IJBCS
ISSN: 2147-1428

Case Report

International Journal of Basic and Clinical Studies (IJBCS)

2023; 12(1): 57-63 Tuncer D et all

Short-Term Results of Intensive Physiotherapy in Injection Induced Quadriceps Femoris Contracture: A case Report

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Abstract

As a result of injection-induced quadriceps muscle contracture, which is the most common acquired quadriceps muscle contracture, causes progressively a loss of ability to bend knees. In this case report presented the results of physiotherapy program of an eight year-old girl who got diagnosed with unilateral quadriceps muscle contracture due to an injection with an inability to bend her left knee. After the physiotherapy program, range of motion of affected knee, muscle strength of lower extremity and the scores of Functional Independence Scale for Children improved.

Key Words: Quadriceps femoris contracture, Physiotherapy, Functional independence, Rare case.

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Introduction

Quadriceps muscle contracture may be congenital or secondary due to different reasons; intramuscular thigh injections, trauma and infections may be the reasons of secondary quadriceps muscle contractures (1, 2). While quadriceps muscle contracture, first described as infantile quadriceps muscle retraction by Hnevkovsky (3) in 1961, it was considered a congenital disease. Todd (4) described the relationship between infantil quadriceps muscle retraction and intramuscular injections. By 1964, the disease was considered as iatrogenic (5, 6).

Muscle contracture with fibrous or scar tissue restricts joint movements and leads to the formation of permanent deformations. As a result of injection-induced quadriceps muscle contracture, the most common acquired quadriceps muscle contracture, causes progressively a loss of ability to bend knees (7).

Physiotherapy plays an important role in gaining postoperative flexion, restoring the strength of the quadriceps muscle and eliminating the predominant knee extension (2).

In this case report, we presented an eight year-old girl who got diagnosed with unilateral quadriceps muscle contracture due to an injection with an inability to bend her left knee. To our knowledge there is no study about the effects of physiotherapy in this group of patients and it's extremely rare to see such a case in daily practice.

Materials and Methods

We present the case of an eight years old girl who has unilateral quadriceps muscle contracture with extended knee because of injection induced origin. She went under left quadricepslasty five years ago but she couldn't receive regular physiotherapy for five years.

The patient was admitted in Bezmialem Vakif University Department of Physiotherapy and Rehabilitation for regular physiotherapy with the complaint that she was not able to bend her left knee. She was born prematurely by ceaserian section and entubated in the neonatal intensive care unit for two months. She was the only child of her parents, had no family member with a similar

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abnormality. There was no history of lifelong trauma but injection to the left limb in early ages, the type and quantity of medication that had been injected, the time-interval between injections and the onset of restricted knee flexion range were unknown, the symptoms progressed slowly. The parent noticed that she had difficulty in squatting, kneeling, sitting cross-legged, running, or climbing stairs with full flexion of knee joints when she was two years old and became more clear as she grew. She had undergone distal quadricepsplasty surgery at three years-old, after the operation knee motion was sufficient for functional movement and the parent reported that her activity improved. There was no information about the flexion degree of the affected knee before and after surgery. Unfortunately she did not receive regular physiotherapy after surgery due to the lack of cooperation with the physiotherapy program.

The parent was informed about the objectives of the study, and the evaluating procedure before the participation. Written informed consent was obtained.

There was longitudinal scar over the skin because of the incison for distal quadricepsplasty (Figure 1). Movement was not limited by pain. Her subsequent mental and motor development was normal.

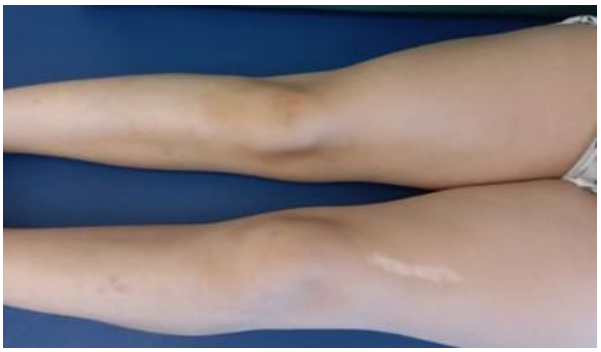

Figure 1: Scar of incision of left leg

Bilateral active and passive knee flexion range of motion (ROM) were measured with a universal goniometer. Normal ROM at the knee is considered to be 0° of extension to 135° of flexion (fully bent knee joint) (8). The range of knee flexion was measured in prone position with the hip

extended. ROM of knee flexion and ankle dorsiflexion were measured both in active and passive bilaterally.

Manuel muscle testing were measured for lower extremities. This test method which is developed by Lovett is often preferred by physiotherapists because it is practical in clinical practice, providing a general assessment of muscle strength. The scores obtained by the muscle test are graded between 0-5 (9). İlopsoas, quadriceps femoris, hamstrings, gluteus medius, gluteus maxiumus muscles were tested bilaterally.

WeeFIM (Functional Independence Scale for Children) for children is an 18-item, 7-level ordinal scale instrument (min/max score: 18/126) that measures a child's consistent performance in essential daily functional skills (10).

The aims of physiotherapy were to improve ROM of flexion of left knee, lower muscle strength and functional independence. The physiotherapy program consisted of streching, strengthening and weight bearing exercises after hotpack application for left quadriceps muscle, three times a day and five times a week for eight weeks. The program was performed two days by physiotherapist in the department and three days at home by parents. All the measurements were performed before and after the eight weeks physiotherapy program.

Results

The measurements of ROM, the scores of manuel muscle testing and WeeFIM improved at the end of the eight weeks of physiotherapy program (Table 1).

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Table 1: Results of range of motion, manuel muscle testing and daily living activity test scores before and after treatment.

	Before physiotherapy		After physiotherapy	
	R	L	R	L
ROM °				
Ankle dorsiflexion ROM (active)	12	10	15	12
Ankle dorsiflexion ROM (passive)	18	18	20	20
Knee flexion ROM (active)	95	48	110	68
Knee flexion ROM (passive)	120	60	125	85
Manuel Muscle Testing				
M. iliopsoas	4	4	4	4
M. quadriceps femoris	4	3+	4+	4+
M. hamstrings	4+	4	5	5
M. gluteus medius	4	4	4+	4+
M. gluteus maxiumus	4	4	4+	4
WeeFIM Subset Scores				
Self-care	30		32	
Transfers	18		20	
Locomotion	12		13	
Sphincter control	16		16	
Communication	14		14	
Social cognition	18		18	
WeeFIM Total scores	108		113	

ROM: Range of motion, R: Right, L: Left, M: Musculus, WeeFIM: Functional Independence Scale for Children.

Discussion

The purpose of this case study was to review the short-term phyisotherapy recovery of an 8-year-old child with injection-induced quadriceps femoris contracture who had a distal quadricepsplasty surgery at three years old Consequently after the program ROM of affected knee and muscle strength of lower extremity and WeeFIM scores improved.

Management of injection-induced quadriceps femoris contracture is mainly surgical except for mild degrees of contractures where flexion of knee is more than 90°. The technique of releasing the adhesion and contractures in the quadriceps muscle is known as "quadricepsplasty". There are various techniques described by various authors for quadricepsplasty (11). Proximal release in the early phase and distal release in the late phase are the recommended treatments (12). The present case was diagnosed as injection-induced quadriceps femoris contracture and distal quadricepsplasty surgery was performed when the patient was three years old. Although the ROM values of the left knee were unkwown before the operation, the parent informed us that their child's left knee was straight and couldn't bend her knee before surgery. And also there is no information about the ROM degree of left knee after surgery. The ROM of left knee improved after the physiotherapy, but if this program would be performed as a follow up procedure post-operatively, maybe the patient would have achieved more flexion degree of left knee until today.

Alvarez (13) reported that pre-operative physiotherapy and manipulation were ineffective except in mild and very early cases and stated that this treatment resulted in a supracondylar fracture of the femur in one patient with quadriceps muscle contracture. On the other hand, the case in this study had a severe contracture on left knee before surgery, when we encountered with her she had 48° flexion of left knee and also the right knee active ROM degree was slightly diminished (120°). Physiotherapy program started with gentle stretching and strengthening exercises with weight bearing exercises in every session. Although it was a short-term program, the exercise results were fine. On the other hand, we think that sustaining this program with an experienced physiotherapist and starting it as early as possible after surgery is important.

Over time, secondary changes may develop, so special attention should be paid to early diagnosis and treatment (14). In our case passive ROM in the uneffected right knee was full, but active ROM of the knee was limited slightly (120°) due to the compensation mechanism. Therefore the exercises should also be performed for uneffected side.

In conclusion we suggest that physiotherapy and other conventional treatments in cases with mild to moderate quadriceps contracture and in cases with severe contracture after surgery may be beneficial for increasing and sustaining ROM of the knee and strengthening of the muscles. Children and parents should be encouraged for regular and intensive physiotherapy in these cases.

Conflict of interest: The authors have no conflict of interest in this paper.

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