

**Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with (single) upper limb deficiency**

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	
	Double Vision	
	Weakness or tingling/burning in arms or legs	
	Severe or increasing headache	
	Seizure or convulsion	
	Loss of consciousness	
	Deteriorating conscious state	
	Vomiting	
	Increasingly restless, agitated or combative	
<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	
	Balance / gait difficulties / motor coordination	
	Disorientation or confusion	
	Blank or vacant look	
	Facial injury after head trauma	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	
	Requires understanding	
	Requires speech	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	
	Eye opening in response to pain	
	Eye opening to speech	
	Eye opening spontaneously	
<b>Best Verbal Response</b>	No verbal response	
	Incomprehensible sounds	
	Inappropriate words	
	Confused	
	Oriented	
<b>Best Motor Response</b>	No motor response	
	Extension to pain	
	Abnormal flexion to pain	
	Flexion / Withdrawal to pain	
	Localizes to pain	
	Obeys commands	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	
	Full range of ACTIVE pain free movement?	
	Is the limb strength and sensation normal?	In residual limb consider associated deficit at baseline

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

**Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with (bilateral) upper limb deficiency**

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	
	Double Vision	
	Weakness or tingling/burning in arms or legs	
	Severe or increasing headache	
	Seizure or convulsion	
	Loss of consciousness	
	Deteriorating conscious state	
	Vomiting	
	Increasingly restless, agitated or combative	
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface
	Balance / gait difficulties / motor coordination	
	Disorientation or confusion	
	Blank or vacant look	
	Facial injury after head trauma	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	
	Requires understanding	
	Requires speech	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	
	Eye opening in response to pain	
	Eye opening to speech	
	Eye opening spontaneously	
<b>Best Verbal Response</b>	No verbal response	
	Incomprehensible sounds	
	Inappropriate words	
	Confused	
	Oriented	
<b>Best Motor Response</b>	No motor response	
	Extension to pain	
	Abnormal flexion to pain	
	Flexion / Withdrawal to pain	
	Localizes to pain	
	Obeys commands	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	
	Full range of ACTIVE pain free movement?	
	Is the limb strength and sensation normal?	In residual limb consider associated deficit at baseline

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

**Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with (single) lower limb deficiency**

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness		
	Double Vision		
	Weakness or tingling/burning in arms or legs		
	Severe or increasing headache		
	Seizure or convulsion		
	Loss of consciousness		
	Deteriorating conscious state		
	Vomiting		
	Increasingly restless, agitated or combative		
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	
		Balance / gait difficulties / motor coordination	
Disorientation or confusion			
Blank or vacant look			
Facial injury after head trauma			
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing		
	Requires understanding		
	Requires speech		
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>			
<b>Best Eye Response</b>	No eye opening		
	Eye opening in response to pain		
	Eye opening to speech		
	Eye opening spontaneously		
<b>Best Verbal Response</b>	No verbal response		
	Incomprehensible sounds		
	Inappropriate words		
	Confused		
	Oriented		
<b>Best Motor Response</b>	No motor response		
	Extension to pain		
	Abnormal flexion to pain		
	Flexion / Withdrawal to pain		
	Localizes to pain		
	Obeys commands		
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?		
	Full range of ACTIVE pain free movement?		
	Is the limb strength and sensation normal?	In residual limb consider associated deficit at baseline	

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

**Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with (bilateral) lower limb deficiency**

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Green
	Double Vision	Green
	Weakness or tingling/burning in arms or legs	Green
	Severe or increasing headache	Green
	Seizure or convulsion	Green
	Loss of consciousness	Green
	Deteriorating conscious state	Green
	Vomiting	Green
	Increasingly restless, agitated or combative	Green
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface
	Balance / gait difficulties / motor coordination	Yellow
	Disorientation or confusion	Green
	Blank or vacant look	Green
	Facial injury after head trauma	Green
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green
	Requires understanding	Green
	Requires speech	Green
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	Green
	Eye opening in response to pain	Green
	Eye opening to speech	Green
	Eye opening spontaneously	Green
<b>Best Verbal Response</b>	No verbal response	Green
	Incomprehensible sounds	Green
	Inappropriate words	Green
	Confused	Green
	Oriented	Green
<b>Best Motor Response</b>	No motor response	Green
	Extension to pain	Green
	Abnormal flexion to pain	Green
	Flexion / Withdrawal to pain	Green
	Localizes to pain	Green
	Obeys commands	Green
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	Green
	Full range of ACTIVE pain free movement?	Green
	Is the limb strength and sensation normal?	In residual limb consider associated deficit at baseline

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

### Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with impaired vision

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	
	Double Vision	
	Weakness or tingling/burning in arms or legs	
	Severe or increasing headache	
	Seizure or convulsion	
	Loss of consciousness	
	Deteriorating conscious state	
	Vomiting	
	Increasingly restless, agitated or combative	
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface
	Balance / gait difficulties / motor coordination	
	Disorientation or confusion	
	Blank or vacant look	
	Facial injury after head trauma	Note pre-injury status
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Hearing can be affected in a small proportion of conditions
	Requires understanding	
	Requires speech	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	
	Eye opening in response to pain	
	Eye opening to speech	
	Eye opening spontaneously	
<b>Best Verbal Response</b>	No verbal response	
	Incomprehensible sounds	
	Inappropriate words	
	Confused	
	Oriented	
<b>Best Motor Response</b>	No motor response	
	Extension to pain	
	Abnormal flexion to pain	
	Flexion / Withdrawal to pain	
	Localizes to pain	
	Obeys commands	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	
	Full range of ACTIVE pain free movement?	
	Is the limb strength and sensation normal?	

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

### Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with absent vision

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Green
	Double Vision	Red
	Weakness or tingling/burning in arms or legs	Green
	Severe or increasing headache	Green
	Seizure or convulsion	Green
	Loss of consciousness	Green
	Deteriorating conscious state	Green
	Vomiting	Green
	Increasingly restless, agitated or combative	Green
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface
	Balance / gait difficulties / motor coordination	Yellow
	Disorientation or confusion	Green
	Blank or vacant look	Red
	Facial injury after head trauma	Yellow Note pre-injury status
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green Hearing can be affected in a small proportion of conditions
	Requires understanding	Green
	Requires speech	Green
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	Green
	Eye opening in response to pain	Green
	Eye opening to speech	Green
	Eye opening spontaneously	Green
<b>Best Verbal Response</b>	No verbal response	Green
	Incomprehensible sounds	Green
	Inappropriate words	Green
	Confused	Green
	Oriented	Green
<b>Best Motor Response</b>	No motor response	Green
	Extension to pain	Green
	Abnormal flexion to pain	Green
	Flexion / Withdrawal to pain	Green
	Localizes to pain	Green
	Obeys commands	Green
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	Green
	Full range of ACTIVE pain free movement?	Green
	Is the limb strength and sensation normal?	Green

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

### Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with globe absent

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Green
	Double Vision	Red
	Weakness or tingling/burning in arms or legs	Green
	Severe or increasing headache	Green
	Seizure or convulsion	Green
	Loss of consciousness	Green
	Deteriorating conscious state	Green
	Vomiting	Green
	Increasingly restless, agitated or combative	Green
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface
	Balance / gait difficulties / motor coordination	Yellow
	Disorientation or confusion	Green
	Blank or vacant look	Red
	Facial injury after head trauma	Yellow Note pre-injury status
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green Hearing can be affected in a small proportion of conditions
	Requires understanding	Green
	Requires speech	Green
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	Yellow Consider bilateral globe absent / may be reliable if one eye affected
	Eye opening in response to pain	Yellow Consider bilateral globe absent / may be reliable if one eye affected
	Eye opening to speech	Yellow Consider bilateral globe absent / may be reliable if one eye affected
	Eye opening spontaneously	Yellow Consider bilateral globe absent / may be reliable if one eye affected
<b>Best Verbal Response</b>	No verbal response	Green
	Incomprehensible sounds	Green
	Inappropriate words	Green
	Confused	Green
	Oriented	Green
<b>Best Motor Response</b>	No motor response	Green
	Extension to pain	Green
	Abnormal flexion to pain	Green
	Flexion / Withdrawal to pain	Green
	Localizes to pain	Green
	Obeys commands	Green
	<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?
	Full range of ACTIVE pain free movement?	Green
	Is the limb strength and sensation normal?	Green

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

### Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in SCI athletes with quadriplegia

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Yellow	
	Double Vision	Green	
	Weakness or tingling/burning in arms or legs	Yellow	
	Severe or increasing headache	Green	
	Seizure or convulsion	Green	
	Loss of consciousness	Green	
	Deteriorating conscious state	Green	
	Vomiting	Green	
	Increasingly restless, agitated or combative	Green	
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	Green
		Balance / gait difficulties / motor coordination	Green
Disorientation or confusion		Green	
Blank or vacant look		Green	
Facial injury after head trauma		Green	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green	
	Requires understanding	Green	
	Requires speech	Green	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>			
<b>Best Eye Response</b>	No eye opening	Green	
	Eye opening in response to pain	Green	
	Eye opening to speech	Green	
	Eye opening spontaneously	Green	
<b>Best Verbal Response</b>	No verbal response	Green	
	Incomprehensible sounds	Green	
	Inappropriate words	Green	
	Confused	Green	
	Oriented	Green	
<b>Best Motor Response</b>	No motor response	Yellow	
	Extension to pain	Yellow	
	Abnormal flexion to pain	Yellow	
	Flexion / Withdrawal to pain	Yellow	
	Localizes to pain	Yellow	
	Obeys commands	Green	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	Yellow	
	Full range of ACTIVE pain free movement?	Yellow	
	Is the limb strength and sensation normal?	Yellow	

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes



### Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in SCI athletes with paraplegia

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Green
	Double Vision	Green
	Weakness or tingling/burning in arms or legs	Yellow (Consider leg involvement)
	Severe or increasing headache	Green
	Seizure or convulsion	Green
	Loss of consciousness	Green
	Deteriorating conscious state	Green
	Vomiting	Green
	Increasingly restless, agitated or combative	Green
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface
	Balance / gait difficulties / motor coordination	Green
	Disorientation or confusion	Green
	Blank or vacant look	Green
	Facial injury after head trauma	Green
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green
	Requires understanding	Green
	Requires speech	Green
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	Green
	Eye opening in response to pain	Green
	Eye opening to speech	Green
	Eye opening spontaneously	Green
<b>Best Verbal Response</b>	No verbal response	Green
	Incomprehensible sounds	Green
	Inappropriate words	Green
	Confused	Green
	Oriented	Green
<b>Best Motor Response</b>	No motor response	Yellow (Lesion level must be noted)
	Extension to pain	Yellow (Lesion level must be noted)
	Abnormal flexion to pain	Yellow (Lesion level must be noted)
	Flexion / Withdrawal to pain	Yellow (Lesion level must be noted)
	Localizes to pain	Yellow (Lesion level must be noted)
	Obeys commands	Green
	<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?
	Full range of ACTIVE pain free movement?	Yellow (Lesion level must be noted)
	Is the limb strength and sensation normal?	Yellow (Consider lower limb involvement)

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

**Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in Cerebral Palsy athletes with spastic diplegia**

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Green	
	Double Vision	Green	
	Weakness or tingling/burning in arms or legs	Red	
	Severe or increasing headache	Green	
	Seizure or convulsion	Yellow Increased risk of epilepsy	
	Loss of consciousness	Green	
	Deteriorating conscious state	Green	
	Vomiting	Green	
	Increasingly restless, agitated or combative	Green	
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	Green
		Balance / gait difficulties / motor coordination	Red Consider test reliability
Disorientation or confusion		Yellow Association with impairment	
Blank or vacant look		Yellow Consider facial muscle involvement	
Facial injury after head trauma		Green	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green	
	Requires understanding	Green	
	Requires speech	Green	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>			
<b>Best Eye Response</b>	No eye opening	Green	
	Eye opening in response to pain	Green	
	Eye opening to speech	Green	
	Eye opening spontaneously	Green	
<b>Best Verbal Response</b>	No verbal response	Green	
	Incomprehensible sounds	Green	
	Inappropriate words	Green	
	Confused	Green	
	Oriented	Green	
<b>Best Motor Response</b>	No motor response	Green	
	Extension to pain	Yellow	
	Abnormal flexion to pain	Yellow	
	Flexion / Withdrawal to pain	Yellow	
	Localizes to pain	Green	
	Obeys commands	Green	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	Green	
	Full range of ACTIVE pain free movement?	Green	
	Is the limb strength and sensation normal?	Yellow Consider lower limb involvement	

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

**Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in Cerebral Palsy athletes with spastic hemiplegia**

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	
	Double Vision	
	Weakness or tingling/burning in arms or legs	Consider side tested and change in symptoms
	Severe or increasing headache	
	Seizure or convulsion	Increased risk of epilepsy
	Loss of consciousness	
	Deteriorating conscious state	
	Vomiting	
	Increasingly restless, agitated or combative	
<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	
	Balance / gait difficulties / motor coordination	Consider test reliability
	Disorientation or confusion	Association with impairment
	Blank or vacant look	Consider facial muscle involvement
	Facial injury after head trauma	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	
	Requires understanding	
	Requires speech	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	
	Eye opening in response to pain	
	Eye opening to speech	
	Eye opening spontaneously	
<b>Best Verbal Response</b>	No verbal response	
	Incomprehensible sounds	
	Inappropriate words	
	Confused	
	Oriented	
<b>Best Motor Response</b>	No motor response	
	Extension to pain	
	Abnormal flexion to pain	
	Flexion / Withdrawal to pain	
	Localizes to pain	
	Obeys commands	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	
	Full range of ACTIVE pain free movement?	
	Is the limb strength and sensation normal?	Consider lower limb involvement

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

**Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in Cerebral Palsy athletes with spastic quadriplegia**

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Green	
	Double Vision	Green	
	Weakness or tingling/burning in arms or legs	Red	
	Severe or increasing headache	Green	
	Seizure or convulsion	Yellow Increased risk of epilepsy	
	Loss of consciousness	Green	
	Deteriorating conscious state	Green	
	Vomiting	Green	
	Increasingly restless, agitated or combative	Green	
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	Green
		Balance / gait difficulties / motor coordination	Red Consider test reliability
		Disorientation or confusion	Yellow Association with impairment
Blank or vacant look		Yellow Consider facial muscle involvement	
Facial injury after head trauma		Green	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green	
	Requires understanding	Green	
	Requires speech	Green	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>			
<b>Best Eye Response</b>	No eye opening	Green	
	Eye opening in response to pain	Green	
	Eye opening to speech	Green	
	Eye opening spontaneously	Green	
<b>Best Verbal Response</b>	No verbal response	Green	
	Incomprehensible sounds	Green	
	Inappropriate words	Green	
	Confused	Green	
	Oriented	Green	
<b>Best Motor Response</b>	No motor response	Green	
	Extension to pain	Yellow	
	Abnormal flexion to pain	Yellow	
	Flexion / Withdrawal to pain	Yellow	
	Localizes to pain	Green	
	Obeys commands	Green	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	Green	
	Full range of ACTIVE pain free movement?	Green	
	Is the limb strength and sensation normal?	Yellow Consider lower limb involvement	

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

**Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in Cerebral Palsy athletes with dyskinetic cerebral palsy**

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Green
	Double Vision	Yellow
	Weakness or tingling/burning in arms or legs	Red
	Severe or increasing headache	Green
	Seizure or convulsion	Yellow Increased risk of epilepsy
	Loss of consciousness	Green
	Deteriorating conscious state	Green
	Vomiting	Green
	Increasingly restless, agitated or combative	Green
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface
	Balance / gait difficulties / motor coordination	Red Consider test reliability
	Disorientation or confusion	Yellow Association with impairment
	Blank or vacant look	Yellow Consider facial muscle involvement
	Facial injury after head trauma	Green
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green
	Requires understanding	Green
	Requires speech	Green
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	Green
	Eye opening in response to pain	Green
	Eye opening to speech	Green
	Eye opening spontaneously	Green
<b>Best Verbal Response</b>	No verbal response	Green
	Incomprehensible sounds	Green
	Inappropriate words	Yellow Consider baseline as speech can be affected
	Confused	Yellow Consider baseline as speech can be affected
	Oriented	Yellow Consider baseline as speech can be affected
<b>Best Motor Response</b>	No motor response	Green
	Extension to pain	Yellow
	Abnormal flexion to pain	Yellow
	Flexion / Withdrawal to pain	Yellow
	Localizes to pain	Green
	Obeys commands	Green
	<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?
	Full range of ACTIVE pain free movement?	Green
	Is the limb strength and sensation normal?	Yellow Consider lower limb involvement

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

**Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in Cerebral Palsy athletes with ataxic cerebral palsy**

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Green	
	Double Vision	Yellow	
	Weakness or tingling/burning in arms or legs	Red	
	Severe or increasing headache	Green	
	Seizure or convulsion	Yellow Increased risk of epilepsy	
	Loss of consciousness	Green	
	Deteriorating conscious state	Green	
	Vomiting	Green	
	Increasingly restless, agitated or combative	Green	
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	Green
		Balance / gait difficulties / motor coordination	Red Consider test reliability
		Disorientation or confusion	Yellow Association with impairment
		Blank or vacant look	Yellow Consider facial muscle involvement
Facial injury after head trauma		Green	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green	
	Requires understanding	Green	
	Requires speech	Green	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>			
<b>Best Eye Response</b>	No eye opening	Green	
	Eye opening in response to pain	Green	
	Eye opening to speech	Green	
	Eye opening spontaneously	Green	
<b>Best Verbal Response</b>	No verbal response	Green	
	Incomprehensible sounds	Green	
	Inappropriate words	Yellow Consider baseline as speech can be affected	
	Confused	Yellow Consider baseline as speech can be affected	
	Oriented	Yellow Consider baseline as speech can be affected	
<b>Best Motor Response</b>	No motor response	Green	
	Extension to pain	Yellow	
	Abnormal flexion to pain	Yellow	
	Flexion / Withdrawal to pain	Yellow	
	Localizes to pain	Green	
	Obeys commands	Green	
	<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	Green
Full range of ACTIVE pain free movement?		Green	
Is the limb strength and sensation normal?		Yellow Consider lower limb involvement	

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

**Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in Cerebral Palsy athletes with mixed cerebral palsy**

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Green
	Double Vision	Yellow
	Weakness or tingling/burning in arms or legs	Red
	Severe or increasing headache	Green
	Seizure or convulsion	Yellow Increased risk of epilepsy
	Loss of consciousness	Green
	Deteriorating conscious state	Green
	Vomiting	Green
	Increasingly restless, agitated or combative	Green
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface
	Balance / gait difficulties / motor coordination	Red Consider test reliability
	Disorientation or confusion	Yellow Association with impairment
	Blank or vacant look	Yellow Consider facial muscle involvement
	Facial injury after head trauma	Green
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green
	Requires understanding	Green
	Requires speech	Green
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	Green
	Eye opening in response to pain	Green
	Eye opening to speech	Green
	Eye opening spontaneously	Green
<b>Best Verbal Response</b>	No verbal response	Green
	Incomprehensible sounds	Green
	Inappropriate words	Yellow Consider baseline as speech can be affected
	Confused	Yellow Consider baseline as speech can be affected
	Oriented	Yellow Consider baseline as speech can be affected
<b>Best Motor Response</b>	No motor response	Green
	Extension to pain	Yellow
	Abnormal flexion to pain	Yellow
	Flexion / Withdrawal to pain	Yellow
	Localizes to pain	Green
	Obeys commands	Green
	<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?
	Full range of ACTIVE pain free movement?	Green
	Is the limb strength and sensation normal?	Yellow Consider lower limb involvement

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

### Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with intellectual impairment

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Green	
	Double Vision	Green	
	Weakness or tingling/burning in arms or legs	Green	
	Severe or increasing headache	Green	
	Seizure or convulsion	Green	
	Loss of consciousness	Green	
	Deteriorating conscious state	Green	
	Vomiting	Green	
	Increasingly restless, agitated or combative	Green	
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	Green
		Balance / gait difficulties / motor coordination	Green
Disorientation or confusion		Yellow	
Blank or vacant look		Yellow	
Facial injury after head trauma		Green	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Green	
	Requires understanding	Yellow	
	Requires speech	Green	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>			
<b>Best Eye Response</b>	No eye opening	Green	
	Eye opening in response to pain	Green	
	Eye opening to speech	Green	
	Eye opening spontaneously	Green	
<b>Best Verbal Response</b>	No verbal response	Green	
	Incomprehensible sounds	Green	
	Inappropriate words	Green	
	Confused	Green	
	Oriented	Green	
<b>Best Motor Response</b>	No motor response	Green	
	Extension to pain	Green	
	Abnormal flexion to pain	Green	
	Flexion / Withdrawal to pain	Green	
	Localizes to pain	Green	
	Obeys commands	Green	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	Green	
	Full range of ACTIVE pain free movement?	Green	
	Is the limb strength and sensation normal?	Green	

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes



### Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with achondroplasia

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	Increased incidence of atlantoaxial instability
	Double Vision	
	Weakness or tingling/burning in arms or legs	
	Severe or increasing headache	
	Seizure or convulsion	
	Loss of consciousness	
	Deteriorating conscious state	
	Vomiting	
	Increasingly restless, agitated or combative	
<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	
	Balance / gait difficulties / motor coordination	
	Disorientation or confusion	
	Blank or vacant look	
	Facial injury after head trauma	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	
	Requires understanding	
	Requires speech	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	
	Eye opening in response to pain	
	Eye opening to speech	
	Eye opening spontaneously	
<b>Best Verbal Response</b>	No verbal response	
	Incomprehensible sounds	
	Inappropriate words	
	Confused	
	Oriented	
<b>Best Motor Response</b>	No motor response	
	Extension to pain	
	Abnormal flexion to pain	
	Flexion / Withdrawal to pain	
	Localizes to pain	
	Obeys commands	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	Increased incidence of atlantoaxial instability
	Full range of ACTIVE pain free movement?	Increased incidence of atlantoaxial instability
	Is the limb strength and sensation normal?	

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

### Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with arthrogyriposis

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	
	Double Vision	
	Weakness or tingling/burning in arms or legs	Weakness may be hard to assess given reduced joint ROM
	Severe or increasing headache	
	Seizure or convulsion	
	Loss of consciousness	
	Deteriorating conscious state	
	Vomiting	
	Increasingly restless, agitated or combative	
<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	
	Balance / gait difficulties / motor coordination	Gait affected in those with LE manifestations
	Disorientation or confusion	
	Blank or vacant look	
	Facial injury after head trauma	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	
	Requires understanding	
	Requires speech	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	
	Eye opening in response to pain	
	Eye opening to speech	
	Eye opening spontaneously	
<b>Best Verbal Response</b>	No verbal response	
	Incomprehensible sounds	
	Inappropriate words	
	Confused	
	Oriented	
<b>Best Motor Response</b>	No motor response	
	Extension to pain	May be altered due to reduced joint ROM
	Abnormal flexion to pain	May be altered due to reduced joint ROM
	Flexion / Withdrawal to pain	May be altered due to reduced joint ROM
	Localizes to pain	May be altered due to reduced joint ROM
	Obeys commands	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	
	Full range of ACTIVE pain free movement?	
	Is the limb strength and sensation normal?	Weakness may be hard to assess given reduced joint ROM

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

### Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with polio

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	
	Double Vision	
	Weakness or tingling/burning in arms or legs	Likely to have baseline weakness (less likely tingling/burning)
	Severe or increasing headache	
	Seizure or convulsion	
	Loss of consciousness	
	Deteriorating conscious state	
	Vomiting	
	Increasingly restless, agitated or combative	
<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	
	Balance / gait difficulties / motor coordination	Gait abnormality dependent on muscles affected
	Disorientation or confusion	
	Blank or vacant look	
	Facial injury after head trauma	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	
	Requires understanding	
	Requires speech	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	
	Eye opening in response to pain	
	Eye opening to speech	
	Eye opening spontaneously	
<b>Best Verbal Response</b>	No verbal response	
	Incomprehensible sounds	
	Inappropriate words	
	Confused	
	Oriented	
<b>Best Motor Response</b>	No motor response	Dependent on which muscles affected
	Extension to pain	Dependent on which muscles affected
	Abnormal flexion to pain	Dependent on which muscles affected
	Flexion / Withdrawal to pain	Dependent on which muscles affected
	Localizes to pain	Dependent on which muscles affected
	Obeys commands	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	
	Full range of ACTIVE pain free movement?	
	Is the limb strength and sensation normal?	Dependent on which muscles affected

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

## Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with muscular dystrophy

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	
	Double Vision	Vision can be affected in OPMD
	Weakness or tingling/burning in arms or legs	Peripheral strength affected in several forms of MD
	Severe or increasing headache	
	Seizure or convulsion	
	Loss of consciousness	
	Deteriorating conscious state	
	Vomiting	
	Increasingly restless, agitated or combative	
<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	
	Balance / gait difficulties / motor coordination	Peripheral strength affected in several forms of MD
	Disorientation or confusion	
	Blank or vacant look	
	Facial injury after head trauma	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	Hearing can be affected
	Requires understanding	
	Requires speech	Oropharyngeal strength and speech affected in DMD and OPMD
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	
	Eye opening in response to pain	Ptosis can be seen in OPMD
	Eye opening to speech	Ptosis can be seen in OPMD
	Eye opening spontaneously	Ptosis can be seen in OPMD
<b>Best Verbal Response</b>	No verbal response	
	Incomprehensible sounds	Oropharyngeal strength and speech affected in DMD and OPMD
	Inappropriate words	Oropharyngeal strength and speech affected in DMD and OPMD
	Confused	Oropharyngeal strength and speech affected in DMD and OPMD
	Oriented	Oropharyngeal strength and speech affected in DMD and OPMD
<b>Best Motor Response</b>	No motor response	
	Extension to pain	May be altered due to muscle weakness
	Abnormal flexion to pain	May be altered due to muscle weakness
	Flexion / Withdrawal to pain	May be altered due to muscle weakness
	Localizes to pain	May be altered due to muscle weakness
	Obeys commands	May be altered due to muscle weakness
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	
	Full range of ACTIVE pain free movement?	
	Is the limb strength and sensation normal?	Peripheral strength affected in several forms of MD

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

## Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with multiple sclerosis

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	
	Double Vision	Vision can be affected in MS
	Weakness or tingling/burning in arms or legs	Likely to have baseline weakness as primary manifestation of MS
	Severe or increasing headache	Headaches can be seen in MS, especially if high burden of brain lesions
	Seizure or convulsion	
	Loss of consciousness	
	Deteriorating conscious state	
	Vomiting	
	Increasingly restless, agitated or combative	
	<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface
Balance / gait difficulties / motor coordination		Peripheral strength and gait typically affected in MS
Disorientation or confusion		
Blank or vacant look		
Facial injury after head trauma		
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	
	Requires understanding	
	Requires speech	Dysarthria common
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	
	Eye opening in response to pain	Ptosis can be seen in MS
	Eye opening to speech	Ptosis can be seen in MS
	Eye opening spontaneously	Ptosis can be seen in MS
<b>Best Verbal Response</b>	No verbal response	
	Incomprehensible sounds	Dysarthria common
	Inappropriate words	Dysarthria common
	Confused	Dysarthria common
	Oriented	Dysarthria common
<b>Best Motor Response</b>	No motor response	
	Extension to pain	Peripheral strength/sensation affected in MS
	Abnormal flexion to pain	Peripheral strength/sensation affected in MS
	Flexion / Withdrawal to pain	Peripheral strength/sensation affected in MS
	Localizes to pain	Peripheral strength/sensation affected in MS
	Obeys commands	
	<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?
Full range of ACTIVE pain free movement?		
Is the limb strength and sensation normal?		Peripheral strength/sensation affected in MS

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes

### Considerations and usability of the 5th edition of the Sport Concussion Assessment Tool (SCAT5) for the immediate or on-field assessment in athletes with spina bifida

<b>STEP 1 RED FLAGS</b>	Neck pain or tenderness	
	Double Vision	
	Weakness or tingling/burning in arms or legs	Due to spinal cord lesion
	Severe or increasing headache	Headaches can be seen in SB, especially if chronic hydrocephalus
	Seizure or convulsion	Seizure can be seen in SB especially if chronic hydrocephalus/shunt
	Loss of consciousness	
	Deteriorating conscious state	Also a symptom of hydrocephalus
	Vomiting	Also a symptom of hydrocephalus
	Increasingly restless, agitated or combative	
<b>STEP 2 OBSERVABLE SIGNS</b>	Lying motionless on the playing surface	
	Balance / gait difficulties / motor coordination	Consider spinal cord lesion
	Disorientation or confusion	Also a symptom of hydrocephalus
	Blank or vacant look	Also a symptom of hydrocephalus
	Facial injury after head trauma	
<b>STEP 3 MEMORY ASSESSMENT MADDOCKS QUESTIONS</b>	Requires hearing	
	Requires understanding	
	Requires speech	
<b>STEP 4 ASSESSMENT OF GLASGOW COMA SCALE (SCORE/15)</b>		
<b>Best Eye Response</b>	No eye opening	
	Eye opening in response to pain	
	Eye opening to speech	
	Eye opening spontaneously	
<b>Best Verbal Response</b>	No verbal response	
	Incomprehensible sounds	
	Inappropriate words	
	Confused	
	Oriented	
<b>Best Motor Response</b>	No motor response	
	Extension to pain	LE strength affected in SB; UE motor testing likely normal
	Abnormal flexion to pain	LE strength affected in SB; UE motor testing likely normal
	Flexion / Withdrawal to pain	LE strength affected in SB; UE motor testing likely normal
	Localizes to pain	LE strength affected in SB; UE motor testing likely normal
	Obeys commands	
<b>CERVICAL SPINE ASSESSMENT</b>	Is the neck pain free at rest?	
	Full range of ACTIVE pain free movement?	
	Is the limb strength and sensation normal?	Consider spinal cord lesion

Green shading: no anticipated additional considerations for Para athletes; Yellow shading: potential additional considerations for some Para athletes (dependent on the level or nature of athlete impairment); Red shading: items from the SCAT5 that should not be used for Para athletes