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Background

Dizziness is the second most common symptom of post-concussive syndrome (PCS) and has been shown to be the only on-field symptom of sports-related concussion that is independently predictive of a prolonged recovery¹. Benign paroxysmal positioning vertigo (BPPV) is an easily treatable cause of dizziness that can result from minor head injury, but is rarely described in the context of pediatric PCS. Our objective was to evaluate the incidence of BPPV in children and adolescents presenting with persistent dizziness in the setting of PCS and to determine the timeliness of its diagnosis and management.

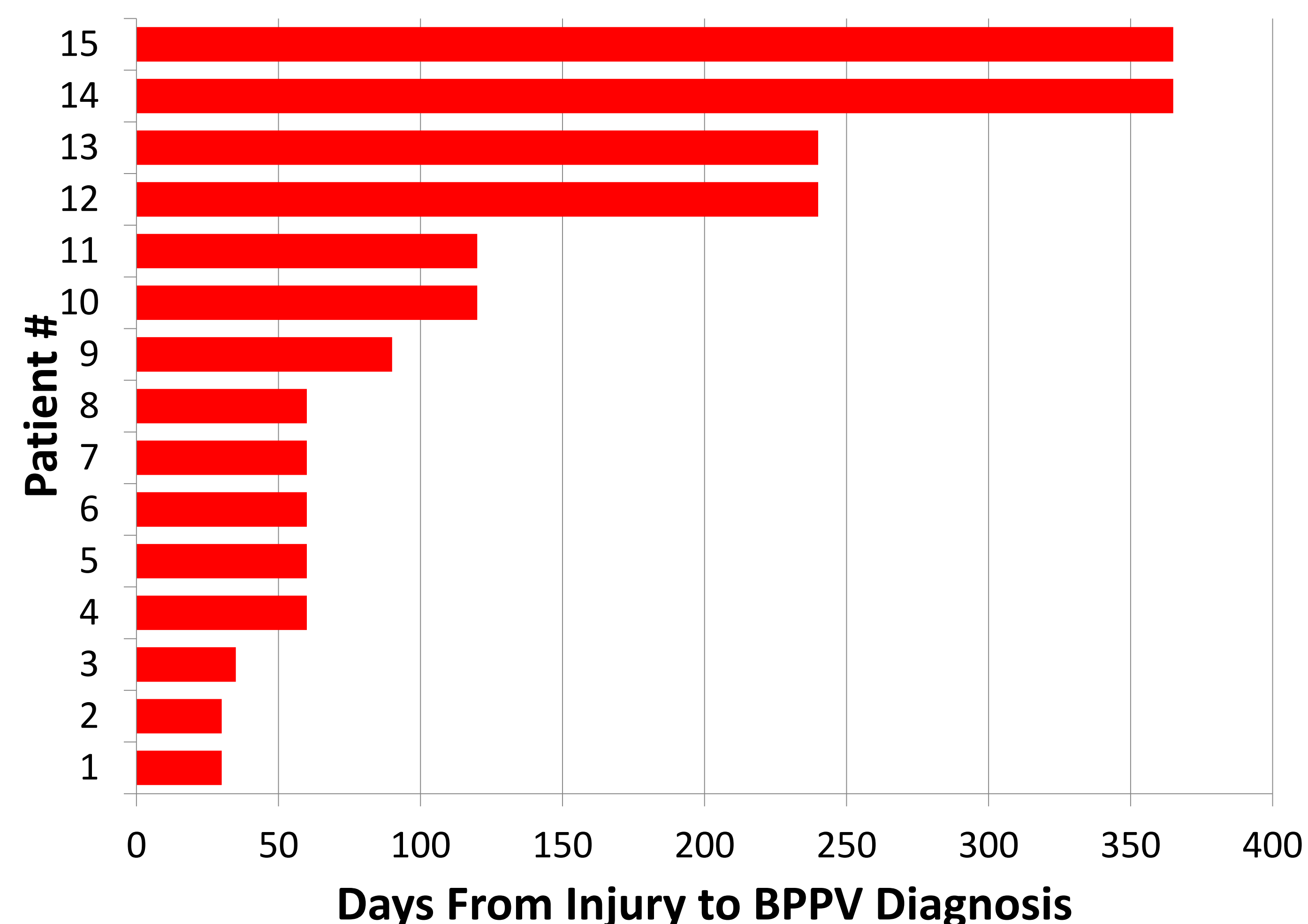
Methods

We retrospectively reviewed the medical records of children and adolescents seen at a pediatric vestibular clinic and at a pediatric multi-disciplinary concussion clinic over a 2 year period (January 2013 through January 2015) that presented with symptoms of persistent dizziness following concussion. Records of patients diagnosed with BPPV were further reviewed to determine features of presentation, timing of diagnosis, additional testing performed, and efficacy of treatment.

Results

Fifteen patients (21.4%) were diagnosed with BPPV out of the 70 patients seen for dizziness in the setting of post-concussive syndrome. The diagnosis was made at a mean of 18.4 weeks (range 4.3 – 52) following the initial injury. Treatment with canalith repositioning maneuvers resulted in complete resolution of dizziness in 8 patients (53%), improvement in dizziness in 6 patients (40%), and no change in dizziness in 1 patient (7%).

Patient Demographics	
Age, years	
Mean +/- SD (Range)	14.1 +/- 2.17 (11-17)
Sex, n (%)	
Male	7 (47)
Female	8 (53)
BPPV side, n (%)	
Left	7 (47)
Right	6 (40)
Bilateral	2 (13)
Mode of Injury, n (%)	
Sports: Player contact	5 (33)
Sports: Ball contact	3 (20)
Hit Head on Door/Wall/Table	5 (33)
Motor Vehicle Crash	2 (13)



Discussion

We have observed as many as 1 in 5 patients with dizziness in the setting of post-concussion syndrome to have evidence of previously undiagnosed BPPV, with the majority having partial or complete recovery of symptoms following treatment with head maneuvers. The recognition and treatment of BPPV was very delayed in most cases, likely reflecting a lack of awareness of the disorder among pediatric concussion providers. The high incidence of partial recovery after maneuvers reflects the complex, multi-factorial nature of dizziness in post-concussion syndrome^{2,3} as well as the previously described higher incidence of treatment-resistance in traumatic BPPV³.

Conclusions

BPPV is a common and easily treatable cause of dizziness in children and adolescents with post-concussive syndrome. The diagnosis is often not made until months after the injury resulting in significant delay of appropriate treatment. Increased awareness of this condition among pediatric providers would lead to earlier diagnosis and treatment.

References

1. Eisenberg MA, Meehan WP 3rd, Mannix R. Duration and course of post-concussive symptoms. *Pediatrics*. 2014;133: 999-1006.
2. Hoffer ME, Gottshall KR, Moore R, et al. Characterizing and treating dizziness after mild head trauma. *Otol Neurotol*. 2004; 25:135-138.
3. Zhou G and Brodsky JR Objective Vestibular Testing of Children with Dizziness and Balance Complaints Following Sports-Related Concussions. *Otolaryngol Head Neck Surg* 2015; 152(6) 1133–1139.