a through elbow amputation) would lead to a loss in lift of ~1.75%. This is a very small quantity. A below elbow amputee has more arm mass and therefore would experience even less than this loss in relation to lift;
- Vertical axis torque: torque about the vertical axis is needed to put the legs through their alternating pattern of stance and swing. Loss of the entire forearm will compromise the ability of the athlete to generate this torque, though again this is not propulsive.

It was decided that through wrist amputation would cause negligible activity limitation in middle and long-distance running events, and that while the effect of through amputation would not be particularly large, it would have sufficient impact on straight-line running to be considered eligible.

Another study supporting the conclusion that through wrist amputation will have negligible impact on running showed that oxygen consumption during steady-state running was not increased when trained runners ran with their hands clasped behind their back (18). If this is the case, then loss of a single hand will have negligible impact on oxygen consumption.

Final Note

It was suggested in some of the feedback that impairments should be eligible if they caused an activity limitation in training, even if they did not directly cause an activity limitation in the sport (e.g., loss of the fingers on one hand will cause activity limitation in certain resistance training exercises considered important in sprinting - the snatch and the power clean – but the impairment will cause negligible activity limitation in the sprint events themselves). However the Classification Code indicates that an impairment should cause an activity limitation in the sport, NOT an activity limitation that affects preparation for the sport. One of the reasons the code specifies this is that there are so many different activities that can be

called “training” - plyometric training, weight training, water training, flexibility training - that almost any impairment at all will cause some degree of activity limitation in at least one of these methods. The task of setting minimum disability criteria would become pointless - anybody with any impairment whatsoever would be eligible. Moreover, as training methods changed, minimum disability criteria would have to change also – as training methods changed some athletes would become newly eligible and others would no longer be eligible.

APPENDIX C – ASSESSING ACTIVITY LIMITATION RESULTING FROM IMPAIRMENT

As indicated in Section 1.2, in order to minimize the impact that impairment has on the outcome of athletic competition, athletes should be placed into classes according to how much their impairment impacts on athletic performance. Ideally 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 impact on the core activities of Paralympic Athletics – running, jumping, throwing and wheelchair pushing. Currently such research does not exist and the aim of Stage 2 of the IPC Athletics Classification project is to address this area so that evidence-based class profiles can be developed in the future (see Appendix J for a description of this project). In the absence of this research, the best method for estimating the extent of activity limitation resulting from impairment requires experts in classification to assess four key areas (20):

- a. Impairment(s) – these tests include, but are not limited to, manual muscle test scores for individual movements (e.g., elbow flexion, elbow extension), assessment of hypertonia at different joints, residual limb length and range of movement;
- b. Novel activities – these are activities which reflect the strength, range of movement and coordination of the athlete and that are unlikely to have been practiced by the athlete in the usual course of training for their sport. For example, foot tapping tasks, hand rubbing, isolated finger flexion/extension, static balance exercises etc;
- c. Practiced activities – these are activities which incorporate elements of strength, range of movement and coordination and are highly likely to have been practiced by the athlete in the course of training for their sport. For example, assessment of sprinters would include bounds, heel flicks, dynamic warm-up routines and dynamic balance exercises.
- d. Training history and other personal and environmental factors affecting how well the athlete will do the activity: this will include questions about frequency and duration of training, periodisation of training, coaching standard (e.g., coach qualifications), use of sports medicine / sports science services. Other factors such as athlete age and gender may also be relevant.

These areas of assessment have been described previously (20). However the relative importance of each of these areas of assessment varies according to the impairment type/s being assessed, as follows:

- Assessment of limb deficiency, leg length difference and short stature: these three impairments are all impairments of structure and have an ICF code beginning with an “s” (see Table 3.1). When classifying these impairments, measurement of impairment alone is usually sufficient, the required measures being (respectively): residual limb length(s) together with notation indicating above or below elbow (for upper limb) or above or below knee (for lower limb); leg lengths together with the difference in length; and standing height and arm length. The reason measurement of impairment is usually sufficient is two-fold:
 - Firstly, these impairments are not training responsive – for example, the residual limb of a unilateral lower-limb amputee does not increase in length in response to training. Because they are not training responsive, an athlete who has trained hard cannot alter their impairment measure and be placed into a less disabled class. Because there is no risk that an athlete’s class can be influenced by training there is no need for tests that provide an indication of how well-trained an athlete is;
 - Secondly, many of the athletes have an impairment that exactly fits a given class profile, and therefore the class an athlete belongs in is usually clear.
- Assessment of impaired muscle power, impaired passive range of movement, hypertonia, ataxia and athetosis: these five impairments are all impairments of function and have an ICF code beginning with a “b” (see Table 3.1). In some instances – for example, complete spinal cord injury (ASIA Class A) – measurement of impairment alone is usually sufficient. The reason impairment assessment is sufficient is the same as that given for impairments of structure – paralysis resulting from complete spinal cord

injury is not training responsive and many class profiles are written in relation to complete spinal cord injury, and so these athletes often have impairments that exactly fit a class profile.

However in many cases assessment of impairment alone is not sufficient, for one or both of the following reasons:

- evidence indicates that some of the impairments may be exacerbated by disuse or inactivity. For example, strength measures of muscles that are partially innervated or affected by spastic hypertonia are improved by resistance training. If impairment measures are training responsive, an athlete measured in an untrained state will have a more severe impairment measure than they would in a trained state, creating the possibility that they would be placed into a less functional class when untrained, and a more functional class when trained. If this occurred, it would defeat the purpose of classification, which aims to reward athletes for hard training;
- athletes do not have an impairment profile that fits exactly with a single class profile. For example an athlete may have a combination of impairment types, such as impaired muscle power and impaired range of movement; or a topographical distribution of impairment that does not fit a class profile, such as often occurs with brain injury, incomplete spinal cord injury, spina bifida or polio.

In instances where impairments may be training responsive or an impairment profile does not exactly fit a class, assessment of impairment alone will not be sufficient to allocate a class. This is not to say that assessment of impairment is not necessary – thorough assessment of impairment is essential in order to make sense of the subsequent activity tests. However, in addition to impairment tests, assessment of novel activities can be used to provide the classification team with an indication of the impact of an athlete's impairments on movement, independent of training. Performance on these tests can be compared with performance on activities which are integral to training for the sport – so called, sports-specific tests. Athletes who are very well trained would be expected to perform better on sports-specific tests than they would on novel activities, while athletes who are not well trained would have relatively little difference between sports-specific and novel tests, because all tests will be essentially novel. Additionally, both novel and practiced activities provide classifiers with an overall impression of how the various components of impairment combine to affect movement. Assessment of training history and other personal factors help in the assessment of how well trained an athlete is. Used in this way, these various methods of assessment can assist classifiers ensure that athletes are placed in the correct class, whether they are well trained are not.

Section C.1 - Assessment of athletes affected by pain

As section 3.2 indicates, pain is not an eligible impairment type. The classification process comprises a number of tests of impairment as well as motor tasks that aim to reflect how much an impairment will impact on sports performance. The results of these tests are the basis of decision making in classification. The physical strain an athlete will experience while completing these tests will, in general, be considerably less than the physical strain they will experience when competing in athletics. If an athlete experiences pain during classification that alters their performance of these tests, then the results of the tests are not valid and the athlete cannot be assigned a class. Without official classification, athletes cannot compete in IPC Athletics events. Painful conditions which may prevent a classification team from assigning a class include temporary musculoskeletal trauma (e.g., strained medial ligament of the knee), arthritis and fibromyalgia.

Section C.2 - Assessment of athletes with progressive health conditions

Health conditions such as multiple sclerosis and Friedreich's Ataxia result in impairments of structure and function which are permanent (i.e. they will not completely resolve) but which may change in severity. Often the rate of change is unpredictable.

When an athlete with a progressive health condition presents for classification, the goal should be to estimate how much activity limitation is caused by the athlete's impairment in its current state, and class should be allocated on this basis. In this sense classification of athletes with fluctuating impairments is exactly the same as athletes with stable permanent impairments. However the class status that an athlete is

assigned should always be review – that is an athlete with a progressive health condition and an unpredictable prognosis needs to be assessed at every competition.

Section C.3 - Assessment of impairment athletes who are young, inexperienced or recently injured

Classification of athletes who are extremely well trained is much easier than athletes who are young, inexperienced or recently injured. This is principally because the impairment profile of an experienced athlete will generally be very stable, and also because classifiers can be confident that when they are assessing such an athlete, any activity limitation observed will be attributable to impairment, rather than to other factors such as lack of conditioning or poor technique for example.

For this reason classifiers should generally be quite conservative when classifying young, inexperienced or recently injured athletes. Caution can be exercised in two ways:

- Class status: avoid assigning permanent status to athletes who are young, inexperienced or recently injured. The following guidelines are useful in this regard:
 - Athletes with congenital motor disorders or who are injured when they are young should be review status until they are judged to be skeletally mature;
 - The incomplete paraplegic should be review status until at least 18 months post injury;
 - The person with a brain injury should be review status until at least 4 years post injury;
 - New / inexperienced athletes should be review status until an appropriate training period has been completed (e.g., 6-12 months).

When in doubt, assign the more functional class: when an athlete who is young, inexperienced or recently injured is close to a boarder-line between two classes, the more functional of the two classes should be assigned and the athlete then observed in competition. If this decision is incorrect, one athlete will be disadvantaged for one competition. However, if the athlete is incorrectly placed into a lower / less functional class, all competing athletes in that class will be disadvantaged.

APPENDIX D – GUIDELINES FOR EXAMINATION of ATHLETES with SPECIFIC HEALTH CONDITIONS

The medical diagnosis of an athlete has a significant impact on how examination for classification is conducted. This Appendix presents important notes for the following diagnostic groups:

D1 - Spinal Cord Injury (complete);

D2 - Spinal Cord Injury (incomplete);

D3 - Polio;

D4 - Spina Bifida;

D5 - Lower limb amputees throwing from a seated position

D1 – HOW TO EXAMINE ATHLETES WITH COMPLETE SPINAL CORD INJURY

History

It is important to ascertain the level of spinal injury, including the fracture level if appropriate, and the spinal cord injury level. It is important to note whether the athlete has a complete or incomplete spinal cord injury and the sensory and motor levels. It is important to note the level of amputation and any associated impairments. The testing will include attention to the following areas of examination.

Manual muscle testing.

Sensory testing (light touch and pin prick).

Range of movement of the spine and limb joints.

Muscle tone assessment.

Tendon reflex assessment.

Pathological reflexes (Babinski-Hoffmann).

Proprioception testing.

Limb length measurement.

Physical Examination

Physical examination can be performed by either carrying out a total examination of the athlete, or by acceptance of what is normal and concentrating on examining the area relevant to the injury. When there is available time, a complete examination of all athletes is indicated. It is always necessary to carry out a full examination when assessing an athlete with an incomplete spinal cord injury or with cerebral palsy.

Measurement of stump lengths is indicated in athletes competing in field events. This can be carried using a tape measure and estimating where the bone end is. If there is doubt the athlete should provide x-rays of both thighs (e.g., C.T Scanogram) so that a more accurate assessment can be performed.

Tests

Functional tests on the examination couch can be helpful in deciding whether certain muscle groups are present. Examples are:

(1) The testing of abdominals, adductors and quadriceps;

(2) Isotonic versus isometric tests.

(3) Hoover's sign—buttock extension of the left leg when an athlete is asked to perform a right straight leg raise and vice versa.

HOW TO CARRY OUT PRE-COMPETITION TESTING

It is important at the time of pre-competition testing that there is appropriate equipment and facilities available to carry out specific tasks. These include the athlete's track chair or field chair, a track with an appropriate surface and a throwing circle with appropriate tie-downs and correct implement weights.

It is important to take time to perform the pre-competition testing.

It is important to have a list of the qualifying performances of all athletes who are being classified.

HOW TO OBSERVE

Important factors include being in an appropriate position to see clearly and have the use of assistive devices such as binoculars or a video recorder to assist with the process.

All actions undertaken by an athlete should be observed e.g.
the undressing that occurs prior to going into the throwing circle.
the transfer onto the throwing chair.
what assistance the athlete offers with the tie-downs both at the beginning and the end.
the transfer back into the day chair.
the adjustment of clothing which may occur at the conclusion of the exercise.

It must be remembered that if an athlete has only three throws, the actual duration of performance is very short. This is the area where athletics differs from other sports.

FACTS TO CONSIDER WHEN OBSERVING TRACK AND FIELD ATHLETES PRIOR TO COMPETITION AND IN COMPETITION

Track

The type of glove used.

The starting position of the hands/gloves.

The point of contact of the gloves on the push rim and the size of the push rim.

What happens to the trunk when the gloves make contact with the push rim?

What trunk movements occur at other times during the cycle of movement?

What happens to the head during the cycle of movement?

How far do the shoulders extend during the cycle of movement?

What happens to the trunk when the athlete stops pushing?

Field

The grip on the throwing implement.

The grip of the non-throwing arm that may include assessment of the manner of gripping of the holding bar.

The starting position, release position, and finishing position of the throwing arm.

The functional use of the non-throwing arm. Is there active elbow movement and/or is the arm used to start trunk movement and then control trunk movement after release of the implement?

Trunk movements.

Off the back of the chair upward.

Forwards and backwards.

Rotation.

Side to side.

Pelvic stability.

Leg movements.

The position of the chair in the throwing circle.

The attachments to assist throwing including strapping, hand grip etc.

SPINAL ASSESSMENT

The following factors are important in the assessment of an athlete who has a spinal curvature or fusion.

Aetiology (cause of disability).

The type of spinal curvature present

scoliosis

kyphosis, or

kypho-scoliosis.

Where the apex of the curve is and where the actual curve appears to start from and appears to finish, i.e. from what level to what level.

The relationship between the rib cage and the pelvis, i.e. is the rib cage free of contact with the pelvis or is it in contact, or is the rib cage inside the pelvis on one side?

The muscle power of the upper and lower abdominals and upper and lower spinal extensors. Is the loss in muscle strength symmetrical? If it is asymmetrical the muscle power is usually greater on the concave side of the curve.

Where there is scoliosis there should be asymmetry of muscle power in the abdominals and spinal extensors. If there is asymmetry in the abdominal muscles and spinal extensors then there may also be asymmetry in the lower limb muscles. In general the muscle power should be greater on the concave side of the curve. There is a loss of spinal movements with a scoliosis, particularly rotation and lateral flexion. The loss of movement is usually asymmetrical and increases as the scoliosis increases. As the size of the scoliosis increases, the spinal muscle power becomes less effective.

The fracture level and in relation to Spina bifida, the neurological level.

In high Spina bifida athletes the presence of pelvic tilt needs to be assessed for and noted.

THE PRESENCE OF A SPINAL FUSION

It is important to note how long the fusion appears to be. In general the fusion for a fracture level is over fewer vertebral segments than for a scoliosis. The strength of the upper and lower abdominals and the upper and lower spinal extensors is important. The effect of surgery on spinal extensor muscle bulk has to be assessed. Functional tests take into account the muscle strength an athlete has and also whether the movement has been affected by scoliosis, spinal fusion or spasticity.

The longer the spinal fusion is, the greater the effect on movement and muscle power. If there is contact between the rib cage and the pelvis, spinal movements will be reduced. Trunk mobility should be assessed, where possible, both above and below the spinal fusion.

Remember that any treatment of the spine may reduce the effectiveness of the spinal extensor muscles and also the abdominal muscles. It may reduce the lateral flexion and rotational ability as well as the flexion/extension movements. On the other hand it may give the athlete greater height and some spinal stability particularly when throwing.

Functional tests demonstrate flexion (forwards movement of the spine) and extension (backwards movement of the spine) or rotation (turning movements in either direction) and tests to determine how far an athlete can lift off his or her lap in the sitting position are helpful. Functional tests for wheelchair athletes in their day chair include asking them to push up a hill and assessing the pattern of spinal movement i.e. is the spinal curve normal or is there a tendency for the spine to lordose. If there is a tendency for the spine lordose, then at what level is this occurring?

Another functional test is to ask the athlete to push their track chair on grass. The added resistance helps not only assess the abdominal function but may also help assess the spinal movement. The next assessment requires the athlete to be observed prior to competition either using their track chair on the actual track or field chair in the field.

As with all sports, the ultimate demonstration of movement potential occurs when the athlete is in the competition.

D2 - HOW TO EXAMINE ATHLETES WITH INCOMPLETE SPINAL CORD INJURY

A classifier should

assess the motor and sensory function in all areas.

note the location of the increase in tone i.e. arm, and/or abdominal, and/or leg muscles.

when assessing incomplete athletes the three areas for consideration include the arms, the trunk and the legs.

When an incomplete tetraplegic athlete is assessed, accurate assessment of the three areas will assist in determining the classification of the athlete. It must be noted that spasticity is rarely helpful in athletic performance. It varies so much e.g. temperature, emotion, and there is no active control of the level of spasticity. Athletes may try to reinforce any spasticity that is useful, but should never be penalized for doing so.

Those athletes who have F52 in the arms some F55 function (3s to 4s) in the trunk will probably be classified as F53 athletes. F52 athletes who have full F55 function (4s to 5s) will most likely be classified as F54 athletes.

Incomplete paraplegics are usually assessed depending on the level of muscle power in the legs.

Those athletes who have grade 1s and 2s in most muscle groups in the legs will generally fit into the F56 class.

Those athletes who have grade 2s and 3s in most muscle groups in the legs will generally fit into the F57 class.

Those athletes who have grade 3s and 4s in most muscle groups in the legs will generally fit into the F58 class.

It is important to note where the athlete has significant muscle power when assessing their movement potential for field events, e.g. if an athlete has 1s and 2s in most muscle groups but then has 4s in the hip abductors and extensors, then this will influence the classification of the athlete for these muscle groups are important when throwing from the sitting position.

D3 - HOW TO EXAMINE ATHLETES WITH POLIO

Please always remember classifiers are evaluating an athlete many years after the maximum effect of the spinal insult. The muscles that are functioning in either the arms or the legs may have initially been affected by the condition and the muscle power that you assess as grade 5 may only be a 4+. It is beneficial to compare the arm muscle bulk to the trunk muscle bulk and to the leg muscle bulk. A decrease in bulk or even apparent absence of a muscle does not always mean a total loss of functional muscle power.

Polio athletes who are tetraplegic are most likely to have had the involvement of all muscle groups by the condition. The arm muscles you assume on examination to have Grade 5 power may have been involved in the process. This may explain the small number of athletes with polio who compete in longer distance events in the tetraplegic classes (800 metres and above). Involvement of the diaphragm and other respiratory muscles in such a severe expression of polio may also be a limiting factor in aerobic activity.

Polio athletes may have skip lesions i.e. they can have normal trunk function and weakness in the legs and then have one arm which is totally normal and the other arm may have weakness of one muscle group e.g. the triceps muscle.

If an athlete has had polio at a young age and on examination you find a scoliosis, you will find that they also have asymmetry of trunk muscle function. The effect of the scoliosis will be that they will also have asymmetry of movement as has already been mentioned.

It is important when examining the legs to note the muscle bulk. If an athlete has asymmetry of muscle bulk and is not moving either leg then it is most likely that they have function of one leg and limited function in the other. The classification can proceed according to where the muscle bulk is, even though the athlete is not showing any movement in the area. The only time a classifier has to be careful in relation to assessing muscle bulk of the legs like this is when an athlete is overweight.

There have been long standing arguments about polio athletes having the advantage of intact sensation. There are people on either side but essentially if an athlete cannot move a joint then having sensation in the joint may not be very helpful. In time there may also be a fall-off of the sensory appreciation coming from the involved joint because of disuse.

The post-polio syndrome has to be considered. There are many theories as to why this occurs. Classifiers must be aware of this syndrome and in particular in PPS athletes showing unexplained muscle fatigue and weakness.

Finally if a polio athlete is not cooperative, using asymmetry of muscle bulk to work out what muscle movements are potentially present can be helpful.

D4 - HOW TO EXAMINE ATHLETES WITH SPINA BIFIDA

The higher the spinal cord level the greater the problems.

Cerebral – (UMN-upper motor neurone) – incoordination of upper limb movements;

Spinal curvature and pelvic tilt noting relationship of the rib cage and pelvis;

Hip contractures as well as hip subluxation and dislocation;

The effect of surgery on the hip.

Athletes with Spina bifida produce a significant challenge in the examination particularly those who have their involvement at a higher spinal cord level. The higher the spinal cord level, the greater the disability and the greater the impairment. The higher the spinal cord level the less likely they are to reach elite championship level.

The higher the spinal cord level, the more likely it is the athlete will have upper limb coordination problems. This needs to be considered when classification is performed for it may be necessary to give the athlete a higher class (greater impairment) than initially thought after assessing muscle function. The assessment of the athlete's arm function is by using examination techniques employed when assessing athletes with cerebral palsy. A clue to whether there may be arm coordination problems of CNS origin (e.g., Athetosis or Ataxia) is when the athlete has had hydrocephalus and associated drainage operations. However it must be emphasised that this situation does not always arise. The incoordination raises the potential for these athletes to compete in the Cerebral Palsy classes.

The higher the spinal level the more likely it is there will be significant spinal deformity either in the form of shortening of the spine due to scoliosis or kypho-scoliosis. The higher the spinal level the more likely it is the athlete will have pelvic tilting which potentially impacts on muscle power the athlete may have in the trunk and also in the legs. The higher the spinal level the more likely it is that one side of the rib cage and the pelvic rim will come into contact. This will potentially restrict trunk rotation and will impact on the athlete's ability in field events.

If there is hip muscle imbalance the hip flexors and adductors are present and the abductors and extensors are absent there will either be subluxation or dislocation of the hips. This will impact on muscle strength. Sometime surgery will have been carried out to correct this tendency and this will also impact on the remaining muscle strength.

Some athletes with Spina bifida will have an ileal conduit i.e. a urinary collection system in which part of the bowel is used as the bladder, and which has an exit point through the abdominal wall. This may interfere with abdominal muscle strength.

Sometimes the higher the level the more likely it is the athlete will have had spinal fusion surgery which impacts on trunk function and also may impact on any remaining abdominal and leg muscle power.

The legs themselves may be spastic or flaccid or have a mixed pattern.

An L4 athlete with Spina bifida classically has muscle power in hip flexors, adductors, knee extensors and the medial knee flexors (hamstrings). When the athlete is tested in the sitting position the medial knee flexors (hamstrings) may produce a moderate contraction. There should be an absence of lateral knee flexors (hamstrings).

An L5 athlete with Spina bifida classically has hip flexors, adductors, and abductors, knee extensors and flexors, and ankle dorsiflexors.

An S1 athlete with Spina bifida will have hip flexors, abductors, adductors and some extensor function, knee flexors and extensors, ankle dorsiflexors with some ankle plantar flexor function.

Often athletes with Spina bifida will have surgery on their feet in the form of fusion operations. These have been carried out because of foot deformities and are usually due to muscle imbalance. Ankle fusion surgery will impact on muscle power below the knees.

D5 – HOW TO EXAMINE LOWER LIMB AMPUTEES THROWING FROM A SEATED POSITION

The following relates to the classification system for above knee amputees. It is important to examine and measure the stump. Muscle charting of the stump is essential and includes testing flexion, extension, abduction and adduction. It is important to test the strength of hip extension from the 90° flexed position i.e. the sitting position.

The second area is to chart the range of movement of the hip joint, with the purpose being to assess whether there are hip joint contractures. If an athlete is sitting for long periods, the athlete may develop a flexion contracture. Another factor that may contribute to contractures is an imbalance of muscle action at the level of the hip joint e.g. abductors versus adductors, or extensors versus flexors.

Measurement of the length of the stump is important and can be carried out by (a) the athlete having an x-rays of the stump, which records the stump length or (b) it can be achieved by direct measurement. Of the two methods the x-ray method is more accurate for often there is a lot of soft tissue between the end of the bone part of the stump and the skin at the end of the stump. However direct measurement is more practical and should be used routinely. X-rays may be used in borderline cases. Using a tape measuring from the tip of the greater trochanter to the approximate end of the femur bone is the measurement that is made. The next measurement is to determine the length from the point of the elbow to the tip of the middle finger with the wrist, hand and middle finger being in a straight line during the measurement process. The reason for performing this measurement is that the distance from the point of the elbow to the tip of the middle finger is the same as from the tip of the greater trochanter to the level of the knee joint.

The significance of stump length is that as the leg length increases the leverage factor comes in to play as well as more muscles becoming active i.e. if the amputation is high e.g. just below the lesser trochanter then the athlete will have less leverage and less muscles acting. There will be strong activity in hip abduction and flexion but less effective extension and adduction. As the stump length increases the leverage factor increases and extension becomes stronger, and as further increase in length occurs, hip adduction becomes stronger.

The fourth area to record is which hand the athlete uses during field events. The purpose for doing this is to check whether the side of the amputation is at the same side as the throwing arm.

By assessing the above four factors and then carrying out pre-competition assessment, classification can be made. The class profiles for F55 – F58 provide a guide to the classification of wheelchair amputees.

APPENDIX E – MANUAL MUSCLE TESTING FOR IPC ATHLETICS CLASSIFICATION

In this System, manual muscle testing is used to assess eligibility and to inform decisions regarding which class an athlete should compete in. To enhance inter-classifier reliability, classifiers should use the Daniels and Worthingham (D&W) methods, as published in 2002 edition (11), WITH THE FOLLOWING MODIFICATION.

Background and Rationale: According to the D&W methods, the muscle grade assigned for a given muscle action is influenced by the range of movement that can be achieved. For example if an athlete is assessed as having passive range of movement (ROM) of 120⁰ at the hip (normal anatomical range) and then can only actively flex the hip to 100⁰ against gravity, according to the conventional D&W scale the athlete must receive a grade of 2, because they cannot complete the available range of movement against gravity (11). However, even athletes performing at the very highest levels in athletics do not use full anatomical ROM at every joint. For example, the range of hip flexion required for elite level sprinting is only 90⁰ (16). If a person can actively flex their hip to 100⁰, assignment of a grade 2 will not be a valid reflection of the activity limitation such a person would experience in the activity of running.

To address this discrepancy, the reference range of movement for assessment of muscle power in this System is not normal anatomical range but rather the range of movement required for the activity (either running or throws). Therefore in this System a runner with 100⁰ hip flexion against gravity will receive a grade of 3 to 5, depending on the amount of resistance that can be tolerated at 90⁰ flexion (no resistance tolerated = 3; some = 4; normal = 5). Muscle grades assigned using this method will provide a more valid indication of the activity limitation likely to be experienced by the athlete when they run. Table E.1 presents the reference range of movement that should be used assessing muscle power in the lower and upper limbs for running and Table E.2 presents the reference range of movement for assessing muscle power in the upper limbs in throwing (lower limbs for throwing are assessed using the same reference range as for running).

In all other regards the methods for assignment of muscle grade are as per the D&W system. For example, a runner with a flexion deficit of 40⁰ (i.e., an available range of 80⁰ hip flexion) and normal muscle power in this range would receive a grade of 5.

Table E.1: Reference range of movement for testing muscle power for RUNNERS in IPC Athletics

Movement	Anatomical ROM (11)	Reference range for this System, based on ROM used in running (15, 16)
Hip Flexion	120 ⁰	90 ⁰
Hip Extension	20 ⁰	5 ⁰
Hip Abduction	45 ⁰	5 ⁰
Hip Adduction	20 ⁰	5 ⁰
Knee Extension	0 ⁰	-15 ^{0*}
Ankle plantar flexion	45 ⁰	25 ⁰
Ankle dorsiflexion	20 ⁰	10 ⁰
Ankle Eversion	25 ⁰	10 ^{0**}
Ankle inversion	35 ⁰	10 ^{0**}
Shoulder Flexion	180 ⁰	10 ⁰
Shoulder Extension	50 ⁰	40 ⁰
Elbow flexion	150 ⁰	90 ⁰

*In running the knee does not fully extend.

**Range of movement data in running was not available for these movements but was thought to be minimal, so a mild restriction of these movements was taken a guide.

Table E.2: Reference range of movement for testing muscle power for THROWERS in IPC Athletics

Movement	Anatomical ROM (11)	Reference range for this System
All lower limb actions as per running (see table E.1)		
Shoulder Abduction	180 ⁰	90 ⁰
Shoulder Horizontal Flexion	130 ⁰	90 ⁰ ROM and apply manual resistance at 60 ⁰
Shoulder Internal Rotation	80 ⁰	60 ⁰
Shoulder External Rotation	60 ⁰	50 ⁰
Elbow Flexion	150 ⁰	90 ⁰
Elbow Extension	0 ⁰	0 ⁰
Wrist Flexion	80 ⁰	80 ⁰
Wrist Extension	70 ⁰	70 ⁰
Finger Flexion	90 ⁰	90 ⁰
Finger Extension	0 ⁰	0 ⁰

APPENDIX F – CODES OF CONDUCT AND RELEASE FORM

This Appendix outlines a code of conduct for the following groups during the classification process:

- Athletes;
- Athlete Representatives;
- Classifiers;
- Observers.

It also contains the Classification release form which all athletes (and their parent / guardian if appropriate) must sign prior to classification.

The spirit of the code is to create a classification process in which each athlete is classified in a way that is fair, proper, respectful and commensurate with their level of comprehension and communication. Furthermore, the classification process should be carried out in a manner which is cooperative, friendly, efficient and non-confrontational. Privacy is essential and the results of the examination process are confidential.

Classification is a three stage process:

- Stage 1 – Examination, which entails assessment of impairment, novel motor tasks and movements that are closely related to the movements required in the sport.
- Stage 2 – Sports specific assessment, which entails observation and assessment of the athlete performing the event/s for which they are entered. Performance should be under conditions and at an intensity that are as close as possible to competition conditions.

After Stage 1 or 2 the athlete will receive a classification for the purposes of the competition. During competition, Stage 3 is conducted.

- Stage 3 – Review in competition. The athlete is observed while competing

For a full description of the classification process, see Section 2.

ATHLETE'S CODE OF CONDUCT

Prior to the commencement of the classification process the athlete or their representative must sign the Classification Release Form to indicate that they will abide by the Athlete's Code of Conduct, which requires that:

- The athlete should cooperate fully with the classification team. The most essential elements of a cooperative approach are:
 - answering all questions fully and truthfully; and
 - attempting all physical tasks and tests to the best of their ability;

Athletes who do not cooperate in these ways may be disqualified from the competition;

- The athlete must present for classification as they would for a sport-specific training session. This means dressed for warm-up activities and with any equipment required to undertake their event readily available (e.g., throwing stool, wheelchair, or running spikes).
- At the conclusion of either Stage 1 or Stage 2 the athlete should sign the classification card to confirm that they have participated in the classification process and have been assigned a class for the purposes of the current competition. Signing this card does not necessarily indicate agreement with the classification decision or prevent the athlete or their representative from protesting the decision of the classification panel (for details of protest procedures, see Appendix G).

An athlete being classified has certain rights. They are:

- The right to withdraw from the classification process at any time: An athlete's participation in the classification process is voluntary and they have the right to withdraw from the classification process at any time. Signing the Athlete Release Form does not change the right of the athlete to withdraw at any time. However an athlete who withdraws from the classification process will not be able to be classified and will therefore be unable to compete Paralympic athletics;

- The right to confidentiality: All information obtained during the classification process will be treated confidentially and will only be used for the purposes for which it was intended - that is, to provide or confirm a classification decision or matters relating to an athlete's participation in the sport;
- The right to challenge a decision: an athlete or their representative may challenge a classification decision through the appropriate channels.

CODE OF CONDUCT - ATHLETE REPRESENTATIVES

An athlete may have a maximum of two representatives present during classification. One is the official representative and the other may be an interpreter/team official. The principal role of the Athlete representatives is to support the athlete and help to ensure that the classification team is able to acquire all the information needed to assign a class.

At the discretion of the classification panel, Athlete Representatives may be involved in discussions with members of the classification panel. These discussions may include the history of the athlete's medical condition. At the end of the physical examination representatives may raise issues in relation to the athlete's medical condition. After the pre-competition testing phase representatives may also contribute to discussions.

Athlete representatives should conduct themselves in an appropriate manner at all times. They should encourage their athlete to be honest when answering questions from the classification panel and to cooperate fully at all times during the assessment process. Aggressive behaviour is never acceptable and will not be tolerated. The athlete representatives must be aware that there may be consequences for inappropriate behaviour.

Any athlete representative who assists or counsels an athlete to wilfully misrepresent their abilities, or to be uncooperative, or to fail to present for classification, will be subject to sanctions. The sanctions will be determined on a case by case basis by the IPC Athletics Technical Committee.

CLASSIFIER'S CODE OF CONDUCT

All classifiers accredited by IPC Athletics are bound by the Classifiers Code of Conduct. The Classifiers Code of Conduct applies to all three Stages of the classification process – examination sports-specific testing and in-competition observation. The Code requires that:

- Identification and dress: Classifiers must wear appropriate identification at all times during the classification and competition periods, particularly in the classification area and at the competition venue. Within the examination rooms, classifiers will wear either the uniform provided by the event organisers or the IPC Athletics uniform. It is not permissible to wear national uniforms of any country. When in the competition central arena, the only dress allowed is the uniform provided;
- Stage 1 - Examination: Wherever possible this process should be carried out by a team of 3 classifiers, who should be mindful of:
 - Documentation: Classification panels will be provided with appropriate recording sheets. At a minimum, classifiers will record the name of the athlete, the three classifiers who carried out the initial classification, a summary of the information upon which the class was based and the class of the athlete. The classification cards will be filled out after completion of the initial classification process and the athlete and their representative (if present) will be informed of the result in a way that is respectful to both parties. The athlete should sign the classification card to verify that they participated in the classification process. The recording sheets should be passed from the classification team to the Chief Classifier for the event who is responsible for transmitting the information to relevant Games officials and relevant team representatives (usually the Chef de Mission);
 - Conduct of initial examination: The classifiers who carry out the initial classification are not permitted to talk to other classifiers about an athlete until a permanent (C) class is issued, as this may prejudice protest hearings. After a permanent class is issued, discussions should be conducted on a purely professional basis. Classifiers may classify

an athlete from the same country, but this should be avoided if at all possible and should occur only in exceptional circumstances. The classification process should be efficient and the examinations should be respectful and carried out discreetly (e.g., removal of clothing only when necessary for classification; provision of sheets for privacy during the examination process). Religious and cultural backgrounds will always be respected; e.g. when classifying male athletes from certain cultures, the presence of female classifiers may not be appropriate. However, if the athlete's religious or cultural background prevents the classification team from acquiring the information necessary to arrive at a decision, then it is not possible to provide a classification.

- Non-cooperation by the athlete: If a classifier suspects that the athlete they are classifying is being uncooperative (i.e., not attempting all tasks to the best of their ability) they should first raise the suspicion with their colleagues. If there is a majority view in the panel that the athlete is not cooperating they should inform the athlete and their representative of this suspicion, inform them that non-cooperation is against the Athlete Code of Conduct and that a breach of this code can result in disqualification. This information should be delivered in a manner that is polite but also clear and firm and the examination should then be resumed. If the team remains convinced that the athlete is still not cooperating, the examination should cease and the matter should be referred to the Chief Classifier who has a number of courses of action at their discretion, including:
 - Reinforcement of the seriousness of non-cooperation and referral back to the classification team;
 - Cancellation of the session in process and re-scheduling with the same classification team in order to allow the athlete and coach to consider the seriousness of the situation;
 - Immediate disqualification from that event.

Regardless of the action taken, all reasonable efforts should be made to adopt a dispassionate and calm approach and to deliver information in a courteous and gentle manner.

- Ineligible athletes: Athletes may not be eligible either because they do not have an eligible impairment type (see Section 3 for a full list of Eligible Impairment types) or because they do not meet minimum disability criteria for their chosen event (see section 4.1 for Minimum Disability Criteria for wheelchair racing, running and jumps and Section 5.1 for Minimum Disability Criteria for Throws). If an athlete is deemed not to be eligible, it is important to inform the athlete and their representative that they are not eligible in a way that is sensitive, dispassionate and respectful. You should also clarify the following:
 - Athletes who are ineligible for Paralympic Athletics, may still be eligible for other Paralympic sports
 - Ineligibility for Paralympic Athletics does not imply that the athlete does not have a disability or that the disability doesn't cause problems with training or competing against non-disabled athletes. Ineligibility simply implies that an athlete does not have an eligible type of impairment or that the impairment that they have does not have a big enough impact on the sport of Athletics.
- Stage 2 – Sports specific testing: If sports specific testing is required, classifiers should conduct the testing in a suitable location and ensure that the athlete has had an appropriate warm up prior to requesting them to perform maximal tests.
- Stage 3 – in-competition observation: Classifiers should only enter the central competition arena on bona fide classification duties and should always obtain prior permission from both the Chief Classifier and the Technical Delegate for the event. Classifiers can establish when they will be required to enter the arena by examining the competition schedule for the day in question and identifying those athletes that require in-competition observation (e.g., athletes with Review Status or new athletes), as well as the time and location of their first performance. Special attention should be paid to observing athletes in their first performance of the competition. All in-competition observations should be recorded on an observation sheet, which will be returned to and retained by

the Chief Classifier. When in the arena classifiers must be discreet and, in general, not interfere with event as a sporting spectacle. Specifically they should not block the view of spectators and must not communicate with competing athletes under any circumstances.

OBSERVER'S CODE OF CONDUCT

At Paralympic Games no formal teaching will take place during the Stage 1 or Stage 2 of the classification process. There will however be a restricted number of places available for trainee classifiers to observe the classification process with the permission of the Head of Classification and Chairman of IPC Athletics. Approved observers will be advised of specific times and locations where they can observe the classification process and they should agree to abide by this advice.

At other competitions recognized by IPC Athletics, observers may be permitted into the classification process for educational purposes at the discretion of the Chief Classifier. Discreet behaviour by observers at all times is essential.

During the classification process, an observer should not communicate with the panel of classifiers carrying out the classification or with the athlete or the athlete's representatives. Communication between observers should be minimal and conducted unobtrusively. Discussions with the panel may occur after the completion of the classification process but after the athlete has left the room.



CLASSIFICATION RELEASE FORM

I _____ (print athlete name) agree to undergo the IPC Athletics classification process and to abide by the Athlete's Code of Conduct. I understand the following:

- The classification process requires me to answer a series of questions including questions about my disability and my training. I agree to answer all questions fully, truthfully and to the best of my knowledge.
- I may be asked to carry out some activities and sports skills. I understand that the nature of these tests and the effort required to do them is similar to that required in training for athletics. I believe I am healthy enough to undertake such tests safely and that there is a small risk in doing them, approximately equal to the risk associated with completing an athletics training session. I agree that if I sustain an injury during the course of this classification process I hold IPC Athletics blameless.
- I must attempt all classification activities to the best of my ability and that failure to give my best effort is considered a form of cheating. If this occurs the classification session will be terminated, a classification will not be issued and I will be disqualified from competition.
- During the classification process I may be photographed or videotaped. I understand that these images will be used for the purposes of classification in order to substantiate decisions made or to educate others about the classification process. The images will not be used for any commercial gain or to support any profit-making venture.

When I receive my class, I understand that my performances in competition will be observed by classifiers to confirm that I have given my best effort during pre-competition evaluation. If the classification team determines that my competitive performance is significantly different from my performance on the physical tests in classification, I understand that I may be disqualified.

I understand that, as an athlete, I have the following rights during classification:

- The right to withdraw: My participation in the classification process is voluntary and I have the right to withdraw from the classification process at any time. Signing this form does not change my right to withdraw at any time. I understand that if I withdraw from the classification process I will not be able to be classified and will not be able to compete in Paralympic athletics competitions;
- The right to respect and confidentiality: Evaluations will be conducted respectfully and information obtained during the classification process will be treated confidentially;
- The right to challenge a classification decision: this should be done through the appropriate channels.

By signing this document I indicate that I understand the above information or that my parent / guardian has read and understood it.

Signature

Date

Signature of parent / guardian (if under 18 yrs)

Date

Witness

Date

APPENDIX G – CLASSIFICATION PROTEST PROCEDURES

1. APPLICATION

These procedures apply to all IPC Athletics recognized competitions including the Paralympic Games, World and Regional Athletics Championships (e.g. European Championships / Arafura).

2. CLASSIFICATION CO-ORDINATION

- 2.1. IPC Athletics will appoint a Team of classifiers to classify at all IPC Athletics recognized competitions. The IPC Governing Board will appoint one member from the Team of classifiers to be the Head of IPC Athletics Classification.
- 2.2. When IPC Athletics sanctions an event it will appoint from within the overall Team a team of classifiers for that event and nominate one member to be Chief Classifier for the duration of that event. The Chief Classifier is responsible for identifying the panels of classifiers from within the team. The Chief Classifier may also be involved with the classification of athletes.
- 2.3. When assessing athletes for classes 11 to 13 each panel will consist of two classifiers. When classifying athletes in classes 32 to 58, the Panel will consist of two or three classifiers. Each panel should comprise two types of classifiers - a medical (doctor, physiotherapist, occupational therapist or other approved health professional) and a technical (Physical education teacher, sports scientist, athlete, coach).
- 2.4. When IPC Athletics approve a competition as an international classification opportunity, there will be a minimum of four international classifiers appointed for athletes with a physical impairment (classes 32-58) – a Chief Classifier, a panel of two and fourth classifier. The principal reason for appointment of the fourth classifier is resolution of protests and confirmation of classification status Not Eligible - in the event of a protest or an athlete being classified Not Eligible, the chief classifier can form a protest panel with the fourth classifier and the issue can be resolved promptly.

At the discretion of IPC Athletics and where it has been communicated in advance the minimum number of classifiers that may be appointed is three – a chief classifier and one panel of two. It is not acceptable to appoint only two classifiers, one of whom is the chief classifier. In such cases protest management will not be available and it is the responsibility of the Local Organizing Committee to communicate this to competing athletes and their delegations

3. THE CLASSIFICATION PATHWAY

- 3.1. Classification will be conducted by panels of classifiers who have expertise in the examination of the disabilities and impairments of athletes entered for each competition.
- 3.2. Classification is a three stage process:
 - Stage 1 – Examination: assessment of impairment, novel motor tasks and movements that are closely related to the sport.
 - Stage 2 – Sports Specific assessment: observation and assessment of the athlete performing the event/s for which they are entered.
 - Stage 3 – Review in competition: observation and assessment of sports specific motor tasks during competition.

- 3.3. Classifiers are expected to confirm the outcome of the examination and pre-competition assessment while observing the athlete in competition. If the findings are not compatible then an athlete may be called in by the Chief Classifier for a classification review by a different panel of classifiers.

4. CLASSIFICATION NOTATION

- 4.1. As part of the entry process, the Organising Committee (OC) of the recognized competition will send a list of all athletes entered for the competition to the IPC Athletics section (i.e. entry list). The entry list will be checked against the IPC Athletics database of classified athletes for verification of class and to identify which athletes require to be classified.
- 4.2. The checked entry list will be returned to the IPC Athletics Technical Delegate for the recognized competition with each athlete allocated a class status N, R, IM or C.
 - (N): indicating the athlete is New (i.e., has not been through the international classification process previously and does not have an international classification);
 - (R): indicating the athlete is under Review (i.e., has been through the international classification process but must be classified again their condition is progressive, borderline or because there is a concern about the authenticity of the classification of the athlete);
 - (IM): acronym for Intentional Misrepresentation of Abilities indicates the athlete has been through an international classification process in any sport but was judged by the classification team concerned not to have fulfilled the requirements of the Athletes Code of Conduct. Such athletes should only be seen by level 2 classification panels;or
 - (C): indicating that the athlete has a classification that has been Confirmed by an IPC Athletics Panel. Note that (C) is the same status as the former status of permanent (P).

5. PROTESTS PRIOR TO THE COMPETITION

- 5.1. Protests may be lodged by either the National Paralympic Committee (NPC) representative of an athlete or a representative of another NPC, or by the Head of IPC Athletics Classification relating to an athlete who has a (C) status classification. The Chairperson of the IPC Athletics Technical Committee or his/her representative must receive this protest at least three months prior to the commencement of the competition into which the athlete is entered. A protest at this time will carry a protest fee, which will be the same fee as that for technical protests (except in the circumstances where the Head of IPC Athletics Classification initiates the protest, when there is no fee payable).
- 5.2. The Chief Classifier of the event will arrange for a protest panel to assess that athlete at the classification venue prior to the start of competition and the decision of the protest panel will be final for the period of the competition (except in circumstances where the Chief Classifier for the event initiates a protest during the competition).
- 5.3. The NPC representative of the athlete or the representative of the protesting NPC will be entitled to appeal the protest panel decision to the Board or Arbitration of Classification (BAC). The procedure and appeal fee will be laid down by the BAC.

6. CLASSIFICATION AT THE COMPETITION VENUE PRIOR TO COMPETITION

- 6.1. For athletes with status (N) or (R) the team of classifiers will carry out the examination and pre-competition assessment for each athlete and prepare a classification report for the Competition Management Group responsible for the event schedule.
- 6.2. The classification report will be prepared at the end of each classification session and displayed at the classification venue and/or TIC for examination by competing nations. The classification report will include the classification outcome and the time when the classification was completed.

7. PROTESTS PRIOR TO COMPETITION

- 7.1. A protest may be made by either the NPC representative of an athlete being classified at the classification venue or by the representative of another NPC relating to an athlete being classified at the classification venue within six hours of the publication of the classification report for the athlete concerned. The protest must be made to the Chief Classifier for the event or the alternative contact identified in the Team Managers Regulations. A protest at this time will carry a protest fee, which will be the same fee as that for technical protests.
- 7.2. A protest panel will reassess the athlete. The decision of the protest panel will be final for the period of the competition (except in circumstances where the Chief Classifier for the event lodges a protest during competition).
- 7.3. The NPC representative of the athlete or the representative of the protesting NPC will be entitled to appeal the protest panel decision to the Board of Arbitration of Classification (BAC). The procedure and appeal fee will be that laid down by the BAC.

8. PROTESTS DURING COMPETITION

The aim is for all classification issues to be resolved prior to the commencement of competition and protests during competition can only be made under the following circumstances.

- 8.1. For athletes with status (N) or (R) prior to the recognized competition (and who were not subject to protest during that process) a protest may be made by either the NPC representative of the athlete or by the representative of another NPC relating to the athlete after the athlete's first event within 30 minutes of the announcement of the provisional result. A protest at this time will carry a protest fee, which will be the same fee as that for technical protests. The athlete will be re-assessed by a protest panel. If the athlete is re-classified it will take effect immediately and the result of the event will be amended to take account of the decision of the protest panel.
- 8.2. The Chief Classifier may also initiate protest proceedings after an athlete's first event in accordance with the previous clause. No protest fee is payable under these circumstances.
- 8.3. If the Chief Classifier considers more function has been shown by an athlete at any other time during competition than was shown during the pre-competition classification process (including prior protest proceedings) or in his/her first event, the Chief Classifier may initiate protest proceedings and the athlete's NPC representative will be notified. A protest panel will be appointed to re-assess the athlete. If the protest is upheld, the athlete will be disqualified from competition and all results achieved expunged from the record and medals returned. No protest fee is payable in these circumstances.

The following will apply for athletes classified (C) prior to the IPC Athletics recognized competition:

- 8.4. If the Chief Classifier considers that an athlete with status (C) demonstrates function, at any time during competition, which is in excess of the expectation for the class then he/she may initiate protest proceedings and the athlete's NPC representative will be notified. A protest panel will be appointed to assess the athlete. If the athlete is re-classified it will take effect immediately. No protest fee is payable in these circumstances. If the Chief Classifier considers that an athlete with status (C) demonstrates function, at any time during competition, which is less than the expectation for the class then he/she may initiate protest proceedings and the athlete's NPC representative will be notified. A protest panel will be appointed to assess the athlete. If the athlete is re-classified it will take effect immediately. No protest fee is payable in these circumstances.
- 8.5. The NPC representative of the athlete or the representative of the protesting NPC as the case may be, will be entitled to appeal the protest panel decision to the Board of Arbitration of Classification (BAC). The procedure and appeal fee will be that laid down by the BAC.

9. PROTESTS AFTER COMPLETION OF COMPETITION

- 9.1. For athletes classified (C) a protest may be lodged by either the NPC representative of the athlete or by the representative of another NPC relating to an athlete, or by the Head of IPC Athletics Classification or his / her representative (Chief Classifier) for determination after the end of that athlete's events for that recognized competition. A protest of this nature will carry a protest fee, which will be the same fee as that for technical protests (except in the circumstances where the Head of IPC Athletics Classification or his/her representative initiates the protest when there is no fee payable).
- 9.2. A protest panel will be appointed to assess the athlete after the completion of that athlete's events or a protest panel will be appointed to assess the athlete at the next classification opportunity at an IPC Athletics recognized meeting. If the protest is upheld, the athlete's re-classification will take effect for the next competition at which the athlete competes.
- 9.3. The NPC representative of the athlete or the representative of the protesting NPC will be entitled to appeal the protest panel decision to the Board of Arbitration of Classification (BAC). The procedure and appeal fee will be that laid down by the BAC

10. PROTEST PROCEDURES

- 10.1. In all cases a protest must be lodged on the correct form provided by the Organising Committee of the recognized competition or where appropriate, by the IPC Athletics Technical Committee Chairperson, and where applicable accompanied by the appropriate fee. Protests made on behalf of an NPC may only be made by the authorised NPC representative. If the protest is upheld, the fee is returned. If the protest is not upheld, the fee will be forfeited and becomes the property of the IPC Athletics Section.
- 10.2. All protests during a competition will be held as soon as possible, depending on the needs of the competition schedule and always within 24 hours of receipt of the protest. Final results for the relevant event will not be announced until after publication of the decision of the protest panel. Athletes will not carry results forward from an event at which they were re-classified.
- 10.3. The protest panel will consist of two classifiers – a medical and a technical – for classes 31 to 58 and two classifiers for classes 11 to 13. The protest panel will not include members of the initial panel of Classifiers. For athletes in classes 11 to 13 and 31 to 58 the protest panel will undertake a medical and functional re-assessment

- 10.4. If the protest panel as part of its deliberations unanimously agrees that an athlete is not cooperating or has not co-operated during the initial assessment or the re-assessment process, the protest panel will not proceed with the classification process and will recommend to the Chairperson of IPC Athletics Technical Committee or his/her nominated representative that the athlete be disqualified from the competition. The athlete will be allocated the status IM-intentional misrepresentation of abilities under the IPC Classification Code (Section 11)
- 10.5. An athlete who does not meet the IPC Athletic minimal disability criteria, both at the time of initial classification and at the time of re-assessment at the same competition, will be declared ineligible (NE) to compete in any competition recognized by IPC Athletics.
- 10.6. The athlete representatives who assist or counsel an athlete to make wilful misrepresentation, or to fail to cooperate, or to fail to present for classification will be subject to sanctions. The sanctions will be determined on a case by case basis by the IPC Athletics Technical Committee.

APPENDIX H – STAFFING, EQUIPMENT AND FACILITIES FOR CLASSIFICATION

This document outlines the staffing, equipment and facilities required to conduct classification. The requirements apply to all competitions recognized by IPC Athletics, including the Paralympic Games, World Championships and Regional Championships (e.g. European Championships, Arafura Games) but are recommended for all competitions.

As described in Section 2, classification is a three stage process:

- Stage 1 – Examination, which entails assessment of impairment, novel motor tasks and movements that are closely related to the movements required in the sport.
- Stage 2 – Sports specific assessment, which entails observation and assessment of the athlete performing the event/s for which they are entered. Performance should be under conditions and at an intensity that are as close as possible to competition conditions.

After Stage 1 or 2 the athlete will receive a classification for the purposes of the competition. During competition, Stage 3 is conducted.

- Stage 3 – Review in competition. The athlete is observed while competing

In addition to general requirements, each Stage has specific requirements in relation to support staff, equipment and facilities.

General requirements

The organizing committee will provide administrative and volunteer staff who will assist with the process of classification. The Chief Classifier will have control of the volunteers in conjunction with the Organising Committee (OC).

The Chief Classifier or his/her authorised representative will have ultimate discretion regarding who may enter a designated classification area. In general entry will be restricted to the following appropriately authorized groups: classifiers; athletes; athlete's representative(s); and observers.

The Chief Classifier should have access to a computer and appropriate support resources to communicate with teams during classification.

Requirements for Stage 1 (Examination)

Reception / Waiting area

A desk and chairs should be provided at the reception area to be used by classification administration staff and the Chief Classifier.

The waiting area for athletes and athlete representatives should be comfortable and weatherproof. From the waiting area a covered passage should connect to the classification rooms. Ideally the waiting area will be able to be secured and have with a single point of entry.

Athletes and athletes' representatives should have ready access to drinking water and toilets from the waiting area.

Classification rooms and equipment

There should be a minimum of four classification rooms, three of which should be of equal size and one room that is much larger.

The 3 smaller rooms should large enough to comfortably hold a minimum of 6 people (3 classifiers, an athlete and 2 athletes' representatives) as well as the necessary equipment:

- examination couch that can be height adjusted electrically or by the use of a foot pedal. Sheets, pillows and covers should be provided to allow examination of the athletes in a dignified manner;
- desk and at least 4 chairs

- a reflex hammer, pins to test sensation, tape measure and goniometer;
- One of the rooms should also have a sphygmomanometer (i.e., blood pressure measuring machine) and a wall mounted tape for measuring height

Each of the 3 smaller rooms should have a single point of entry with a closing door (preferably lockable) in order to permit private examination and confidential consultation by a classification panel. Power points should be available in each.

The larger classification room should be at least 10 X 20 metres. The floor surface should be clear and should be suitable for a range of vigorous gross motor activities (e.g., wheeling, running, jumping, hopping, stretching and sprinting on the spot).

Indoor throwing equipment should be provided. This should include, at a minimum, volleyball and tennis ball, but ideally would also include indoor shot put, 2kg medicine ball, Boccia balls and soccer ball.

Classifiers should have ready access to the following:

- hand washing facilities – running water, soap and towels – that are sufficiently close to the classification area to permit hand washing between examinations;
- toilets
- refrigerator
- drinking water (bottled) and coffee and tea making facilities.

Requirements for Stage 2 (Sports specific assessment)

A competition-standard athletics venue should be made available to conduct Stage 2 of the classification process – sports specific assessment – should it be required. The venue for Stage 2 classification should match the competition conditions in the following regards:

- the track surface (minimum length 60m; preferable 400m);
- tie-down facilities for throwing stools;
- long jump pit
- availability of the full range of implement weights

In summary, the facilities must permit observation of the athlete performing the events for which they are entered at moderately high intensity

If Stage 2 facilities are not in close proximity to Stage 1, transport should be provided for all involved in the process - classifiers; athletes; athletes representative(s); and observers. Where required, transport for the athlete's track or field chair and other equipment should also be provided.

Requirements for Stage 3 (Review in competition)

At the athletics track venue there should at least one examination room that is large enough to comfortably hold a minimum of 6 people (3 classifiers, an athlete and 2 athlete's representatives) as well as the necessary equipment:

- examination couch that can be height adjusted electrically or by the use of a foot pedal. Sheets, pillows and covers should be provided to allow examination of the athletes in a dignified manner;
- desk and at least 4 chairs
- a reflex hammer, pins to test sensation, tape measure and goniometer;
- a wall mounted tape for measuring height

It should have a single point of entry with a closing door (preferably lockable) in order to permit private examination and confidential consultation by a classification panel. Power points should be available. It should be as close as possible to the 100 metres finish area.

The facilities should include a secure area where classifiers can leave their belongings while they observe athletes during events. Most of the observation of athletes in events will take place from outside the arena

but occasionally it is necessary for a classifier to enter the central arena (see Classifiers Code of conduct for permissions required to enter the competition arena).

Where possible, access to a video playback system with the capacity to take a direct feed from a camcorder or similar is highly desirable. Increasingly, classifiers at international level use these devices to capture footage of athletes of interest and subsequently review the footage in detail, permitting more accurate classification.

Equipment and facilities for classification of visually impaired athletes

These are the items of equipment required by the classifiers of visually impaired athletes (T/F11 – 13).

- | | | |
|---|--|---|
| A | <ul style="list-style-type: none">• One Autorefract keratometer• Box of glasses with frame• Frontofocometer• Slit lamp• Retinometer (optional)
• Ophthalmoscope (direct and indirect)• Goldmann’s visual field perimeter or automated static perimetry• Esterman Test | <p>allowing an objective refraction of the athlete.</p> <p>for subjective refraction.</p> <p>to allow an accurate measurement of the power of the glasses.</p> <p>to examine the anterior segment of the eye.</p> <p>to confirm in some specific cases the subjective eyesight with acuity charts.</p>
<p>to measure and determine with a paper document the visual field.</p> |
| B | <ul style="list-style-type: none">• Acuity Charts | <p>E.T.D.R.S (Light House, New York)
THE SOSH Vision Chart designed by the student optometric service to humanity third edition 1990</p> |

In order to measure visual acuity accurately, the acuity chart must be placed at a distance of between one and six metres from the athlete. Classifiers must be able to control the luminosity (brightness of the light source) in the room being used for classification. It is extremely important that there is no great variation in luminosity between the waiting area and the classification area.

Visual acuity must be measured at least five times at different distances and using tests of varying sizes.

Prior to a major IPC Athletics event the Chief Classifier for the event plus the Event Organising Committee and the classifiers selected for classes 11-13 will discuss who is responsible for the provision of equipment.

APPENDIX I – HOW TO QUALIFY AS AN IPC ATHLETICS CLASSIFIER

General Comments

The process of training IPC classifiers is imbedded in the IPC Academy and provides a structured education programme that ensures global standardised levels of competence amongst IPC Athletics classifiers.

The programme, adjacent to a similar programme for technical officials, will combine use of both digital learning (main emphasis on gaining ‘knowledge’) and face to face training (main emphasis on gaining ‘competencies’). Within the programme there are three levels of qualification: Trainee, Level 1 and Level 2. An outline of progression is provided below.

Background Knowledge / Experience:

To be eligible to begin training as an IPC Athletics Classifier candidates must show evidence of one of the following criteria. The criteria below are the basic qualifications which will determine the type of classifier the candidate may become:

Medical

- A professional qualification in Medicine, Physiotherapy or Occupational Therapy

Technical

- A professional qualification in Exercise, Sport Science or Physical Education
- An appropriate nationally recognised athletics coaching qualification
- An athlete who has competed at an IPC World Championships or Paralympic Games.

An English copy of the basic qualification will be required at initial registration to the IPC Athletics Classifier Course.

All candidates should have appropriate experience and competency in working with athletes who have an activity limitation for competing.

Candidates that qualify for ‘Medical Classifier’ will be expected to have the ability to carry out and report on an appropriate and detailed neuromusculoskeletal assessment. Candidates should possess strong movement analysis skills.

Candidates that qualify for ‘Technical Classifier’ will be expected to have a sound knowledge of the IPC Athletics disciplines with the ability to analyse and critique the movements of a performing athlete.

In addition to the criteria above, all candidates must have a sufficient knowledge of the English language (as this is the official communication language of IPC Athletics).

Step One - Becoming a Trainee Classifier:

Candidates are required to complete a digital training tool provided online, downloadable, or via CD format.

The online learning format will be easily accessible to all and will provide background knowledge in topics including:

- History of the Paralympic movement and IPC Classification
- IPC Position Stand on Classification in Paralympic Sport
- IPC Classification Code
- Classification Rules and Regulations
- Sport-Specific Evidence Based Classification
- Introduction to IPC Athletics
- Eligibility Criteria
- Sport Class Profiles

- Classifier Assessment Methods & Techniques
- Classifier Code of Conduct

On successful completion of the on-line training and examination the candidate will be added to the IPC Athletics Classifier Database, and is certified as an IPC Athletics ‘Trainee’ Classifier.

The online-training course will be available from the IPC Academy from Summer 2010 onwards.

Step Two – From Trainee Classifier to Level 1 Classifier:

The Trainee Classifier must apply to attend a 2-3 day IPC Athletics classification seminar / workshop and participate in IPC Athletics Classification at IPC Recognized Competitions.

At the seminar / workshop the main emphasis will be on competency training. This will involve practical work, with or without athletes. Trainee Classifiers will need to complete a formal examination which will test their knowledge of the classification process and current rules and regulations as well as their competencies to act as ‘classifier’. Understanding and use of the English language will also be assessed.

Additionally, Trainee Classifiers will be appointed to international IPC Athletics Classification panels at dedicated IPC recognized competitions and participate in a minimum of twenty-five (25) athlete evaluations, covering the broad range of IPC Athletics sport classes.

Assessment at the competition will be done by a certified IPC Athletics ‘Educator’ (typically Level 2 Classifier) and will involve the trainee manifesting a number of competencies, including assessment and analytical skills, reasoning skills, communication skills and administrative & documentation skills. In addition, the Educator will also take into consideration the personal attributes shown by the trainee including professionalism and time management. .

Following the assessment, the Educator will decide if the Trainee has completed each competency based on standard testing criteria. If so, the Educator will inform IPC Athletics who will endorse the change of certification from Trainee to Level 1 Classifier.

The IPC Athletics Classifier Database will be updated and the new Level 1 Classifier will be eligible for full participation as a member in future IPC Athletics international classification panels.

The Trainee Classifier must have the endorsement from their National Paralympic Committee (NPC) as a prerequisite for attending the seminar and practical training. The Endorsement from the NPC would be a letter on official letterhead and signed by the official IPC contact person i.e. Secretary General or President.

Step Three – From Level 1 to Level 2 Classifier:

To obtain a Level 2 certification, a Level 1 Classifier will need to have performed on an IPC Athletics appointed panel in at least 2 major IPC Athletics recognized competitions. The candidate will also present a written record / portfolio of continuing classification involvement.

The Level 1 Classifier must attend additional face to face training, at which time themes related to communication, leadership, administration and ‘code of conduct’ matters are further elaborated.

On successful completion of the examination following the face to face training the candidate will be certified in the IPC Athletics Classifier Database as an IPC Athletics Level 2 Classifier.

IPC Athletics has different levels of classifiers on its database:

Trainee – a potential IPC Athletics classifier who has attended an approved IPC Athletic Classification Seminar.

- Level 1** – an IPC Athletics classifier who has attended an approved Seminar and has successfully completed the IPC Athletics Classification formal examination and informal assessment process and demonstrated competence in the core duties of an IPC Athletics classifier or is a classifier who has an International Classification qualification (IWAS, CPISRA or IBSA) and significant classification experience in the sport of Athletics at major International Games.
- Level 2** – an IPC athletics classifier who has classified at two International IPC Athletics competitions including either the IPC World Athletics championships and/or the Paralympics games and has demonstrated advanced skills as an IPC Athletics classifier. Appointment to Level 2 is at the discretion of the Head of Classification.
- Chief Classifier** –An experienced Level 2 classifier who has significant classification experience as well as the administrative skills required to run Classification at a major IPC Athletics games.
- Teacher** – An experienced Chief or Level 2 classifier appointed by the Head of Classification to perform this role.
- Head of Classification** – A Chief Classifier appointed by the IPC Governing Board to act as the Head of Classification for the sport of Athletics.

APPENDIX J – Overview of the IPC Athletics Research Plan

Background

In 2002 IPC Athletics established the Sports Science Subcommittee (SSS). Chaired by Dr John Bourke, the terms of reference for the SSS included addressing sports science issues that would improve classification in disability athletics. In 2003 the SSS endorsed a research project entitled the *IPC Athletics Classification Project*^k which was developed by Dr Sean Tweedy with assistance from Dr John Bourke.

The aim of the *IPC Athletics Classification Project* was to develop a taxonomically valid, evidence-based system of classification for all athletes previously classified under the following systems:

- Cerebral Palsy - Sport and Recreation Association (CP-ISRA);
- International Stoke Mandeville Wheelchair Sports Federation (ISMWSF);
- International Sports Organization for the Disabled (ISOD) system for Amputees; and
- ISOD (Les Autres).

Note that the project did not address athletes whose principal impairment is vision impairment (currently classified in the IBSA system) or intellectual disability (currently classified in the INAS-FID system).

The Project has two stages:

Stage 1 - *Building the Foundations* (recently completed); and

Stage 2 – *Developing evidence-based class profiles*, (recently commenced).

In summary, the aims of Stage 1 were to develop a framework for classification that was taxonomically valid – taxonomy being the science of classification – and describe minimum disability criteria that were consistent with the framework. Stage 1 has been completed and the outcomes have been included in this report. However Stage 1 did not change the actual class profiles – accredited classifiers who scan of Sections 4.2 and 5.2 will notice only minor changes to the profiles and that classes F31-58 and T31-54 are still in place. The work of developing class profiles that are consistent with the new framework will be undertaken in Stage 2.

The remainder of Appendix J provides an overview of Stage 1 (aims methods and outcomes) and outlines the research plan for Stage 2 which has commenced and which will continue over the next several years.

Stage 1 - “Building the Foundations”

Aims

Stage 1 of the project had two principle aims:

- develop a framework for a system that was taxonomically sound and which preserved the culture and fabric of IPC Athletics;
- develop valid minimum disability criteria

Many of the questions which had to be addressed did not have a single, correct answer. For example, which impairment types should be eligible for IPC Athletics? What was an appropriate criterion to decide whether an impairment was severe enough to be eligible? The answers to such questions needed to be informed by research wherever possible, but because matters of opinion were involved, the answers to such questions could not be provided by only one or two people.

Methods

The Delphi process is a scientific method was developed in order to arrive at a consensus position among a group of experts on complex problem (4, 6). The process is driven by a moderator – Dr Sean Tweedy in this case. With Dr Bourke, Dr Tweedy identified and documented the concepts that required expert opinion, collated the relevant research and then, designed and wrote a questionnaire which was

^k The original project was called the *Disability Athletics Classification Project*. It was changed to the *IPC Athletics Classification Project* following written endorsement from the IPC.

distributed to a panel of experts. When the questionnaire was returned the moderator analyzed the results, clarified responses where necessary, and formulated a further questionnaire. This process was complex and so ran over 5 rounds (usually only three are required). Twenty-four experts in disability athletics from five continents contributed to the process. The experts were of four types:

- Athlete experts: Athletes who had competed at Paralympic level in athletics;
- Movement science experts: Scientists with doctoral qualifications in the movement sciences who had published original research in the area of disability athletics;
- Classification experts: Internationally accredited classifiers with more than 10 years experience in classifying;
- Coaching experts: Coaches who had successfully coached athletes with disabilities to international level.

Table J.1 presents all experts who contributed to the project. Of the 24 originally recruited, 21 completed all 5 of the Delphi rounds, an excellent retention rate for such demanding work. The 21 remaining are marked (*).

Outcomes

The quality of the people who contributed to Stage 1 was excellent – they were highly accomplished in their respective fields and were culturally and geographically diverse. The quality of the expert panel is evidence that the results that were achieved were also high quality. The minimum level of agreement set for consensus was 70% support from the expert panel but in most instances levels of agreement were much higher (median ~85%). Given the complexity of the issues addressed this high level of agreement is outstanding.

The areas on which consensus was reached include:

- **System Specifications:** it was agreed that the language used and the taxonomic structure of the system would be consistent with the *International Classification of Functioning Disability and Health (ICF)* (21). Statements regarding the purpose and the conceptual basis of the system were also agreed upon and these are presented in Section 1 – Description of the System;
- **Eligible impairment types:** using the compendium of neuromusculoskeletal impairments presented in the ICF, it was agreed that the following 8 impairment types would be classified in this system – increased muscle tone, ataxia, athetosis, impairment of muscle power, impairment of passive range of movement, limb deficiency, leg length difference and short stature. These outcomes are presented in detail in Section 3 – Eligible Impairment Types ;
- **Minimum Disability Criteria:** the experts agreed upon operational descriptions of exactly how severe each of the 8 impairment types had to be in order for an athlete to be eligible to compete in Paralympic Athletics. The descriptions were determined by the requirements of the main athletic disciplines (running, jumps, throws and wheelchair racing). These are presented in Section 4.1 and 5.1 of this document;
- **The General Structure for classes:** agreement was reached regarding a system for grouping impairment types according to how they will impact on the biomechanics of different athletic technique (rather than by diagnosis).

Table J.1: The 24 experts who contributed to Stage One – *Building the Foundations*

		Athlete	Scientist	Classifier	Coach
Bagley, Dr Anita*	USA		X		
Beeton, Hilary*	RSA			X	
Bourke, Dr. John*	Australia			X	
Burkett, Dr Brendan*	Australia		X		
Chow, Dr John*	USA		X		
Eriksson, Peter*	Canada				X
Fowler, Dr Neil*	United Kingdom		X		
Hollenbeck, Scott	USA	X			X
Goodman, Scott*	Australia				X

		Athlete	Scientist	Classifier	Coach
Ilman, Dr Arnold	USA			X	
Jebali, Dr.Halim*	Tunisia			X	
Kruimer, Dr. Aart*	Netherlands			X	
Laverborn, Mats*	Sweden	X		X	
Little, Jim*	USA			X	
McDonald, Hamish*	Australia	X			
Morse, Marty	USA	X			X
Nolan, Dr Lee*	Sweden		X		
Nunn, Chris*	Australia				X
Qasrawi, Dr. Bassam*	Kuwait			X	
Richter, Dr. Ken*	USA			X	
Russell, Eric*	Australia	X			X
Sauvage, Louise*	Australia	X			X
van der Woude, Dr Luc*	Netherlands		X		
Williams, Dr Gavin*	Australia		X		
TOTAL		6	7	9	7

(*) indicates those who contributed to all five Delphi rounds.

Conclusion

The outcomes of Stage 1 of the IPC Athletics Classification Project laid the foundations for the development of a new system of classification – a valid taxonomic structure for the system is now in place, the criteria for eligibility have been established and the results have the considered support of IPC Athletics as well as 24 respected experts in the area. IPC Athletics is now in an excellent position to commence the next stage of the project that will replace the current class profiles with evidence-based profiles.

Stage 2 – Developing evidence-based class profiles

The most important system specification that was agreed upon in Stage 1 was the conceptual basis of the system – the system will minimise the impact of neuromusculoskeletal impairments on the outcome of competition by grouping athletes according to the extent of activity limitation that results from impairment¹. When athletes are grouped on this basis, the competitive success of an athlete will not be influenced by the severity of their impairment. Instead, the factors that will determine competitive success in Paralympic Athletics will be the same as those that determine success in non-disabled athletics – hours of training, quality of training, anthropometry, technique, equipment and psychology.

The activity limitation caused by impairment depends on the type and severity of impairment that the person has, but equally on the activity that the person wants to do. For example, a person with bilateral hand impairment will experience more limitation in throwing activities (shot put, discus, javelin) than it will be in running activities. The aim of Stage 2 of the research project is to develop several batteries of tests specifically to evaluate how much factors such as loss of range of movement, loss of strength and increased muscle tone impact on a person's ability to run, throw, jump or push a wheelchair. Importantly the tests will be standardised and quantifiable, and the research will allow the measures to be weighted according to how much they affect the activity. These tests will be the principle means of placing people into classes and will replace the profiles that are currently in use.

As mentioned, Stage 2 of the Classification project has just commenced. It will run until 2010 and will be led by Dr Sean Tweedy, together with the assistance of Prof. Yves Vanlandewijck (Chair of the IPC Sports Science Committee). The project aims to develop evidence-based class profiles that will replace those currently used (presented in Sections 4.2 and 5.2). When the work is complete, the classification process and outcomes will be fundamentally changed. While athletes will still be physically assessed, the

¹ This statement uses definitions approved by the World Health Organization and has been adopted in the most up-to-date IPC Classification Code available at the time of writing.

core of the process will be a set of standardised test batteries comprising tests that are quantifiable and developed specifically to evaluate how much factors such as loss of range of movement, loss of strength and increased muscle tone impact on a person's ability to run, throw, jump or push a wheelchair. The classification outcome will also be different – the number and composition of classes is likely to significantly alter in many instances. Consequently the old names – T31-T54 and F31-F58 – will no longer be appropriate. This Stage of the project has been reviewed by independent panellists from the Australian Research Council who confirmed our methods constitute best-practice, and have a realistic prospect of developing and validating the various test batteries.

An important feature of our approach is that we have scheduled extensive consultation processes prior to implementation. For example, this document was reviewed by the Sports Technical Committee of IPC Athletics, circulated to all member nations for comment, reviewed at the IPC Athletics Summit held in February 2009, and passed by the Governing Board of the IPC before it was eventually adopted.

APPENDIX K – Medical Review

Many athletes have interventions that will materially and permanently alter measures of impairment in order to assist with daily functioning. Note that the intervention received may increase or decrease the sports impact of an impairment and re-classification may therefore be to a higher or lower class. This rule thus applies to athletes with any classification status – New, Review or Confirmed.

In instances when an athlete receives such an intervention AFTER they have been classified (e.g., botox to reduce hypertonia; tendon releases; Harrington rods or joint fixations to assist posture/stability; corrective eye surgery), the athlete is obliged to notify their NPC, who must notify IPC Athletics by completing the Medical Review Form and submit it to the address indicated.

The Medical Review Form should be received by IPC Athletics within 6 months of the intervention or before the athlete's next competition, whichever is the sooner. There may be exceptions to this timeframe as some interventions will take longer from which to recover e.g. 12 months before training or competition is allowed after the procedure being completed, Failure to correctly notify IPC Athletics within the timeframe indicated may be considered a case of intentional misrepresentation see above comment regarding time frame of skills and/or abilities as defined under the IPC Classification Code (section 11).

Once this Medical Review Form is submitted it will be assessed by the IPC and the NPC will be notified whether the request is accepted or not

Note:

1. If accepted the athlete sport class status will be changed into 'REVIEW' with immediate effect.
2. the requirement for reclassification does not guarantee that the sports class of the athlete will necessarily change. The re-classification process will be conducted and a sport class will be allocated on the basis of the assessments conducted and in accordance with the IPC Athletics Classification rules

Subject to completing and submitting the form to IPC Athletics within the required timeframe the date of the intervention will be used for official purposes.