Learning Effect With Repeated Use of the DynaVision D2
Visual Motor Evaluation

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INTRODUCTION
Recently a light-training reaction device has been developed to enhance sensory motor integration with the purpose of improving athletic performance. It has also been suggested that this system can serve as an evaluation tool for concussions and visual-field deficits that can provide information for a team’s medical staff on issues related to return to play. However, in these circumstances it becomes critical to determine how many trials are needed to achieve a true baseline measure.

METHODS
Twenty-one female division I college athletes performed three different hand-eye reaction time tests over a two week period.

Device Set-up
The board was adjusted to each subject by setting the LCD screen just below eye level. Subjects were instructed to back away from the board until all the lights were visible in their peripheral vision and they could still reach all the lights.

The Tests
• Peripheral Vision (PV) test: Any of the 64 lights is lit until the subject touches the light at which time a new light will illuminate. Objective: Hit as many lights as possible during 60 seconds.
• Peripheral Vision with Number Recall (PVNR): Any of the 64 lights is lit for 1 second and every 5 seconds a 5-digit number appears in the LCD window for 1 second. Objective: Hit as many lights as possible while verbally stating the 5-digit number.
• Visual Reaction (VR) test: The 5 horizontal lights to the left of the center ring are utilized. Upon start of the test, any of the 5-lights will illuminate and the subject has to move the hand from the starting position, hit the illuminated light and return to the starting position.

RESULTS
Significant improvements in PV were seen between T1 (69.3 ± 7.8 hits), T2 (77.4 ± 12.5 hits), and T3 (82.3 ± 7.6 hits). There was no significant improvement between T3 and T4 (84.9 ± 9.5 hits). In the PVNR, no significant differences were seen between T1 (61.6 ± 11.0 hits), T2 (63.4 ± 14.3 hits), and T3 (67.3 ± 12.6 hits). However, there was significant improvement between T4 and T3 (75.2 ± 11.9 hits), Figure 2.

The only significant difference in the VR tests across the trials. The only significant difference in the VR tests across the left hand trials was between T2 (0.445 ± 0.029 sec) and T4 (0.378 ± 0.029 sec).

There was no significant difference in motor reaction time between hands or across the four trials. Table 1.

Summary & Conclusions
Results indicate that competitive athletes should perform three trials to achieve baseline performance measures in the PV test. However, as the complexity of the task increases as in the PVNR, at least a fourth trial is necessary. In addition, both visual and motor reaction time does appear to be consistent with each testing trial, suggesting that there is a limited learning effect in VR observed during consecutive testing trials when assessing competitive athletes.