51 BC 4 Sport Class

Athletes who are diagnosed with an Impairment of Non-Neurological origin NOT affecting the CNS and who do not present with Tonal change or Spasticity as their primary impairment. BISFed acknowledge that Athletes with Spinal Cord Injury (SCI) may have Spinal Spasticity as part of their physical presentation, but this must not be the primary impairment and Athletes must meet the Minimum Impairment Criteria as detailed below.

51.1 BC4 Minimal Impairment Criteria (MIC)

Athletes in the BC4 Sport Class MUST meet the MIC for Impaired Muscle Power. On Physical Assessment, the Athlete has muscle strength of Grade 3 or less in Shoulder Muscles (in 0-90 degrees ROM Flexion/Abduction) and in Elbow Extensors. Muscle strength as assessed in the sitting position (Adapted from Daniels and Worthingham muscle testing scale- See point 47.4 for further details). The Athlete may also present with Impaired ROM or Loss of Limb/Limb deficiency but MUST still meet the Impaired Muscle Power MIC.

51.1.1 Topography: Impairment(s) affect all four limbs and trunk 88 BISFed Classification Rules – 5th Edition, 2021

51.1.2 Eligible Impairments: Primarily Impaired Muscle Power, Impaired Range of Movement (with impaired muscle power), Limb deficiency (with impaired muscle power).

51.1.3 Athletes with the following medical diagnoses resulting in functional limitations as per the IPC Eligible impairments detailed above and meet the criteria for the Sport Class profile will be eligible to play Boccia:

51.1.3.1 Myopathies with the overall strength of 3/5 or less in the shoulders and the upper limb muscle groups. This includes conditions such as Muscular Dystrophy.

51.1.3.2 Spinal cord lesion of upper cervical spine (C4-5), complete or incomplete tetraplegic, with the overall strength of 3/5 or less in the upper limb muscle groups.

51.1.3.3 Motor neuron disease, Spinal Muscular Atrophy, Spinal cord disease such as Transverse myelitis with the overall strength of 3/5 or less in the upper limb muscle groups.

51.1.3.4 Spina bifida combined with upper extremity involvement with the overall strength of grade 3/5 or less in the upper limb muscle groups and trunk.

51.1.3.5 Peripheral Neuropathies such as Charcot-Marie-Tooth disease with the overall strength of grade 3/5 or less in the upper limb muscle groups and trunk.

51.1.3.6 Limb loss/Limb Deficiency of all 4 limbs with a very high level of amputation more than 1/3 of the upper limb above the elbow and ½ of the lower limb amputated above the knee that influence the trunk stability. Amelia or shortened limbs with overall strength of Grade 3/5 or less in the Upper limb muscle groups.

51.1.3.7 Impaired Range of movement- Arthrogryposis with muscle strength of grade 3/5 or less in the upper limbs and lower limbs muscle groups throughout the available active range of the limbs as well as weakness of the upper and lower trunk extensor and core muscles of 3/5 and less. 89 BISFed Classification Rules – 5th Edition, 2021

51.1.3.8 Other conditions and syndromes such as Multiple Sclerosis, TARS Syndrome (Thrombocytopenia with Absent Radius), Juvenile Arthritis, and Osteogenesis Imperfecta, which results in overall poor strength of grade 3/5 in the Upper limb muscle groups and/or limited range of movement.

51.2 BC4 in summary

51.2.1 Athletes will have severe locomotor dysfunction affecting all four limbs and the trunk.

51.2.2 Athletes must have a lack of active trunk control, unable to regain midline position independently when fully flexed and side flexed due to weakness in the trunk muscles which impacts on their dynamic postural control and sitting balance will be affected.

51.2.3 Moderate impairment of function and may have some limitation in active functional range of movement due to impaired muscle power and lack of control affecting the upper limbs/trunk/lower limbs.

51.2.4 Impaired muscle power in the Upper Limb, Lower Limb and trunk. For the throwing athlete, overall muscle strength of grade 3/5 or less in the Upper limbs, Lower limbs, and trunk muscle groups. For the footplayer, overall muscle strength of grade 3/5 or less in the Lower limb especially Quads and Hamstrings muscles.

51.2.5 Athletes may use a manual or power wheelchair for everyday mobility and/or sport specific performance on court using the upper limbs or lower limbs to propel the wheelchair.

51.2.6 Athletes may walk with assistance or use a walking aid for short distances.

51.2.7 Athletes may be able to transfer independently using a variety of different methods and transfer aids. 90 BISFed Classification Rules – 5th Edition, 2021

51.3 BC 4 Thrower: Upper Extremities

51.3.1 Active range of movement in the Upper limb is limited due to impaired muscle power and/or impaired range of movement/flexibility and or limb deficiency/limb loss of more than 1/3 above the elbow.

51.3.2 In the Physical Assessment of the Shoulder, Athletes may be able to move the shoulder through a full range of motion against gravity however they are unable to do this against moderate manual resistance or with a boccia ball holding it at 90˚ for more than 3 sec. They have Grade 3 muscle strength or less according to Daniels and Worthingham Scale.

51.3.3 Physical Assessment Elbow (Triceps and Biceps) - Athletes may be able to move the elbow through a full range of motion against gravity, however, they are unable to do this against moderate manual resistance. They have Grade 3 muscle strength or less according to Daniels and Worthingham Scale.

51.3.4 Physical Assessment Combined Shoulder and Elbow - Athletes are unable to independently maintain 90˚ to full shoulder range of flexion/elevation/abduction and actively extend the elbow against moderate manual resistance maintaining the Shoulder range of motion. They have Grade 3 muscle strength or less on Physical Assessment of combined movement at the shoulder & elbow according to Daniels and Worthingham Scale.

51.3.5 On Technical Assessment when throwing using the over arm/dart throw, the elbow must be below shoulder level (90 degrees) on the active extension of the elbow, when releasing the ball. It is, therefore, a gravity assisted release of the ball (this will fit with Grade 3 or less in the muscle groups impacting on the throw).

51.4 BC4 Wrist, Hand function and grip.

51.4.1 Athletes may be able to demonstrate full ROM of the wrist, thumb, and fingers. however, there will be weakness of the grip. If the strength in the wrist and hand is greater than 3, other 91 BISFed Classification Rules – 5th Edition, 2021 muscle groups that are more proximal need to be Grade 3 or less and visibly impact on the propulsion of the ball into the field of play.

51.4.2 Intrinsic hand and grip strength weakness will be evident on power grip and pinch grip testing. This will be demonstrated functionally by the weakness of functional grasp (flexors) and on the release (extensors).

51.4.3 There may be some loss of fine motor control and coordination within the hand because of muscle weakness and so manual dexterity will be affected in some way. Athletes may have finger flexion deformities due to extensor weakness.

51.5 BC4 Trunk/Postural Control and Balance

51.5.1 Athletes will demonstrate trunk muscle weakness with overall trunk muscle strength of less than grade 3 into side flexion/rotation/flexion and extension on Physical assessment. Athletes will have some limitation of their active trunk mobility because of this postural muscle weakness ( abdominals and back extensors such as erector spinae) which affects dynamic postural control and will show the inability to regain midline position independently when fully flexed or side flexed.

51.5.2 Athletes can demonstrate some degree of dissociation of the pelvis/ lumbar spine/trunk and upper limb movement through coactivation of the postural muscles and some core stability.

51.5.3 On Physical Assessment and Technical Assessment trunk muscle weakness will affect the Athlete’s ability to maintain good sitting balance/ posture and to control movement or regain midline position without the use of some compensatory strategies (see definition of compensatory movement and strategies in the appendices).

51.5.4 Athletes will demonstrate the use of some compensatory movements or strategies to improve their postural control and stability when preparing to throw, throughout the throwing action and when returning to an upright sitting position after a balance 92 BISFed Classification Rules – 5th Edition, 2021 disturbance. This may include for example stabilising with the non-throwing arm, head or shoulder girdle fixation or use of straps and other aids.

51.5.5 Trunk muscle fatigue is often evident after prolonged functional activity and will result in the use of greater compensatory strategies to maintain posture, balance and throwing position.

51.5.6 Athletes may need to use pelvic, waist or other straps in combination to improve their posture and stability when throwing and to compensate for the active muscle weakness.

51.5.7 Athletes with SCI specifically Cervical spinal lesions will have no activation of their trunk muscles and therefore very limited postural control and balance. As a result, the use of compensation strategies will be more evident, and Athletes may use a corset/waist strap and/or belt to improve their stability.

51.5.8 It is common for Athletes to present with spinal deformities such as Kyphosis of Scoliosis resulting in trunk asymmetry and reduced control. \*\*NB With regards to the above criteria it is very important to consider the whole picture:

51.5.9 The whole upper limb and its relationship with the trunk and lower limbs needs to be looked at when assessing individual Athletes.

51.5.10 The overall muscle strength of the upper limb should be considered and if muscle strength testing reveals isolated muscle(s) that have muscle strength of Grade 4/5; the impact of this increased strength on the functional throw must be considered, assessed, and explained.

51.5.11 If this additional muscle strength in the upper limb or strength in the trunk and Lower Limb is found to assist the throwing technique, then the Athlete will not be eligible as a BC4 Athlete. 93 BISFed Classification Rules – 5th Edition, 2021

51.6 Technical Analysis of the BC4 throwing actions

51.6.1 Gravity assisted throwing actions are commonly seen in BC4 Athletes such as the pendulum throw/chest or dart throw.

51.6.2 This is as a result of muscular weakness in the whole upper limb (Grade 3/5 or less) or as a result of limited distal activity of the upper limb (below the elbow) resulting in minimal hand function and poor grip where Athletes have reduced control of grasp and release of the ball when throwing (e.g. in CharcotMarie Tooth (CMT) or Peripheral Nerve injury).

51.6.3 On Technical Assessment of the Chest or dart throw the Athlete’s elbow must be below shoulder level (90 degrees) when actively extending the elbow to release the ball.

51.6.4 The ball is often propelled: a) From a bilateral grasp and push action from the chest b) By use of pendulum swing action or c) Another gravity assisted release action such as a dart/over arm or chest throw.

51.7 BC4 - Use of an approved glove, Splint, and strapping

51.7.1 Athletes with the above physical profile and overall upper limb muscle strength of Grade 3/5 or less but who are unable to hold the boccia ball in their hands with a sustained grasp due to significant distal muscle weakness, minimal or no hand activity, will be allowed to use a glove, splint, strapping or any other device that is approved by the Classifiers to play Boccia (e.g SCI tenodesis or CMT)

51.7.2 No device or strapping is permitted that assists the propulsion of the ball. Any glove, strapping or device will be to aid the grasp of the ball which otherwise would be significantly affected by weakness or loss of grasp only.

51.7.3 The gloves, splints, strapping or any other device must be assessed and approved by the BISFed Classification Panel to 94 BISFed Classification Rules – 5th Edition, 2021 check its suitability and necessity at each competition (during equipment check or during Athlete Evaluation). This will be recorded on the BISFed database.

51.7.4 A list of Athletes allowed and approved by the Classifiers to use a glove, splint, strapping or another device will be published on the BISFed website.