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## The Value of the Vestibular/Ocular Motor Screening (VOMS) in Evaluating Adolescent Patients with Concussions

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## The Value of the Vestibular/Ocular Motor Screening (VOMS) in Evaluating Adolescent Patients with Concussions

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## ***The Value of the Vestibular/Ocular Motor Screening (VOMS) in Evaluating Adolescent Patients with Concussions***

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### **OBJECTIVE**

To determine the VOMS can differentiate between typical and protracted recoveries in adolescent patients.

### **SETTING AND DESIGN**

A cohort study of participants diagnosed with a concussion at one of seven Central Ohio school districts.

### **PARTICIPANTS**

De-identified medical records of adolescents diagnosed with concussion were analyzed. To be included, participants must have been diagnosed with a concussion that was evaluated by an athletic trainer within three days of injury. Participants (n=29) were between 11-19 years of age with 65.5% identifying as male and 34.5% as female. SRCs were reported as follows: 24.1% in 7th, 34.5% in 8th, 10.3% in 9th, 17.2% in 11th, and 13.8% in 12th grades

### **INTERVENTION**

VOMS scores assess vestibular and ocular impairments across eight domains: (1) vestibular ocular reflex (VOR) – horizontal, (2) VOR – vertical, (3) visual motion sensitivity (VMS), (4) smooth pursuits, (5) saccades – horizontal, (6) saccades – vertical, (7) near point convergence (NPC), and (8) NPC distance.<sup>1</sup> VOMS domains (except NPC distance) assess patient-rated changes in headache, dizziness, nausea, and foggy on a scale of 0-10 (none to severe), resulting in a score between 0-40 per domain.<sup>1</sup> NPC distance is the average distance in centimeters across three trials.<sup>1</sup> The VOMS has been validated in patients 9-40 years of age ( $\alpha = 0.92$ ).<sup>2</sup>

### **MAIN OUTCOME MEASURES**

Participants were described by gender, grade, and sport. VOMS scores were documented within three days of injury and analyzed between retroactively assigned recovery groups (n=14 typical (</=14 days); n=15 protracted (>14 days)) using a t-test. A significant level was set at 0.05.

### **RESULTS**

Participants were initially evaluated with the VOMS 1.76±1.70 days after injury. When comparing time of the initial evaluation, there was no significant difference between recovery groups. There were no significant differences for gender, grade, or sport. There was no significant difference between recovery groups on VOMS domains. However, NPC (12.14±6.95 typical, 15.43±7.05 protracted) demonstrated a moderate effect size (g=0.46).

### **CONCLUSION**

Because vestibular rehabilitation therapy (VRT) during the acute phase of concussion is associated with a reduction in symptom duration,<sup>4</sup> predicting adolescents at risk for protracted recoveries may improve outcomes. In this study, VOMS scores were not statistically different between recovery groups, suggesting that the VOMS cannot predict protraction. This contradicts previous research. Anzalone et al<sup>3</sup> analyzed VOMS scores collected within 14 days of injury and found that apart from NPC, VOMS domains were associated with protraction in adolescents. Mucha et al<sup>2</sup> assessed adolescents within 21 days of injury and identified the VOR and VMS as most predictive

of concussion. To our knowledge, this study was the first to use VOMS within the three days of injury. Knell et al<sup>5</sup> determined the VOMS was not a stand-alone prognostic tool to predict protraction when used within seven days of injury.

**KEY WORDS:** *Adolescent Athletes, Concussion, VOMS*

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