Case Report

Left peroneal paresis in a young female basketball player after anterior cruciate ligament reconstruction of the right knee

Pavao Vlahek[1], Goran Kozjak[2], Eugen Kanjir[3]

From [1]Ward Physician, Department of Physiotherapy, Polyclinic Medikol, University North Varaždin, Varaždin, Croatia, [2]Ward physician, Department of Traumatology, County Hospital Čakovec, Čakovec, Croatia, [3]Coach, Strength and Conditioning Unit, Football Club Varteks, Varaždin, Croatia

ABSTRACT

There are various reasons for the injury to the peroneal nerve but the most common cause is compression anywhere along its route, from the origin to the distal branches, usually at the knee level. At the knee level, compression on the fibular level within the course of the peroneal nerve and anatomical and pathological is the site where the peroneal nerve is usually affected. Iatrogenic injuries after surgical interventions to the knee, metabolic, or toxic causes are also common. We present the case of a young female basketball player who underwent a surgical procedure for the injured anterior cruciate ligament of the right knee and during the rehabilitation process, peroneal paresis of a left leg occurred.

Key words: Anterior cruciate ligament reconstruction, Case report, Contralateral peroneal paresis, Knee surgery

The reasons for the injury to the peroneal nerve can be many but the most common cause is the compression of the nerve anywhere along its route, from the origin to the distal branches, usually at the knee level [1,2] Reasons might be due to compression on the fibular level within the course of the peroneal nerve and anatomical and pathological entities that can compress it. Iatrogenic injuries after surgical interventions to the knee are also common. Apart from these, metabolic or toxic causes can be the reason for the compression of the nerve [3,4]. Clinical presentation of the peroneal paresis is a weakness or complete paralysis of dorsal extensors resulting in partial or complete foot drop and walking difficulty. Sensory disturbances are commonly associated resulting from different sensory quality alterations, usually numbness, tingling, or pain. After operative treatment of the knee, peroneal paralysis can occur on the operated leg during operation or rehabilitation [5] However, paralysis of the contralateral leg as a result of a surgical procedure of the ipsilateral knee has not yet been presented in the literature.

CASE REPORT

A 14-year-old female basketball player with a 6 years of training history fell during the game and had a magnetic resonance imaging confirmed an injury to the anterior cruciate ligament (ACL) of the right knee in March 2020. She underwent a surgical procedure for the injured ACL of the right knee but during the rehabilitation process, peroneal paresis of the left leg occurred. The patient underwent an arthroscopic reconstructive surgical procedure with semitendinosus and gracilis tendons (STG) construct 2 months after the injury in May 2020.

The rehabilitation started immediately after the surgical procedure with passive mobilization and cryotherapy of the right knee which was accompanied by electrostimulation of the right leg muscles. First few weeks, she had a right knee orthosis locked according to the protocol for the ACL STG reconstruction. Rehabilitation was somehow delayed due to epidemiologic reasons because of the COVID-19 pandemic. The process was going progressively well in the beginning but after 5 months, full extension of the right knee was still lacking 10°. After physical therapy at another institution, the patient was referred to our institution.

On initial examination, she was 190 cm high and weighed 80 kilograms. Gait was disturbed with slight limping of the right leg, hip, and pelvic compensation, hypotrophy of the right leg muscles persisted. We continued the rehabilitation process until in the 6th month of the post-operative rehabilitation process. The patient reported weakness of the contralateral, left leg foot, and numbness feeling below the left ankle. On examination, paresthesia of L5, S1 left leg dermatome and none to a minimal extension of foot and fingers were present.

Electromyography studies (EMG) were done immediately and showed no activity in the left extensor digitorum brevis muscle

Access this article online	
Received - 10 November 2022 Initial Review - 21 November 2022 Accepted - 14 December 2022	Quick Response code
DOI: 10.32677/ijcr.v8i12.3701	

Correspondence to: Pavao Vlahek, Poliklinika Medikol, Franca Prešerna 13, 40000, Čakovec, Croatia. E-mail: pavao.vlahek@gmail.com

© 2022 Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC-ND 4.0).

and anterior tibial muscle, confirming a lesion of the peroneal nerve on a knee level. MR of the left knee was done to exclude any processes influencing the peroneal nerve on the fibular level. The findings were normal, without any anatomical structure, new, inflammatory, or any other process affecting the left peroneal nerve.

Because of young age and fast growth in the previous period, MR of the lumbosacral spine was done to exclude any processes on that level and it was also normal. Laboratory findings were normal. We concluded that the peroneal lesion of the left peroneal nerve was due to abnormal gait biomechanics, mechanical compression to the peroneus in the left, non-operated, knee region, and continued with physical therapy of the right knee restoring the extension deficit, and improving left leg peroneal paresis with electrostimulation and kinesiotherapy.

Two months after peroneal paresis onset, EMG studies were repeated and showed improvement in the left extensor digitorum brevis muscle and anterior tibial muscle, lesion of the peroneal nerve on a knee level was confirmed again. Six months after the onset of the left leg peroneal paresis and persistent physical therapy, the strength of the left foot extension returned to normal altogether with the right knee extension.

DISCUSSION

In this paper, we have tried to present a case of peroneal paresis after knee surgery for ACL. This case occurs in some cases but on the operated leg and not the contralateral leg as was the case in our patient. Any similar case or study was not found published by the date.

By further diagnostic procedures, we have excluded all the other causes of peroneal paresis of the contralateral leg and concluded that compensatory mechanisms are responsible for it.

Compensatory biomechanical mechanisms of the body are well known [6,7]. These complex and fine-tuned protective mechanisms try to decrease the load of the biomechanical structure that is affected by lesions of various origins. In joints, they tend to protect them from acceleration to degenerative states that affect them by a natural process. Compensatory mechanisms are sometimes hidden and can only be detected by technology, like muscle strength measured by isokinetic machines, or sometimes obvious, like limping. Compensations are most common on structures in the proximity of the affected part of the body but if injuries are greater, distal structures are involved too.

Usually, they work in favor of helping the affected structure but sometimes in the opposite direction. For example, when the ACL of the knee is affected, local compensations occur in the form of adaptations of quadriceps contraction during gait when the knee is near full extension or increased hamstrings and decreased gastrocnemius activity, which normally contributes to the stability of the knee [8,9].

In our case, during the process of operated leg rehabilitation, full extension of it was not able to be achieved. It is well known that leg length discrepancy can lead to various compensatory states [10]. What has happened to our patient was compensation and putting more pressure on the contralateral leg that badly affected it. Due to the knee extension of the operated leg that was not full and because the leg was shorter when walking, the contralateral leg started to have different biomechanical properties and compensations. In that process, knee biomechanical properties of the contralateral leg put different pressure on the peroneal nerve on the knee level and damaged it causing paresis.

There are different solutions to how this could have been handled. First and most important is seeing the body as a whole mechanism when planning rehabilitation and not just focusing on the affected part. If full recovery of an affected part is not possible, prediction of compensatory mechanisms should be thought off. The solution could be to put a crutch in one contralateral hand to relieve all the structures until all the normal biomechanical properties are not met [11].

CONCLUSION

We would like to emphasize that taking care of an operated limb has an effect on the non-operated limb due to compensatory mechanism and we have to think in advance about how the contralateral limb can be affected and try to preserve it and avoid new injuries or conditions. Peroneal nerve injury recovery time depends on the extension of the original lesion and months into restoration are sometimes needed.

ACKNOWLEDGMENT

Pavao Vlahek, Goran Kozjak, and Eugen Kanjir have given substantial contributions to the conception and the design of the manuscript, to acquisition, analysis and interpretation of the data. Both authors have participated in drafting the manuscript and revised it critically. All authors read and approved the final version of the manuscript. All authors contributed equally to the manuscript and read and approved the final version ofthe manuscript. This paper or any of its results have not been presented at any congress or published in any form previously.

REFERENCES

1. Poage C, Roth C, Scott B. Peroneal nerve palsy: Evaluation and management. J Am Acad Orthop Surg 2016;24:1-10.
2. Erdil M, Ozkan K, Ozkan FU, Bilsel K, Turkmen I, Senol S, *et al*. A rare cause of deep peroneal nerve palsy due to compression of synovial cyst-case report. Int J Surg Case Rep 2013;4:515-7.
3. Guzel S, Ozen S, Cosar SN. Bilateral peroneal nerve palsy secondary to prolonged sitting in an adolescent patient. Int J Neurosci 2022;132:885-7.
4. Bahtiyarca ZT, Karaahmet OZ, Ates MP, Unal ZK, Cakcı FA. Acute bilateral foot drop in a chronic alcoholic patient. Turk J Phys Med Rehabil 2018;65:87-92.
5. Carender CN, Bedard NA, An Q, Brown TS. Common peroneal nerve injury and recovery after total knee arthroplasty: A systematic review. Arthroplast Today 2020;6:662-7.
6. Byrnes SK, Kunic D, Rethwilm R, Böhm H, Horstmann T, Dussa CU. Compensatory mechanisms in children with idiopathic lower extremity internal rotational malalignment during walking and running. Gait Posture 2020;79:46-52.
7. Wiedenhofer B, Matschke S, Pitzen T, Ruf M, Ostrowski G, Charles YP, *et al*. Biomechanische kompensationsmechanismen der huftgelenke und der wirbelsaule: Das wesentliche fur wirbelsaulen-und huftchirurgen. Der Orthop 2020;49:870-76.
8. Papadonikolakis A, Cooper L, Stergiou N, Georgoulis AD, Soucacos PN.

Compensatory mechanisms in anterior cruciate ligament deficiency. Knee Surg Sports Traumatol Arthrosc 2003;11:235-43.
9. Jonsson H, Karrholm J, Elmqvist LG. Kinematics of active knee extension after tear of the anterior cruciate ligament. Am J Sports Med 1989;17:796-802.
10. Gordon JE, Davis LE. Leg length discrepancy: The natural history (and what do we really know). J Pediatr Orthop 2019;39:S10-3.
11. Warees WM, Clayton L, Slane M. Crutches. In: StatPearls. Treasure Island, FL: StatPearls Publishing; 2022.

Funding: Nil; Conflicts of interest: Nil.

How to cite this article: Vlahek P, Kozjak G, Kanjir E. Left peroneal paresis in a young female basketball player after anterior cruciate ligament reconstruction of the right knee. Indian J Case Reports. 2022;8(12):385-387.