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ANALYSIS OF SIDELINE CONCUSSION SCREENING TOOLS IN AN ATHLETIC SETTING

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INTRODUCTION

As research brings to light the effects of continuing to participate after concussion, the critical importance of keeping concussed athletes off the field is now understood as a potential life or death situation. There has been a renewed emphasis on tools and/or techniques that screen for symptoms of concussion on ‘the sideline’.

PURPOSE

This paper examines the sideline tools currently utilized, recently implemented or under development and explores their potential benefits, limitations and availability. When available, data regarding sideline accuracy and reliability was analyzed. It serves as a primer to healthcare professionals of the now and future of sideline screening for concussion.

COMMON ABBREVIATIONS

SRC – Sport-Related Concussion
SCST- Sideline Concussion Screening Tool
RTP – Return to Play
ICCCS – International Consensus Conference on Concussion in Sport

SCST'S EVALUATED

Current: Standardized Assessment for Concussion [SAC], Balance Error Scoring System [BESS], King-Devick Test [K-D], Standardized Concussion Assessment Tool 3rd Ed [SCAT-III]
Future: Vestibular-Ocular Motor Screening [VOMS], Blood Testing, Force Plate instrumentation of BESS

CURRENT SCST TRAJECTORY EVALUATION

	Anxiety/Mood	Cervical	Migraine	Cognitive	Vestibular	Ocular
CURRENT						
SAC	Not included	Not included	Not included	Memory Recall; Concentration	Not included	Not included
BESS	Not included	Not included	Not included	Not included	Patient assessed for balance deficiencies	Not included
K-D	Not included	Not included	Not included	Not included	Demands coordination of eye movement	Not included
SCAT III	Pt reported	Pt Reported; Clinician Examination	Pt Reported	Pt Reported; Memory Recall; Concentration	Modification of BESS	Not included

CURRENT SCST ANALYSIS

	Available	Compared to Baseline	Quantifiable Results	Strengths	Limitations	Sensitivity/ Specificity	Likelihood Ratio	Reliability	Access	Cost
CURRENT										
SAC	Now	Yes	X	Cost; Simplicity	Limited scope; Word List can be memorized;	Drop of ≥1: SN: 0.95 SP: 0.76	LR+: 3.96; LR-: 0.066	Test-Retest = 0.55	Online	Free
BESS	Now	Yes	X	Cost; Identify balance deficiencies	Specific to balance; Heavy reliance on rater perception	SN = 0.34 SP = 0.96	LR+: 8.5 LR-: 0.688	Interrater = 0.57; Intrarater = 0.74	Online	Free
K-D	Now	Yes	X	Quick (2-3 min); evaluates saccades	Requires access to cards	SN = 0.86 SP = 0.90	LR+: 8.6 LR-: 0.16	Test-Retest = 0.94	Digital Access OR Printed Kit	\$20/athlete/yr
SCAT III	Now	Yes	X	Pulls from variety of other tools, internationally developed & accepted	Length to complete (15-20 min)	SSS ≥ 7 SN=0.96 SP = 0.77	LR+: 4.17 LR-: 0.05	Test-Retest for Graded Symptom Checklist: 0.62	Online	Free

FUTURE SCST TRAJECTORY EVALUATION

	Anxiety/Mood	Cervical	Migraine	Cognitive	Vestibular	Ocular
FUTURE						
VOMS	Physician Determined	Pt assessed for headaches	Pt assessed for dizziness	Pt assessed for fogginess	Pt assessed for nausea	Pt assessed for convergence
BLOOD TESTING	N/A	N/A	N/A	N/A	N/A	N/A
Force Plate	Not Included	Not Included	Not Included	Not Included	Pt assessed for postural or balance deficiencies	Not Included

CLINICAL TRAJECTORIES OF CONCUSSION

It has been proposed that there are six common clinical trajectories that concussion symptoms manifest.

Anxiety/Mood: marked increase in anxiety and depression.

Cervical: primarily head and neck pain and headache.

Migraine: Unilateral, mod-to-severe headache and photo/phono-sensitivity

Cognitive/Fatigue: Fogginess or apathy, memory or energy challenges.

Vestibular: vertigo, nausea, easily over-stimulated in busy environments.

Ocular: motor or sensory dysfunction such as difficulty focusing the eye or uncoordinated movement.

KEY FINDINGS

➤ This project concluded that no single SCST should be relied on to make a quick, quantifiable decision to allow an athlete to RTP. This is in line with the recommendations of the 4th ICCCS.

➤ The author recommends that an appropriately trained health care professional, who is familiar with the athlete, administer a combination of the SCAT-III and VOMS SCST's to make RTP decisions. The combination of the two evaluate all six clinical trajectories and are free, easy SCST's to administer.