

Update on the Incidence of Nerve Palsy following Pavlik Harness Treatment for Developmental Dysplasia of the Hip: Not Just the Femoral Nerve

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INTRODUCTION: Pavlik harnesses have been used for approximately a century to treat developmental dysplasia of the hip (DDH). Femoral nerve palsies are a documented complication of Pavlik harness use with an incidence of 2.5% in one study. Case reports have identified rare occurrences of brachial plexus palsies in patients undergoing Pavlik harness treatment. The primary aim of this study was to evaluate the incidence of various nerve palsies in patients undergoing Pavlik harness treatment for DDH. Secondary aims were to determine which demographic or hip characteristics were associated with development of nerve palsy.

METHODS: In this retrospective cohort study at a single tertiary care orthopaedic hospital, patients diagnosed with DDH between 02/01/2016 and 04/01/2023 were identified for inclusion using ICD-9 and ICD-10 diagnosis codes. Age < one year and treatment with Pavlik harness were inclusion criteria. Demographic data was extracted as were characteristics of the dysplasia including hip laterality, age of initiation of Pavlik harness treatment, and use of an abduction orthosis. Ultrasound metrics (alpha angle and femoral head coverage) at the time of initiation of Pavlik harness treatment were also collected. If a patient developed nerve palsy, the nerve affected, age at onset, duration, and recurrence of the palsy were recorded. Median (interquartile range [IQR]) was reported for variables with units of time while mean (standard deviation [SD]) was reported for ultrasound metrics. Independent samples t-tests were conducted to determine whether associations existed between ultrasound metrics collected at the initiation of Pavlik harness treatment and the occurrence of nerve palsy. A 2-tailed P value threshold of 0.05 was considered significant for all statistical tests. All statistical analyses were performed.

RESULTS: A total of 501 patients with DDH were initially identified, of which 353 met inclusion/exclusion criteria, resulting in 559 treated hips (59% bilateral). Some 83% were female and the median age at treatment initiation was 19 (IQR: 3, 51) days old. In total, 71% of all unilateral cases involved the left hip. A total of 25% of patients wore an abduction orthosis at some point during the course of treatment. Twenty-four patients (6.8%) had documented nerve palsy following Pavlik harness treatment, of which 21 (88%) had femoral nerve palsy, 2 (8%) brachial plexus palsy, and 1 (4%) inferior gluteal nerve palsy (Table 1). The median duration of Pavlik harness treatment before palsy was diagnosed was 49 (IQR: 14, 76) days. One patient developed nerve palsy 1 day after transitioning from a Pavlik harness to an abduction brace. Nerve palsy lasted a median of 8 days (IQR: 2, 21). In 19%, treatment was considered complete and in 81% Pavlik harness/DDH treatment was prematurely discontinued. Nerve palsy recurred in 1 patient. Those who were diagnosed with nerve palsy had smaller alpha angles (Left: P=0.021; Right: P=0.004) and less femoral head coverage (Left: P=0.002; Right: P=0.021) at the time of initiation of Pavlik harness treatment than the rest of the cohort (Table 2).

DISCUSSION AND CONCLUSION: In addition to femoral nerve palsy, brachial plexus palsy and inferior gluteal nerve palsy were identified in this cohort. Our findings demonstrate higher rates of femoral nerve palsy than previously reported in literature. Regarding the risk of nerve injury, this study found that nerve palsy is more likely to occur in infants with more severe hip dysplasia at the time that Pavlik harness treatment is initiated. Physicians should be vigilant in assessing upper and lower extremity neurological status to identify nerve palsies, both before and after initiating treatment.

Table 1. Nerve palsy characteristics in the 24 patients for whom nerve palsy was diagnosed.

Nerve(s) affected (N=24)	N (%) or median (IQR)
Femoral Nerve	21 (88%)
Brachial Plexus	2 (8%)
Inferior Gluteal Nerve	1 (4%)
Laterality of Palsy (N=23)	
Left	19 (83%)
Right	3 (13%)
Bilateral	1 (4%)
Age at palsy diagnosis (days) (N=21)	49 (14, 76)
Duration of Pavlik harness use before palsy diagnosis (days) (N=21)	7 (3,28)
Duration of palsy symptoms (days) (N=15)	8 (2,21)
Time between resolution and recurrence of palsy (days) (N=1)	7 (N/A)
Treatment once palsy resolved (N=21)	
Pavlik Harness	8 (38%)
Abduction Orthosis	10 (48%)
Open Reduction	9 (43%)
None	4 (19%)

Table 2. Comparison of baseline* radiographic measurements between patients who developed nerve palsy with those who did not. Values are reported as mean±SD.

Measurement	Developed Palsy		P-value
	Yes	No	
Alpha angle			
Left	47±9 (N=10)	54±9 (N=158)	0.021
Right	49±9 (N=12)	55±7 (N=180)	0.004
Femoral head coverage			
Left	0.14±0.24 (N=7)	0.35±0.16 (N=146)	0.002
Right	0.20±0.15 (N=5)	0.36±0.16 (N=130)	0.021

*Measurements were collected at the visit where Pavlik harness treatment was initiated.