Turk J Phys Med Rehab 2024;70(3):402-405
DOI: 10.5606/tftrd.2024.11968
Available online at www.turkishjournalpmr.com

Case Report

Posture-induced compressive peroneal neuropathy during harvesting season: A case series

Aylin Sarıyıldız

Department of Physical Medicine and Rehabilitation, Çukurova University Faculty of Medicine, Adana, Türkiye

ABSTRACT

Posture-induced compressive peroneal neuropathy usually occurs after maintaining certain positions, such as prolonged squatting or habitual leg crossing. Peroneal neuropathy mainly presents with unilateral foot drop and variable sensory deficit. In this article, a case series of unilateral/bilateral peroneal nerve palsy secondary to prolonged squatting during peanut harvesting was reported. The four patients presented were aged between 12 and 21 years. All patients showed signs of peroneal nerve palsy in the electrophysiological examination. The present article also reviewed the clinical evaluation, rehabilitation approaches, and prognosis of posture-induced peroneal neuropathy in light of the current literature.

Keywords: Foot drop, peroneal nerve, peroneal neuropathy, posture, squatting.

Peroneal neuropathy (PN) is the most common entrapment neuropathy of the lower extremity and may develop due to numerous etiological factors. These include trauma (e.g., knee dislocation, severe ankle inversion injuries, and fractures), compression (e.g., casting, bracing, pneumatic compression device, positioning during anesthesia/coma/sleep/bed rest, excessive weight loss, and postural factors), masses/tumors (e.g., ganglia, lipoma, and osteoma), inherited diseases (e.g., hereditary neuropathy with liability to pressure palsies and Charcot-Marie-Tooth neuropathy), vascular pathologies, diabetes mellitus, leprosy, and idiopathic disease. Compression of the nerve in any region along the anatomical path in the lower extremity (most often at the level of the fibular head) is the most frequent cause of PN and occurs for several reasons. Posture-induced compression, such as habitual leg crossing, sitting cross-legged, prolonged squatting, and kneeling stand, are common reasons.[1-5] Foot drop due to weakness of the dorsiflexor muscles of the foot is the most common clinical presentation in PN. Diagnosis is made by anamnesis, neurological examination, and electrodiagnostic evaluation. In terms of differential diagnosis, various central and peripheral neurological pathologies should be considered. These include but are not limited to radiculopathy, lumbosacral plexopathy, sciatic mononeuropathy, motor neuron disorder, and polyneuropathy. Further evaluation and imaging methods for differential diagnosis should be planned when necessary.[2,6]

Posture-related compressive PN (CPN) is mostly unilateral, has been documented in adults, and is rarely seen in childhood. This article aimed to review the clinical presentation, risk factors, diagnosis, treatment options, and prognosis of four patients of different age groups, including adolescents and adults, who developed unilateral/bilateral CPN secondary to prolonged squatting during the same harvest season.

CASE REPORT

The cases were adolescent-adult populations aged 12 to 21 admitted to our outpatient clinic with complaints of unilateral/bilateral weakness of the

Corresponding author: Aylin Sarıyıldız, MD. Çukurova Üniversitesi Tıp Fakültesi Fiziksel Tıp ve Rehabilitasyon Anabilim Dalı, 01790 Sarıçam, Adana, Türkiye.
E-mail: aylingoksen@hotmail.com

Received: October 20, 2022 **Accepted:** April 07, 2023 **Published online:** January 15, 2024

Cite this article as: Sarıyıldız A. Posture-induced compressive peroneal neuropathy during harvesting season: A case series. Turk J Phys Med Rehab 2024;70(3):402-405. doi: 10.5606/tftrd.2024.11968.

foot and sensory deficit. Thorough patient history revealed that all cases maintain the squatting position for 5 to 8 h a day for 4 to 10 days during peanut harvesting. One of the cases (case 4) had a previous diagnosis of migraine, and the others had no history of recent trauma and no significant medical or family history of hematological, metabolic, and neurological disorders or pressure neuropathies. Neurological examination of all cases revealed bilateral normal muscle tone, normal muscle strength in the upper extremities, proximal lower limb muscles, ankle plantar flexors, and ankle invertors of the lower extremities. Muscle strength was assessed using the Medical Research Council scale. The scoring system assesses the strength of ankle dorsiflexion, ankle evertor, and extensor hallucis longus on a scale of 0 to 5. The Medical Research Council is a valid tool for assessing muscle strength.[7] There were varying degrees of strength loss in the ankle dorsiflexor, extensor hallucis longus, and ankle evertor. In addition, deep tendon reflexes in all cases were normal and pathological reflexes were negative. The range of motion was full throughout all extremities. Laboratory tests, including complete blood count, liver, thyroid, and kidney function tests, serum uric acid, vitamin B12, and folate levels, were normal, which excluded biochemical neuropathy causes. Electrophysiological evaluation (motor and sensory nerve conduction studies) of the cases was performed 14 to 21 days after the onset of complaints. The results showed unilateral/bilateral common peroneal mononeuropathy across the fibular head (Table 1). On the basis of these findings, these patients were diagnosed with posture-induced CPN.

First, the patients were informed about the modification of activities/positions, which would lead to the compression of the peroneal nerve (crossing the legs, squatting, and contacting the knee with a hard surface). Twice-daily physical therapy sessions of 30 to 45 min were planned in the physical therapy department. The rehabilitation program

TABLE 1
Details of all patients' electrophysiological findings

	Latency (ms)				Amplitude (μV)				NCV (m/s)			
	Case				Case				Case			
	1	2	3	4	1	2	3	4	1	2	3	4
Motor NCS												
Right peroneal nerve												
Ankle	5.1	4.8	4.1	4.3	5.0	7.6	6.7	5.4				
Fibular head	11.5	12.5	13.6	11.7	4.9	7.8	6.8	5.4	45.8	44.9	46.2	43.2
Lateral popliteal fossa	13.8	15.1	16.2	15.2	1.7	1.9	1.8	0.9	32.1	33.1	37.4	31.9
Left peroneal nerve												
Ankle	4.8	5.2	4.3	4.4	5.3	8.0	7.1	5.5				
Fibular head	12.1	12.3	12.8	11.8	5.2	8.1	7.2	5.7	46.2	42.9	44.5	46.8
Lateral popliteal fossa	13.2	14.2	15.7	16.1	1.9	2.0	2.1	5.6	33.6	32.1	36.3	49.2
Right tibial nerve												
Ankle	3.8	4.0	5.2	4.9	14.2	13.4	9.6	9.2				
Popliteus	10.8	12.1	15.1	14.9	12.1	12.2	10.2	10.4	50	47.2	44.3	46.3
Left tibial nerve												
Ankle	3.7	3.9	4.9	4.7	15.1	14.3	9.8	9.9				
Popliteus	11.1	10.2	13.2	13.8	13.6	13.8	10.6	11.3	49.8	48.1	45.7	45.8
Sensory NCS												
Right superior peroneal nerve	3.6	2.9	2.7	3.2	18.1	20.1	21.3	16.7	46.2	42.2	46.6	45.6
Left superior peroneal nerve	3.5	3.1	3.1	3.3	20.2	19.3	20.3	17.8	47.3	44.6	47.2	46.8
Right sural nerve	3.1	3.4	3.6	3.6	15.3	13.8	15.1	16.1	49.2	45.1	46.2	48.2
Left sural nerve	2.8	3.3	3.4	3.5	16.2	14.1	15.5	16.4	48.6	44.2	47.1	48.8

NCV: Nerve conduction velocity; NCS: Nerve conduction study.

TABLE 2
Demographic and clinical characteristics of cases

Cases	Age/Sex	Affected side	Duration of squatting posture		Strength of ankle dorsiflexor		Strength of EHL		Strength of ankle evertors		Time of recovery (weeks)
			Hours	Days	Right	Left	Right	Left	Right	Left	
1	12/F	Right	6	4	2/5		3/5		2/5		3
2	15/F	Bilateral	5-8	6	1/5	1/5	1/5	1/5	1/5	1/5	4
3	18/M	Bilateral	8	10	4/5	2/5	1/5	1/5	4/5	2/5	4
4	21/F	Bilateral	6	5	3/5	3/5	2/5	2/5	3/5	3/5	2

EHL: Extensor hallucis longus; F: Female; M: Male.

included an active assisted range of motion of the knee and ankle, resistive exercises to ankle dorsiflexor and evertor muscles by using light/moderate intensity exercise bands, and stretching exercises for plantar flexor and inverter muscle groups. Additionally, electrotherapy with a modified galvanic current (0.5-sec duration, 1.5-sec interval, 50-100 Hz frequency) or burst modulated Russian stimulation (4-sec duration, 12-sec interval, 50 Hz frequency) was applied to the tibialis anterior and peroneal muscles (Chattanooga Intelect Advanced 2773MS®; DJO Global, Lewisville, USA).

Posterior leaf spring orthosis was recommended for cases 1 and 2 with prominent steppage gait and history of fall attacks to walk better and more safely. Weekly follow-ups of the cases were performed. All patients resolved entirely within two to four weeks. Detailed information on the clinical parameters of the cases is given in Table 2.

DISCUSSION

Complete or partial foot drop is a clinical issue that can cause injury and falls. The most common cause of foot drop is PN at the level of the fibular head. However, a careful diagnostic approach is required as there are many other possible causes.[2] Detailed anamnesis and physical examination is the first step of the evaluation method in diagnosis and differential diagnosis. Although posture-induced CPN is a well-known clinical entity, there are very few individual reports on bilateral posture-induced CPN.[8-11] The reports typically involve adults; posture-induced bilateral CPN is rare in adolescents.[12]

All patients in the present case series had a history of picking peanuts in a peanut field in a squatting position for 5 to 8 h a day for 4 to 10 days before the complaint of a drop foot. Tuna and Satis[9] reported three agricultural workers who developed bilateral peroneal nerve palsy due to prolonged squatting: two patients had complete recovery during their follow-up, while sequelae remained in one patient. Yu et al.[13] reported that bilateral PN developed in only one of 26 patients who developed CPN due to various postural causes. It was also stated that maintaining the triggering posture for a mean value of 124.2 min put the peroneal nerve at risk of compression neuropathy. Although complete recovery was observed in most cases, the clinical recovery period was not associated with the time the patients sustained a posture that affected the peroneal nerve. Sangwan et al.[14] reported that CPN developed in 30 farmers aged 15 to 45 who worked in a squatting position for an average of 5 to 6.5 h a day during the harvest season and that only four of the patients developed bilateral PN. They stated that most patients had almost complete recovery within three to six weeks with conservative treatment.

In the current case series, almost complete clinical improvement was observed in all patients within a relatively short period (two to four weeks). This finding was consistent with the current literature. Physicians must be familiar with foot drop secondary to posture-induced PN, particularly in pediatric cases, and determine the best rehabilitative and diagnostic approach. Prompt and proper diagnosis is essential since it may prevent inappropriate treatments and allow preventative measures to avoid complications.

In conclusion, CPN can occur due to maintaining a posture affecting the peroneal nerve for varying periods. The data in the literature are mostly in the form of case reports. The number of reports involving children/adolescents is limited. Complete resolution of CPN can be achieved in a relatively short period of time with appropriate management, including the avoidance of triggering position, individualized exercise/physical therapy, and bracing

when necessary. In prolonged/permanent PN cases, other etiological factors should be considered, and relevant management strategies should be applied meticulously.

Patient Consent for Publication: A written informed consent was obtained from the patients and/or parents of the patients.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of Interest: The author declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding: The author received no financial support for the research and/or authorship of this article.

REFERENCES

1. Poage C, Roth C, Scott B. Peroneal nerve palsy: Evaluation and management. J Am Acad Orthop Surg 2016;24:1-10. doi: 10.5435/JAAOS-D-14-00420.
2. Stewart JD. Foot drop: Where, why and what to do? Pract Neurol 2008;8:158-69. doi: 10.1136/jnnp.2008.149393.
3. Attarian S, Fatehi F, Rajabally YA, Pareyson D. Hereditary neuropathy with liability to pressure palsies. J Neurol 2020;267:2198-206. doi: 10.1007/s00415-019-09319-8.
4. Koc F, Güzel R, Benlidayi IC, Yerdelen D, Güzel I, Sarica Y. A rare genetic disorder in the differential diagnosis of the entrapment neuropathies: Hereditary neuropathy with liability to pressure palsies. J Clin Rheumatol 2006;12:78-82. doi: 10.1097/01.rhu.0000208634.26253.17.
5. Margulis M, Ben Zvi L, Bernfeld B. Bilateral common peroneal nerve entrapment after excessive weight loss: Case report and review of the literature. J Foot Ankle Surg 2018;57:632-4. doi: 10.1053/j.jfas.2017.10.035.
6. Mitsiokapa E, Mavrogenis AF, Drakopoulos D, Mauffrey C, Scarlat M. Peroneal nerve palsy after ankle sprain: An update. Eur J Orthop Surg Traumatol 2017;27:53-60. doi: 10.1007/s00590-016-1845-0.
7. Medical Research Council. Aids to the investigation of peripheral nerve injuries. In: War Memorandum No.7, 2nd ed. (revised). London: HMSO, 1943.
8. Toğrol E. Bilateral peroneal nerve palsy induced by prolonged squatting. Mil Med 2000;165:240-2.
9. Tuna M, Satis S. Bilateral peroneal nerve paralysis in agricultural workers: Three case reports. Occup Med (Lond) 2021;71:381-4. doi: 10.1093/occmed/kqab144.
10. Koksal A, Dogan VB . Acute bilateral drop foot as a complication of prolonged squatting due to haemorrhoid. Ideggyogy Sz 2019;72:353-6. doi: 10.18071/isz.72.0353.
11. Kodaira M, Sekijima Y, Ohashi N, Takahashi Y, Ueno K, Miyazaki D, et al. Squatting-induced bilateral peroneal nerve palsy in a sewer pipe worker. Occup Med (Lond) 2017;67:75-7. doi: 10.1093/occmed/kqw133.
12. Güzel Ş, Ozen S, Coşar SN. Bilateral peroneal nerve palsy secondary to prolonged sitting in an adolescent patient. Int J Neurosci 2022;132:885-7. doi: 10.1080/00207454.2020.1849188.
13. Yu JK, Yang JS, Kang SH, Cho YJ. Clinical characteristics of peroneal nerve palsy by posture. J Korean Neurosurg Soc 2013;53:269-73. doi: 10.3340/jkns.2013.53.5.269.
14. Sangwan SS, Marya KM, Kundu ZS, Yadav V, Devgan A, Siwach RC. Compressive peroneal neuropathy during harvesting season in Indian farmers. Trop Doct 2004;34:244-6. doi: 10.1177/004947550403400424.