



In Practice - Case Study

Regional Soccer Club – Sport Etudes Pre-Season Baselines

As part of their annual pre-season baselines, 125 youths, aged 12 to 17, were tested in the Fall of 2018. These young athletes are at various locations and schools within the Greater Montreal area. Socio-economic background varies widely as talent and soccer performance are the primary selection criteria to be part of the Sport-Etudes program.

The baseline testing included the SCAT5, the Near-Point-Convergence, the King-Devick, the reaction times using the ruler test and Saccade Analytics.

Baseline testing was completed using a station by station format. The Saccade Analytics station area took an average of 8 to 10 minutes per athlete. While an athlete was tested, another was getting ready and watching the test. This facilitated instructions comprehension and accelerated the process. Thirty athletes were tested every afternoon during their Sport-Etudes periods.

The baselines were used to determine if an athlete had issues pre-season as well as determining if an athlete returned to norm following a concussion. The following case illustrates one such incident.

14-Year Old Soccer Athlete

Case History

A 14-year-old female soccer athlete went to head a ball, got hit from behind, and fell. She whiplashed her head onto the turf field. She saw a medical doctor, was diagnosed with a concussion, and put on a rest protocol.

Here baseline was within norms except for anti-saccades latencies.

She was seen in clinic 10 days following the injury. She starts school this week and her father is very concerned because she tried to run and was not well enough to do anything. Next weekend are the league finals. She is still symptomatic. She has a hard time focusing, is fatigued with headaches, has neck pain, and is dizzy.

Her results show a “focalized” smooth pursuit, with high vergence and poor accuracy. Her neck movements are restricted in right rotation and extension with hypomobile OA and pain. Vestibular tests have high vergence variability during vertical head movements, which are very restricted due to neck pain. Her saccades have poor accuracy, above norms. OKN testing shows poor gains upwards with high vergence variability.

Tested 10 days post-injury.

She is following the Return to School and Return to Sport Protocol as defined in the Consensus statement on concussion in sport (McCroly 2017).

- Return to school phases: progression following Berlin consensus



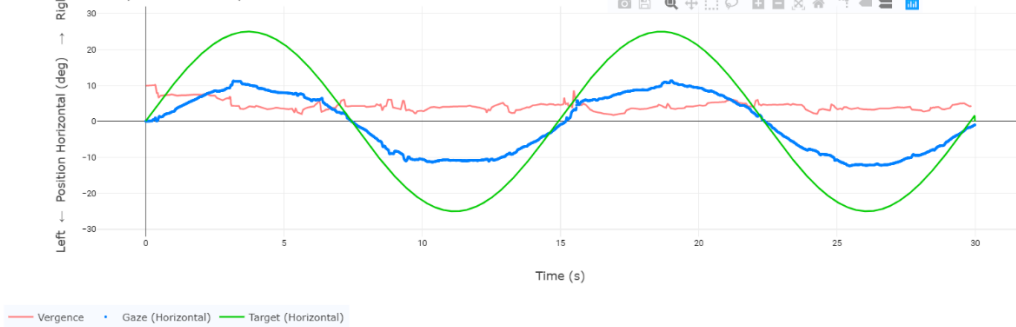
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- Return to sport: limited to light cardio (walk).

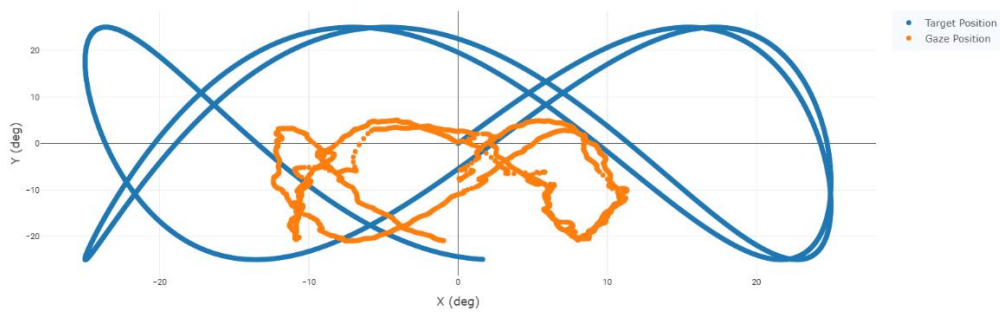
Smooth Pursuit (Head Fixed)

METRIC	CATEGORY	VALUE	EXPECTED RANGE
MEAN VERGENCE		4.3 ± 1.4 deg	i
i MEAN PURSUIT ERROR		13.7 deg	< 3.5 deg i
NUMBER OF SACCADES		4 sacc.	i
i HEAD CONTRIBUTION TO PURSUIT	Mean ▼	0.0 %	> 30.0 % i

TIME SERIES (HORIZONTAL)



GAZE VS TARGET POSITION





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Saccades

METRIC	CATEGORY	VALUE	EXPECTED RANGE	
MEAN VERGENCE		3.4 ± 3.6 deg		i
MEAN SACCADE ACQUISITION ERROR		4.4 deg	< 3.0 deg	i
MEAN SACCADE LATENCY (REACTION TIME)		195 ms	< 260 ms	i

AVVOR

METRIC	CATEGORY	VALUE	EXPECTED RANGE	
MEAN VERGENCE		0.3 ± 4.1 deg		i
AVOR GAIN UP	Mean	30.0 %		i
AVOR GAIN UP	25 deg/s	31.7 %	60.0 - 110.0 %	i
AVOR GAIN UP	50 deg/s	26.8 %	50.0 - 110.0 %	i
AVOR GAIN DOWN	Mean	93.1 %		i

OKN

METRIC	CATEGORY	VALUE	EXPECTED RANGE	
MEAN VERGENCE		1.3 ± 5.1 deg		i
OKN GAIN LEFT	Mean	69.6 %		i
OKN GAIN RIGHT	Mean	77.0 %		i
OKN GAIN DOWN	Mean	55.8 %		i
OKN GAIN UP	Mean	31.4 %		i
OKN GAIN UP	25 deg/s	13.7 %	40.0 - 110.0 %	i
OKN GAIN UP	50 deg/s	43.5 %	40.0 - 110.0 %	i

Tested 1-month post-injury.

She followed the Return to School and Return to Sport Protocol as defined in the Consensus statement on concussion in sport (McCrorry 2017). She was given peripheral vision exercises,

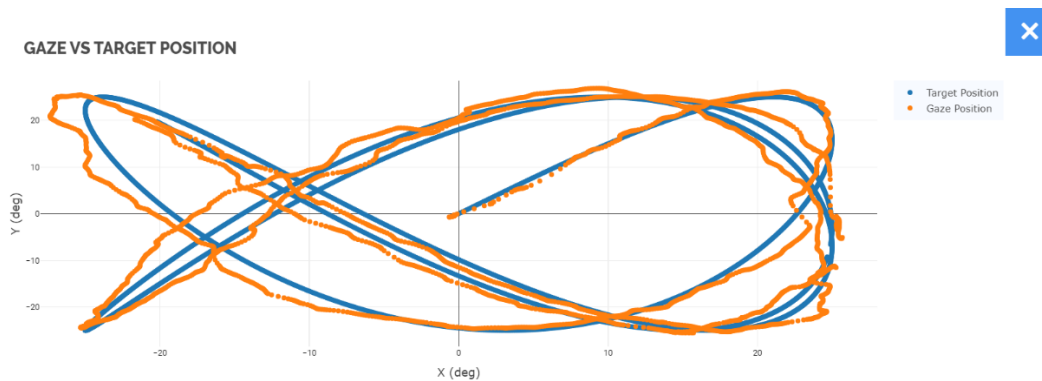


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manual neck treatment with neck stretches, and proprioception neck exercises combined with oculomotor exercises.

- Return to school phases: progression following Berlin consensus completed.
- Return to sport: Ready to increase intensity provided medical clearance. (To note, she took an extra month to return to play).

Smooth Pursuit (Head Fixed)



METRIC	CATEGORY	VALUE	EXPECTED RANGE
MEAN VERGENCE		0.0 ± 2.1 deg	i
✓ MEAN PURSUIT ERROR		1.4 deg	< 3.5 deg i
NUMBER OF SACCADES		6 sacc.	i
! HEAD CONTRIBUTION TO PURSUIT	Mean ▼	0.0 %	> 30.0 % i

Saccades

METRIC	CATEGORY	VALUE	EXPECTED RANGE
MEAN VERGENCE		0.2 ± 1.6 deg	i
✓ MEAN SACCADE ACQUISITION ERROR		2.5 deg	< 3.0 deg i
✓ MEAN SACCADE LATENCY (REACTION TIME)		186 ms	< 260 ms i



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AVVOR

METRIC	CATEGORY	VALUE	EXPECTED RANGE
MEAN VERGENCE		-0.3 ± 0.8 deg	i
✓ AVOR GAIN UP	Mean <input type="button" value="v"/>	102.3 %	i
✓ AVOR GAIN DOWN	Mean <input type="button" value="v"/>	88.3 %	i

OKN

METRIC	CATEGORY	VALUE	EXPECTED RANGE
MEAN VERGENCE		0.3 ± 1.7 deg	i
✓ OKN GAIN LEFT	Mean <input type="button" value="v"/>	77.9 %	i
✓ OKN GAIN RIGHT	Mean <input type="button" value="v"/>	73.8 %	i
✓ OKN GAIN DOWN	Mean <input type="button" value="v"/>	60.7 %	i
✓ OKN GAIN UP	Mean <input type="button" value="^"/>	62.6 %	i
✓ OKN GAIN UP	25 deg/s	75.9 %	40.0 - 110.0 % i
✓ OKN GAIN UP	50 deg/s	56.8 %	40.0 - 110.0 % i